



1-1-1937

The Relation Between Achievement in Home Economics and Intelligence

Lucy Montgomery

Follow this and additional works at: <http://digitalcommons.butler.edu/grtheses>

 Part of the [Education Commons](#)

Recommended Citation

Montgomery, Lucy, "The Relation Between Achievement in Home Economics and Intelligence" (1937). *Graduate Thesis Collection*. Paper 124.

This Thesis is brought to you for free and open access by the Graduate Scholarship at Digital Commons @ Butler University. It has been accepted for inclusion in Graduate Thesis Collection by an authorized administrator of Digital Commons @ Butler University. For more information, please contact fgaede@butler.edu.

THE RELATION BETWEEN ACHIEVEMENT
IN HOME ECONOMICS AND INTELLIGENCE

BY
LUCY MONTGOMERY

A Dissertation Submitted in Partial Fulfillment
of the Requirements for the Degree
Master of Science

COLLEGE OF EDUCATION
BUTLER UNIVERSITY
INDIANAPOLIS, INDIANA

1937

LD
701
.B82h
M6679
C2

ACKNOWLEDGMENTS

The author of this study wishes to acknowledge the advice and suggestions of Dr. W. L. Richardson and to acknowledge the helpful criticism and guidance of Dr. A. B. Carlile, under whose direction the study was made; also to acknowledge the assistance in procuring the data given by Miss Dale Waterbury of Shortridge High School, Indianapolis, Indiana.

TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS	111
TABLE OF CONTENTS	iv
LIST OF TABLES AND ILLUSTRATIONS	v
 Chapter	
I. INTRODUCTION	1
Statement of the Problem	1
The Source of Data	2
The Method of Procedure	3
Relation of class work in academic subjects and I Q	4
Opinions of relation of achievement in Home Economics and I Q	8
What the Intelligence Test Measures	12
Specific Tasks of the Study	16
II. HOME ECONOMICS OBJECTIVES	19
III. FINDINGS	28
IV. CONCLUSIONS AND RECOMMENDATIONS	49
BIBLIOGRAPHY	53

LIST OF TABLES AND ILLUSTRATIONS

Table	Page
I. Intelligence Quotients and Grades in Home Economics of 281 Shortridge High School Pupils	29
II. Distribution of I Q's of 281 Students of Home Economics	36
III. Distribution of Grades of 281 Students of Home Economics	39
IV. Comparison of Achievement in Home Economics of the Bright to Gifted Group; The Normally Intelligent Group; and the Dull Normal to Borderline Group	42
V. I Q's and Grades of 281 Home Economics Students	45

Figure

1. Illustrating the Distribution of I Q's Given in Table II	37
2. Illustrating the Distribution of Grades Given in Table III	40

THE RELATION BETWEEN ACHIEVEMENT
IN HOME ECONOMICS AND INTELLIGENCE

CHAPTER I

INTRODUCTION

Statement of the Problem.-- This study is the result of the combination of several factors. It is principally, however, the result of an interest in the relation of grades achieved by students in high school and their intelligence; of experiences in teaching both academic subjects and home economics; and of observing the work of a number of home economics teachers. An interest in the relation of grades and I Q's together with the experiences in teaching and observing home economics classes has brought up the question of the relation between grades achieved by students in this subject and the intelligence of these students as indicated by their I Q's.

The study was undertaken to answer the following questions: (1) Is there a positive relation between achievement in home economics and intelligence? (2) If there is a positive relation between achievement in home economics and intelligence is the relationship sufficiently marked to be

significant in individual prognosis?

The Source of Data.-- The study was made at Shortridge High School, Indianapolis, Indiana, a school of about three thousand pupils in which home economics is an elective. The courses offered in home economics are Foods I and II, Clothing I and II, Home Living, Related Art, and Social Practice. The grades and the I Q's of 281 home economics students formed the material for the investigation.

Since, in home economics as in other subjects, grading as yet depends largely upon teacher judgment and schools and teachers vary as to accomplishments required for certain grades, the pupils for the investigation were selected from classes of one teacher in foods and from one in clothing - the two phases of home economics in which the study was made. It was thought that this would reduce, as far as possible, different standards of grading. Grades in the school are indicated by A+, A, B, C, and D. An A+ represents the unusual accomplishment; A indicates good work; B, average; C, poor; and D, failure.

The intelligence ratings in the school are determined by means of the Terman Group Test of Mental Ability. This test is given, however, only to pupils whose I Q's have not previously been determined. The Illinois General Intelligence Scale is used in the elementary schools from which many of the pupils come and therefore the Shortridge records show the

I Q's determined by the Illinois test for some pupils and by the Terman test for others. Either rating was used for this study as very high correlations have generally been shown to exist between the results of these tests.

Since in some studies it has been stated that the foundations gradually acquired in a subject increasingly become as significant a factor as intelligence in conditioning achievement, pupils from classes in Clothing I and Foods I were selected for the study.

The Method of Procedure.-- The assumption underlying the study was, that if the mental capacity as indicated by the I Q plays a part at all significant in determining pupil achievement in home economics this circumstance should manifest itself through an increase in grade corresponding to the increase in I Q. The study was developed upon this assumption through the accomplishment of the following tasks:

1. The grades in home economics and the I Q's of the 281 students selected for the investigations were compiled.
2. These data of grades in home economics and I Q's were analyzed and compared.
3. The relationship between the two variables was determined and interpreted.

The Generally Accepted Relation Between
Class Work in Academic Subjects and Intelligence

It is rather generally accepted that there is a positive

relationship between class work in academic subjects and intelligence - that is, that as the measure of intelligence increases there is also an increase in achievement. This opinion is sustained by studies which have been made to show the relation of the grades of students and their I Q's. Those examined included studies to show the relation of the I Q's and grades in high school, grades in foreign languages, and grades in algebra. With the exception of one study in algebra¹ and a study concerning grades in shop work² all of the studies examined have indicated a significant positive relationship between intelligence, as indicated by the I Q, and achievement, as indicated by class grades. However, while showing a positive relationship between achievement and intelligence the conclusions given in most of the studies indicate that the normal trend of intelligence upon achievement is affected by such factors as classification of pupils, habits of application, collateral interests and other factors of a similar nature.

A study of the relation between I Q's and grades in high

¹Rose Richter, "The Predictive Value of I Q's for Success in Algebra". High Points in the Work of the High Schools of the City of New York. October, 1934.

²George Gordon, "Relation of the Pupils' Intelligence Quotients to Their Grades in the High School Shops". Industrial Education Magazine. Vol. XXX (January '29) pp. 249-50.

school³ stated that the conclusion was, "a distinct correlation indicating a distinct general relationship." The coefficient of correlation was $+ .41$. It was also found that a change of ten points in the I Q involved on the average an improvement of 8 per cent in the pupil's work. There was also a consideration of the lowest group, the poor work group, from 0 to 69 per cent. The question was, who contributes to this poor work group from the standpoint of the I Q? Is there any relation between the I Q of the pupil and his tendency to do work at the lowest level? The conclusions again stated "a distinct relationship". The co-efficient of correlation was $- .54$, showing that the higher I Q the lower the average tendency to do poor work.

A study of the effect of I Q's on the grades in foreign languages⁴ stated, "That intelligence has a significant influence upon pupil achievement in Spanish as measured by teachers' grades." No coefficient of correlation was given but graphs substantiated the conclusion quoted.

The study of I Q's and grades in Algebra referred to above gave a correlation of $.30 + .05$ which the author stated

³S. B. Yacknowitz and L. Frankel, "Study of the Relation Between the I Q's of Pupils in the Walton High School and Their Work in the Classroom." High Points. September 1932, p. 21.

⁴W. F. Kaulfers, "Effect Of The I Q On the Grades Of One Thousand Students of Foreign Languages." School and Society, August 3, 1929.

was too low to have predictive value. She also stated that leaving out extremes -- those classified as below normal and very superior -- there was very little difference in achievement between the lower and the higher I Q groups. In the study in shop work, also referred to above, the correlation was not given but the average grade of the group above the average I Q for the school was 79.44 while the average grade for the group below the average I Q for the school was 79.73. The author felt that intelligence tests have not materially helped the shop teachers to foresee what to expect from pupils. While each of these authors felt his findings were not conclusive they may indicate, as stated in the study in algebra, that we are overemphasizing the amount of intelligence required for learning. They may also mean that the group tests do not test innate capacity or that they do not test the kind of capacity required to learn particular subjects.

Paul L. Boynton says,⁵ that it is a subject of much discussion among psychologists as to whether there is anything such as general intelligence or whether there are specific intelligences, or whether each intelligent response incorporates both the general and the specific. He says,

⁵Paul L. Boynton, Intelligence Its Manifestations and Measurements, D. Appleton and Co., 1933. Chap. I.

that undoubtedly intelligence tests were evolved in an effort to measure general ability -- that in recent years the point has been emphasized that individuals have special capacities or "have more intelligence in one line than another". In this connection he refers to Spearman's two factor theory of intelligence as worthy of analysis and investigation. This theory is, that there is a general and a specific factor in all intelligent responses. In other words, that each intelligent act depends upon the same general fund of mental energy and upon a specific capacity for the particular act. According to his theory two individuals, who vary in general abilities and who also vary in a certain special ability, may reach the same point in the special ability. One individual reaches the point with a very large amount of general ability and a small amount of the special ability. The other individual reaches the point with a much smaller amount of general ability and a larger amount of special ability than was possessed by the first one. While this theory has not been demonstrated to the satisfaction of investigators it is interesting and might explain the conclusions in the study of intelligence and grades in algebra, which were stated above and which may be summarized as follows: (1) that we may be overemphasizing the amount of intelligence required for learning particular subjects; (2) that group tests may not test the kind of ability required to learn particular subjects;

and (3) that the lower I Q does about as well in algebra as the higher I Q.

In general however it seems to be accepted that there is a positive relationship between intelligence and achievement in academic subjects.

Opinions Concerning Achievement in Home Economics and Intelligence

That there is a positive relation between achievement in home economics and intelligence seems not to be so generally accepted as the opinion regarding the relationship between achievement in academic subjects and intelligence. Home economics is not to be placed in the same category as other subjects, in respect to intelligence, if one judges by the opinions of the administrative officers and sponsors who recommend home economics only to girls who do poor work in other courses and who are not going far in school. But if one judges by the opinions of home economics teachers it may be placed with other school subjects in this respect. Home economics teachers will tell you that intelligence is as necessary for success in this subject as in other subjects; that the learning process in home economics is the same as in other subjects. They may even quote from a recent book on the psychology of secondary school teaching stating that, "the same general laws and conditions apply to all types of learning."⁶

⁶James L. Mursell, The Psychology of Secondary School Teaching. New York: W. W. Roston & Co., 1932. Ch. II.

This difference of opinion in the consideration of home economics may come from the fact that the administrators and sponsors who recommend home economics only to girls who do poor work in other courses are still thinking of the subject simply as a particular skill while the home economist thinks of it not only as developing certain skills necessary in the home but as a subject which in addition to these skills has many other objectives of a broad social value.

Few investigations seem to have been made to show the relationship between achievement in home economics and intelligence. A need however for such studies was presented at a regional conference on home making education called by the Commissioner of Education at Cincinnati, Ohio in 1930.

Data have been assembled for higher education showing intelligence necessary to secure a grade of A in university courses.⁷ In these the intelligence necessary to make a grade of A in home economics was lower than in the other subjects, also the number of cases considered was much lower than in the other subjects. A similar study has been made which indicates the median I Q's for high school students passing and failing thirteen subjects.⁸ This study showed that the median I Q

⁷James L. Mursell, op. cit., p. 333.

⁸Ibid. p. 333.

of students passing in household arts, sewing, and cooking was 107, 94, and 83 respectively and that these were lower than the median I Q of pupils passing in other subjects. Numbers of pupils were not stated in the report of this study as it was given by Mursell in *The Psychology of Secondary School Teaching*.

Another interesting study has been made in which there was a comparison of the intelligence of a group of home economics students and a group of non-home economics students.⁹ The difference in the median I Q of the two groups was found to be 2.4 in favor of the non-home economics group. A comparison of the grades in mathematics, English, and language of the two groups showed that the median in these academic subjects for all home economics students was 80.8 and for the non-home economics students was 84.3. The author stated that correlations showed no appreciable difference between I Q and academic marks for the two groups; "that in attempting to predict from her I Q what academic mark a girl will be apt to receive, it is of no advantage to know whether she is in the home economics group or not."

Another correlation made in this study was between mathematics marks and home economics marks. In this correlation $r = 0.67$, which the author thought did not show the

⁹Edna M. Engle, "How Intelligent is the Girl who Elects Home Economics", Journal of Home Economics, March, 1929.

negative relation implied in the statement, which she had so often heard, that "a girl who does poorly in mathematics and language will do well in home economics".

In conclusion it was stated that those who had chosen home economics did rate about five points lower in I Q than their colleagues in academic classes; and that, in regard to marks, the girls who had chosen home economics obtained marks in academic subjects on an average about 3 per cent lower than their colleagues in the academic classes. It was also stated that, on the other hand, the girls who had chosen home economics had obtained marks in that subject about equivalent to the marks obtained by the academic students in the academic subjects. The average marks for both were about 85. The author felt that if these marks could be taken at face value one might say that the girl who chooses home economics is somewhat less of the academic type than the average - that she does slightly less well in academic subjects but makes up for it in her achievement in home economics. These figures were not taken at face value, however, and the most that was claimed for them was that they showed a probable tendency.

It seems that further study concerning the relation between achievement in home economics and intelligence is worthwhile. Aside from the interesting facts such study would set forth as to the relationship between achievement as indicated by grades and intelligence as indicated by I Q's,

one can foresee that it might be a very definite help to home economics. If the study showed a positive relation between achievement and intelligence it might result in more adequate guidance of high school girls in the selection of home economics subjects. It would very probably result, also, in a change in attitude of those administrators and sponsors who think that home economics is only for the girl who can not get along in other subjects and who is not going far in school.

If such a study of grades in home economics and I Q's showed no relationship between achievement and intelligence it might result, when home economists became aware of this fact, in adjustments in the home economics curriculum and in teaching procedures. Perhaps the home economics curriculum is not appealing to the bright, alert girl of superior ability -- perhaps it is not meeting her needs or is not in accord with her interests.

What the Intelligence Test Measures

In considering the relation between achievement in home economics and intelligence as indicated by the I Q a consideration of what is meant by intelligence seems necessary and also a consideration of what the intelligence test measures.

One finds a diversity of opinion among psychologists as to the nature of intelligence. It has been defined as the

ability to respond to new situations, as power to learn, as capacity for abstract thinking, as intellectual ability.⁹ These are but a few samples. On account of this difference in agreement as to defining the term there seems to be a tendency to give up the idea of a formal definition as the basis of the program of testing. Some psychologists suggest that if an intelligence test score turns out to tell us something of real importance about an individual we need not care exactly what it does measure. They say the proof of the pudding is the eating, whatever happens to be in it. Some have even proposed substituting the term classification test for the term intelligence test, as what the test really does is to rank the individual within the group. They consider that if the standing in a group under conditions determined by one of these tests proves to be predictive of success in school and in after life, then the value of the test is established, and the problem of defining intelligence can be left until a time when more adequate information has been accumulated.

Intelligence tests as they are still called have been devised to bring into play the various mental processes thought to be concerned in intelligence. These tests have come to be the most reliable single method of grading intelligence and forecasting a pupil's capacity for improvement. The

⁹James L. Mursell, op. cit., p. 236.

results of the tests give a pupil's mental level expressed by the age he reaches in the graded series of tests and this age is known as his mental age. If a pupil is said to have a certain mental age it is meant thereby that his performance on the test is equal to the average performance of a fair number of children of that chronological age. The Intelligence quotient is simply the ratio of the mental age to the chronological age. Usually this ratio is multiplied by 100 to do away with decimals. In formula form $I Q = \frac{MA}{CA} \times 100$.

There are different classifications of the significance of the I Q. Most of these indicate that an I Q of 70 or less indicates feeble-mindedness, an I Q of from 70 to 79 indicates a borderline case, an I Q from 80 to 89 indicates a dull normal, an I Q from 90 to 109 indicates normality, an I Q from 110 to 119 indicates brightness, an I Q from 120 to 129 indicates a very bright individual, and an I Q of 130 or above indicates a very superior or "gifted" individual. Such classifications must be interpreted with care, the psychologist tells us, or they will lead to conclusions in dealing with pupils that may not be warranted. Psychologists also state that the most essential thing to understand about the intelligence quotient is that it is simply a means for taking chronological age into account in measuring intelligence.

The correlation of intelligence scores and achievement has not always been as high as might be expected because while

the intelligence test may measure the ability to do work it does not measure the will to work. Also such factors as incorrect habits of learning and differences in preparation may effect achievement. It is said too that the foundation gradually acquired in a subject increasingly becomes as significant a factor as intelligence in conditioning achievement.

The interpretations of correlations between I Q's and achievements vary. It is said that a correlation coefficient, which is the measure of the relationship between two sets of scores derived from the same group, is often given an interpretation beyond all bounds of statistical justification. Boynton¹⁰ says that no coefficient less than .30 signifies a relationship of any particular importance; that by the time a coefficient has reached .40 it indicates a marked relationship; and .50 shows a fairly high relationship. Beyond this each increase in the coefficient indicates that a still closer relationship exists between the two sets of measures. He also quotes Rugg as saying that he regards correlation "as negligible or indifferent when r is less than .15 to .20; as being present but low when r ranges from .15 or .20 to .35 or .40; as being markedly present or marked when r ranges from .35 or .40 to .50 or .60; as being high when it is above .60 or .70."

A negative coefficient indicates as much relationship as

¹⁰Paul L. Boynton, op. cit., p. 320.

a positive coefficient but of an inverted order.

Even though the correlation of I Q's and grades may not be as high as might be expected and even though the interpretations of these correlations may vary it is generally conceded that intelligence tests serve as a basis to determine the ability of pupils to advance with pupils of their own age.

Specific Tasks of the Study

It is hoped that the results of this study may give some indication of the relationship of achievement in home economics and this quality called intelligence. It is hoped that the study may show:

1. Whether intelligence has a significant influence upon pupil achievement in home economics.
2. Whether a pupil's achievement in home economics can be foretold by the I.Q.

It is also hoped that it may result in more adequate guidance for high school pupils with regard to home economics subjects and that it may be of help to home economics teachers and administrators.

It is believed that the first statement can be answered by finding the correlation coefficient of the grades of a group of home economics students and the I Q's of these students. If the coefficient of correlation is a positive one of from .35 or .40 to .50 or .60 the conclusion will be warrant-

ed that the relation between achievement in home economics and intelligence is significant -- that the achievement tends to increase with the intelligence for the particular group being considered. If the coefficient is negative an inverse relationship would be indicated. A correlation might show a coefficient of zero - showing that no relation existed between the two factors being considered.

It is also believed that the correlation coefficient will answer, at least in part, the question as to whether a pupil's work in home economics can be foretold by the I Q. A sufficiently high correlation coefficient would indicate that the I Q had prognostic value for the individuals of the group. However a correlation coefficient might show a general tendency for one variable to increase as the other one increases and yet the relation might not be sufficiently uniform or close to make it possible to predict accurately for each individual case.

Whatever findings are shown however from this or similar studies all girls will continue to need an opportunity to have some home economics training. Certainly the girl of high I Q should have such training, for homes need the leadership that the most intelligent can give; and certainly the girl of low I Q, for she too will be a home maker and should have every help the community can give her.

As to whether the study will result in more adequate

guidance for high school pupils, with regard to home economics, and whether it will be of help to us as home economics teachers and administrators will depend not only upon the findings of the study but upon the use made of them. Oliver Wendell Holmes said,

There are one-story intellects, two-story intellects, and three-story intellects with sky lights. All fact collectors, who have no aim beyond their facts are one-story men. Two-story men compare, reason, generalize, using the labors of the fact collectors as well as their own. Three-story men idealize, imagine, predict; their best illumination comes from above, through the sky light.

CHAPTER II

HOME ECONOMICS OBJECTIVES

In the introduction there was a consideration of what is meant by intelligence and what the intelligence test measures. There was also a consideration of the relation between intelligence and achievement in certain school subjects. Now before proceeding with a study of the relation of intelligence and achievement in home economics it seems important to consider the scope of home economics and home economics objectives.

The following statement of aims gives a good present day view of the scope of home economics work which is included in most courses of study in addition to the particular skills of cooking and sewing.

- I. General Aims: Those of any course such as development of functioning ideals of workmanship, punctuality, responsibility, etc.
- II. Special Aims: To give girls a respect for, and an understanding of, the magnitude of the work of making a home by developing:
 1. An appreciation of what a home can be expected to do for its members and of the principles underlying the organization of a home that it may function,
 2. A scientific attitude toward the problems of household management,

3. An appreciation of women's responsibility particularly as:
 - (a) Spender of 75 to 90 percent of the income of the world,
 - (b) Selector of standards,
 - (c) Organizer,
 - (d) Guardian of health, mental, moral, and physical, of her family,
4. Ability to select diets,
5. Ability to select clothing from the standpoints of suitability, wearing qualities, workmanship, and cost,
6. An appreciation of family and civic housing problems and some solutions,
7. An appreciation of the aesthetic values of home life.¹

It can readily be seen that in the acquiring of such abilities, appreciations, and attitudes there would be need for, not only the processes of mental organization necessary in acquiring a skill as a fixed habit, but a hierarchical evolution to the grade of mental organization necessary for problem solving and gaining new attitudes and appreciations. It would seem, therefore, that for success in such a course, a sufficiently high level of intelligence to be capable of fairly good mental organizations would be necessary.

Among home economics teachers and administrators there has long been a realization that home economics is a much

¹Leona Florence Bowman, Problems In Home Economics Teaching. The University of Chicago Home Economics Series, The University of Chicago Press, 1925. P. 18.

larger field than simply the matter of cooking and sewing. They think of it as one of the important areas in the education of every girl. That this viewpoint is also coming to be understood by school administrators was shown when so large a number of administrators and advanced students of education ranked home economics first in promoting the seven cardinal principles of education. This ranking was given in a seven-year experiment carried on in one of our university schools of education.² The men and women, administrators and advanced students of education, by whom the ranking was made, were members of a course in extra-curricular activities. In connection with their readings and discussions of the philosophy of education they were asked to rate six school subjects and six extra-curricular activities according to their value in promoting the seven cardinal principles of education as set forth in United States Bureau of Education Bulletin, 1918, No. 35. In every one of the fourteen classes, over a period of seven years, home economics was ranked first.

It is very heartening to think of such a recognition of the wide social value of home economics, and an added interest seems to have been given to all studies that may help evaluate home economics education. There is much however to be done

²Roswell C. Puckett, "The Educator's Estimate of Home Economics in High Schools", Journal of Home Economics, Vol. XXVI (August 1934), p. 418.

by home economists before such a recognition becomes a general one and before some work in home economics is considered a necessary part of the training of all girls. The home economics program must continue to be kept in line with social and economic developments and there must be increased effort to shape public opinion regarding the importance and significance of home economics training to the homes and family life of the community.

In the early days of home economics education the emphasis was on cooking and sewing skills - the making of a cake of good texture, the sewing of a fine seam. The development of a sufficient skill is, of course, still considered an objective of home economics but it is far from being, as many think, the only objective. Skill may be thought of as the only objective because it is the most easily noticed one. One can understand how the attractive dress, the well served meal may be looked upon simply as an evidence of motor skill, and how other less noticeable objectives, for which the experiences were also provided, may be overlooked. The finished dress, for instance, may not give evidence, to one not familiar with the work, of the training in selection of a suitable style and material for the dress; in determining the size of pattern and the amount of material to be purchased; in the selection of the material with reference to quality, suitability, and amount of money to be spent; and in the

planning of good ways of procedure in the use of both pattern and material so that there will not be perhaps two sleeves for one arm or similar mistakes. They do not realize that there is this training in selection, in buying, and planning in addition to the training in the actual construction of a garment.

One who is not familiar with the work is apt, also, to overlook that the making of a dress and the serving of a meal has furnished opportunity for observation and guidance in significant behavior. Some of the most significant kinds of behavior which may be observed in home economics classes are responsibility, cooperation, ability in leadership, originality, and persistence. Of course home economics classes are not the only ones in which these desirable qualities are practiced but they furnish additional opportunities for developing these qualities, and the courses are planned with this in mind.

Health took its place among home economics objectives some years ago and has maintained its importance. The preparation of milk, vegetable, and fruit dishes has come to have a much more prominent place than formerly - in fact has almost taken the place of the less healthful recipes formerly taught. The wise choice of foods and a knowledge of the foods essential in the maintenance of health and in the protection from disease are an important part of all foods courses. The

effect of clothing upon health needs to be given more consideration, although many schools are doing effective work in this phase. Recently a class at Shortridge High School was asked, as a review of a clothing and health unit, to make posters which would show some of the ways that clothing might affect health. The result was quite an interesting group of posters showing seasonal clothing, rainy-day outfits, shoes, and clothing which allows for freedom of movement. The latter was worked out through a comparison of old and modern styles. The results of the project showed, however, that the girls had more knowledge on the subject than was functioning in the selection of their clothing.

Next came the realization that the economic and social aspects of the family belonged in the field of home economics and units in child care, family relationships, budgeting of money, home living, and the like were introduced. Now there are few schools in which home economics is taught that have not introduced some such units with the view to giving an intelligent understanding of the family, some of its problems, and its importance.

Recently the contribution that home economics can make to the all-round development and guidance of every individual has been more clearly recognized than ever before. Evidences of this are the ranking given home economics by educators, referred to above; the introducing in some schools of units

in personality development; and the adding of a unit on individual development and guidance in an advanced course for teachers in the School of Home Economics at Oklahoma Agricultural and Mechanical College.

Another important purpose, which home economics courses are coming to serve, is to make usable much of what is taught in other courses. Home Economics is related to so many other subjects that it could become a veritable clearing house for a whole curriculum. When beginning to list a few points of contact with other subjects one immediately thinks of the many points in common with the art department - points in color and line as applied to clothing and to the home. Probably no other subject than home economics could have more worthwhile contacts with the science department. There is opportunity to make certain phases of chemistry function in relation to the canning and baking lessons; to the care of clothing; and to the testing of textiles. There could be contacts with physics especially in relation to the use and care of household appliances. There is constant use of mathematical knowledge - estimates of materials needed, and the solution of problems such as, "Is it more economical to make or to buy ready to wear?" An idea of the mathematics which one uses in the home may give the girl for whom mathematics is difficult an idea that it is an essential part of her education. There are of course the contacts with the

English department which every subject has but in addition valuable ideals in the study of family relations could come through the study of home life as pictured in literature.

The textile enthusiast thinks she might almost teach history from the textile standpoint so there must certainly be points of contacts between the history and home economics departments which the average teacher can make use of in an integrating program. There is the part cotton has played in the history of our country. And the Industrial Revolution was so largely occasioned by the invention of machinery for spinning and weaving that the teacher of home economics, in contrasting earlier hand processes with the machine methods, can scarcely help but lead pupils to understand the facts and conditions which led to it. Other interesting points of contact might be costumes that mark certain periods or that are associated with certain historical characters; how styles and textile manufacturing have been effected by the political conditions of countries; and interesting clothing laws.

The home economics courses are also taking a place in the guidance program of many schools. The home economics teacher is introducing her classes to the values of home economics training not only as an avocation but as a vocation as well. The vocational opportunities into which the various phases of home economics training may lead are listed and discussed from the standpoint of qualifications, training, openings,

advantages, and disadvantages.

From this limited over-view of the scope and objectives of home economics, and from the following reasons why home economics occupies a place of significance in a functioning curriculum it is hoped that the subject may be recognized as one of importance.

Home Economics occupies a significant and essential place in the curriculum first, because its study makes for an intelligent understanding of the family and its position of supreme importance in our type of civilization.

A second reason for assigning home economics a place of significant importance is that its very subject matter and activities are an essential part of the concern of by far the largest group of our adolescent and adult female population.

In the third place, home economics courses are requisite for the development of specific abilities required in the most effective maintenance and direction of the modern home. ³

³W. E. Sheffer, "The Place of Home Economics In a Functioning Curriculum", Journal of Home Economics, September, 1935.

CHAPTER III

FINDINGS

The data for this investigation, as was stated in the introduction, consist of the I Q's of 281 Shortridge High School students and their achievements in home economics as represented by their grades. Table I shows the I Q of each of these students and the school grade representing her achievement in home economics. The pupils are ranked according to the intelligence quotient. The results of the analysis and comparisons of the data which were made in solving the problems of this study concerning the relation between achievement in home economics and intelligence are as follows.

The I Q's of the group show a wide range - a range from 72 to 153. The distribution is shown in Table II. It is a fairly normal one but skewed slightly to the right. According to the general classification of I Q's 49 per cent of the group would be considered of normal intelligence; 40 per cent would be classified as bright to gifted; and 11 per cent, as dull normal and borderline cases. The greatest number have I Q's of 100 to 109 and the average I Q is 108.06. Figure 1 shows graphically the distribution of the group with

TABLE I

INTELLIGENCE QUOTIENTS AND GRADES IN HOME
ECONOMICS OF 281 SHORTRIDGE HIGH SCHOOL PUPILS

Pupil	I Q	Home Economics Grade	Pupil	I Q	Home Economics Grade
1	153	B	21	130	C
2	151	A	22	129	B
3	147	A	23	128	A+
4	145	A	24	128	A
5	145	B	25	128	A
6	144	A	26	128	A
7	141	B	27	128	B
8	140	A	28	127	A
9	140	B	29	126	A
10	138	A	30	126	A
11	138	B	31	126	B
12	136	A	32	126	B
13	136	B	33	126	B
14	135	A	34	126	B
15	135	C	35	125	A
16	133	A	36	125	A
17	133	B	37	125	A
18	133	B	38	125	A
19	131	B	39	124	A
20	130	A	40	124	B

TABLE I (Continued)

Pupil	I Q	Home Economics Grade	Pupil	I Q	Home Economics Grade
41	123	A+	61	118	A
42	123	A	62	118	B
43	123	A	63	118	B
44	123	B	64	118	B
45	122	A	65	117	A
46	122	B	66	117	A
47	122	B	67	117	B
48	121	A	68	117	B
49	121	B	69	117	C
50	121	B	70	116	A
51	121	B	71	116	A
52	121	B	72	116	A
53	120	A	73	116	A
54	120	B	74	116	B
55	120	B	75	115	A+
56	120	B	76	115	A
57	118	A	77	115	A
58	118	A	78	115	A
59	118	A	79	115	A
60	118	A	80	115	A

TABLE I (Continued)

Pupil	I Q	Home Economics Grade	Pupil	I Q	Home Economics Grade
81	115	B	101	111	A
82	115	B	102	111	A
83	115	B	103	111	B
84	115	B	104	111	B
85	115	B	105	111	B
86	115	B	106	111	B
87	115	C	107	111	B
88	114	A	108	111	C
89	114	A	109	111	C
90	114	A	110	110	A
91	114	A	111	110	B
92	114	B	112	110	B
93	114	C	113	109	A+
94	113	A	114	109	A
95	113	C	115	109	A
96	113	C	116	109	A
97	112	A	117	109	B
98	112	A	118	109	B
99	112	B	119	109	B
100	112	C	120	109	C

TABLE I (Continued)

Pupil	I Q	Home Economics Grade	Pupil	I Q	Home Economics Grade
121	109	C	141	106	B
122	108	A	142	106	B
123	108	A	143	106	B
124	108	A	144	106	B
125	108	A	145	106	B
126	108	A	146	106	B
127	108	B	147	106	C
128	108	B	148	106	C
129	108	B	149	105	A
130	108	B	150	105	A
131	108	C	151	105	B
132	107	A	152	105	B
133	107	A	153	105	B
134	107	B	154	105	B
135	107	B	155	105	B
136	107	B	156	105	C
137	107	C	157	105	C
138	107	C	158	105	C
139	106	A	159	104	A
140	106	A	160	104	A

TABLE I (Continued)

Pupil	I Q	Home Economics Grade	Pupil	I Q	Home Economics Grade
161	104	A	181	102	A+
162	104	A	182	102	A
163	104	A	183	102	B
164	104	B	184	102	B
165	104	B	185	101	A+
166	104	B	186	101	A+
167	104	B	187	101	A
168	104	B	188	101	A
169	104	B	189	101	B
170	104	B	190	101	B
171	104	B	191	101	B
172	104	C	192	101	B
173	104	C	193	101	B
174	104	D	194	101	C
175	103	A	195	100	A
176	103	A	196	100	A
177	103	A	197	100	A
178	103	B	198	100	B
179	103	C	199	100	B
180	103	C	200	100	B

TABLE I (Continued)

Pupil	I Q	Home Economics Grade	Pupil	I Q	Home Economics Grade
201	100	C	221	96	A
202	99	A	222	96	B
203	99	B	223	96	B
204	99	B	224	96	B
205	99	B	225	96	B
206	99	C	226	96	C
207	99	C	227	95	A
208	99	C	228	95	A
209	99	C	229	95	B
210	98	A+	230	95	B
211	98	A	231	95	C
212	98	B	232	94	B
213	98	C	233	94	B
214	98	C	234	94	B
215	98	C	235	94	B
216	97	B	236	94	C
217	97	B	237	93	A
218	97	C	238	93	C
219	96	A	239	93	C
220	96	A	240	93	D

TABLE I (Continued)

Pupil	I Q	Home Economics Grade	Pupil	I Q	Home Economics Grade
241	92	B	261	86	B
242	91	A	262	86	C
243	91	A	263	86	C
244	91	D	264	86	C
245	90	A	265	85	B
246	90	B	266	85	C
247	90	B	267	85	D
248	90	B	268	84	B
249	90	D	269	84	B
250	90	D	270	84	C
251	89	A	271	83	B
252	89	C	272	83	C
253	89	D	273	83	C
254	88	A	274	83	C
255	88	C	275	83	D
256	87	A	276	83	D
257	87	B	277	82	C
258	87	B	278	80	C
259	87	D	279	79	C
260	86	B	280	73	D
			281	72	D

TABLE II
 DISTRIBUTION OF I Q'S OF 281 STUDENTS OF
 HOME ECONOMICS

I Q Interval	Frequency	Per cent of Group
150	2	.7
140 - 149.9	7	2.4
130 - 139.9	12	4.2
120 - 129.9	35	12.4
110 - 119.9	56	19.9
100 - 109.9	89	31.6
90 - 99.9	49	17.4
80 - 89.9	28	9.9
70 - 79.9	3	1.
Total	281	

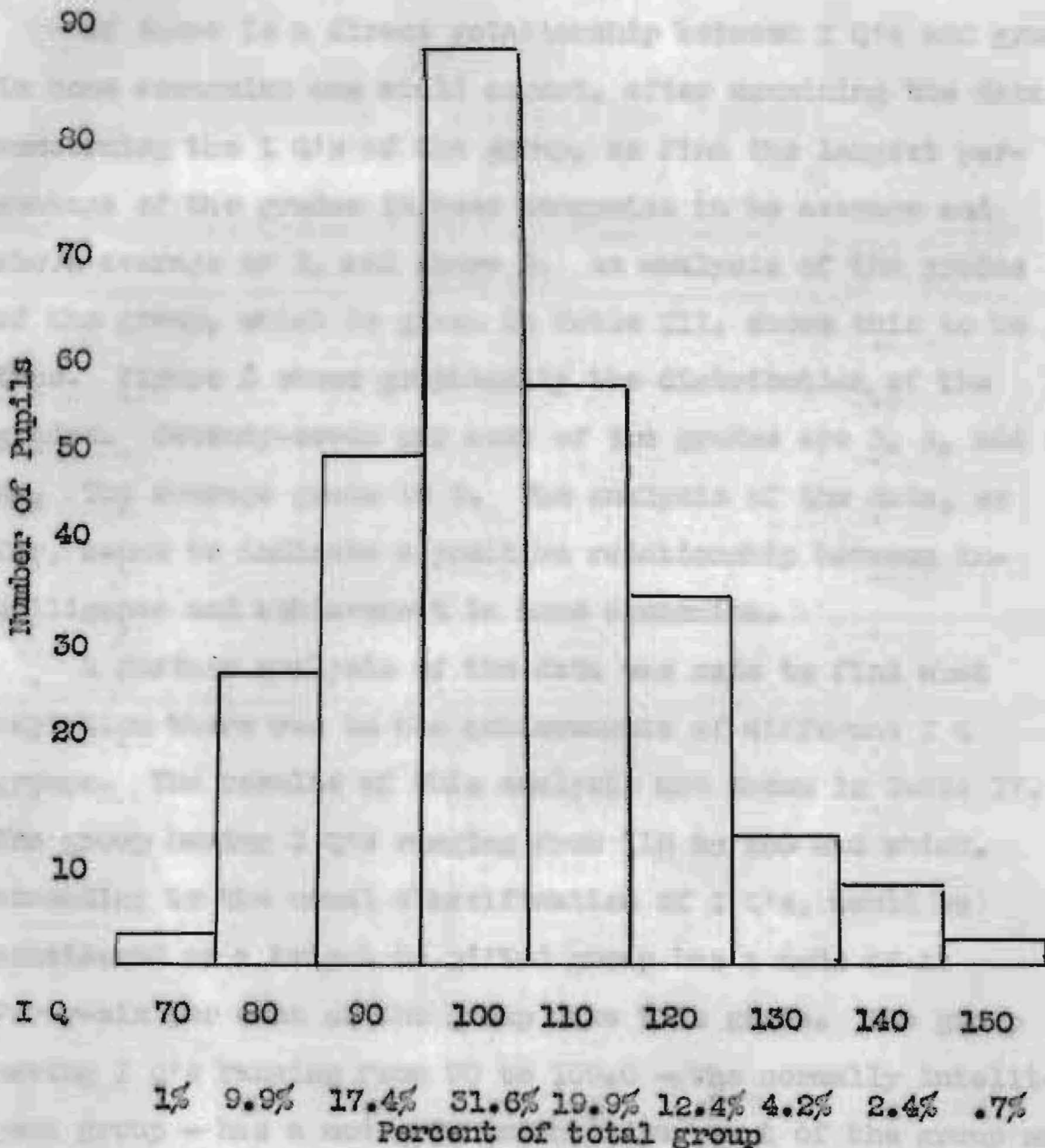


Figure 1. ILLUSTRATING THE DISTRIBUTION OF I Q'S GIVEN IN TABLE II.

regard to the I Q's.

If there is a direct relationship between I Q's and grades in home economics one would expect, after examining the data, concerning the I Q's of the group, to find the largest percentage of the grades in home economics to be average and above average or B, and above B. An analysis of the grades of the group, which is given in Table III, shows this to be true. Figure 2 shows graphically the distribution of the grades. Seventy-seven per cent of the grades are B, A, and A+. The average grade is B. The analysis of the data, so far, seems to indicate a positive relationship between intelligence and achievement in home economics.

A further analysis of the data was made to find what variation there was in the achievements of different I Q groups. The results of this analysis are shown in Table IV. The group having I Q's ranging from 110 to 153 and which, according to the usual classification of I Q's, would be considered as a bright to gifted group has a mode of A. Forty-six per cent of the group make this grade. The group having I Q's ranging from 90 to 109.0 - the normally intelligent group - has a mode of B with 41 per cent of the group making this grade. The lowest group with I Q's from 72 - 89.9 has a mode of C with 41 per cent of the group making C. The mode for each group shows an increase in achievement for each group of higher I Q. This analysis again indicates a direct or positive relationship between intelligence and

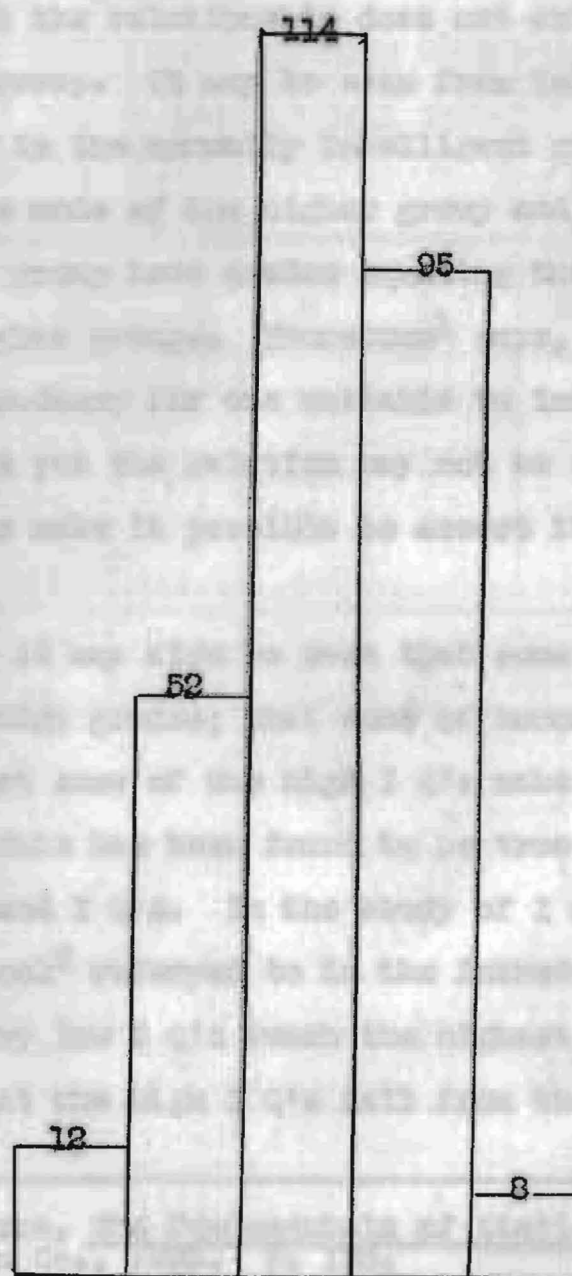
TABLE III
 DISTRIBUTION OF GRADES OF 281 STUDENTS
 OF HOME ECONOMICS

Grade	Frequency	Per cent of Group
A+	8	2.84
A	95	33.80
B	114	40.56
C	52	18.50
D	12	4.27
Total	281	

Grade

Percent of total group 4.27 18.50 40.56 33.80 2.84

Figure 1. Illustration of the distribution of grades given in Table III.



Grade	D	C	B	A	A+
Percent of total group	4.27	18,5	40.56	33.8	2.84

Figure 2. ILLUSTRATING THE DISTRIBUTION OF GRADES GIVEN IN TABLE III.

achievement in home economics. The overlapping of grades in each group, however, shows that the relation is not a perfect one - that is, that the relationship does not exist for each individual of the group. It may be seen from Table IV that a number of pupils in the normally intelligent group have grades equaling the mode of the higher group and also that some in the lowest group have grades equaling the mode in each of the two higher groups. Thurstone¹ says, that there may be a general tendency for one variable to increase as the other increases and yet the relation may not be sufficiently uniform or close to make it possible to assert it for each individual case.

From Table IV it may also be seen that some of the lowest I Q's make high grades; that some of normal intelligence fail; and that some of the high I Q's make average and poor grades. This has been found to be true in other studies of grades and I Q's. In the study of I Q's and grades in high school² referred to in the introduction it was stated that very low I Q's reach the highest level of performance and that the high I Q's fall from the highest to

¹L. L. Thurstone, The Fundamentals of Statistics. New York, The MacMillan Co., 1925. P. 193.

²S. B. Yacknowitz and L. Frankel, Loc. Cit.

TABLE IV

COMPARISON OF ACHIEVEMENT IN HOME ECONOMICS
OF THE BRIGHT TO GIFTED GROUP; THE NORMALLY
INTELLIGENT GROUP; AND THE DULL NORMAL
TO BORDERLINE GROUP

I Q Interval	Grade in Home Economics					Mode
	A+	A	B	C	D	
110 - 153	3	52	47	10	0	A
90 - 109.9	5	40	59	29	5	B
72 - 89.9	0	3	8	13	7	C
Total	8	95	114	52	12	

the lowest group.

The problem now became, how close is the relationship between intelligence and achievement in home economics for this group. After the measure of relationship between the two variables has been found there will then be the problem of interpreting its significance and determining whether it is of particular value.

The correlation methods in statistical work have been developed to facilitate the study of relations between variables where the records show considerable scatter - such as is shown in these data.

The data used in determining the relationship between the intelligence of this group and their achievement in home economics are shown in Table V, plotted in the form of a correlation table. From this it is again apparent that there is a general tendency for the grades to increase from each class interval in I Q to the next higher interval in I Q. This is shown by the tendency to a diagonal arrangement of the frequencies. The lack of a perfect diagonal arrangement of the frequencies again indicates the imperfect relationship. No noticeable diagonal arrangement of the frequencies would have indicated no relation between the two variables; or if there had been an inverse or negative relationship the diagonal would have been in the opposite direction. The correlation coefficient between the I Q's and grades in home

economics of these 281 students is $.41 \pm .03$.

Rugg states, as referred to on page 16 of the introduction of this study, that a correlation coefficient ranging from .35 or .40 to .50 or .60 indicates that the correlation is "marked". Therefore, according to Rugg the correlation between intelligence and achievement in home economics for this group would be considered a marked positive correlation. The authors of the study of I Q's and grades in high school,³ also referred to in the introduction, found the correlation coefficient to be .41, the same as was found in this study. Judging from these results it would seem that there is the same general relationship between intelligence and achievement in home economics as there is between intelligence and achievement in other high school subjects.

It is believed that the interpretation of the correlation coefficient and its probable error found in this study would be, that for this particular group there is a significant tendency for those who have the highest I Q's to make the highest grades in home economics and for those who have the lowest I Q's to make the lowest grades in home economics. Furthermore, while there is fairly good evidence of the existence of this tendency as a whole, the tendency is not universal enough to base individual prediction upon it. The

³S. B. Yacknowitz and L. Frankel, Loc. Cit.

TABLE V

I Q'S AND GRADES IN HOME ECONOMICS
of 281 STUDENTS

$$r = -.41 \pm .03$$

I Q	Grades					Total
	D	C	B	A	A+	
150			1	1		2
140-149			3	4		7
130-139		2	5	5		12
120-129			17	16	2	35
110-119		8	21	26	1	56
100-109	1	16	39	29	4	89
90- 99	4	13	20	11	1	49
80- 89	5	12	8	1		26
70- 79	2	1				3
Total	12	52	114	95	8	281

analysis indicates that while the I Q's of the group tend to predict the grade of work which can be expected as a group every individual may not measure up to her I Q in achievement or may surpass in achievement what may be expected from one of her I Q. Therefore an individual I Q can not always be depended upon to foretell achievement in home economics.

The data show that three pupils in the I Q interval 80 - 89, and twelve pupils in the interval 90 - 99 had grades of A and A+. On the other hand a pupil with an I Q of 150 and three pupils in the I Q interval 140 - 149 made grades of B; and two pupils in the I Q interval 130 - 139 made grades of C. Such variations indicate that it will be necessary to consider factors other than the I Q in order to foretell a pupil's success in home economics.

Just what these factors are would be interesting and helpful data in the guidance of students and would make a worthwhile study concerning this or other groups. While the determining of such factors may not be relevant in the solving of the problems set forth in this study it is interesting to note some of the factors that the teachers of this group feel were influential in aiding a student in making a higher grade than might be expected of one of her I Q or, on the other hand, that kept her from measuring up to her I Q.

Pupil A, I Q 153, grade B. -- Home economics work was a new experience. She was very anxious to do the work but

always fearful that she was not doing as well as someone else in the class. Her grades in other subjects were the highest and evidently she felt a responsibility of reaching the same high mark in home economics. Had the teacher realized this in time the emotional disturbance might have been overcome.

Pupil B, I Q 135, grade C. -- In this case there was a lack of good work habits necessary for a great degree of success in anything. This may have been partly due to her physical condition. Her grades in other subjects were about the same as in home economics.

Pupil C, I Q 130, grade C. -- In this case the home conditions were not normal. Part of her time was spent with the mother and part with the father. A lack of a wholesome home atmosphere seemed to result in an attitude of satisfaction with very mediocre achievement.

Pupil D, I Q 117, grade C. -- Too many outside interests was the factor responsible for this grade.

In trying to account for the high grades of some of the low I Q's the following pupils were cited:

Pupil C, I Q 89, grade A. -- Industry and good work habits seemed to be her outstanding traits. She too may have been one of the individuals who, according to Spearman, has a large degree of special ability which enabled her to succeed in this subject even though her general intelligence was low.

Pupil F, I Q 91, grade A. -- A determination to succeed together with a spirit of elation that came from being able to help others at her table -- these factors and unusual habits of industry contributed much to her achievement.

These cases probably give instances of comparatively few of the factors, other than intelligence, which are influencing pupils' achievements. A study of such factors would no doubt reveal many others such as, pupil's study load, interest in the subject, and attitude toward the teacher. The listing of a few such cases, however, is sufficient to help one realize that factors other than intelligence are influencing the learning process and that such factors must be taken into consideration before the most economical and efficient ways of teaching can be devised.

CHAPTER IV

CONCLUSIONS AND RECOMMENDATIONS

Summary of Method of Procedure.-- The following summarizes the study described in the preceding pages:

1. The I Q's and grades of 231 students in home economics were compiled.
2. The data consisting of the grades in home economics and the I Q's of these 231 students were analyzed and compared.
3. The findings were interpreted according to such authorities as Dr. Harold O. Rugg and Dr. Paul L. Boynton, and also by comparing the findings of this study with the findings of similar studies in other subjects.

Conclusions.--- The analysis of the data for this study of achievement in home economics and student intelligence seems to justify the following conclusions:

1. That there is a marked positive relation between achievement in home economics as indicated by grades and intelligence as indicated by I Q's.
2. That while the relation between achievement and intelligence is marked the correlation is not sufficiently

high or the relation sufficiently perfect to warrant expecting a change in grade, for every observation, proportional to the change in I Q.

3. That while the I Q's will signify in general the work in home economics which may be expected from this group or from similar groups, the results of the study do not warrant using the I Q alone to prognosticate individual success in home economics.

Recommendations.-- While the present investigation reveals a marked relationship between achievement in home economics and intelligence the sampling may not have been sufficiently large for the findings to be considered applicable to all groups of home economics students. However the results seem significant enough to warrant the following statement to home economics teachers:

That, although this study has shown a positive relation between grades in home economics and I Q's, the fact that some low I Q's reached a high level and some high I Q's fell to a low level of achievement indicates that there are other factors than intelligence affecting the performance of work in the class room. Therefore since there is no sharp cleavage, in this investigation, between I Q's and performance it is suggested that increased attention and study be given (1) to determining the factors, other than intelligence, which may be stimulating the low I Q to perform better and (2) to

determining the factors which may be tending to make the high I Q do work far below the level of which she is capable. When such factors are recognized ways of using them, in the one instance, and of counteracting them, in the other, can no doubt be found.

The results of this investigation of the relation between intelligence and achievement in home economics seem also to warrant these statements to guidance sponsors:

1. That since there is this evidence of a positive relationship between intelligence and achievement in home economics it is believed that the girl of low I Q should not be placed in home economics classes with the expectation that she can succeed there even though she can not succeed in other subjects.

2. That since there is this evidence that there is a positive relation between intelligence and achievement in home economics it is suggested that home economics be more often recommended as a subject of interest and of value to the girl of high I Q as well as recommended to the girl of low I Q.

The results of the study may also warrant the following statement to still another group -- to the administrators of home economics:

Since this study gives evidence of a marked positive relationship between intelligence and achievement in home

economics and since it is seldom possible to classify students in home economics with reference to intelligence it is suggested that increased attention be given to courses of study in this subject. It is believed that courses of study must be broad enough and flexible enough so that the girl of low I Q will find work in which she can attain a degree of success and at the same time the girl of high I Q find work that will interest her and challenge her ability.

1. *Journal of Home Economics Education*, Vol. 1, No. 1, 1910, p. 10.

2. *Journal of Home Economics Education*, Vol. 1, No. 2, 1910, p. 15.

3. *Journal of Home Economics Education*, Vol. 1, No. 3, 1910, p. 20.

4. *Journal of Home Economics Education*, Vol. 1, No. 4, 1910, p. 25.

5. *Journal of Home Economics Education*, Vol. 1, No. 5, 1910, p. 30.

6. *Journal of Home Economics Education*, Vol. 1, No. 6, 1910, p. 35.

7. *Journal of Home Economics Education*, Vol. 1, No. 7, 1910, p. 40.

8. *Journal of Home Economics Education*, Vol. 1, No. 8, 1910, p. 45.

9. *Journal of Home Economics Education*, Vol. 1, No. 9, 1910, p. 50.

10. *Journal of Home Economics Education*, Vol. 1, No. 10, 1910, p. 55.

BIBLIOGRAPHY

- Bowman, Leona Florence, Problems In Home Economics Teaching. The University of Chicago Home Economics Series. The University of Chicago Press, 1925. P. 18.
- Boynton, Paul L., Intelligence Its Manifestations and Measurements. D. Appleton and Co., 1933.
- Gordon, George, "Relation of the Pupils' Intelligence Quotients to Their Grades in High School Shops", Industrial Education Magazine, January 1929.
- Kaulfers, W. F., "Effect Of The I Q On The Grades Of One Thousand Students of Foreign Languages", School and Society, August 3, 1929.
- Mursell, James L., The Psychology of Secondary School Teaching. New York: W. W. Norton & Co., 1932.
- Puckett, R. C., "Educators Estimate of Home Economics in High School", Journal of Home Economics, August, 1934.
- Richter, Rose, "The Predictive Value of I Q's for Success in Algebra", High Points In the Work of the High Schools of the City of New York, October 1934.
- Thurstone, L. L., The Fundamentals of Statistics. New York, The MacMillan Co., 1925, p. 193.
- Yacknowitz, S. B., and Frankel, L., "Study of the Relation Between the I Q's of Pupils in the Walton High School and Their Work in the Classroom", High Points, September, 1932.