A COMPARISON OF THE SCHOLASTIC SUCCESS OF EMPLOYED

AND NONEMPLOYED COLLEGE STUDENTS

A THESIS

SUBMITTED TO THE DEPARTMENT OF

PSYCHOLOGY 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

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INTRODUCTION

THE PROBLEM

For many years the question of what effect engaging in
non-academic work as a means of partial or entire self-support
while attending college has been discussed. In particular,
the effect of working upon scholastic achievement has been
generally questioned. Does a student's academic success suffer,
improve, or remain unchanged because of time and effort expend-
ed upon earning his livelihood?

Every year students throughout the country are faced
with the dilemma of whether to borrow, work while attending
school, or refrain from entering until fully capable of paying
outright for their education.

There has been a great deal written concerning the
problem, but a large part of the material available is mere-
ly subjective opinion.

RELATED STUDIES

Some studies, such as the one by Wilson, represent
more than opinion. The report of this investigation which
was made at Columbia follows:[1]

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[1] Calvin Dill Wilson, Working One's Way Through College
and University (Chicago: A. C. McClurg & Co., 1912), p. 134.

"An investigation was made of the records of all the
students in Columbia College who had applied to the commit-
tee for work during the academic year--ninety-two in num-
ber--and the standing of these students was compared with
that of an equal number of other college students selected
at random. The result showed that the general average
standing of the Employment Committee students is somewhat
higher than that of the other students. We concluded that
this is due more to their earnestness of purpose than to
superior ability. Conversation with the men themselves
would seem to bear out this conclusion, for they state that
the outside employment forces them to more intense applica-
tion in the preparation for their daily academic tasks.
In other words, the higher marks may represent harder in-
tellectual work, not necessarily stronger intellectuality.

A lack of controlling the investigation makes this
study subjective; although, no doubt, it is more valuable than
mere opinion. The scope of the study is small, the investiga-
tion including only 184 cases.

According to Crawford:[2] "Provided a student does not
overdo self-support, there is no reason why he cannot stand
well in his class, scholastically and generally, if he is the
sort of person who would do so anyway."

Fallows[3] has a favorable word to say for the student who
works in regard to his "intellectual glory."

Among those who consider working, especially self-support
detrimental to scholastic success are President Conant[4] of

[2] Albert Beecher Crawford, "The scholarship racket." The
Saturday Evening Post, 107:104, April 6, 1935.

[3] Alice Katharine Fallows, "Working one's way through
college." The Century Magazine, 40:524, July, 1901.

[4] Albert Beecher Crawford, op. cit., p. 104.

Harvard, the President of St. Lawrence University,[5] Sharpe,[6]
and Miss Fallows.[7] Miss Fallows states that women suffer
more intellectually than do men when faced with the necessity
of earning money while attending college.

Canon[8] considered the problem from the viewpoint of
the comparative percentages of working and non-working stu-
dents on probation. Table I summarizes his findings. As
may be observed in Table I, there were 2.15 per cent more
working freshmen on probation than non-working freshmen;
15.45 per cent more working sophomores on probation than
non-working sophomores; 7.93 per cent less working juniors
on probation than non-working juniors; and 4.52 per cent
more working seniors on probation than non-working seniors.

In conclusion Canon states:[9]

> Ignoring other factors, it seems that the fresh-
man program might be left as it was; the sophomores should

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[5] Orlando F. Lewis, "The self-supporting student in
American colleges." The North American Review, 179:725,
November, 1904.

[6] Russel T. Sharpe, "College and the poor boy."
Atlantic Monthly, 151:701, June, 1933.

[7] Alice Katharine Fallows, "Working one's way through
women's colleges." The Century Magazine, 40:324, 340, July,
1901.

[8] Ernest H. Canon, Some Studies in the Registrar's
Office, (unpublished Masters thesis, University of Kentucky,
Lexington, Kentucky, 1925), p. 59.

[9] Ibid., p. 61.

not carry so much outside work; the juniors could be
allowed to take on additional hours of outside work;
while the seniors should be advised not to engage in as
much outside work.

TABLE I*

PERCENTAGE OF WORKING AND NON-WORKING STUDENTS ON
PROBATION AT THE UNIVERSITY OF KENTUCKY
THE FIRST SEMESTER OF 1924-1925

Classification	% Workers on probation	% Non-workers on probation	Difference
Freshmen	40.84	38.69	2.15
Sophomores	35.57	19.12	16.45
Juniors	19.56	27.49	-7.93
Seniors	15.21	10.69	4.52

Read table thus: Of the freshmen workers 40.84 per
cent were on probation, of the freshmen non-workers 38.69 per
cent were on probation; or a difference of 2.15 per cent; etc.

No mention of the controlling of such factors as in-
telligence, age, sex, or number of academic hours carried was
made by Canon.[10] His conclusions, in which he "ignores other

* Data from Ernest H. Canon, Some Studies in the
Registrar's Office (unpublished Masters thesis, University
of Kentucky, Lexington, Kentucky, 1925), p. 59.

[10] Ibid., p. 61.

factors" are, therefore, of questionable validity.

After viewing the work that had been done in the field,
it was felt that there was a need for a statistical treatment
of the problem.

SCOPE OF THE STUDY

This study is based primarily on the median grades, the
decile rank and the amount of non-academic work of six hundred
and ten students attending the Kansas State Teachers College
of Emporia, at Emporia, Kansas, the second semester of the
academic year 1934-1935.

PURPOSE OF THE STUDY

The purpose of the study was to determine statistically,
insofar as was possible: (1) The scholastic standing of the
non-working, the moderate working, and the hard working stu-
dents; (2) the scholastic standing of the C. S. E. P. (College
Students' Educational Project) workers, the State workers, and
the non-campus workers; (3) the reliability of the differences
obtained; and (4) the advisability of working or not working
while attending college as indicated by the results of the study.

CONTROL OF THE STUDY

In an attempt to insure validity of the study, several
factors other than the experimental ones were controlled. The

factors controlled were decile ranking, age, academic classification (freshman, sophomore, junior, and senior), academic load or number of hours carried, and sex of the students.

Comparable per cents of the various experimental groups were placed in the different decile ranks. Cases that deviated excessively from the average ages of the freshmen, sophomores, juniors, and seniors were excluded from the study; the freshmen over twenty, the sophomores over twenty-two, the juniors over twenty-four and the seniors over twenty-six years of age were thrown out. Equivalent per cents of freshmen, sophomores, juniors, and seniors were used in the experimental groups. Students carrying less than twelve hours of academic work were excluded from the study. The sex of the students in the experimental groups was also considered.

It has been assumed in this study that teachers' marks are valid criteria for evaluating the scholastic achievement of college students.

PROCEDURE

The procedure followed consisted in obtaining data establishing the number of hours of non-academic work performed, the average grade each student made, and the decile rank for each case of the study.

A division into three groups, based upon number of hours worked per week, was then made. The groups were:

Class A, non-workers, zero to three hours per week; class B, moderate workers, six to twenty-one hours per week; and class C, which will be referred to as hard, persistent, or arduous workers, twenty-four hours per week and over.

In each of the three groups the cases were then divided according to decile rank. The median mark indices for each decile in each of the three groups and the median mark indices for all the cases in each of the three groups were computed. The median mark index was found by determining the median of the average grades of the cases under consideration.

From the quartile deviations, the probable errors of the median mark indices were established. Then the reliabilities of the differences between the median mark indices and the algebraic differences existing between the median mark indices were computed. Next, the critical ratio, which is the ratio of the algebraic difference of the medians to the reliability of the difference between the two medians, was calculated. Finally, the chances of a true difference greater than zero existing between the two medians were determined by means of Table XV in Garrett.[11]

Another division according to type of work engaged in was made, the divisions being as previously indicated, C. S. E. P. workers, State workers, and non-campus workers. A

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11 Henry E. Garrett, *Statistics in Psychology and Education* (New York: Longmans, Green and Co., 1926), p. 135.

similar, though limited, treatment to the one recorded above was given these groups.

SOURCES OF DATA

Data concerning non-academic work performed were tabulated from a survey composed by Dr. H. E. Schrammel, Director of the Bureau of Educational Measurements at the Kansas State Teachers College. This survey, which included seven pages of matter of an informational character, was administered by C. S. E. P. workers who had been carefully instructed regarding the administration of this particular survey. Individual attention was given to each student answering the questions.

The questions asked which had to do with non-academic work included: Do you work for your room? Do you work for your board? Do you work at home? Do you work for the State? Do you work under the C. S. E. P.? Do you work elsewhere? The number of hours per month worked for the State and under the C. S. E. P. were indicated; and the number of hours per week for the other types of employment were shown.

The average grades of the students considered were computed from data from the records of the office of the registrar of the college. All college courses offering credit except physical education were included.

The decile ranks of the students were obtained from files in the Bureau of Measurements. The decile rank is

determined by scores made on the entrance examinations. The
examinations consist of a battery of tests including a college
entrance test, an English test, a vocabulary test, a reading
test, a spelling test, and a mathematics test. The students
are divided into ten groups or deciles, decile X being the
highest group and decile I being the lowest group.

ORGANIZATION OF SUCCEEDING CHAPTERS

In Chapter II a short history of the prevalence of the
needy college student in America is set forth. In Chapter III
a comparison is made of the scholastic success of non-working
students and the two classes of working students at the Kansas
State Teachers College. The scholastic success at the Kansas
State Teachers College of the various types of workers--the
C. S. E. P., the State, and the non-campus--is the basis for
the comparison in Chapter IV. The results of the study are
summarized in Chapter V.

CHAPTER II

PREVALENCE OF THE NEEDY COLLEGE STUDENT IN AMERICA

A brief history of the prevalence of the needy college
student in American colleges serves to show the value in deter-
mining the effect of non-academic work upon scholastic success.
A survey of the number of working students at the Kansas State
Teachers College of Emporia the second semester, 1934-1935, in-
dicates how the Teachers College compares with other colleges
in this respect.

As early as 1653 American colleges began to solve the
financial problems of needy students. Harvard in that year
gave Zachariah Bridgen a job "ringeing the bell and waytinge
on table."[1] Through the succeeding years unorganized assist-
ance was provided. By the beginning of the twentieth century,
the group of needy students had become so large that official
attention was demanded.

President Lowell pointed out to his alumni in 1909
that Harvard was to a large extent a poor man's college, that
there was a good deal of suffering and want, that many stu-
dents were insufficiently clothed and not a small number in-
sufficiently fed.[2] In order to help needy students, the

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[1] Russell T. Sharpe, "College and the poor boy."
Atlantic Monthly, 151:697, June, 1933.

[2] Loc. cit.

colleges built up scholarships and loan funds, and also organized employment bureaus.

Table II shows the amount of self-help in forty-nine teachers colleges in 1928. It may be observed that of the

TABLE II*

AMOUNT OF SELF-HELP IN TEACHERS COLLEGES IN 1928

No. of Teachers Colleges	Sex of Students	Number Enrolled	No. of Self-help	Per cent of Self-helpers
49	Male	12,616	3,518	28
	Female	35,485	5,431	15
	Total	48,101	8,949	19

Read table thus: Of the students in the 49 teachers colleges considered, 12,616 were males of which 3,518 or 28 per cent were self-helpers; etc.

48,101 cases considered 19 per cent were self-help students. Furthermore it may be seen that 15 per cent of the females and 28 per cent of the males contributed toward their expenses by working while attending college.

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* Data from Walter J. Greenleaf, Self-help for College Students, Bulletin (1929), No. 2, (Washington: United States Government Printing Office, 1929), p. 61.

According to Sharpe,[3] by 1927 one-third of the American college students were looking for employment. Reynolds,[4] however, estimated that in 1927, 55 per cent were wholly or partly self-supporting; 12.5 per cent were earning all their expenses; and 25 per cent were earning 50 per cent or more of their total expenses. He further stated that 20.90 per cent of the men and 68.81 per cent of the women attending state universities earned nothing toward their support.

Greenleaf, in a book published in 1930, stated that in a total of ninety-six teachers colleges the average expense of attending school for nine months is $335; that a fourth of the men and a sixth of the women work during term time; and that 11 per cent of the men and 4 per cent of the women are entirely self-supporting.[5]

He further stated that 763 colleges and universities which keep records of work among students, estimated that 46 per cent of the men and 23 per cent of the women earn all or a part of their expenses. These 763 institutions enroll 84

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[3] Loc. cit.

[4] O. Edgar Reynolds, The Social and Economic Status of College Students, Bulletin (1927), No. 272, (New York: Bureau of Publications, Teachers College, Columbia University, 1927), pp. 26-27.

[5] Walter J. Greenleaf, "Self-supporting college students." Life in College, Christian Gauss, (New York: Charles Scribner's Sons, 1930), p. 269.

per cent of all college students in the United States.[6]

Figures compiled by Thompson in 1932 estimated that 50 per cent of the men students were earning a major portion of their expenses while studying in universities and colleges.[7]

In a survey made in March, 1933, at the University of Colorado, it was found that 42.3 per cent of all men in the university were employed and that 18.5 per cent of the women were employed while in school.[8]

Table III shows the number and per cent of working and non-working students at the Kansas State Teachers College the second semester of the academic year 1934-1935. Data were available on only 610 students out of the total enrollment of 1411.

As may be observed in Table III, 75.61 per cent of the male students earned part or all of their college expenses, 51.35 per cent of the female students earned part or all of their college expenses, and 59.30 per cent of all the students considered worked while attending school. The per cents are higher, both in the case of the male and female students, than

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[6] Ibid., p. 267.

[7] Warren E. Thompson, "College youth discusses itself." New Outlook, 161:42, December, 1932.

[8] Fred E. Aden, "Some facts related to student life as found in a survey at the University of Colorado, March, 1933." School and Society, 39:182, February 10, 1934.

TABLE III

NUMBER AND PER CENT OF WORKING AND NON-WORKING STUDENTS AT
THE KANSAS STATE TEACHERS COLLEGE THE SECOND
SEMESTER OF THE ACADEMIC YEAR 1934-1935

Sex	No. of cases	Class A		Workers					
		No.	%	Class B		Class C		Total	
				No.	%	No.	%	No.	%
Male	201	49	24.39	101	50.24	51	25.37	152	75.61
Female	409	199	48.65	157	38.39	53	12.96	210	51.35
Total	610	248	40.70	258	42.30	104	17.00	362	59.30

Read table thus: Of the 201 males 49 or 24.39 per cent
were non-workers; 101 or 50.24 were moderate workers; 51 or
25.37 per cent were hard workers; and 152 or 75.61 worked; etc.

are the per cents of the employed students as found in the

various investigations recorded above. This difference is no

doubt at least partly due to the innovation of the C. S. E. P.

in February, 1934. The above surveys were made before 1934.

Another factor, which may have been influential in making for

a high per cent of working students, is the presence in the

working groups of resident students who worked at home.

It may further be observed in Table III that 25.37 per

cent of the male students, 12.96 per cent of the female stu-

dents and 17.00 per cent of all the students worked twenty-

four or more hours per week. This group may be considered,

if not completely, at least almost completely self-supporting.
Again, as in the case of all the workers, K. S. T. C. has a
higher per cent of students employed in this group than do
the groups investigated by Reynolds and Greenleaf.

Thus, it would seem that the prevalence of employed
students in American colleges justifies a serious consideration
of the effect upon scholastic achievement of working while in
school.

CHAPTER III

THE SCHOLASTIC SUCCESS OF THE STUDENTS
OF THE THREE CLASSES OF WORKERS

As has beeen previously indicated, the three classes of
workers considered in this part of the study are: Class A,
which includes students working from zero to three hours a week;
class B, which is composed of students who work from six to
twenty-one hours a week; and class C, which consists of those
students who engage in non-academic work twenty-four or more
hours a week. The scholastic success of the three classes of
workers, in terms of median mark indices and critical ratio
values, is determined in this chapter.

As may have been noted, neutral zones were set up in
order to separate groups. Students considered as being in the
neutral zone between class A and class B were those who worked
either four or five hours a week; whereas the neutral zone between
class B and class C included students working twenty-two or
twenty-three hours a week. The cases falling in the neutral
zones were excluded from the study.

CONTROL OF ACADEMIC CLASSIFICATION

In Table IV, Distribution of Cases in the Classes of
Workers According to Academic Classification, it may be observ-
ed that similar per cents of freshmen, sophomores, juniors and
seniors appear in each of the three classes. The deviation of

the per cent of freshmen in class A (non-workers) from the per
cent of freshmen in the entire study is 6 per cent; in class
B (moderate workers) the deviation is 2 per cent; and in class
C (persistent workers) the deviation is 7 per cent. Likewise,
the sophomores of class A and class B deviate by 1 per cent
each and in class C the deviation in zero; the juniors of class
A deviate by 4 per cent, and of class B and class C by 2 per
cent each; the seniors of class A and class B deviate by 1 per
cent, and of class C by 5 per cent. The deviations of the var-
ious per cents are low in all cases. This means that the dis-
tribution, according to college classification is practically
the same for the three divisions of non-academic workers.

TABLE IV

DISTRIBUTION OF CASES IN THE CLASSES OF WORKERS
ACCORDING TO ACADEMIC CLASSIFICATION

Group	Total Cases		Class A		Class B		Class C	
	No of Cases	%	No.	%	No.	%	No.	%
Freshman	320	52	145	58	128	50	47	45
Sophomore	166	27	65	26	73	28	28	27
Junior	71	12	20	8	36	14	15	14
Senior	53	9	18	8	21	8	14	14
Total	610		248		258		104	

Read table thus: Of the 320 freshmen, composing 52 per
cent of the cases, 145 were in class A, 128 were in class B
and 47 were in class C; 58 per cent of class A were freshmen;
etc.

CONTROL OF THE SEX FACTOR

Since the number of cases in the study would have been appreciably decreased if the exact per cents of men and women were placed in class A, class B, and class C, it was necessary to determine if sex influenced grades to any great extent in this study.

It was found that the average grade received by the men was 2.74, by the women was 2.67 and by all the cases 2.70. Thus it is seen that the women made a slightly better average grade than did the men, the difference being only .07. The average decile ranks for the male, female and total cases were identical.

In Table V, Distribution of Cases in the Classes of

TABLE V

DISTRIBUTION OF CASES IN THE CLASSES OF
WORKERS ACCORDING TO SEX

Group	Total Cases		Class A		Class B		Class C	
	No. of Cases	%	No.	%	No.	%	No.	%
Male	201	33	49	20	101	39	51	49
Female	409	67	199	80	157	61	53	51
Total	610		248		258		104	

Read table thus: Of the 201 males, 49 were in class A, 101 were in class B and 51 were in class C; 33 per cent of the total cases were males; etc.

Workers According to Sex, it may be noted that 20 per cent of class A (non-workers), 39 per cent of class B (moderate workers), and 49 per cent of class C (arduous workers) were men. Furthermore, 33 per cent of the total number of cases were men. Thus, class A deviated by 13 per cent from the per cent of men in the entire study, class B by 6 per cent and class C by 16 per cent. Moreover, as might be expected, Table V indicates that as the number of hours of work per week increases the per cent of male students increases, whereas the per cent of female students decreases.

DECILE GROUPS

Table VI shows the distribution of cases in the decile groups for each class of worker. It may be observed that the three classes of workers were represented with a reasonable degree of uniformity in the decile groups.

The per cents in class A (non-workers) range from 8.1 per cent in decile I, to 11.3 per cent in deciles III and IV. The per cents in class B (moderate workers) range from 7.4 in decile III, to 12.8 in deciles VI and X. The per cents in class C (hard workers) range from 4.8 in decile I, to 16.3 in decile X.

The per cent of class A in decile X is 8.9 and the per cent of class C in decile X is 16.3; this represents the greatest difference between two classes in one decile. On the

other hand, there is no difference between the per cents of
class A and class B in decile V, as both are 10 per cent; this
represents the least difference between two classes in one
decile. Thus, the differences range from 7.4 to 0.

TABLE VI

DISTRIBUTION OF CASES IN THE DECILE GROUPS
FOR EACH CLASS OF WORKER

Decile	No. Cases	Class A		Class B		Class C	
		No.	%	No.	%	No.	%
X	72	22	8.9	33	12.8	17	16.3
IX	70	25	10.0	32	12.4	13	12.5
VIII	55	22	8.9	24	9.3	9	8.7
VII	63	27	10.9	26	10.0	10	9.6
VI	66	24	9.7	33	12.8	9	8.7
V	64	25	10.0	26	10.0	13	12.5
IV	60	28	11.3	23	8.9	9	8.7
III	55	28	11.3	19	7.4	8	7.7
II	59	27	10.9	21	8.2	11	10.5
I	46	20	8.1	21	8.2	5	4.8
Total	610	248		258		104	

Read table thus: Of the 72 cases in decile X, 22 of
the cases were in class A, 33 in class B, and 17 in class C;
8.9 per cent of class A, 12.8 per cent of class B, and 16.3
per cent of class C were in decile X; etc.

THE MEDIAN MARK INDEX

In order to find the median mark indices, it was nec-
essary to convert all grades into numerical values. The letter

system of grading at the Kansas State Teachers College is as follows: A, superior; B, good; C, average; D, poor; and F, failure. Numerical values were given to the letter grades as follows: A, one point; B, two points; C, three points; D, four points; and F, five points. In finding the mark indices, the grades were assigned numerical values, these values were then multiplied by the number of hours credit for each grade, the products were added and then the sum was divided by the total number of hours credit. For example, if a student had the following scholastic record: 5 hours of A's, 3 hours of B's, 3 hours of C's, 2 hours of D's, and 2 hours of F's, he would have a mark index of 2.53; since the following calculations would be made: $5 \times 1 + 3 \times 2 + 3 \times 3 + 2 \times 4 + 2 \times 5 \div 15 = 2.53$.

After the mark indices were found for all the cases in each group, the medians of each of the decile groups in the three classes, and the medians for the total cases in each of the three classes were calculated. The medians so found were called the median mark indices. The quartile deviations were calculated, and the P. E.'s of the medians were evaluated.

In Table VII, Median Mark Index and Probable Error of Each Class Worker, it may be observed that students in class B (6 to 21 hours of work per week) rank first with a median mark index of 2.64, students in class C (24 hours of work per week and over) rank second with a median mark index of 2.65, and students in class A (0 to 3 hours of work per week) rank third with an index of 2.83.

TABLE VII

MEDIAN MARK INDEX AND PROBABLE ERROR OF
EACH CLASS OF WORKER

Decile Rank	No. of cases	Class A	Class B	Class C
X	72	2.11 ± .07	2.08 ± .11	2.04 ± .17
IX	70	2.33 ± .13	2.30 ± .07	2.50 ± .14
VIII	55	2.50 ± .11	2.60 ± .11	2.23 ± .18
VII	63	2.58 ± .09	2.53 ± .10	2.50 ± .32
VI	66	2.89 ± .07	2.58 ± .07	2.53 ± .07
V	64	3.03 ± .10	2.93 ± .08	3.08 ± .14
IV	60	2.85 ± .07	3.03 ± .15	2.90 ± .17
III	55	2.95 ± .06	2.90 ± .10	3.00 ± .18
II	59	3.15 ± .10	2.94 ± .08	2.72 ± .16
I	46	3.17 ± .07	3.42 ± .07	3.65 ± .15
Total	610	2.83 ± .03	2.64 ± .03	2.65 ± .03
Total Cases	610	248	258	104

Read table thus: In decile X class A had a median
mark of 2.11 with a probable error of ±.07, class B had a
median mark of 2.08 with a probable error of ±.11, and class
C had a median mark of 2.04 with a probable error of ±.17;
etc.

In considering the decile groups: Class B ranks first
in three of the decile groups, second in five and third in
two--having an average rank of 1.9; class B ranks first in
five, second in one and third in four--having an average rank
of 1.9; and class A ranks first in two, second in four and
third in four--having an average rank of 2.2. Thus, in the
consideration of the median marks by decile groups, class B

and class C tie for first with a rank of 1.5, and class C has

a rank of 3.

The P. E.'s for the decile groups range from approximate-

ly one-eighth as large as the median in class C, decile VII, to

approximately one-thirty-seventh as large as the median in

class B, decile VI. The P. E.'s for the medians of the total

cases in all the classes is ±.03. In classes B and C, the P.

E. is about one-eighty-eighth as large as the median, and in

class C about one-ninety-fourth as large as the median. This

signifies that the medians are highly reliable.

For the total cases in class B, the chances are even

that the obtained median of 2.64 does not differ from the true

median by more than ±.03. Moreover, since 4 P. E. includes

practically all of the cases in a normal distribution, it is

certain (the chances are 99 in 100) that the true median lies

within the limits 2.64 ± 4 x .03, or between 2.76 and 2.52.

Similarly, it is certain that the true median for class C

lies within the limits 2.65 ± 4 x .03, or between 2.77 and

2.53. Likewise, for class A the true median would fall within

the limits 2.83 ± 4 x .03, or between 2.95 and 2.71.

CRITICAL RATIOS

The critical ratio is a ratio of the obtained difference

between the median mark index of the two classes compared and

the P. E. of the difference of the medians. The P. E. of the

difference of the medians is calculated from the formula:

$PE_{(diff.)} = \sqrt{PE^2_{(mdn.1)} + PE^2_{(mdn.2)}}$, in which $PE_{(mdn.1)}$ and $PE_{(mdn.2)}$ are the P. E.'s of the two obtained medians.

A ratio of 4.0 or higher shows complete reliability of the measures compared; i. e., it signifies that there are 100 chances in 100 that a true difference exists. Ratios of less than 4.0 show reliabilities from 50 chances in 100, or a mere chance difference, to 99 chances in 100. Thus, a critical ratio of 1.0 signifies 75 chances in 100 of the existence of a true difference; one of 2.0, 91 chances in 100; and one of 3.0, 98 chances in 100.

The data in Table VIII may be interpreted as follows: For the total cases in the various classes, class B (moderate workers) exceeds class A (non-workers) with a critical ratio of 4.48, or a reliability of 100 chances in 100; class C (persistent workers) exceeds class A with a critical ratio of 4.24, or a reliability of 100 chances in 100; and class B exceeds class C with a critical ratio of .24, or a reliability of 57 chances in 100.

In the decile groups the following cases had critical ratios of 1.2 (or over), or had a reliability of at least 80 chances in 100: In decile IX, class B exceeds class C with a critical ratio of 1.28, or a reliability of 81 chances in 100; in decile VIII, class C exceeds class A with a critical ratio of 1.28, or a reliability of 81 chances in 100; in

TABLE VIII

COMPARISON OF THE SCHOLASTIC SUCCESS OF
THE CLASSES OF WORKERS IN TERMS
OF CRITICAL RATIO VALUES

Decile Rank	B and A	C and A	C and B
X	.23	.38	.20
IX	.20	-.89	-1.28
VIII	-.64*	1.28	1.75
VII	.37	.24	.09
VI	3.13	3.64	.51
V	.78	-.29	-.93
IV	-1.09	-.27	.57
III	.43	-.26	-.48
II	1.64	2.28	1.23
I	-2.53	-2.90	-1.39
Total	4.48	4.24	-.24

Read table thus: In decile X class B exceeds class A with a critical ratio of .23; class C exceeds class A with a critical ratio of .38; etc.

decile VIII, class C exceeds class B with a critical ratio of 1.75, or a reliability of 88 chances in 100; in decile VI, class B exceeds class A with a critical ratio of 3.13, or a reliability of 98 chances in 100; in decile VI, class C exceeds class A with a critical ratio of 3.64, or a reliability of 99 chances in 100; in decile II, class B exceeds class A

* A critical ratio preceded by a minus sign denotes that the second-named class exceeds the first-named class. No sign denotes that the first-named class ranks first.

with a critical ratio of 1.64, or a reliability of 87 chances in 100; in decile II, class C exceeds class A with a critical ratio of 2.28, or a reliability of 94 chances in 100; in decile II, class C exceeds class B with a critical ratio of 1.23, or a reliability of 80 chances in 100; in decile I, class A exceeds class B with a critical ratio of 2.53, or a reliability of 95 chances in 100; in decile I, class A exceeds class C with a critical ratio of 2.90, or a reliability of 97 chances in 100; and in decile I, class B exceeds class C with a critical ratio of .24, or a reliability of 57 chances in 100.

It should be stated that the signs of the critical ratios were altered so that when class A exceeded class B (or any other class exceeded another) it meant that the students in class A had a better scholastic record than the students of class B; i. e., had a lower median mark index. Before the change, if A exceeded B, A had a larger median mark index, and hence a lower scholastic record.

In Table VIII it may be observed that in seven of the decile groups class B exceeded class A, in five of the decile groups class C exceeded class A, and in six of the decile groups class C exceeded class B. Also, it may be noted that in decile I as the amount of non-academic work increased, the scholastic record lowered (the critical ratio values are all negative); whereas the reverse is true in both deciles X and II (the

critical ratios are all positive.)

Thus, considering the total cases in each group, it has been shown that the working students, both of class B and of class C, exceed the non-working students in scholastic success; and also that the reliability of the difference between the medians is highly significant. This may be due to the presence, in the working groups, of State and Federal employees who are required to attain an average scholastic record; or to more intense application or greater seriousness of purpose on the part of the working students. Furthermore, it may be concluded that students who work from six to twenty-one hours a week have a mere chance to exceed in scholastic success students who work twenty-four hours a week or more. The reliability of the difference between the medians of the two working groups is not significant.

SUMMARY AND CONCLUSIONS

1. The rankings of the three classes of workers for the total cases in each class were as follows: Class B, composed of students working from six to twenty-one hours a week, ranked first; class C, composed of students working twenty-four or more hours a week, ranked second; and class A, composed of non-working students, ranked third in scholastic achievement. The rankings of the classes in the decile groups which had high reliability agreed with the rankings

for the total cases in each class. Class B exceeded class C
only slightly. Classes B and C may have exceeded class A be-
cause of the presence in the former groups of State and Federal
workers who are required to attain at least an average scholas-
tic record. A greater seriousness of purpose and more intense
application on the part of the working students might also
have influenced the rankings.

2. The critical ratios for the total cases in each
class ranged from 4.48 or complete reliability, to 0.24 or
very low reliability. The critical ratios in the decile
groups ranged from 3.64 or high reliability to 0.09 or ex-
ceedingly low reliability. The P. E.'s of the medians in
about two-thirds of the divisions within the decile groups
were greater than the differences between the medians. Sig-
nificant comparisons were made with all decile groups combined.

3. There was a uniform distribution of cases from the
classes of workers in the decile groups; hence, the classes
were similar in regard to ability as measured by college en-
trance examinations.

4. As the number of hours of work a week increased,
the per cent of male students in the groups increased; how-
ever, it was found that the scholastic success of the males
and females in this study differed but slightly. Therefore,
it may be concluded that sex was not an influential factor
in determining the rankings of the classes of workers.

5. Distribution of cases in the classes according to academic classification was uniform; hence, academic classification was not a determining factor of the rankings of the classes.

CHAPTER IV

THE SCHOLASTIC SUCCESS OF STUDENTS ENGAGING IN THE THREE TYPES OF NON-ACADEMIC WORK

In the course of this study, the question arose as to whether the type of non-academic work engaged in influenced scholastic achievement. Consequently, in an attempt to answer the question, the working students were divided into the following three types: Type I, off the campus or non-campus workers, including students who worked at home, for their room and board, or for some employer other than the State and Federal governments; type II, State workers; and type III, C. S. E. P. (College Students' Educational Project) workers, who are also referred to as Federal workers. The solution of the problem involved the establishment of median mark indices and critical ratio values for each type of worker.

The following regulations governed both State and C. S. E. P. student employees at the Kansas State Teachers College the second semester 1934-1935: (1) The maximum amount any student is to receive for one month's service shall be $25; (2) a student shall not be employed in more than one position, place, or department at a given time; and (3) student assistants must be enrolled in and satisfactorily (a "C" average) carrying a minimum of twelve hours of college credit courses exclusive of physical training practice. Students enrolled in additional courses above the minimum requirement must be

passing at all times in all courses. Students who do not meet this requirement are to be relieved from employment until such failure or failures are made up.

Although the regulations governing the State and the C. S. E. P. working students were identical, the selection of the employees for the two types differed in that the heads of the various departments selected State aid students to work for them, but the C. S. E. P. workers were appointed to jobs by the Employment Committee. Furthermore, the State workers were not required to sign a sworn statement saying that without the aid given them they would be unable to attend college, whereas the C. S. E. P. employees were required to sign such a statement.

Thus, it is seen that the type I (State) and type II (Federal) workers were under the necessity of attaining at least an average scholastic record, whereas the type III (non-campus) workers were under no such requirement.

CONTROL OF ACADEMIC CLASSIFICATION

In Table IX, Distribution of Cases in the Types of Workers According to Academic Classification, it may be observed that similar per cents of freshmen, sophomores, juniors, and seniors appear in each of the three types. The deviation of the per cent of freshmen in type I (non-campus employees) from the per cent of freshmen in the entire study is 0.7 per

cent; in type II (State employees) the deviation is 11.7 per
cent; and in type III (C. S. E. F. employees) the deviation
is 14.7 per cent. Likewise, the sophomores of type I deviate
by 0.1 per cent; of type II by 4.3 per cent; and of type III
by 4.4 per cent. The deviation of the per cent of juniors of
type I from the per cent of juniors in the total number of
cases is 2.1 per cent; of type II, 0.7 per cent; and of type
III, 4.3 per cent. Similarly the seniors of type I deviate
by 1.3 per cent; of type II by 8.1 per cent; and of type III
by 6 per cent.

TABLE IX

DISTRIBUTION OF CASES IN THE TYPES OF WORKERS
ACCORDING TO ACADEMIC CLASSIFICATION

Group	Total cases		Type I		Type II		Type III	
	No. of cases	%	No.	%	No.	%	No.	%
Freshman	175	48.3	91	47.6	33	36.6	51	63.0
Sophomore	101	27.9	53	27.8	29	32.2	19	23.5
Junior	51	14.1	31	16.2	12	13.4	8	9.8
Senior	35	9.7	16	8.4	16	17.8	3	3.7
Total	362		191		90		81	

Read table thus: Of the 175 freshmen, 91 were type I,
33 were type II, and 51 were type III; of the total cases,
48.3 per cent were freshmen, 27.9 per cent were sophomore; etc.

Although the deviations in the case of the freshmen of type II and type III are rather large, they are still small enough to assume that academic classification does not influence the validity of the study to any great extent.

CONTROL OF THE SEX FACTOR

Table X, Distribution of Cases in the Types of Workers According to Sex, shows that the per cents of the men and women in the three types of workers are similar. It may be observed that 39.3 per cent of type I (non-campus workers), and 44.5 per cent each of type II (State workers) and type III

TABLE X

DISTRIBUTION OF CASES IN THE TYPES OF WORKERS ACCORDING TO SEX

Sex	Total cases		Type I		Type II		Type III	
	No. of cases	%	No.	%	No.	%	No.	%
Male	151	42	75	39.3	40	44.5	36	44.5
Female	211	58	116	60.7	50	55.5	45	55.5
Total	362		191		90		81	

Read table thus: Of the 151 males, 75 were type I, 40 were type II, and 36 were type III; of the total cases 151 or 42 per cent were males and 211 or 58 per cent were females; etc.

(Federal workers) were men. Thus, type I deviated by 2.7 per cent from the per cent of males in the entire study, and types II and III by 2.5 per cent each.

DECILE GROUPS

Table XI shows the distribution in the decile groups for each type of worker. Considering the differences, in the

TABLE XI

DISTRIBUTION OF CASES IN THE DECILE GROUPS
FOR EACH TYPE OF WORKER

Decile	No. Cases	Type I		Type II		Type III	
		No.	%	No.	%	No.	%
X	50	21	11.0	15	16.7	14	17.3
IX	45	18	9.4	15	16.7	12	14.8
VIII	33	18	9.4	7	7.7	8	9.9
VII	36	17	8.9	10	11.1	9	11.1
VI	42	15	7.9	15	16.7	12	14.8
V	39	22	11.5	8	8.9	9	11.1
IV	32	24	12.6	3	3.3	5	6.2
III	27	16	8.4	8	8.9	3	3.7
II	32	19	9.9	8	8.9	5	6.2
I	26	21	11.0	1	1.1	4	4.9
Total	362	191		90		81	

Read table thus: Of the 50 cases in decile X, 21 were type I, 15 were type II, and 14 were type III; 11.0 per cent of type I, 16.7 per cent of type II, and 17.3 per cent of type III were in decile X; etc.

per cent columns, between the types within a decile group, there are three differences--the difference between types I and II, between types I and III, and between types II and III. Therefore, there is a total of thirty differences for the ten deciles. Of these thirty, nine have a difference of less than 2; nineteen less than 5; twenty-six less than 7; and thirty, or all, have differences of less than 10. The largest difference exists between type I (non-campus workers) and type II (State workers) in decile I; the difference between 11.0 per cent and 1.1 per cent being 9.9 per cent. The difference between the per cents of workers in type II and type III (Federal workers) in decile VII is zero; each has a per cent of 11.1.

Thus it is seen that the per cents of the three types of employees are represented fairly uniformly in the decile groups. It would appear that no type has a decided advantage as far as decile rank is concerned. Substantiation for this assumption was found when the averages of the percentile ranks for the students within each type were computed. The average percentile rank for type I was found to be 54; for type II, 66; and for type III, 59.

MEDIAN MARK INDICES AND CRITICAL RATIO VALUES

The median mark index for type I (non-campus workers) was found to be 2.83 ± .06; for type II (State workers),

with a critical ratio of 3.54, or there are 99 chances in 100
that a true difference greater than zero exists. Type III
(C. S. E. P. employees) also exceeds type I with a critical
ratio of 3.54, or a reliability of 99 chances in 100. The
critical ratio of type II and type III is zero, indicating
that the chances are 50 in 100 that a true difference greater
than zero exists between the two medians.

As was the case in Chapter III, the plus and minus signs
of the critical ratios were so arranged that when type II ex-
ceeded type I it meant that the students in type II had a
better scholastic record than did the students of type I;
i. e., had a lower median mark index.

Thus, considering the total cases in each type, it has
been shown that both the Federal and State employees exceed
the non-campus employees in scholastic success. This is prob-
ably due to the requirement that State and Federal workers
must attain an average scholastic record in order to remain
employed; whereas the non-campus workers are under no such re-
quirement. The reliabilities of the differences of the medians
are highly significant, as there are 100 chances in 100, in
each case, that a true difference greater than zero exists.
Furthermore, it has been shown that the Federal and State
employed students attained the same scholastic record. Thus,
the reliability of the difference between the medians is not
significant.

SUMMARY AND CONCLUSIONS

1. The rankings of the three types of workers for the total cases in each type in regard to scholastic success were as follows: Type II (State employees) and type III (Federal employees) tied for first, and type I (non-campus employees) ranked third. The requirement that State and Federal workers attain an average scholastic record may have influenced the rankings.

2. The critical ratios between type I and the other two types were 3.54, indicating a high reliability in the rankings. Since type II and type III had the same median mark indices, their critical ratio was necessarily zero.

3. There was a fairly uniform distribution of cases from the different types of workers in the decile groups; hence the types were similar in regard to ability as measured by college entrance examinations.

4. The per cents of male students in the three types of workers were quite similar; therefore, it may be concluded that sex did not influence the results of the study.

5. The per cents of the freshmen, sophomores, juniors, and seniors in the three types of workers were similar; therefore, it may be concluded that academic classification did not influence the results of the study.

CHAPTER V

SUMMARY AND CONCLUSIONS

There was very little difference in the distribution of cases in the ten decile groups in any part of this study. No one class or type of worker profited materially by having a disproportionate share of cases in the higher ability groups as measured by the college entrance examinations.

The ranking of the classes of workers, as measured by scholastic success in college, was as follows: Class B (composed of students working from six to twenty-one hours a week), first; class C (composed of students working twenty-four or more hours a week), second; and class A (composed of non-workers--zero to three hours a week), third. There was only a slight difference in the scholastic achievement of class B and class C.

The various types of employees ranked as follows: Type II (State employees) and type III (Federal employees) tied for first; type I (non-campus employees) ranked third.

Thus, it is seen that campus workers (State and Federal employees) working from six to twenty-one hours a week should have a slightly better scholastic record than any other combination. However, since the differences between the median mark indices of the various groups are small--being less than four-tenths of a grade point in all cases--the scholastic records of any of the types or classes should not differ

materially.

Comparisons with critical ratios of 2.0 or greater are significant, giving a reliability of from 98 to 100 chances in 100 of a true difference greater than zero existing. Critical ratios of 1.0 or less have little reliability of a true difference greater than zero. In this study of the thirty-six critical ratios computed, nine reached or exceeded 2.0, and seven more exceeded 1.0.

Class A (non-workers) and type I (non-campus workers), ranking lowest in their respective divisions, had the same medians with reliabilities of 100 and 99 chances in 100 respectively. This seems to indicate that the requirement that an average scholastic record be maintained in order to remain employed is an incentive to scholastic success. Thus the presence of State and Federal workers in classes B (moderate workers) and C (hard workers) may account for the higher grades of these two classes. Furthermore, the working students may have had a greater seriousness of purpose, or may have applied themselves to their academic tasks with greater intensity, than the non-working students.

Similar studies could be carried out in other colleges. With a large number of cases, conclusions could be made with greater confidence in the reliability of the results. Predictions could be made with a high degree of accuracy concerning the chances for scholastic success of

employed and non-employed students. Thus, the advisability of
working or not working while attending college could be deter-
mined conclusively.

The final conclusion may well be that engaging in non-
academic work while attending the Kansas State Teachers College
was not detrimental to scholastic success; in fact, scholastic
achievement seemed to be slightly raised.

A study to determine if non-academic work is more or
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