SELF-SUPPORT AS A FACTOR IN SCHOLASTIC ACHIEVEMENT

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SELF-SUPPORT AS A FACTOR IN SCHOLASTIC ACHIEVEMENT

INTRODUCTION

Chapter I

Interest in self-support as a factor in scholastic achievement prompted this study. The fact that many students are earning partial or complete self-support in our high schools and colleges makes the subject one of importance to the successful administration of educational institutions of the United States.

The College Club of Saint Louis--the St. Louis Branch of the American Association of University Women--conducted an investigation by the questionnaire method for the purpose of finding the number and kinds of occupations open to women students who must support themselves. Incidentally, the questionnaire included items concerning the number of women students who were self-supporting, and the judgments of college officials as to the effect of self-support upon the student's health, social status, scholarship etc.

This questionnaire was sent to 235 colleges and universities, 153 of which are on the accredited list of the American Association of University Women. One hundred and ninety (190) of the questionnaires were returned. The data thus collected showed that the

percentage of women students earning self-support, in part or wholly, ranged from 1½% at Occidental College to 100% at Park College. The average percentage of self-supporting women in the 190 colleges was 20%. The percentage of women earning self-support varied with geographical location. In the South, 21 of the colleges had fewer than 20% of their women earning self-support, while only seven colleges had more than 20% defraying their current expenses. In the far West the situation was quite different. In 15 of the colleges more than 20% of the women were self-supporting; four colleges only had less than 20% of the women contributing toward self-support. In most schools having more than a thousand women students enrolled, more than 20% of the women were self-supporting.

Replies to the question concerning the kind of work open to self-supporting women students showed that few colleges attempt to place students in employment according to their interests and abilities. However, an unusual program of this type was attempted in Goucher College. It is of interest to note that intellectually stimulating work such as tutoring, translating etc. is much less frequently followed in all the colleges than is work such as waiting tables etc.

Restrictions as to the amount of school work,

the number of hours spent in self-support, and the kind of outside work have been made in thirty-six of the institutions studied. The judgment of officials answering the questionnaire differed as to the amount of time a student should wisely give to self-support:

10 considered no self-help, or not more than an hour daily advisable.

24 set the maximum at 2 hours daily.

42 set the maximum at 3 hours daily.

35 set the maximum at 4 hours daily.

8 thought that more than 4 hours daily inadvisable.

To the question, "Do you feel that women students earning part or all of their expenses, especially by housework or dining room service", are given the same social status which others have? brought out the following opinions:

1. 75% felt that the social status of the student was not affected.

2. Three frankly stated that social status was affected by the stigma of work, while two said that the work sometimes won admiration for the girl. Five felt that engaging in house work is a decided handicap to the girl socially.

3. Most of the officials answering the question seemed to feel that the self-supporting woman student was hypersensitive regarding her work.

4. Many felt that the student's personality, social qualities and her attitude toward her work were the determining factors in her social status.

The advisability of the student borrowing money to put herself through college rather than giving time and energy to self-support was considered. Most of the replies indicated that the woman student with good health could very well give some time to self-support without injurying her scholarship or health. It was generally felt that the scholarship of the self-supporting students was better than that of other students. Eighty-one out of 124 replies agreed that self-support deprives the student of sufficient recreation.[1]

Miss Lou LaBrant in her study on the Intelligence of High School Students and Later College Achievement found that the self-supporting students ranked

1. Self-Help for Women College Students, prepared under the auspices of the College Club of Saint Louis, American Association of University Women, 1634 I Street, N. W., Washington, D. C., May 1926

lower in intelligence than the other students studied. Eighty-eight students were included in this study. Most of them had completed three semesters of College work. Thirty-seven of these students were self-supporting, partially and wholly. Three times as many self-supporting fell below the median as above on the Terman Intelligence Test.[2]

At Yale University, it was found that the granting of scholarships motivated scholastic achievement. Students in need of financial assistance made higher scholastic records than other students. Scholarships were granted on the basis of superiority in school grades. The group of students applying for scholarships were representative of the entire student body in regard to mental ability as determined by psychological tests.[3]

Approximately 26% of the women students in the University of Kansas are self-supporting, partially or wholly. Of this group, approximately 8% are earning 50% for more of their of their current expenses while attending school. The range of time devoted to this work is from nine to fifty-six hours weekly, the mean time, 25.75 hours. The problem of self-support and its

2. LaBrant, Lou, Intelligence of High School Students and Later College Achievement, pp. 26-27, Master's Thesis, 1925, University of Kansas.

3. Crawford, A. B., The Effect of Scholarships (A Study in Motivation), Journal of Personnel Research, Vol. IV, nos. 9 and 10, January-February, 1926

results, therefore, is a rather important one in this institution. The present writer was actuated to study in a detailed manner self-supporting students because of the feeling that much more definite information than available was needed in guiding these students.

SPECIFIC FIELD OF STUDY

Chapter II

This study concerns 96 self-supporting undergraduate women enrolled in the University of Kansas during the school year, 1926-27. These women were earning 50% or more of their current expenses. The data secured for this group are compared with those obtained from an equated group, not earning self-support. One hundred and ten students made up the original group of self-supporting women. Those over twenty-five years of age were eliminated, so that the group would represent more nearly typical university students in regard to chronological age.

The two groups were compared in regard to mental ratings, scholastic achievement, number of hours of school work carried and chronological age. The purposes were to discover (1) the effect of self-support (50% or more) on school grades and (2) the amount of outside work an average student can engage in while carrying the average amount of school work and obtain satisfactory grades.

One-half of each group was chosen at random for intensive study. The women students making up these smaller groups were asked to estimate weekly the time spent in preparation of school work. These records were secured for a period of nine weeks during the

second semester of the school year, 1926-27. This period extended through the mid-semester examinations, thus giving a typical sampling of the academic year. The purposes of securing information in regard to study habits were to determine: (1) the relationship between school grades and time spent in study for both groups, (2) the amount of time necessary for preparation of school work for the two groups and (3) whether self-support (50% or more) deprives the student of time for study to the extent that average scholarship is prevented.

METHOD

Chapter III

The data for this study were secured through personal interviews and from official university records. The names of the 96 self-supporting women were obtained from registration cards. Each of these was paired with a student not earning self-support. The students were equated on the bases of (1) sex, (2) mental rating, (3) chronological age (within four years) and (4) classification in the University. Care was taken to avoid matching a self-supporting student with one who might be earning even a small per cent of her self-support.

The mental ratings were obtained from the psychology department of the University. These were in the form of deciles, secured from group tests given at the time the students entered the University. The freshmen and sophomore ratings were obtained from the Thurstone Psychological Examination, and the junior and senior ratings, from the Otis Group Intelligence Scale, Advanced Examination, Form A. Scholarship records were procured from the office of the Registrar.

Through the office of the Dean of Women the personal interviews were arranged and held with each

member of the self-supporting group and one-half of the member of the control group--those only of the control group who kept study records. The amount of time each of the self-supporting group spent in outside work was ascertained during the personal interview.

RESULTS

Chapter IV

Part I

The results of this study are presented in two divisions: the first, concerns the entire groups and the second, the two smaller groups for which study estimates were collected.

MENTAL RATINGS

The first step in making this study was to obtain the mental ratings for the self-supporting group, then to match them with those students who were not self-supporting. Since the students were paired on the basis of mental ratings, the results are practically the same for both groups. Table I shows the distribution of mental ratings for the students studied. The mean decile rank for both groups is 4.76, the fourth decile of mental ability for college students enrolled in the University of Kansas. The mean mental rating for the 37 freshmen is the lowest (6.21). The three upper classes have means considerably higher: sophomores, 4.25; juniors, 4.33; seniors, 3.05. The mean decile rank for the entire student body is 5.00. The intelligence of the self-supporting students in this study is higher than that found by Miss LaBrant.[4] However, this group is larger

4. LaBrant, Lou, Intelligence of High School Students and Later College Achievement, Master's Thesis, University of Kansas, 1925

and includes students of advanced classification in the University while Miss LaBrant's study included students who had completed three semesters' work only. In this study there are twice as many freshmen with intelligence ratings below the median decile (4) as above, and for the sophomores, there are as many above the median as below. In Miss LaBrant's study there were three times as many self-supporting freshmen and sophomores below the median of intelligence as above.

TABLE I

Distribution of Mental Ratings for the Self-Supporting Group of undergraduate women students at the University of Kansas

Decile Rating (Order of merit)	Freshmen F's	Sophomore F's	Junior F's	Senior F's	Total F's
1	3	2	4	4	13
2	3	4	2	5	14
3	5	5	2	3	13
4	2	5	1	4	12
5	2	3	0	2	7
6	4	1	2	2	9
7	4	0	0	0	4
8	6	1	2	0	9
9	6	2	1	0	9
10	4	1	1	0	6
Totals	37	24	15	20	96
	Mn. 6.21	Mn. 4.25	Mn. 4.33	Mn. 3.05	Mn. 4.76

It is evident that selection has taken place with advancement in classification since the mean intelligence ratings are considerably higher for the upperclassmen than for the freshmen. In the sophomore group, only four individuals are to be found in the lower three deciles while sixteen of the freshmen are in these deciles; in the junior year this same ratio (4) is again found--this finding may be due to the relatively large number of students entering the University for the first time at the beginning of the junior year, otherwise a more select group would be expected than is found in the sophomore year. In the senior group there is no student with a mental rating below the sixth decile.

SCHOLARSHIP

The second step involved a comparison of the scholarship ratings of the two groups. The scholarship ratings were computed in the following manner:

Each hour of A was given seven points

Each hour of B was given five points

Each hour of C was given four points

Each hour of D was given three points.

Each hour of F was given one point.

Courses marked incomplete were eliminated. These points for weighting grades are practically the same as those used by Ben D. Wood[5]; they recognize a greater

5. Wood, Ben D., Measurement in Higher Education, pp. 75-76, Yonkers on Hudson, N. Y., World Book Company, 1923

difference between a grade of A and a grade of F than most devices for weighting grades. The scholarship averages for the two groups are practically the same. These data are presented in Table II. The self-supporting freshmen have an average slightly higher than that of the matched freshmen; the matched sophomores exceed the self-supporting sophomores by .127 points only; the self-supporting juniors exceed the matched juniors by a greater margin than any of the class groups compared. The matched seniors exceed the self-supporting seniors by .379 points. The average difference between the two

TABLE II

Scholarship Averages for the Self-Supporting Group and the Control Group. Comparisons made between Classes.

No. of Cases	Self-Supporting Group	Scholar-ship	Control Group	Scholar-ship
37	Freshmen	4.002	Freshmen	3.897
24	Sophomores	4.452	Sophomores	4.577
15	Juniors	4.814	Juniors	4.414
20	Seniors	4.867	Seniors	5.246
	Total average: 4.5337		Total Average: 4.5286	
		Difference: .0049		

groups in scholarship is too slight to be of much significance.

RELATIONSHIP BETWEEN SCHOLARSHIP AND MENTAL RATINGS

The mental ratings were correlated with the

scholastic ratings for each class represented in the two groups. The Pearson product-moment formula ($r = \frac{\Sigma xy}{\sqrt{\Sigma x_2 \cdot \Sigma y_2}}$) was used. These results are given in Table III. In only two cases are the correlations high enough to be of much significance. The coefficients of correlation of the self-supporting group are higher on the whole than those for the control group. The coefficients for the self-supporting seniors (.513) and for the matched juniors (.483) are approximately the same as those found for the entire student groups entering the University in 1921, 1922, and 1923 by Mr. Rosenow.[6] These coefficients of correlation found by Mr. Rosenow were 0.44, 0.52 and 0.47 for the three years, respectively. The relationship between the mental and scholastic ratings of the matched seniors (-.091)

TABLE III

Showing the Coefficients of Correlation between Scholarship and Mental Ratings for the Self-Supporting and the Control Groups

No. of Cases	Classification	Self-Supporting Group r and P. E.	Control Group r and P. E.
37	Freshman	.282 ± .022	.145 ± .087
24	Sophomore	.170 ± .097	.304 ± .010
15	Junior	.369 ± .066	.483 ± .122
20	Senior	.513 ± .080	-.091 ± .025

6. Rosenow, Curt, Predicting Academic Achievement, Pedagogical Seminary & Journal of Genetic Psychology, Dec. 1925

is quite in contrast to that found for the self-supporting seniors. It is practically zero. The coefficients of correlation for the freshmen of both groups (.282 for the self-supporting and .145 for the matched groups) are too low to have much significance. So too is the coefficient for the matched sophomores (.170).

One reason for the relatively low correlations may be that the decile ratings were used rather than the scores made on the intelligence tests. The use of decile ratings necessarily limited the scattering of mental ratings. However, the decile rating assured a more consistent method of matching inasmuch as the tests were taken by the students at different periods of time and two tests were used. This narrow scattering, no doubt, affected the senior group more than the others since the first six deciles only were represented.

AMOUNT OF TIME DEVOTED TO WORK

Table IV displays the average amount of time spent weekly in earning self-support by the members of each of the four classes. The number of hours spent weekly in earning self-support varied little throughout the four years represented, although there is a slight tendency for the amount of work to decrease in the junior and senior years.

The range in the amount of time spent in

earning self-support is from nine to fifty-six hours weekly for the entire group.

TABLE IV

Showing the Average Amount of Time spent weekly in earning Self-Support by the members of the four Classes Represented

No. of Cases	Classification	Average Time Weekly earning Self-Support
37	Freshman	27 hours
24	Sophomore	26.77 hours
15	Junior	24.46 hours
20	Senior	24.79 hours

Mean time for entire group: 25.75 hours

Table V shows the coefficient of correlation between time spent in self-support and scholastic achievement. For each class the result is negative, but only in the junior and senior classes are the coefficients of correlation high enough to be significant. The large probable errors, however, take away the significance of the coefficients because of the unreliability indicated. However, these consistently negative results, while low, would seem to indicate that self-support does not make for the best scholarship. The coefficient of correlation is least in the freshman year where the average amount of self-support is greatest, and highest in the junior year where the average amount of self-support is least. However, the reliability of the junior year coefficient is doubtful because of the large P. E.

The greatest difference in the number of hours spent weekly in earning self-support for the classes is only slightly more than two hours, consequently it probably is of little importance. Presumably, juniors and seniors

TABLE V

Showing Coefficients of Correlation between Scholastic Ratings and Time Spent in Earning Self-Support for Each Class

No. of Cases	Classification	Correlation and Probable Error
37	Freshman	-.112±.109
24	Sophomore	-.020±.149
15	Junior	-.363±.151
20	Senior	-.262±.130

are required to devote more time to academic work than the underclassmen. This may account for the higher inverse correlation in the junior and senior years.

AMOUNT OF SCHOOL WORK CARRIED

Upon comparing the amount of school work carried by the self-supporting group and the matched group, only a slight difference is found. Table VI gives the average number of hours carried by each class as well as the averages for the two entire groups. The average difference between the amount of school work carried by the two groups is only .72 hour, less than one hour.

It seems that the average amount of time spent in self-support affects only slightly the amount of school work the student carries. In both groups the seniors carry slightly more school work than do the underclassmen. There is a gradual increase in the amount carried by the matched group as classification advances while in the self-supporting group the juniors average fewer hours per semester than do the freshmen. This may be due also

TABLE VI

Showing the Number of Hours of School Work Carried Each Semester by the Self-Supporting and Control Groups

No. of Cases	Classification	Self-Supporting Group No. of Hrs.	Control Group No. of Hrs.
37	Freshman	13.76	14.33
24	Sophomore	14.40	14.48
15	Junior	13.25	14.53
20	Senior	14.68	15.63
		Mean: 14.02	Mean: 14.72

Difference: .72 hours

to the fact that many students enter the University for the first time at the beginning of the junior year.

CHRONOLOGICAL AGES OF TWO GROUPS

The difference in the chronological ages of the two groups is also slight. These data were controlled in matching the groups (within four years). However,

this limitation did not alter the average chronological ages greatly. Table VII displays these data:

TABLE VII

Showing a Comparison of the Mean Chronological Ages for the Self-Supporting and the Control Groups

No. of Cases	Classification	C. A. (years) for Self-Supporting Group	C. A. (years) for Control Group
37	Freshman	19.45	19
24	Sophomore	20.66	20.08
15	Junior	21.33	20.93
20	Senior	22.40	21.85

The control group has a slightly lower mean chronological age than does the self-supporting group in each of the four classes, though in no comparison does as much as a year's difference appear. It is probable that the self-supporting group as a whole has had to miss more regular years of school than has the matched group. It is sometimes necessary for the self-supporting student to spend some time working before entering the University. Occasionally he drops out for a year or two to do such work before finishing his course.

SUMMARY

For the group of self-supporting women students studied the average amount of time devoted to financially remunerative work is 25.75 hours weekly, the average amount of school work carried is 14.02 hours each semester, the average mental rating is in the fourth decile (4.76).

Under these conditions the average scholastic record is 4.53 (B-). In view of these data, it seems reasonable to assume that the average student, under similar conditions, could maintain the same scholastic average. Of course, in individual cases, health, temperament, perserverance and recreation and the kind of employment are among factors to be considered. The importance of such factors is undetermined at the present time.

THE VARIABILITY WITHIN THE SELF-SUPPORTING GROUP

Careful observation of individual cases leads to some interesting suggestions which the statistics thus far presented do not reveal. Table VIII shows that the four freshmen women with mental ratings in the tenth (lowest) decile made scholastic records of D plus, C-, B-, and B. The average scholastic record for the four women is 4.170 or C plus. The average amount of time spent weekly in self-support is 23.63.

TABLE VIII

Showing Data for Freshmen Women whose Mental Ratings fell in the tenth (lowest) decile on the Thurstone Intelligence Test

Case	Scholarship	No. Hrs. School Work per Semester	No. Hrs. Spent Weekly in Self-Support
1	3.317 (D plus)	14½	21
2	3.666 (C-)	15	31⅓
3	4.533 (B-)	15	21
4	5.166 (B)	12	21
	Average: 4.170	Average: 14⅙	Average: 23.63

The three women in the first (highest) decile made scholarship records of D plus and B- as is shown in Table IX. They averaged 23.33 hours weekly in self-support and attained an average scholastic record of 4.178 or C plus. Thus we find, for these students representing the extremes in mental ability among the freshmen class of 1926-27

achieving the same scholastic averages (4.170 for those in the lowest decile and 4.178 for those in the highest). Those in the lowest decile carried slightly more outside work than those in the highest decile. What can be the degree of difference in actual mental ability?

TABLE IX

Showing data for Freshmen Women whose Mental Ratings fell in the first (highest) decile on the Thurstone Psychological Examination

Case	Scholarship	No. Hrs. School Work per Semester	No. Hrs. Spent Weekly in Self-Support
1	3.230 (Dplus)	15	21
2	4.666 (B-)	15	21
3	4.700 (B-)	15	28
	Average: 4.178	Average: 15	Average: 23.33

Three freshmen women failed in 40% of their school work at the end of the first semester, and consequently came under the University regulation for elimination. Table X gives information concerning them.

TABLE X

Showing Data for Three Freshmen Women Failing in 40% of their School Work during the First Semester

Case	Mental Rating	No. Hrs. School Work	Time Spent Weekly in Self-Support
1	6	12	40
2	8	13	49
3	9	12	28

Their mental ratings fell in the sixth, eighth and ninth deciles. Case I had the highest mental rating. Both case I and II were reinstated because the amount of work which they were carrying to defray their expenses was unusual. The administration felt that they deserved another chance under more favorable conditions. The third case is known to be psychopathic.

The highest scholastic records for the freshmen were made by women whose mental ratings fell in the second and third deciles. (See Table XI) The one making the highest record (A-) carried 12 hours of school work and spent 24 hours weekly in outside work. The second highest record was made by a woman carrying 15 hours of

TABLE XI

Showing the Highest Scholarship Records for the Freshmen

Case	Mental Rating	Scholarship	No. Hrs. of School Work	No. Hrs. Spent Weekly in Self-Support
1	2	6.166 (A-)	12	24
2	3	5.400 (B plus)	15	28

school work and spending 28 hours weekly in outside work. She was more mature than the student attaining the highest record--her chronological age being 23 years in comparison with 19 years for the other.

Scholastic standing below C- (other than those mentioned for the freshmen) was made by students whose mental ratings fell in the sixth, seventh, eighth

and ninth deciles. These data are shown in Table XII:

TABLE XII

Showing Scholarship Records and Mental Ratings of Freshmen making averages below C-

No. of Cases	Mental Rating	Scholarship	Hours of School Work	Hours Spent in Self-Support Weekly
1	6	2.333 (D-)	15	25
2	7	3.419 (D plus)	12	21
3	8	3.000 (D)	13	24
4	8	3.000 (D)	12	35
5	9	3.153 (D plus)	13	10

One freshmen in the sixth decile of mental ability; two, in the seventh; three, in the eighth, and three in the ninth decile made scholastic averages above C-.

The highest scholastic record for the sophomore group was made by a student whose mental rating fell in the fourth decile. (Table XIII) The lowest scholarship record was made by a student with a mental rating in the first decile. However, the first student carried fewer hours of academic work and spent less time in self-support. One individual representing the tenth decile has maintained a C plus average while carrying between twelve and thirteen hours of school work each semester and giving 28 hours weekly to self-support.

One student in the second decile and another, in the third decile, have maintained splendid records.

TABLE XIII

Showing Scholarships of some Students of the Sophomore Group

Case	Mental Rating	Scholarship	No. Hours School Work	No. Hours Spent Weekly in Self-Support
1	4	6.600(A-)	8 1/3	26
2	1	3.350 (D plus)	11 1/3	35
3	3	5.909 (B plus)	15 1/3	24 1/3
4	2	5.789 (B plus)	15 2/3	24
5	10	4.204 (C plus)	12 2/5	28

As is shown in Table XIV, there is no striking variation in the junior group. Two individuals with mental ratings in the first decile have the highest records. One individual representing the tenth decile has the lowest scholarship record. However, one of the poorest records was made by a student whose mental rating fell in the second decile.

TABLE XIV

Showing Variation with the Junior Group

Case	Mental Rating	Scholarship	No. Hrs. School Work	No. Hours Spent in Self-Support
1	10	3.750	13	28
2	1	5.416	12	30
3	1	6.333	13	26 1/3
4	1	5.312	14 1/5	14 1/3
5	2	3.943	15 1/3	14 3/4

In the senior group only the first six deciles are represented. Table XV shows the variation. Two individuals in the second decile hold the highest scholastic records. One student in the first decile ranks third in scholarship. One student in the sixth decile has an average equivalent to that of two in the first decile, while another student whose mental rating is in the sixth decile has the lowest scholastic average. The student making

TABLE XV

Showing variation within the Senior Group

Case	Mental Rating	Scholarship	No. Hrs. School Work	Hours Spent in Self-Support
1	2	6.101 (A-)	17 4/5	9
2	2	6.045 (A-)	15 4/7	25/5
3	1	5.824 (B plus)	13 4/7	24½
4	6	5.181 (B plus)	16 4/7	30
5	6	3.624 (C-)	14	38½

the lowest average has 11 hours of outside work above the average for the group, so the unusual amount of outside work, no doubt, accounts to some extent for her record.

RESULTS

Part II

For the second part of this study forty-five pairs, or approximately one-half of the two larger groups, were chosen at random. Each member of these groups was asked to keep estimates of the number of hours she spent in study each week for the first nine weeks of the second semester. It was possible to collect only thirty-four pairs of these records. The mean mental rating for the thirty-four students in each group is 4.17. This is slightly higher than that for the entire groups, but since it is same decile (4.17 to 4.76), the smaller groupsiare fairly representative of the larger groups in regard to mental ability.

COMPARISON OF GROUPS

The average scholarship for the self-supporting group is 4.79. This is slightly higher than that for the entire group of self-supporting students--4.79 to 4.53. The average scholarship for the control group is 4.53 which is almost the same as that (4.52) for the entire control group.

The self-supporting group averages approximately 23 hours weekly in self-support. The amount for the entire group of self-supporting students was 26 hours weekly, or three hours more.

The average amount of time spent in preparation of school work was practically the same for the self-supporting and the control groups. The control group averaged 23.58 hours weekly in comparison with 22.70 hours for the self-supporting group.

For these two groups the difference in scholastic averages is .26 points in favor of the self-supporting group; the difference in study time is .88 hours more for the control group.

CORRELATION BETWEEN FACTORS

Scholarship was correlated with mental ratings, with time spent in study, with time spent in self-support; and mental ratings were correlated with time spent in study for these thirty-four pairs of students making up the self-supportin and the control groups. Table XVI gives the results.

The coefficient of correlation between mental ratings and scholarship are practically the same for the two groups. They are low. The P. E. in each is too large. Even a slighter difference exists between school grades and time spent in study for the two groups. The coefficients of correlation in both cases are practically zero. Inasmuch as time spent in study is, by no means, a measure of efficiency of study, this relationship may

not be surprising.

Quite a contrast exists between the two groups in regard to the correlation between mental ratings and time spent in study. For the self-supporting group the coefficient of correlation is positive (.289) though low; while for the matched group the coefficient of correlation is negative to a degree of -.485. This wide difference suggests several explanations. The self-supporting students

TABLE XVI

Showing the Coefficients of Correlation between the Four Factors Considered for the Self-Supporting and Control Groups

Self-Supporting Group	Control Group
r and P. E.	r and P. E.
Between Scholarship and Mental Ratings	
.278 ± .105	.301 ± .104
Between Scholarship and Hours of Study	
.032 ± .115	.066 ± .114
Between Mental Ratings and Hours of Study	
.289 ± .105	-.485 ± .086

may be more serious-minded than the matched students because of hardships which they have met. It is possible that the responsibility of self-support has caused them to form more industrious habits. However, industry seems to add little to their gains in so far as school marks are concerned. If school marks measure actual efficiency, then the self-

supporting students seem to be the losers in time and effort. To what extent industry in school work indicates a formation of desirable habits would be of interest. Perhaps the habit of industry will aid these self-supporting students to after-school success. Another possible explanation for this difference in industry may be due to the fact that the self-supporting students have not as desirable a background educationally as the matched students. If this is the case, the self-supporting students would necessarily give more time to preparation. A lack of knowledge would, no doubt, influence their grades because of the limited facilities with which to carry out illustrations. It may be also, that the self-supporting students have not come from the cultural background that the matched students have, and therefore are not as polished. Such a lack might influence grades. The self-supporting student may give his best energy to his outside work, and therefore cannot study as effectively as his grades seem to indicate.

RELATIONSHIP BETWEEN VARIABLES

In an attempt to find the actual bearing of self-support on scholarship, partial correlation was used so that the influence of mental ratings and time spent in study could be eliminated. Table XVIII shows the coefficients of correlation between the various

factors and the method of partialling out each factor.

TABLE XVIII

Showing Correlation Between the Various Factors Studied and Method of Partialling out Factors

Factors	Correlation and P. E.
1 = Scholarship	$r_{12} = .111 \pm .115$
2 = Self-Support	$r_{13} = .278 \pm .105$
3 = Mental Rating	$r_{23} = .003 \pm .115$
4 = Study Hours	$r_{14} = .032 \pm .115$
	$r_{24} = .036 \pm .115$
	$r_{34} = .289 \pm .105$

Formula for partialling out one variable:

$$r_{12.3} = \frac{r_{12} - (r_{13} \times r_{23})}{\sqrt{1 - r_{13}^2}\sqrt{1 - r_{23}^2}}$$

Substituting figures for symbols gives:

$$r_{12.3} = \frac{.111 - (.278 \times .003)}{\sqrt{1 - .01024}\sqrt{1 - .000064}} = .112$$

Formula for elimination coefficients of correlation between Scholarship and time spent in study, and Scholarship and Mental Ratings giving more exact correlation between Scholarship and Self-Support:

$$r_{12.34} = \frac{r_{12.3} - (r_{14.3} \times r_{24.3})}{\sqrt{1 - r_{14.3}^2}\sqrt{1 - r_{24.3}^2}}$$

Substituting figures for symbols gives:

$$r_{12.34} = \frac{.112 - (-.46 \times .034)}{\sqrt{1 - .092116}\sqrt{1 - .001156}} = .113$$

The first step was to find the relationship between scholarship and self-support when the influence of mental

ratings was eliminated. Time spent in study was eliminated in the same way. The third step was to find the relationship between self-support and scholarship by the formula given in the fourth part of Table XVIII. This procedure left a correlation of .113 between self-support and scholarship which is .002 higher than it was before the elimination of the three variables.

WEIGHT OF FACTORS STUDIED

The regression equation was used to determine the influence of each of the factors upon scholarship in similar cases.* The formula for finding the regression equation is:

$$X_1 = X_2 + b_{1.234} X_3 + b_{1.234} X_4$$

or substituting figures gives:

$$X_1 = .107X_2 + .307X_3 + .000X_4$$

Table XIX interprets the meaning of the Xs:

X_1 = Scholarship
X_2 = Self-Support
X_3 = Mental Ratings
X_4 = Study Time

Self-support has .107 degrees of influence on scholarship, mental rating has .307 degrees of influence and time spent in study, .000 influence. Mental ratings, while having

little influence, have approximately three times as much weight as self-support in determining scholarship while time spent in study seems to have little effect on scholarship.

In spite of the lack of correlation between time spent in study and scholastic achievement, the two individuals who studied least, five and seven hours weekly, have very low scholastic records and have failed some courses. Their mental ratings are in the first and second deciles respectively and they are not self-supporting. Since there are no cases displaying the effect of no time spent in study, it seems reasonable to assume the the average student should allow himself the average amount of time for study in order to make satisfactory grades.

* The high probable errors accompanying the low coefficients of correlation indicate the futility of using the regression equation. However, the results of the regression equation corroborate the unimportance of the coefficients of correlation.

CONCLUSIONS AND SUMMARY

Chapter V

Tentative conclusions only can be drawn from the data presented in this study because of the limited number of cases.

The following tentative summary and conclusions are presented from the data given in Part I:

1. The average mental ability of the ninety-six self-supporting students is slightly higher than that for college students in general (4.76 in comparison with 5.00 decile ratings).
2. There is no conspicuous difference between the scholastic achievement of the self-supporting group and the control group.
3. There is less than an hours difference in the amount of school work carried by the two groups studied. The control group carries slightly more school work than the self-supporting group.
4. There is a negative correlation between self-support and scholarship for the four classes represented by the self-supporting group. This would seem to indicate that scholarship tends to vary inversely with the

amount of time given to self-support. However, the coefficients of correlation found are too low to be of high prognostic value.

5. The self-supporting group are slightly older chronologically than the control group.

Conclusions based on the results presented in Part II:

1. Self-supporting students average approximately the same amount of time in study as the control students.

2. The correlation between scholarship and time spent in study is positive for the self-supporting students while it is negative for the control students. This would seem to indicate that it is necessary for the self-supporting students to study more than the non-self-supporting students, inasmuch as the difference in scholastic achievement is very small.

3. The correlation between scholarship and time spent in self-support is positive for this group whereas it was negative for the entire group of self-supporting students. However, the coefficient of correlation for this group is too low to be significant.

4. The elimination of the influence of mental ratings and study time makes practically no difference in the coefficient of correlation between self-support and scholarship.

5. The regression equation shows that mental ratings are approximately three times as important as self-support in determining scholastic achievement, and that time spent in study carries no weight in proportion to the two preceding factors.

Out of these data the following questions arise:

1. What would be the results scholastically if the non-self-supporting student had the motivation which the self-supporting student seemingly has?

2. Does the responsibility of self-support ultimately, if not immediately, prove detrimental to the student's health?

3. Does the social life of the self-supporting student suffer because of self-support duties?

4. Does self-support deprive the student of time he would otherwise use in pursuing cultural activities?

5. Does the responsibility of self-support develop such desirable habits as reliability, industry, etc. which are not developed by

the present system of education?

7. How would similar data for the self-supporting men students compare with those for women students?

8. What do the differences between decile ratings of mental ability mean for college students?

9. What are the relative values of motivation and ability as factors conditioning success in college?

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