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Chinese Students in America:
Qualities Associated with Their Success

By

JENNINGS PINKWEI CHU

Submitted in Partial Fulfillment of the
Requirements for the Degree of Doctor of
Philosophy in the Faculty of Philosophy
Columbia University

Published by
Teachers College, Columbia University
New York City
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JENNINGS P. CHU

New York City,
April, 1922

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Chinese Students in America: Qualities Associated with Their Success

CHAPTER I

STATEMENT OF THE PROBLEM

For the past fifty years, China has made a practice of sending students to the United States to be educated in American colleges and universities. Many psychological problems have arisen in connection with this practice, which, fundamental and important as they are, have never been solved or even explicitly formulated. A solution of them, however, would greatly aid in the improvement of methods for the preparation and selection of these students.

With the steady growth of the number of Chinese students in America and with the increasing emphasis placed upon the value of their American education in recent years, these psychological problems have come more and more to the fore. The need of a logical statement of some of them and of a scientific attempt towards their solution is manifest and pressing. Fortunately, the science of mental measurement, which has recently made great progress in America, will directly lend itself to the solution of these problems and indirectly open a new field in China for educational experimentation, of which the present investigation may be a beginning.

The problem in connection with the education of Chinese students in America emanates from a consideration of their success as a result of that education. Briefly stated, it comprises the following:

1. What should be considered as success of a Chinese student in America?
2. What are some of the qualities associated with it?
3. How are they related to it?
4. How are they related to one another?
5. How can the optimum amount of success be secured in the light of our knowledge of its relationship to the qualities associated with it?
6. What should be the proper method for the preparation and selection of the prospective Chinese student in America?

Questions 1 and 2 will be answered in the following paragraphs. It is in an attempt to answer questions 3, 4, 5, and 6 that the present investigation is undertaken.

Before any attempt is made to find out the relationship between success and the qualities associated with it, the first two questions proposed in the statement of the problem need to be answered. First, what should be considered as success of a Chinese student in America? Elusive and comprehensive as it may seem at first sight, success of a student may be said to be of two kinds: academic and non-academic. For this study, scholarship has been chosen as indicative of academic success and leadership as indicative of non-academic success. This twofold classification is unavoidable, inasmuch as the career of a student is devoid of any professional specialization that will give a single indication of his total life success.

A complete answer to the second question—What are some of the qualities associated with success?—presents almost insuperable difficulties. The total qualities associated with success, be it in the form of scholarship or leadership, are perhaps so numerous and overlapping that any attempt to list them short of an exhaustive study of all desirable human traits by means of regression equations would seem to fail in its purpose. We can enumerate off-hand under scholarship, for instance, such qualities as intelligence, industry, ambition, language ability and concentration, and under leadership such qualities as personality, character, initiative, decisiveness and force. These qualities in each group, however, overlap a great deal and our knowledge of them is at present so inadequate that it would seem difficult, if not impossible, to measure them objectively.

On the other hand, knowledge of English and knowledge of Chinese have been chosen as qualities associated with both scholarship and leadership, and this for various reasons. In the first place, in the judgment of the writer from the beginning of his investigation, these two qualities might be uncorrelated or independent of each other. This was found to be the case, as will be shown in the body of the thesis. Second, these qualities can be objectively measured, it being possible to get measures of them by means of tests and school marks in these languages. Third, in actual practice, the selection of a prospective Chinese student in America has been largely determined by his achievement in the knowledge of English and Chinese, as is so well exemplified by the competitive examina-

tion held in China for the purpose of selecting such students, in which tests of a knowledge of these two languages constitute two-thirds of the requirements.

This, then, brings out a more technical statement of the problem, namely, a study of the intercorrelation between scholarship, leadership, knowledge of English and knowledge of Chinese among Chinese students in American colleges and universities, based on such objective data as will be presently described.

CHAPTER II

EXPERIMENTAL MATERIAL

I. THE SUBJECTS

The subjects for this investigation were 664 Chinese students in America distributed among the following college and university centres: the number in parentheses after each college or group of colleges is the number of subjects from that college or group of colleges studied in this investigation: Baldwin Wallace College (9); University of Chicago (35); University of Cincinnati (6); Coe College, Iowa (8); Cornell University (46); University of Detroit (11); George Washington University (14); Grinnell College (4); Harvard University (37); Johns Hopkins University and University of Maryland (10); Leland Stanford Jr. University (11); Lehigh University (9); Marquette University, Milwaukee (14); Massachusetts Institute of Technology (26); Michigan University (45); University of Minnesota (12); New York University (20); Northwestern University (7); Oberlin College (20); Ohio State University (17); Oregon Agriculture College (7); University of Pennsylvania (22); Pomona College (6); Purdue University (18); University of Rochester (5); Schenectady Chinese Students' Club (3); Syracuse University (18); University of Washington, Seattle (14); University of Wisconsin (6); Yale University (15) and a group of girl students from Vassar College, Wellesley College, Bryn Mawr College and Mount Holyoke College amounting to (9). In the accompanying table is shown the distribution in these American colleges and universities of the Chinese students embodied in this study:

NUMBER OF STUDENTS	NUMBER OF COLLEGES
<i>over</i> 50	1
40-49	3
30-39	3
20-29	4
10-19	12
4- 9	14
	<hr/>
	37

It must be remembered that the numbers of students in the foregoing table are the ones that were embodied in this study, while the actual numbers in these colleges are in many cases a little larger and in a few cases twice as large.

Among these students are included both the undergraduate and graduate students. High school students and those engaged in full time teaching are excluded from this study. They all represent students from China, of whom two-fifths depend, for their maintenance, upon either government or special scholarships and the other three-fifths upon their parents or relatives or upon themselves. In the analysis of facts, no distinction is made as to the course of study they take, or age and sex, or maintenance.

2. THE DATA

In order to make a study of these subjects in respect to their scholarship, leadership, knowledge of English and knowledge of Chinese, it was found necessary to gather all the relevant data then available. Inasmuch as the crux of the problem consists in the finding of the proper relationships of these four qualities rather than any objective measurement of them according to certain standardized criteria, the effort was focused upon a procedure whereby such relationships as should exist between them could be best secured. Therefore, the judgment of associates in the form of rankings was used, with all possible protection against certain defects inherent in the method, and validated by such other possible measures then available as high school marks, college marks, tests, and personal records. These sources of data were secured in the following manner.

The Judgment of Associates. The fact that the Chinese students in America generally group themselves in different college centres in small numbers, all associated closely with each other, and therefore thoroughly acquainted with one another, offers an opportunity seldom found elsewhere for ranking. For this study, in the case of those centres where the number of students exceeded twenty-four, the total number was divided into several convenient groups on the basis of mutual acquaintance or other affiliations. For the purpose of ranking, a number larger than twenty-four would be too unwieldy for any judge to make the ranking accurate, and a group smaller than four could hardly make the ranking significant. Consequently,

the size of groups in this study varies from four to twenty-four. The accompanying table will show the distribution of the number of groups of these 664 Chinese Students in America.

SIZE OF RANKING GROUP (i.e. No of Students Rated)	NO. OF GROUPS
20-24	8
15-19	12
10-14	14
5- 9	26
Less than 5	<u>4</u>
	64

The form of the original directions for the ranking sheet is reproduced here.

DIRECTIONS FOR THE RANKING SHEET

On the next page you will find a list of names of Chinese students in your locality or school, whom I presume you know well. Look the list through. If there are persons whom you do not know well, omit their names by marking a cross (X) after each. Omit also your own name by marking a cross (X) after it. These marked names will not be considered. Having done so, please observe the following procedure:

1. Look through the rest of the names. Decide which one in your judgment would be the best in Scholarship (See Definitions below), and put a figure "1" after his or her name in the Scholarship column.

2. Next decide which one would be the second best in Scholarship and put a figure "2" after the name in the same column. Next decide which one would be the third best in Scholarship and put a figure "3". Continue the same process until the Scholarship column has in it figures 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and so on, representing the ranks of these students from best to poorest in Scholarship.

3. Proceed likewise with each of the remaining columns, considering the rank each person would have in Leadership, Knowledge of English, and Knowledge of Chinese. (See Definitions below.)

DEFINITIONS

Scholarship: means ability in studies, as shown by school standing, degrees, honors, and other signs or evidences.

Leadership: means ability to take initiative, willingness to assume responsibility and ability to inspire confidence in others.

Knowledge of English: means knowledge to understand printed and oral English and to express well orally and in writing.

Knowledge of Chinese: means knowledge to understand printed Chinese and to express well in writing.

RANKING SHEET

The ranking sheet is divided into five vertical columns, headed with the following captions: Name, Scholarship, Leadership, Knowledge of English, and Knowledge of Chinese, as shown on page 14, in which it has been filled with rankings and their transmutations.

In April, 1920, these ranking sheets were sent with return envelopes to 926 Chinese students grouped under 62 college or university centres. Out of these, 465 or a little over 50 per cent returns were received. This means that on the average each person is ranked or judged by half of the people in the group in which he is one. This is evidenced by the later finding that the largest number of judgments given to a person is 12 which is one half of the total number of 24 on the list.

The individual who is judging may not know well enough all the qualities in the individuals judged. This results in a different number of people within a group being ranked by the same judge for the four qualities. Thus judge X in group Q judges 22 people of his group for scholarship, 23 for leadership, 23 for knowledge of English, and 14 for knowledge of Chinese.

Thus in all we find there are 656 people ranked in scholarship; 631 in leadership; 664 in knowledge of English; and 590 in knowledge of Chinese. This would mean that the Chinese students know most about the knowledge of English of their associates and least about their knowledge of Chinese.

Individual Records. In connection with the ranking sheet, a questionnaire was sent out for the purpose of gathering individual records which would later on lend themselves to the validation of the rankings. The original sheet is here reproduced.

QUESTIONNAIRE

1. Name and address.....
2. School attending.....Major course.....
3. Degrees obtained (where and when).....
4. How many years of English did you have in China?.....
5. School in China where you got most of your English.....
6. When did you come to the U. S. A.? Month.....Year.....
7. Since coming here, if you have been president, vice-president, secretary, general secretary, treasurer, or manager, please fill out the following:

<i>Name of Organization</i>	<i>Name of Office Held</i>	<i>Year to Year</i>
.....
.....
.....

8. If you have been editor, contributor, or reporter of any magazines, Chinese or English, please fill out the following:

<i>Name of Magazine</i>	<i>Name of Position Held</i>	<i>Year to Year</i>
.....
.....
.....

9. If you have written books either in Chinese or in English, please fill out the following:

<i>Title of Book</i>	<i>Pages</i>	<i>Publishing Co.</i>	<i>Date of Publication</i>
.....
.....

10. If you have been awarded any scholarship, fellowship, assistantship, or instructorship, please fill out the following:

<i>Position</i>	<i>School</i>	<i>Subject</i>	<i>Year to Year</i>
.....
.....

11. If you belong to any honorary American fraternities, please fill out the following (e. g., Phi Beta Kappa, Sigma Xi, etc.):

<i>Name of Fraternity</i>	<i>School</i>	<i>When Elected</i>	<i>For Excellence in What Subject</i>
.....
.....

12. Mention any other honors which have come to you (e. g., graduated with honor, etc.).....
-

A brief inspection of the questions will show that each one has its specific purpose and most of them are related to the four qualities in our study. The evaluation of these questions is found in Chapter VI.

Test Scores in English. Knowledge of English was the only quality, of which an objective measure could be secured by means of tests. Four sets of English tests were given to 42 of the subjects from eight different college centres, namely, Harvard, Yale, Columbia, New York University, University of Pennsylvania, Massachusetts Institute of Technology, Johns Hopkins University, and University of Maryland. These four sets are (1) Thorndike Alpha 2, Part II, (2) Reading Test I¹, (3) Reading Test II¹, and (4) Thorndike

¹Reading tests I and II are of the type used in parts II and III of the Thorndike Intelligence Examination for High School graduates, Series 1919-1923.

Vocabulary Test. Alpha 2, Part II, is known to all who are familiar with tests. Reading Test I and II are each made of four parts. The vocabulary test is made of five parts. In order to show the degree of difficulty of the reading and vocabulary tests, a part of each is shown below.

SAMPLE OF READING TEST

Continuous improvements have enabled engineers to reproduce machinery of less and less weight for the same power, and at the same time to reduce the spaces required for its accommodation, the vibrations due to the working of the engines, and the consumption of fuel per horse power. For engines of high power, quadruple expansion has sometimes been adopted, scientific methods of balancing have been employed, improved qualities of steel and bronze have been introduced, the rate of revolution has been increased, and forced lubricating fitted. In the boilers higher steam pressures have been used, superheating in some cases being resorted to; the rate of combustion has been accelerated by supplying air under pressure in the stockhold or in the furnaces, and sometimes by placing fans in the exhaust to draw the air and products of combustion more rapidly through the fires; the former being known as *forced draught* and the latter as *induced draught*. In the navy, with the view of saving weight, water-tube boilers have been adopted, but boilers of this type have not yet been generally fitted in the mercantile marine. Steam pressures now in common use vary from 100 to 180 lb. per sq. in. in cargo ships; from 140 to 220 lb. in passenger ships, including the large Atlantic liners; from 210 to 300 lb. in large warships where water tube boilers are used; while in the destroyers and other classes of warships in which small water-tube boilers are used it varies from 180 to 230 lb. per sq. in.

1. Of the improvements noted, which do you think is the main cause of the reduction in vibration?
2. What do you think is superheated?
3. What feature of an ordinary stove would correspond to the exhaust?
4. Give two words which mean the same as "fitted" as used in line 7.
5. Name one product of combustion which would not be drawn through the fire by an induced draught.
6. Which of the reductions noted do you attribute most particularly to the increased rate of revolution?

SAMPLE OF VOCABULARY TEST

A I

Write Ha before every word that means something done with hands.

Write F before every word that means something done with feet.

Write E before every word that means something done with eyes.

Write M before every word that means something done with mouth.

Write T before every word that means a tool.

Write B before every word that means a part of the body.

Write S before every word that means a part of the house.

Write H before every word that means about ships, the sea, and sailing.

pulverize	jamb	regurgitate
ratchet	espy	scourge
scour	spinnaker	clamor
gape	slander	gimlet
adze	perambulate	glower
laud	quaver	polka
lugger	gable	mandrel
spokeshave	lathe	pancreas
converge	prate	newel
cajole	alcove	transcribe
wainscot	expostulate	fibula
pirouette	ulna	roam
brig	jettison	calipers
larynx	calumnate	upbraid
purses	wherry	cochlea
limn	dermis	dhow
ilium	swage	

High School Marks in China. High school marks in China were secured for 84 of the subjects. These marks, covering four years in high school, comprise (1) general averages, (2) marks in English, and (3) marks in Chinese. They were used to check up the validity of the judgment in the corresponding qualities and for the prediction of academic success in America on the basis of that in China. The detailed nature of these marks will be described in Chapter IV.

College Marks in America. Since not many students take any course in English and certainly none would take any in Chinese in America, the college marks in America are confined only to general averages as indications of scholarship. Marks of 122 students were secured from the Chinese Educational Mission and the Educational Bureau of the Chinese Ministry of Education, Washington, D. C. They were marks of different subjects and covered different numbers of years according to individual cases.

CHAPTER III

THE JUDGMENT OF ASSOCIATES

The judgment of associates in respect to a number of human traits, to result in high validity and reliability, must needs meet several rigorous conditions. First, there must be a thorough acquaintance among those who judge one another; second, the judgments must be comparable; third, the final judgment of a person in a particular trait must be the average of as many judgments as can be secured; fourth, there must be a common understanding of the trait to be judged. In this study, the first condition is well met by the unique situation of the Chinese students, in which they cultivate their familiarity to a high degree through meetings, discussions, conferences and all kinds of publications both in English and Chinese. The second condition has to be met by adequate statistical treatment as will be explained later. The third and fourth conditions are both rigorously conformed with.

I. TRANSMUTATION OF RANKINGS INTO SIGMA POSITIONS

When the rankings were returned, it was found that they were extremely unwieldy and irregular. For instance, in the same quality, say scholarship, a person might be ranked as one among 8 people by one associate, and then as one among 11 people by another. Supposing that he is ranked by both as the third, evidently the third among 8 people is not as high as the third among 11, for there are more cases in the latter. Again, it was also found that, on the same sheet ranked by any judge, under scholarship 18 people might be ranked; then under leadership 15 people might be ranked; under knowledge of English perhaps 19 people; under knowledge of Chinese most likely only 14 people. The difficulties with the way of obtaining correlations by means of Spearman's formula for ranking, are apparent. In order to surmount these two difficulties pointed out above, it was imperative to transmute these ranking values of 1, 2, 3, 4, 5, etc., into some other terms so that the third among 8 will have a different value from a third among 11 and that correlations could be computed not from the data of every sheet by

Spearman formula but from the data of all sheets on the basis of the number of judgments and by the Pearson product-moment formula.

The method for the transmutation of rankings into sigma positions can be found in Thorndike's *Mental and Social Measurements*, pages 116 and 221 ff. For the convenience of this study, which involves more than 2,000 such transmutions, a special table was made which shows the different comparable values of each number according to its place in groups of different sizes. If we look at number "1" in Table I, we will see that it has values, 1.10, 1.27, 1.40, 1.49, 1.59, etc., as it happens to occur in groups of 3, 4, 5, 6, 7, etc. On page 14 is shown the original ranking sheet filled out by the judge with figures which, in turn, are transmuted into sigma positions according to Table I. The number to the left in each column is the original rank. The signed number is the transmuted sigma value. The value of this procedure can be seen when we begin to add all the rankings of a person in a particular quality in terms of the plus and minus sigmas, which, as we have just observed, are of comparable values. Thus a person's final score in a quality is the algebraic sum of the sigma values divided by the number of judgments. To illustrate, if A's rankings in scholarship as given by five judges are "5" among 10, "5" among 12, "6" among 10, "4" among 13 and "7" among 11, then his average score in it in terms of sigma positions will be the sum of .13, .32, -.13, .61, -.23 divided by 5, or .14.

All the later correlations of judgments are made of these average sigma values thus computed.

TABLE I
SIGMA POSITIONS OF RANKS FOR A GIVEN NUMBER OF PEOPLE RANKED

The table reads "When 3 people are ranked the first rank has a value of 1.1 sigma; the second a value of 0 sigma; the third a value of -1.1 sigma. When 4 people are ranked the first rank has a value of 1.27 sigma; the second a value of .32 sigma; the third of -.53 sigma; and the fourth of -1.27 sigma."

Rank	NUMBER OF PEOPLE RANKED																				
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	1.10	1.27	1.40	1.49	1.59	1.63	1.71	1.76	1.81	1.86	1.86	1.92	1.92	1.99	1.99	1.99	2.10	2.10	2.10	2.10	2.10
2	0	.32	.53	.68	.80	.89	.98	1.04	1.11	1.16	1.21	1.26	1.29	1.32	1.35	1.38	1.41	1.45	1.45	1.48	1.52
3	-1.10	-.32	0	.22	.36	.48	.60	.68	.76	.81	.88	.94	.98	1.00	1.04	1.08	1.11	1.15	1.18	1.20	1.23
4	-1.27	-.53	-.22	0	.15	.29	.39	.48	.55	.61	.69	.72	.77	.81	.86	.90	.94	.98	.98	1.00	1.04
5	-1.40	-.68	-.36	-.15	0	.13	.23	.32	.39	.47	.51	.57	.61	.68	.71	.76	.79	.82	.86	.86	.86
6	-1.49	-.80	-.48	-.29	-.13	0	.10	.19	.27	.33	.39	.45	.50	.55	.60	.63	.67	.71	.71	.71	.71
7	-1.59	-.89	-.60	-.39	-.23	-.10	0	.09	.16	.23	.31	.35	.41	.45	.48	.54	.58	.58	.58	.58	.58
8	-1.63	-.98	-.68	-.48	-.32	-.19	0	.08	.15	.20	.27	.32	.36	.41	.47	.47	.47	.47	.47	.47	.47
9	-1.71	-.76	-.55	-.39	-.27	-.16	0	.08	.15	.20	.27	.32	.36	.41	.47	.47	.47	.47	.47	.47	.47
10	-1.76	-.81	-.61	-.47	-.33	-.23	-.15	0	.08	.15	.20	.27	.32	.36	.41	.47	.47	.47	.47	.47	.47
11	-1.81	-.88	-.69	-.51	-.39	-.29	-.19	0	.08	.15	.20	.27	.32	.36	.41	.47	.47	.47	.47	.47	.47
12	-1.86	-.94	-.72	-.57	-.45	-.35	-.27	-.19	0	.08	.15	.20	.27	.32	.36	.41	.47	.47	.47	.47	.47
13	-1.86	-.94	-.72	-.57	-.45	-.35	-.27	-.19	0	.08	.15	.20	.27	.32	.36	.41	.47	.47	.47	.47	.47
14	-1.86	-.94	-.72	-.57	-.45	-.35	-.27	-.19	0	.08	.15	.20	.27	.32	.36	.41	.47	.47	.47	.47	.47
15	-1.92	-.92	-.72	-.57	-.45	-.35	-.27	-.19	0	.08	.15	.20	.27	.32	.36	.41	.47	.47	.47	.47	.47
16	-1.92	-.92	-.72	-.57	-.45	-.35	-.27	-.19	0	.08	.15	.20	.27	.32	.36	.41	.47	.47	.47	.47	.47
17	-1.99	-.99	-.77	-.61	-.48	-.39	-.29	-.19	0	.08	.15	.20	.27	.32	.36	.41	.47	.47	.47	.47	.47
18	-1.99	-.99	-.77	-.61	-.48	-.39	-.29	-.19	0	.08	.15	.20	.27	.32	.36	.41	.47	.47	.47	.47	.47
19	-1.99	-.99	-.77	-.61	-.48	-.39	-.29	-.19	0	.08	.15	.20	.27	.32	.36	.41	.47	.47	.47	.47	.47
20	-2.10	-.98	-.76	-.63	-.54	-.47	-.38	-.29	-.19	0	.08	.15	.20	.27	.32	.36	.41	.47	.47	.47	.47
21	-2.10	-.98	-.76	-.63	-.54	-.47	-.38	-.29	-.19	0	.08	.15	.20	.27	.32	.36	.41	.47	.47	.47	.47
22	-2.10	-.98	-.76	-.63	-.54	-.47	-.38	-.29	-.19	0	.08	.15	.20	.27	.32	.36	.41	.47	.47	.47	.47
23	-2.10	-.98	-.76	-.63	-.54	-.47	-.38	-.29	-.19	0	.08	.15	.20	.27	.32	.36	.41	.47	.47	.47	.47

RANKING SHEET

Read Directions and Definitions *very carefully* before you proceed. *Use pencil.*

NAME	SCHOLARSHIP	LEADERSHIP	KNOWLEDGE OF ENGLISH	KNOWLEDGE OF CHINESE
A	×	9 + .35	×	×
B	×	10 + .23	12 - .06	×
C	×	22 -1.52	20 -1.20	×
D	11 - .13	13 - .13	14 - .29	16 - .76
E	6 + .55	6 + .71	8 + .41	15 - .60
F	1 +2.10	4 +1.04	3 +1.20	14 - .45
G	×	16 - .47	13 - .18	1 +2.10
H	4 + .90	5 - .86	9 + .29	2 +1.45
I	16 - .90	20 -1.04	21 -1.48	11 - .06
J	2 +1.41	2 +1.52	1 +2.21	8 + .32
K	3 +1.11	15 - .35	15 - .41	12 - .19
L	15 - .71	14 - .23	17 - .67	6 + .60
M	8 + .27	18 - .71	7 + .54	20 -2.10
N	19 -2.10	21 -1.23	19 -1.00	19 -1.45
O	10 0.00	7 + .58	10 + .18	9 + .19
P	18 -1.41	17 - .58	18 - .82	18 -1.15
Q	9 + .13	19 - .86	16 - .54	17 - .94
R	13 - .41	11 + .13	5 + .82	3 +1.15
S	×	×	×	×
T	7 + .41	1 +2.16	2 +1.48	5 + .76
U	14 - .55	12 0.00	6 + .67	10 + .06
V	17 -1.11	23 -2.16	22 -2.10	13 - .32
W	5 + .71	3 +1.23	4 +1.00	4 + .96
X	2 +1.41	8 + .47	11 + .06	7 + .45
No. ranked	19	23	22	20

Your name..... Date.....

2. COMPARISON OF THE JUDGMENTS IN ENGLISH WITH TEST SCORES
IN ENGLISH: THE VALIDITY OF THE JUDGMENTS IN THE
KNOWLEDGE OF ENGLISH

Before any correlations could be made with the average sigma values given to each subject in the four qualities, it was first necessary (1) to compare the rankings or judgments of these four qualities with some other independent criteria of the same qualities, and (2) to find out how well the judgments of each quality of a certain sub-

ject agree with one another. The former is called the *validity* of the judgment and the latter the *reliability*.

We will take knowledge of English for our first consideration. As described in the last section the four sets of Thorndike English tests were given. The scores in these English tests were then correlated with the judgments, and the coefficients are shown in Table II.

TABLE II

SHOWING THE INTERCORRELATIONS BETWEEN THE JUDGMENTS IN ENGLISH AND THE TEST SCORES IN ENGLISH. $N=42$

	READING I	READING II	THORNDIKE ALPHA 2, II	THORNDIKE VOCABU- LARY
Judgments in English.....	.41 ± .084	.37 ± .088	.32 ± .091	.61 ± .064
Reading I.....		.56 ± .069	.58 ± .067	.49 ± .078
Reading II.....			.63 ± .063	.21 ± .094
Thorndike Alpha 2, II.....				.34 ± .089
Thorndike Vocabu- lary.....				

A brief inspection of Table II will at once show that the correlations between the judgments and different test scores are approximately as high as the correlations among test scores themselves.

The average coefficient of the correlations between the judgments and test scores is .43, and that of the correlations among test scores themselves is .47. This means that the judgments in the knowledge of English are highly valid in so far as they are compared with the test scores in English. This would warrant our relying on the judgments in English so far as their validity is concerned. But since the cases here considered are rather few, and since it would be better if we could secure other independent criteria to check up the judgments, high school marks, college marks, and individual records were also employed for our purpose, in which more cases were involved, as will be described in later chapters.

As regards the validity of judgments in scholarship, leadership, and knowledge of Chinese, since no objective tests were available, academic and individual records were secured as criteria. In regard

to leadership, it has so far remained such an elusive human trait that at present the only good measure of its quantity and quality that can still be resorted to is "a consensus of opinion" rendered by the largest number of best qualified judges.

3. THE RELIABILITY OF THE JUDGMENT: SELF-CORRELATION

The validity of the judgments having been established, the next step was to ascertain the reliability, or how well the different judgments of a particular quality agreed among themselves. It is to be

TABLE III

SHOWING THE RELIABILITY COEFFICIENTS OR COEFFICIENTS OF SELF-CORRELATION OF 2 WITH 2 JUDGMENTS, 3 WITH 3, 4 WITH 4, 5 WITH 5 IN THE FOUR QUALITIES

	SCHOLARSHIP		LEADERSHIP		KNOWLEDGE OF ENGLISH		KNOWLEDGE OF CHINESE	
	NO. OF CASES	<i>r</i>	NO. OF CASES	<i>r</i>	NO. OF CASES	<i>r</i>	NO. OF CASES	<i>r</i>
2 with 2 Judgments	118	.63 ± .037	121	.72 ± .029	110	.60 ± .042	118	.71 ± .032
3 with 3 Judgments	77	.73 ± .037	79	.66 ± .044	83	.88 ± .017	76	.79 ± .029
4 with 4 Judgments	53	.84 ± .027	44	.70 ± .044	52	.80 ± .034	27	.83 ± .041
5 with 5 Judgments	15	.85 ± .048	5	.82 ± .094	12	.92 ± .030	8	.85 ± .066

noted that the number of judgments on a certain quality varies widely with different people; it ranges from 3 to 12 judgments. It would be extremely laborious, if not impossible, to find out the correlation of one judgment with every other for more than 600 people in four qualities. As statistically justified, it was only necessary to split the judgments into halves and correlate them. Thus all the judgments on a quality of a subject were massed in a random fashion; then the total judgments of 4, 6, 8, 10, 12 in number were split into 2 with 2, 3 with 3, 4 with 4, 5 with 5, 6 with 6; these halves were added, due regard being given to the plus and minus signs and correlations made out of these halves. To illustrate, suppose a cer-

tain subject receives the following judgments in scholarship: 1.32, .23, 1.29, 1.32, 1.26, .68 as they come in random sampling. It is only necessary to add the first three and next three and call the pair 2.84 and 3.26, the same procedure of thus pairing the judgments being observed throughout. All the coefficients are contained in Table III.

The significance of these coefficients can not escape our attention. We notice two things: first, that the coefficients are substantially high, showing the high reliability of judgments; and second, that on the whole, as the number of judgments increases there is a tendency of corresponding increase in the coefficients, which means a corresponding increase in the reliability of judgments.

From the coefficients in Table III we may estimate the self-correlations for an estimate from any given number of judges with another estimate from that same number of different judges, the two groups of judges being drawn at random. The formula to be used is the usual Spearman prophecy formula or the formula for self-correlation, as shown in the following:

$$r_p = \frac{p(r_q)}{q + (p - q)r_q}$$

in which

q is the number of judgments whose correlation coefficient is known,
 p is any number of judgments whose correlation coefficient is to be found out,

r_q is the correlation coefficient of q judgments with q judgments and
 r_p which is unknown, is the correlation coefficient of p judgments with p judgments.

To illustrate, let us take the facts from Table III. We find there that the self-correlation coefficient of 2 with 2 judgments in scholarship is .63. Based upon this fact what should be the self-correlation coefficients when we have 3 with 3 judgments, 4 with 4 judgments, 5 with 5, 6 with 6 and so on? If we substitute the formula we have the following:

$$r_3 = \frac{3(.63)}{2 + (3 - 2).63} = .72$$

We can find out a series of values of r_p as p becomes 4, 5, 6, 7, 8, 9, 10, 11, 12, etc., on the basis of $q = 2$ and $r_q = .63$. This series of values appears in Column II of Table IV A.

TABLE IV

A

THEORETICAL SELF-CORRELATION FOR SCHOLARSHIP ACCORDING TO THE NUMBER OF JUDGMENTS, ESTIMATED FROM EMPIRICAL r 's FOR 2 WITH 2 (.63), 3 WITH 3 (.73), 4 WITH 4 (.84) AND 5 WITH 5 (.85).

I	II	III	IV	V	VI	VII (VI ÷ 4)	VIII
NUMBER OF JUDGMENTS	q_2	q_3	q_4	q_5	SUM OF q 's	GENERAL THEORETICAL VALUE	FITTED THEORETICAL VALUE
2	.630	.643	.724	.694	2.691	.673	.668
3	.720	.730	.798	.773	3.021	.755	.750
4	.773	.783	.840	.819	3.215	.804	.799
5	.810	.819	.868	.850	3.347	.837	.830
6	.836	.844	.887	.872	3.439	.860	.856
7	.856	.864	.902	.888	3.510	.878	.871
8	.872	.878	.913	.901	3.564	.891	.885
9	.884	.890	.922	.911	3.607	.902	.898
10	.895	.899	.929	.919	3.642	.911	.909
11	.903	.908	.935	.926	3.672	.918	.913
12	.911	.915	.940	.932	3.698	.925	.918

TABLE IV

B

THEORETICAL SELF-CORRELATION FOR LEADERSHIP OBTAINED AS IN TABLE IV A

I	II	III	IV	V	VI	VII (VI ÷ 4)	VIII
NUMBER OF JUDGMENTS	q_2	q_3	q_4	q_5	SUM OF q 's	GENERAL THEORETICAL VALUE	FITTED THEORETICAL VALUE
2	.730	.566	.538	.642	2.480	.620	.623
3	.808	.600	.636	.732	2.836	.709	.714
4	.844	.721	.700	.785	3.050	.763	.768
5	.877	.764	.744	.820	3.205	.801	.803
6	.890	.795	.778	.845	3.308	.827	.828
7	.904	.820	.803	.864	3.391	.848	.849
8	.915	.838	.824	.879	3.456	.864	.864
9	.924	.858	.840	.891	3.513	.878	.876
10	.931	.866	.854	.901	3.552	.888	.889
11	.937	.877	.865	.909	3.588	.897	.896
12	.942	.886	.875	.916	3.619	.905	.900

TABLE IV
C

THEORETICAL SELF-CORRELATION FOR KNOWLEDGE OF ENGLISH,
OBTAINED AS IN TABLE IV A

I	II	III	IV	V	VI	VII (VI ÷ 4)	VIII
NUMBER OF JUDGMENTS	q_2	q_3	q_4	q_5	SUM OF q 'S	GENERAL THEORETICAL VALUE	FITTED THEORETICAL VALUE
2	.600	.831	.667	.821	2.919	.730	.720
3	.693	.880	.750	.874	3.197	.799	.783
4	.750	.907	.800	.902	3.359	.840	.830
5	.790	.924	.833	.920	3.467	.867	.859
6	.818	.936	.857	.932	3.543	.886	.879
7	.840	.945	.875	.942	3.602	.901	.893
8	.857	.951	.889	.949	3.646	.912	.901
9	.871	.957	.899	.954	3.681	.920	.911
10	.882	.961	.909	.958	3.710	.927	.918
11	.892	.964	.917	.962	3.735	.934	.920
12	.899	.967	.924	.965	3.755	.939	.925

TABLE IV
D

THEORETICAL SELF-CORRELATION FOR KNOWLEDGE OF CHINESE,
OBTAINED AS IN TABLE IV A

I	II	III	IV	V	VI	VII (VI ÷ 4)	VIII
NUMBER OF JUDGMENTS	q_2	q_3	q_4	q_5	SUM OF q 'S	GENERAL THEORETICAL VALUE	FITTED THEORETICAL VALUE
2	.710	.714	.709	.694	2.827	.707	.710
3	.786	.700	.785	.773	3.134	.784	.786
4	.831	.834	.830	.819	3.314	.829	.831
5	.860	.862	.859	.850	3.431	.855	.860
6	.880	.882	.879	.872	3.513	.878	.880
7	.896	.898	.895	.888	3.577	.894	.896
8	.907	.909	.907	.900	3.625	.906	.907
9	.917	.915	.916	.911	3.659	.915	.917
10	.925	.926	.924	.919	3.694	.924	.925
11	.931	.932	.930	.926	3.719	.930	.931
12	.937	.938	.936	.931	3.742	.936	.937

In a similar manner we find values of r_p as p varies on the bases of the obtained correlations (when q is 3, r_q is .73; when q is 4, r_q is .84; when q is 5, r_q is .85) in the case of scholarship. These four sets of values are shown in Table IVA, in which, for instance Column II reads: If the observed coefficient of q_2 is .63, then by applying the Spearman prophecy formula the coefficients, $r_3, r_4, r_5,$ etc., will be .720, .773, .810, etc., as p becomes 3, 4, 5, etc.

By using the data of Column I, Table IVA as abscissa and the data in the Columns II, III, IV, V as ordinates, four curves can be plotted, each of which will show the theoretical rise in self-correlation in the judgment of scholarship. The most probable curve will be the one plotted by combining the four altogether and fitting to the empirical .63, .73, .84, and .85.

In Figs. 1, 2, 3 and 4, the solid lines show the newly fitted theoretical curves and the dotted lines the observed correlations. The values for these newly fitted theoretical curves are called "fitted theoretical values," as shown in Column VIII, Table IV. The advantage of these fitted theoretical values is that they give the

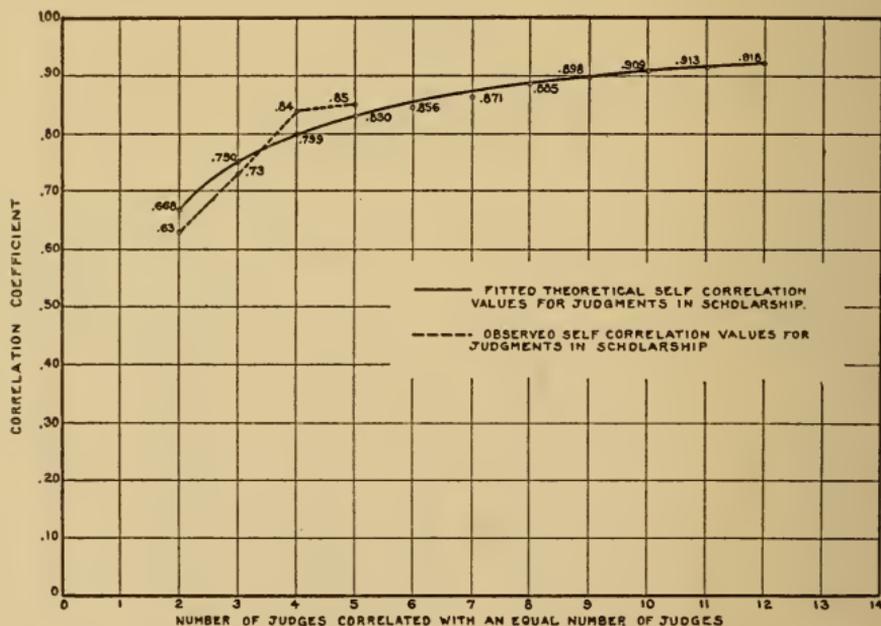


FIG. 1. Curves Showing the Fitted Theoretical and Observed Self-correlation Values for Judgments in Scholarship.

coefficients from judgments of 2 in each half to 12 in each half, thus aiding us greatly in computing correlations corrected for attenuation.

The data in Table IV and in Figs. 1, 2, 3 and 4 show that the obtained values in Chinese agree best with the "fitted theoretical values" in it, while the obtained values in other three qualities do not agree so well with their corresponding fitted theoretical values. This would mean that the judgments agree best on the knowledge of Chinese, the reason being most probably that Chinese, the mother tongue, stands out as a prominent quality, in respect to which Chinese students come to know one another most readily and a competent judgment of which can be rendered in a most valid and reliable way.

It may be contended that, as stated previously, there was in total a less number of judgments in knowledge of Chinese, showing that the quality was not so widely known to judges as others; but this does not change the fact that the judges were better able to rate knowledge of Chinese, so that when the quality *is* judged, it is judged in a more thorough manner. The obtained values in scholar-

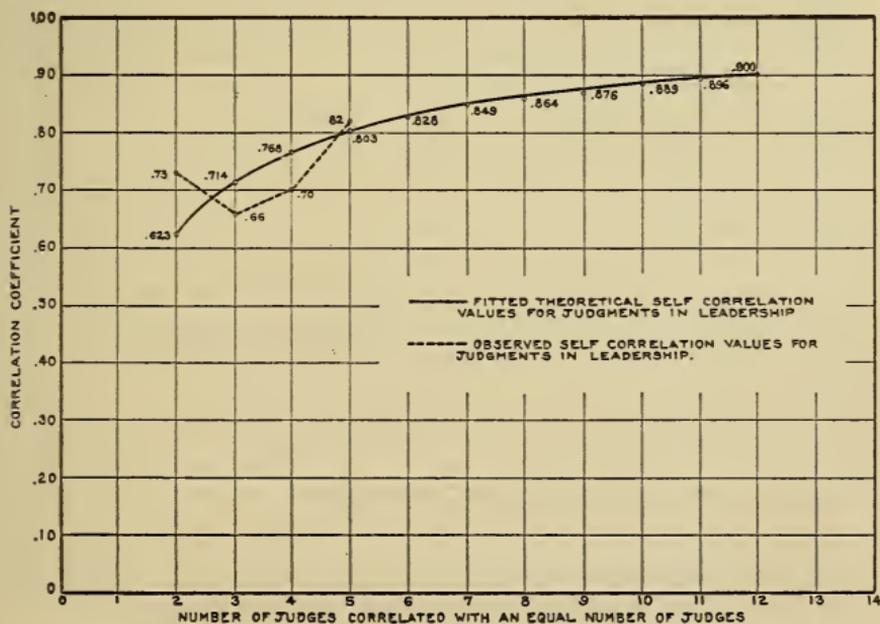


FIG. 2. Curves Showing the Fitted Theoretical and Observed Self-correlation Values for Judgments in Leadership.

ship stand second in conformity with the fitted theoretical values therein. This would seem to indicate that scholarship, as easily evidenced by school marks, degrees, and rewards, with which the students are fully acquainted, does not seem to be vague to them. The obtained and fitted theoretical values in English stand third in agreement. We are inclined to believe that they should agree even better, inasmuch as English is a daily spoken language for these students. It is to be noted, however, that the correlation coefficient of 5 with 5 judgments in the knowledge of English runs as high as .92; it is a clear indication that when there are 10 judgments in the knowledge of English the number is highly sufficient. The obtained and fitted theoretical values in leadership agree poorest, which, however, was not unexpected. We are all aware of the vagueness of the meaning of leadership and the lack of standards to judge by. Still, however, there is a tendency of the obtained values to rise as the number of judgments increases.

Taken as a whole, the reliability of judgments on these four qualities, as described above, has led to two conclusions: first, the reli-

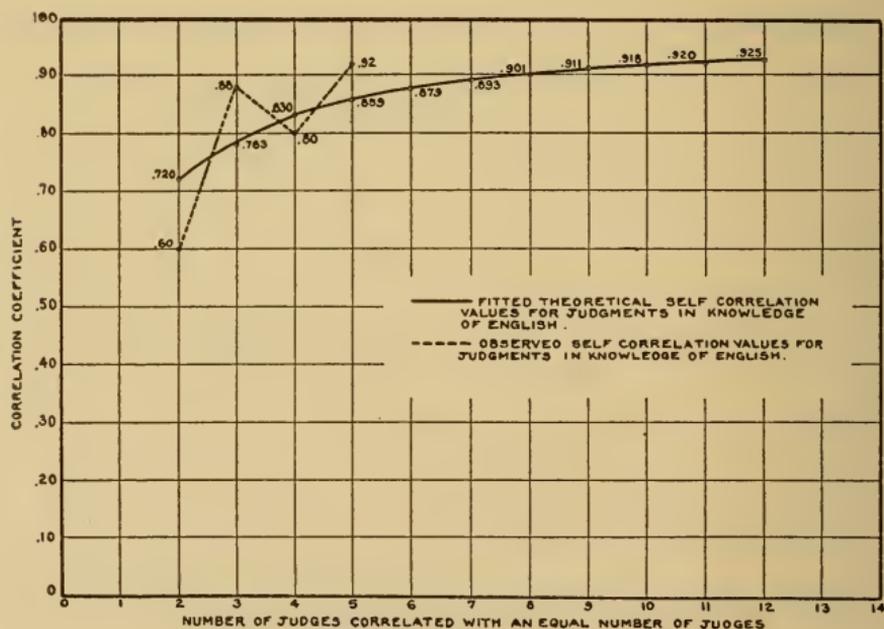


FIG. 3. Curves Showing the Fitted Theoretical and Observed Self-correlation Value for Judgments in Knowledge of English.

bility is very high, and second, on the average, it has accorded with our general statistical principle that the increase in judgments is accompanied by a corresponding increase in correlation coefficients. That is, the judgments are both sufficiently valid and reliable to justify our reliance upon them.

The validity and reliability having both been established, the next step is to compute the raw correlations among these four qualities.

4. RAW CORRELATIONS

When we come to compute the raw correlations among these four qualities we are confronted with the fact that the judgments given to different people in each quality vary as much as from 3 to 12. An average of 3 judgments naturally cannot have as high a reliability as that of 5 judgments; and that of 7 judgments likewise cannot be compared with that of 9, etc. It would be statistically erroneous to include under one study judgments by varying numbers of judges. It was found proper, consequently, to divide the

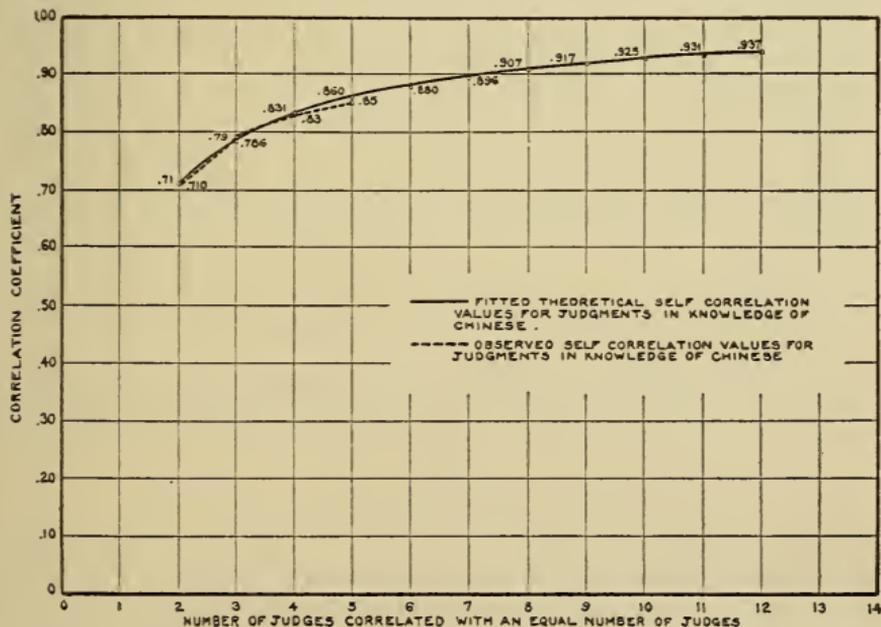


FIG. 4. Curves Showing the Fitted Theoretical and Observed Self-correlation Values for Judgments in Knowledge of Chinese.

subjects, for purposes of correlation, into four large groups in each of the four qualities. They are (1) those judged by either 3 or 4 judges; (2) those judged by either 5 or 6 judges; (3) those judged by either 7 or 8 judges; and (4) those judged by 9, 10, 11 or 12 judges. All correlations were computed by Pearson's product-moment method. The coefficients are presented in Table V.

TABLE V
SHOWING THE RAW INTERCORRELATIONS OF SCHOLARSHIP, LEADERSHIP,
KNOWLEDGE OF ENGLISH AND KNOWLEDGE OF CHINESE

CORRELATION OF	3 OR 4 JUDGMENTS		5 OR 6 JUDGMENTS		7 OR 8 JUDGMENTS		9, 10, 11 OR 12 JUDGMENTS	
	NO. OF CASES	<i>r</i>	NO. OF CASES	<i>r</i>	NO. OF CASES	<i>r</i>	NO. OF CASES	<i>r</i>
Scholarship with Leadership.....	232	.578 ± .030	185	.536 ± .036	130	.331 ± .053	62	.416 ± .072
Scholarship with Knowledge of English.....	260	.533 ± .031	180	.609 ± .032	129	.506 ± .044	59	.695 ± .047
Scholarship with Knowledge of Chinese.....	212	.334 ± .043	180	.453 ± .029	128	.307 ± .054	58	.139 ± .088
Leadership with Knowledge of English.....	242	.525 ± .041	197	.583 ± .033	129	.526 ± .043	48	.705 ± .049
Leadership with Knowledge of Chinese.....	178	.229 ± .049	198	.347 ± .043	120	.150 ± .060	51	.311 ± .085
Knowledge of Eng- lish with Knowl- edge of Chinese..	177	.027 ± .051	200	.014 ± .048	134	.078 ± .059	63	.011 ± .085

A discussion of the significance of these coefficients, as shown in Table V, will be presented in Section 7 of this chapter.

5. CORRELATIONS CORRECTED FOR ATTENUATION

All correlation coefficients in Table V, it should be noticed, are subject to errors due to paucity of measures. What we are concerned with in this study is what would be the true correlations among these four qualities, were it possible to secure all the possible competent judgments in each quality. In practice, such correla-

tions cannot be secured. Mathematically, however, we can compute such true relationships between these qualities by means of Spearman's formula for the correction of the correlation coefficients:

$$r_{xy} = \frac{\sqrt{r_{x_1y_1} \cdot r_{x_2y_2} \cdot r_{x_1y_2} \cdot r_{x_2y_1}}}{\sqrt{r_{x_1x_2} \cdot r_{y_1y_2}}}$$

Another form of this formula is:

$$r_{xy} = \frac{\sqrt{r_{x_1y_2} \cdot r_{x_2y_1}}}{\sqrt{r_{x_1x_2} \cdot r_{y_1y_2}}}$$

x_1 and x_2 are the two independent series of measures of quality A; y_1 and y_2 are the two independent series of measures of quality B. To illustrate the application of this formula to our problem, it is necessary to refer to Tables IV and V. Let us work out, for example, the true correlation between scholarship and leadership of those subjects uniformly judged by 3 or 4 judges. Then $r_{x_1x_2}$ will be .775, the average of .750 and .799, as contained in Column VIII, Table IVA the fitted theoretical values for 3 and 4 judgments in scholarship; $r_{y_1y_2}$ will be .741, the average of .714 and .768, as shown in Column VIII, Table IVB, the fitted theoretical values for 3 and 4 judgments in leadership.

In this particular case, the values $r_{x_1y_2}$ and $r_{x_2y_1}$ were not obtained since they are by the nature of the case approximately the same and equal to the raw correlation r_{xy} . We therefore write

$$\sqrt{r_{y_1x_2} \cdot r_{x_2y_1}} = \sqrt{(.578)^2} = .578$$

By substituting these values, the Spearman formula for the correction of correlation coefficients is greatly simplified,

$$r_{xy} = \frac{.578}{(.775 \times .741)^2} = .764$$

which is the correlation corrected for attenuation between scholarship and leadership in the case of those judged by either 3 or 4 judges. The rest of the correlations are likewise corrected, as shown in Table VI.

TABLE VI

SHOWING THE CORRELATIONS CORRECTED FOR ATTENUATION BETWEEN
SCHOLARSHIP, LEADERSHIP, KNOWLEDGE OF ENGLISH, AND
KNOWLEDGE OF CHINESE

CORRELATION OF	3 OR 4	5 OR 6	7 OR 8	9, 10, 11 OR 12
	JUDGMENTS	JUDGMENTS	JUDGMENTS	JUDGMENTS
	<i>r</i>	<i>r</i>	<i>r</i>	<i>r</i>
Scholarship with Leadership . . . . .	.764	.648	.382	.464
Scholarship with Knowledge of English . . . . .	.684	.713	.572	.762
Scholarship with Knowledge of Chinese . . . . .	.423	.530	.338	.151
Leadership with Knowledge of English . . . . .	.679	.693	.600	.781
Leadership with Knowledge of Chinese . . . . .	.296	.413	.171	.343
Knowledge of English with Knowledge of Chinese	-.033	.016	-.087	.012

A brief inspection of these corrected correlations as compared with the observed correlations (Table V), shows that on the whole the values of the former are only slightly higher than those of the latter, which would indicate that the obtained measures attain a high degree of approximation to the true measures.

6. FINAL COMPOSITE CORRELATIONS

All the correlation coefficients in Table VI, though they have been corrected for attenuation, represent various values of single true correlations, due to the difference in measures. It is desirable to give one single expression of the correlation in each case. This single expression—the final composite correlation—we compute as the average of the four separate correlations of Table VI each as the square root of the number of cases.

The final composite correlations thus obtained are shown in Table VII.

TABLE VII

SHOWING THE FINAL COMPOSITE CORRELATIONS BETWEEN SCHOLARSHIP, LEADERSHIP, KNOWLEDGE OF ENGLISH, AND KNOWLEDGE OF CHINESE.

CORRELATION OF	NO. OF CASES	<i>r</i>
Scholarship with Leadership.....	609	.592 ± .050
Scholarship with Knowledge of English	628	.719 ± .027
Scholarship with Knowledge of Chinese.....	578	.389 ± .047
Leadership with Knowledge of English.....	616	.679 ± .022
Leadership with Knowledge of Chinese	547	.309 ± .030
Knowledge of English with Knowledge of Chinese..	574	-.024 ± .014

The deviation of each correlation coefficient in Table VI from the corresponding final composite correlation in Table VII was obtained. The sigma of these deviations was computed. The probable error is therefore this sigma divided by \sqrt{n} (in this case 4) and multiplied by .6745. Thus, for the correlation between scholarship and leadership, the calculation is as shown in the accompanying table:

CORRECTED CORRELATION COEFFICIENTS	DEVIATIONS OF COLUMN (1) FROM .592 OF TABLE VII	d^2
.764	+ .172	.029584
.648	+ .056	.003136
.382	- .210	.044100
.464	- .128	.016384
		Sum $d^2 = .093204$

$$\sigma = \frac{\sqrt{.093204}}{4} = .15$$

$$P. E. = .6745 \frac{\sigma \text{ dis}}{\sqrt{n}} = .674 \frac{.15}{2} = .050$$

7. INTERPRETATION OF RESULTS

The correlation coefficients, as shown in Table VII, are significant and certain interpretations of them with respect to each one may be made here.

a. The correlation between scholarship and leadership is rather high ($r = .592 \pm .05$). This high correlation coefficient clearly indi-

cates that academic work has a significant bearing upon non-academic work. But it has an even more significant meaning: it indicates that the non-academic work of Chinese students in America is of a highly academic type instead of a social, recreational, and athletic type, as is the case with American students. The non-academic activities in which Chinese students in America generally participate and develop their capacities for leadership include, almost exclusively, academic discussions, speeches, debates, writings, etc., to which scholarship evidently contributes a large part. On the other hand, non-academic activities such as athletics, social affairs in various forms, in which leadership would require qualities different from those essential to scholarship, are rarely participated in by Chinese students in America.

The writer is not aware of any experiment that has been conducted to show the relationship between scholarship and school leadership. Studies have been made between scholarship and leadership after the individuals have graduated from college through Phi Beta Kappa and *Who's Who* records; they, however, are somewhat different from our study in that the leadership element considered in them is of the after-school period.

Another significant fact that this rather high correlation brings out is a confirmation of the traditional practice in China of predicting non-academic leadership almost exclusively upon the basis of academic attainment. For centuries past, the selection of administrative officers in China had been purely determined by accomplishments along academic lines. The old examination system was typical. In the Western countries, leadership in all walks of life is recognized irrespective of academic attainment though the latter has its important part to play. In China, or in the minds of the Chinese, it is hardly conceivable except in rare cases that recognition be given to non-academic leadership without first ascertaining the academic background. Just as the Greeks believed that the philosophers should rule, so do the Chinese hold that the intellectuals or *literati* should lead. It is within the limit of reason to expect that if a scientific determination is to be made in China among Chinese students there to find out the relationship between scholarship and leadership, the correlation coefficient will be still higher than .592.

b. The correlation between scholarship and knowledge of English is high ($r = .719 \pm .027$) and the correlation between scholarship and

knowledge of Chinese is low ($r = .389 \pm .047$), the former being the highest of all the correlations obtained. These two correlation coefficients tend to settle the long-standing dispute between two theories: one maintains that knowledge of Chinese which carries with it knowledge of Chinese history, Chinese philosophy, Chinese attitudes, interests, habits, forms a valuable asset in the acquisition of Western knowledge, and that knowledge of English is not essential; the other maintains just the opposite, that is, knowledge of English is essential. These two correlations found in this study are undoubtedly in support of the second theory. Their significance lies in the fact that while knowledge of English is more causal to the degree of scholarship, knowledge of Chinese is not a good measure of the scholarship of a Chinese student in America, since in all probability the correlation found (.389) is due in large part to the influence of intelligence, which is undoubtedly highly correlated with both scholarship and knowledge of Chinese. Thus, if it were possible to "partial out" the influence of intelligence, the correlation between scholarship in America and knowledge of Chinese would be much nearer zero. The explanation for the existence of the high correlation between scholarship and knowledge of English is simple. Scholastic attainment in America presupposes, other things being equal, an efficient instrument to work with and a good method to work by. The former consists of a knowledge of English as a language and the latter consists of proper attitude, interests, habits, and ideals acquired through a knowledge of English. The extent to which a Chinese student acquires this method and instrument conditions the extent to which he will succeed in understanding, appreciating, and mastering readings and lectures in English and in approaching and solving problems that are Western in nature. It is to be noted that while these two correlations obtain among Chinese students in America they may not hold true among Chinese students in China. While no scientific determination has been made, it is very likely that among students in China knowledge of Chinese is more closely associated with scholarship than knowledge of English.

c. The correlation between leadership and knowledge of English is high ($r = .679 \pm .022$) and the correlation between leadership and knowledge of Chinese is low ($r = .309 \pm .030$). The situation here is somewhat similar to that described in the preceding paragraph. Other things being equal, leadership in America demands an instru-

ment and a method, or a language and an attitude. The language is, of course, English which Chinese students in America generally speak, and the attitude implies all those modes of behaviour, conduct, and bearing that are Western. This statement is evidenced by the use of English in most, if not all, of the discussions, writings and speeches among Chinese students here and by the adoption of ways of appealing, convincing, and influencing people, which the students have to acquire anew in this country.

A correlation of .309 between leadership and knowledge of Chinese shows that if intelligence, which is decidedly correlated highly with both leadership and knowledge of Chinese, is "partialed out," knowledge of Chinese will be correlated extremely low with leadership in America. On the other hand, if a scientific determination is to be made among Chinese students in China on the relationship of leadership with knowledge of English and with knowledge of Chinese, the coefficients may be just the reverse; that is, leadership is correlated very low with knowledge of English and rather high with knowledge of Chinese. This statement, however, still awaits further verification.

d. The correlation between knowledge of English and knowledge of Chinese is virtually zero ($r = -.024 \pm .014$). The existence of this slightly negative or substantially zero correlation raises two fundamental questions in respect to the teaching of English and of Chinese: First, is there any fundamental difference between the English language and the Chinese language? Second, is there any great divergence of emphasis upon and time in teaching these two languages?

In the attempt to answer the first question, it may be said on the positive side that English and Chinese are two totally different languages. In writing, English goes horizontally from left to right, while Chinese goes vertically from right to left. English is phonetic, while Chinese is ideographic. English grammar has been quite fully developed; Chinese grammar has not had concise formation and has not been taught as such. In English, the written and spoken languages are almost, if not perfectly, identical; in Chinese the gulf between the two has been as wide as that between the language of *Paradise Lost* and modern American journalistic language. The English words are mostly polysyllabic, but without exception the Chinese characters are monosyllabic. By virtue of these differences,

it may be inferred that neither identity of procedure nor identity of elements would or could exist in the process of learning these two languages. Thus the lack of transfer tends to reduce the correlation between these two languages to zero.

The second interpretation of the lack of correlation between English and Chinese is found in the existing fact that the emphasis upon and the time in teaching these two languages in different schools in China have been so varied. Essentially, there are three types of schools in China which, for the sake of argument, let us call types "A," "B," and "C." A short description as to how English and Chinese are taught in these schools may be of service here. In type "A" school, the students commence to learn Chinese very early in their school life and master it thoroughly. It is not until very late, just prior to their coming to America, that they begin to learn English. The preponderance of emphasis upon and time devoted to the study of Chinese produces the type of Chinese students in America that generally excels in the knowledge of Chinese and is handicapped in the knowledge of English. To type "A" belong the old-fashioned Chinese schools, most of which are government schools. In type "B" school, students generally have acquired a good knowledge of Chinese, but they also begin to learn English fairly early with due emphasis upon it. As a result, these students possibly possess a corresponding attainment in their knowledge of English and of Chinese. To type "B" belong most of the modern schools in China, both government and private. In type "C" school, knowledge of English stands out as a paramount feature in the curriculum, overshadowing and crowding out the rest of school studies, among which is included the study of Chinese. The product of this type of school is a group of students well versed in English, especially in spoken English, but poorly prepared in the knowledge of Chinese. To type "C" belong most of the missionary schools in China. Now, if we make a study of the correlation between Chinese and English among students from the type "A" schools, it will be highly negative; the same relationship will exist among students from the type "C" schools. But if the correlation between English and Chinese is to be worked out among students from the type "B" schools, it will in all probability be highly positive. The question now is how the students from the three types of schools are distributed in America. It is recalled that question 5

in the questionnaire (page 7) attempts to find out the school in China where each student acquired most of his knowledge of English, which will also indirectly indicate the particular type of student he is. A distribution of these three types of students in America according to the types of schools they come from in China is made as shown below:

1. Students from type "A" schools in China—20 per cent
2. Students from type "B" schools in China—52 per cent
3. Students from type "C" schools in China—28 per cent

The number of Chinese students who were born and brought up in America are so few that they are negligible for our purpose. Now, if we add the students from schools of types "A" and "C," they comprise 48 per cent of the total number of students included in this study or practically one half; the students from schools of type "B" are roughly another half of the total. The correlation between English and Chinese among "A" and "C" students will be negative while that among "B" students will be positive. A correlation of something around zero is therefore highly probable when these three types of students are assembled in one study.

These two interpretations evidently represent two theories: one attributing the zero correlation between knowledge of English and knowledge of Chinese to the intrinsic and fundamental differences between these two languages; the other to external and artificial causes. If the former is true, then the correlation, as it exists now, will persist permanently so long as English and Chinese remain fundamentally different. If the latter is true, the zero correlation can be increased from a low positive value to a high positive value in proportion as human effort is brought to change the environmental influences. The writer is inclined to believe that the latter interpretation is more likely to be true, though the former is not to be ignored. The correlation probably can be raised considerably higher on the positive side, but it is unlikely that it could be raised as high as that between, say, English and French or even between Russian and Spanish.

e. One of the interesting points of this general problem is the correlation of leadership in student days in America with leadership in future years in China. This particular phase of the problem cannot be solved now, for the records of the older gen-

erations of Chinese students in America both for the student period and for the period after their return to China are incomplete. The writer hopes, however, to take up this question by preserving the records of the six hundred and sixty-four subjects of this study and by following their careers upon their return to China. In the meantime, it may be said that in all probability the dependence of leadership upon general intelligence will make this correlation high and that the dependence of leadership upon the formation of habitual responses to environmental factors will tend to make the correlation low. The latter part of the statement will become clearer when it is remembered that the American environment is at many points different from the Chinese environment, and that consequently responses which are effective in either one of the two environments may be ineffective or even handicapping in the other.

CHAPTER IV

COMPARISON OF THE JUDGMENTS WITH HIGH SCHOOL MARKS

In Chapter III we showed the validity of the judgments of associates in English by comparing them with test scores in English. The purpose of this and the following chapters is to prove the validity of the judgments of associates in the other three qualities, namely: scholarship, leadership, and knowledge of Chinese.

The validity of the judgments in the qualities of scholarship, knowledge of English and knowledge of Chinese will be proved by comparing them with the high school marks from China of 78 of the subjects who studied in the same school. The students from this school are fairly representative of the Chinese students in America. These marks cover a period of four years in the high school, comprising the following: (1) general average in High School I, II, III, IV; (2) marks in English in High School I, II, III, IV; and (3) marks in Chinese in High School I, II, III, IV. The average mark of any student in any subject, say, English, is the average of the marks of English for four years and this average is taken as an index of the knowledge of English of that student. The following tables show the averages, standard deviations, and corrections for (A) general average, (B) English, and (C) Chinese.

A brief inspection of the foregoing tables will show that in each case the averages are approximately the same; so are the standard deviations. The correction in each case is computed by comparing the average of each year with the general average of the four years and finding the deviations therefrom with either a plus or minus sign, as the case may be. In order to make the work less laborious and much simpler, these corrections can be used for computing the final average in each subject for each person. Thus, if A has in four years in the high school the following marks in English: 88.5, 86.3, 80, 79.5, then these values, when corrected according to the corrections in Table VIII B, will become 88.5, 70, 84.3, 83, 80.5, which are averaged again to be 85 as a single index of A's mark in English in the four years in the high school.

TABLE VIII

SHOWING THE AVERAGES, STANDARD DEVIATIONS, AND CORRECTIONS OF HIGH SCHOOL MARKS FOR FOUR YEARS IN (A) GENERAL AVERAGE, (B) ENGLISH, AND (C) CHINESE

A

GENERAL AVERAGE

	H. S. I	H. S. II	H. S. III	H. S. IV
No. of Cases...	130	146	109	102
Average.....	81.83	83.53	79.48	82.68
Standard Deviation ...	4.4	4.5	5.1	4.3
Correction.....	0	-2	+2	-1

B

ENGLISH

	H. S. I	H. S. II	H. S. III	H. S. IV
No. of Cases...	131	189	154	149
Average.....	80.85	82.74	77.88	79.85
Standard Deviation ...	5.1	6.2	6.2	5.0
Correction.....	0	-2	+3	+1

C

CHINESE

	H. S. I	H. S. II	H. S. III	H. S. IV
No. of Cases...	119	179	172	137
Average.....	80.46	81.41	82.01	78.45
Standard Deviation ...	7.4	7.1	7.2	7.1
Correction.....	+1	0	-1	+3

The marks for the general average and for Chinese are computed in a similar manner.

It must be noted here that in comparing the high school marks with the judgment, in order to find out the validity of the latter, the general average mark in the high school is taken to be indicative

of scholarship, the mark in English to be indicative of knowledge of English, and the mark in Chinese to be indicative of knowledge of Chinese. The correlations thus computed are shown in Table IX.

TABLE IX

SHOWING THE CORRELATION BETWEEN THE HIGH SCHOOL MARKS AND THE JUDGMENT OF ASSOCIATES IN SCHOLARSHIP, KNOWLEDGE OF ENGLISH, AND KNOWLEDGE OF CHINESE

CORRELATION OF	NO. OF CASES	<i>r</i>
H. S. General Averages with the Judgment in Scholarship.....	68	.421 ± .068
H. S. Marks in English with the Judgment in Knowledge of English.....	76	.307 ± .070
H. S. Marks in Chinese with the Judgment in Knowledge of Chinese.....	68	.374 ± .071

The coefficient of .307 in Table IX shows that the judgment in English does not correlate so highly with high school marks in English as it does with test scores in English, for, if we refer back to Table I, the average correlation coefficient of the judgment with the four English test scores is .43. But still the difference is not so great as to make us doubt the validity of the judgment as compared with high school marks.

The three correlation coefficients of .421, .307, and .374 are enough to warrant us to rely upon the judgment in scholarship and knowledge of Chinese.

By using the high school marks, inter-correlations between the general averages, marks in English, and marks in Chinese were also computed, as shown in Table X.

TABLE X

SHOWING THE CORRELATIONS BETWEEN THE HIGH SCHOOL GENERAL AVERAGES, MARKS IN ENGLISH AND MARKS IN CHINESE

CORRELATION OF	NO. OF CASES	<i>r</i>
H. S. General Averages with Marks in English....	84	.683 ± .039
H. S. General Averages with Marks in Chinese....	72	.190 ± .077
H. S. Marks in English with Marks in Chinese....	77	.191 ± .074

The rather high correlation coefficient of .683 between general averages and marks in English as compared with that of .719 as secured on the basis of the judgment is interesting. It shows very conclusively that the judgment of associates and high school marks agree very well in their estimation of scholarship and knowledge of English. And this agreement adds, of course, more weight to the validity of the judgment.

The low correlation coefficient ($r = .190$) between general averages and marks in Chinese gives weight to the fact that Chinese has a very small part to play in the estimation of scholarship, or better still, in determining the general averages in that particular high school. And such is the actual case. For, to the knowledge of the writer, in that high school, the department of Chinese is a separate and distinct unit which has nothing to do with the Western department, so called, which includes all modern subjects, taught in English.

CHAPTER V

COMPARISON OF THE JUDGMENTS WITH COLLEGE MARKS

I. THE JUDGMENTS IN SCHOLARSHIP AND GENERAL AVERAGES IN COLLEGES

If it is desirable to compare the judgment of associates with high school marks in China, it will be still more desirable to compare it with college marks in America. This was done in a crude way, for any fine statistical manipulation did not seem possible, though profitable, due to the erratic nature of the material in hand. College marks of 122 of the students in our study were secured. Since some had more marks and others less, due to the difference of the number of years which had been spent here and to other causes, such as that some colleges made reports of marks while others did not, it was decided to include only those students who had a total of at least 7 marks in different subjects. The method for weighting these marks from different colleges was a simple one. Either by correspondence or by studying the catalogues, the different marking systems of more than 50 colleges were collected and compared. It was found that, numerous as they were, these systems did not differ very much. Inasmuch as many systems preferred letters or abbreviations to designate marks such as "A" standing for "excellent" which is equal to "90-100" and "B" for "very good" which is equal to "80-90," it was imperative, for the purpose of transmutation of capital letters into numbers, to devise a definite method by means of which to transmute. This was done by taking the mid-value of a range of values that was given to a certain designation. To illustrate: the marking system of a certain college is somewhat like the following: H.H.C. = 95-100; H.C. = 90-94; C. = 85-89; etc. If we want to assign numerical values to H.H.C., H.C., and C., etc., we simply take the mid-values of their corresponding numbers, which are 97, 92, 87, etc. Thus, if a student receives a mark of H.H.C. in a certain subject, the most convenient way to express it numerically is to call it 97, which would probably be the average of all the H.H.C. marks received.

After all the transmutations were made, the marks of every student were averaged as an index of his scholarship. The average of these 122 marks was found to be 81.2 with a standard deviation of 7.1. These two values, however, are not as significant as they might appear to be, since they were computed from marks from different systems.

The correlation of college marks with judgments in scholarship was worked out and the coefficient was $.414 \pm .052$. This coefficient warrants us again to trust the judgment in scholarship as reasonably valid.

2. HIGH SCHOOL GENERAL AVERAGES COMPARED WITH COLLEGE GENERAL AVERAGES

Another correlation that is of interest and might be mentioned here is that between high school averages and college averages. The correlation coefficient was found to be $.412 \pm .074$. This must be taken to mean the correlation between the entire high school work in China and the entire college work in America. Here again the coefficient is not as significant as it might be, due to the difference in the marking systems. Still it indicates how accomplishment in high school in China will predict accomplishment in college work in America, and to that extent it is significant and of practical use.

CHAPTER VI

COMPARISON OF THE JUDGMENTS WITH INDIVIDUAL RECORDS

I. A SCALE FOR JUDGING THE ACTIVITIES OF CHINESE STUDENTS IN AMERICA

When the ranking sheets were sent out, it is to be noted that the judges were not asked to rank themselves among those whom they ranked, the reasons being that, first, the extreme modesty which is characteristic of Chinese might result in ranking oneself too low, thus rendering the rankings inaccurate and, second, the embarrassment put to the judge might even hinder his otherwise willing cooperation in this work. Consequently, a questionnaire was sent with the ranking sheet to each one, asking him or her to fill it out for himself or herself as the case may be, concerning the four qualities in our study. This questionnaire is shown on page 7. The facts stated in these questionnaire sheets, however, were found to be so unwieldy as to make a direct statistical treatment of them seem impossible. To evaluate these facts by a number of judges without at first some objective criteria to fall back upon would be to expose oneself to gross error. Consequently, a method was devised whereby all the facts were classified under four headings: scholarship, leadership, knowledge of English, and knowledge of Chinese. Then the procedure was greatly simplified by evaluating each position or achievement once and for all by twelve judges. This saved the judges the trouble of going over all the original papers, which would mean a tremendous amount of time and labor. To illustrate: If ten students happened to have Phi Beta Kappa keys from ten different colleges, it was only necessary to take this particular fraternity key as an evidence of scholarship common to all, and ask the judge to give a numerical value to it. It might be contended that Phi Beta Kappa keys from different colleges might carry different values and they again might differ with different individuals. True, but for our purpose it was not essential; in fact, not desirable to make too fine a distinction. It was sufficient to mark off a man

with such an honor key from one who had a different one or from one who did not have any.

This being the general principle, all those common activities in terms of positions held, degrees gained, articles written, or other works accomplished, with the exception of a few activities peculiar to certain individuals, were listed under the four headings to which they belonged and submitted to twelve judges who were asked to give them numerical values. The judgments were made on a scale of 10, i. e., the judgments varied from 0 to 10. "0" is assigned to those activities that deserve no credit; "1" to those that deserve the least amount of credit; "10" to those that deserve the highest amount of credit. The rest of credits, 2, 3, 4, etc., are assigned to positions that fall in between. The reason for selecting just twelve judges instead of more or less is that given in Chapter III, where it was pointed out that this seems to be the optimum number because of its high self-correlation coefficient. These twelve judges were fully acquainted with the activities of Chinese students in America, mature in scholarship, and sound in judgment. Thus each activity received twelve values or judgments. These judgments were split into halves and correlations were computed to show their reliability, as shown in Table XI.

TABLE XI

SHOWING THE RELIABILITY OF 12 JUDGMENTS ON INDIVIDUAL RECORDS

CORRELATION OF	NO. OF CASES	<i>r</i>
6 with 6 Judgments in Scholarship.....	17	.636 ± .096
6 with 6 Judgments in Leadership.....	78	.855 ± .020
6 with 6 Judgments in Knowledge of English.....	40	.892 ± .023
6 with 6 Judgments in Knowledge of Chinese.....	42	.865 ± .026

These high self-correlation coefficients warrant us to make use of the judgments of these twelve judges for the treatment of individual records. The next step is to give a single score to each activity by averaging the twelve judgments.

With the omission of a few individual activities which partake of personal character, the scale thus made out is produced in Table XII. These omitted activities were such as to reveal the identity of the individuals holding the positions involved.

TABLE XII

A SCALE FOR JUDGING THE ACTIVITIES OF CHINESE STUDENTS IN AMERICA

LEADERSHIP

<i>Position</i>	<i>Organization</i>	<i>Points</i>
President	Chinese Students' Alliance in America	9.2
Vice President	" " " " "	5.7
Secretary	" " " " "	6.8
Treasurer	" " " " "	6.3
Councilman	" " " " "	5.8
Representative	" " " " "	4.8
Auditor	" " " " "	4.4
Election Officer	" " " " "	4.4
Chairman	Section of Chinese Students' Alliance in America	8.0
Vice Chairman	" " " " " " "	5.0
Secretary	" " " " " " "	5.8
Treasurer	" " " " " " "	5.4
President	Local Chinese Students' Club in America	6.7
Vice President	" " " " " "	4.3
Secretary	" " " " " "	4.8
Treasurer	" " " " " "	4.5
Manager	" " " " " "	4.3
Auditor	" " " " " "	3.1
Committeeman	" " " " " "	3.8
General Manager	Chinese Students' Monthly	7.3
Advertising Manager	" " "	6.0
Circulation Manager	" " "	5.5
Associate Manager	" " "	4.4
General Manager	Chinese Students' Quarterly	6.4
Advertising Manager	" " "	5.1
Circulation Manager	" " "	4.8
Associate Manager	" " "	3.9
Chairman	Annual Students' Conference	7.9
Secretary	" " "	6.1
Treasurer	" " "	5.7
Committeeman	" " "	5.7

<i>Position</i>	<i>Organization</i>	<i>Points</i>
President	College Cosmopolitan Club	6.3
Manager	" " "	4.9
Secretary	" " "	4.5
Treasurer	" " "	4.3
Chairman	Chinese Prohibition League	5.3
Secretary	" " "	4.4
Treasurer	" " "	4.3
President	Chinese Students' Professional Societies or Clubs, Such as Banking Club, Educational Club, Engi- neering Club, etc.	6.2
Vice President	" " " "	4.3
Secretary	" " " "	4.7
Treasurer	" " " "	4.3
Committeeman	" " " "	3.5
Auditor	" " " "	2.8
President	Alumni Association, Such as Nankai Alumni Asso- ciation, Soochow Alumni Association, Tsing Hua Alumni Association, etc.	6.3
Vice President	" " " "	4.3
Secretary	" " " "	4.8
Treasurer	" " " "	4.1
Committeeman	" " " "	3.6
Auditor	" " " "	2.8
President	Chinese Patriotic Committee	6.9
Secretary	" " "	5.6
Treasurer	" " "	5.1
President	Chinese Students' Christian Association	7.3
Vice President	" " " "	4.8
General Secretary	" " " "	7.3
Chairman	Local College Y. M. C. A.	4.6
Secretary	" " "	3.6
Treasurer	" " "	3.1
Cabinet Member	Local College Y. M. C. A.	2.7
Member Volunteer Band	" " "	1.8
Chairman	College Students' Bible Class	3.0
Leader	College Students' Discussion Group	3.3

SCHOLARSHIP

<i>Position or Achievement</i>	<i>Institution</i>	<i>Points</i>
Fellowship	College or University	7.7
Scholarship	" " "	5.8
Graduation with Honor	" " "	7.0
Ph.D.	" " "	8.9
Instructor	" " "	7.0
Lecturer	" " "	6.8
Assistant	" " "	5.8
Member	Phi Beta Kappa Society	7.4
Member	Sigma Xi "	7.5
A.B. with	Magna Cum Laude	6.5
A.B. with	Summa Cum Laude	6.4

KNOWLEDGE OF ENGLISH

<i>Position or Achievement</i>	<i>Organization</i>	<i>Points</i>
Editor-in-Chief	Chinese Students' Monthly	8.9
Associate Editor	" " "	6.0
Contributor	" " "	4.9
Reporter	" " "	3.4
Editor-in-Chief	"Christian China"	7.6
Associate Editor	" "	5.3
Contributor	" "	4.3
Reporter	" "	3.4
Editor-in-Chief	American College Paper	8.9
Associate Editor	" " "	6.5
Contributor	" " "	5.1
Reporter	" " "	3.7
First Prize Essay	Chinese Students' Monthly	6.9
Second Prize Essay	" " "	5.6
First Prize	College English Oratorical Contest	6.9
Second Prize	" " " "	5.6
Member	College English Debating Team	6.6

KNOWLEDGE OF CHINESE

<i>Position</i>	<i>Organization</i>	<i>Points</i>
Editor-in-Chief	Chinese Students' Quarterly	8.3
Associate Editor	" " "	6.1
Contributor	" " "	4.9
Reporter	" " "	3.8

Position	Organization	Points
Editor	"Science" in Chinese	7.8
Contributor	" " "	5.8
Editor-in-Chief	"Political Science Review" or "Cheng Hsueh Ts'ung K'an"	
Editor	" " " " "	7.1
Contributor	" " " " "	5.9
Contributor	Shanghai Shun Pao	5.1
Contributor	"The Renaissance"	5.0
Contributor	"Eastern Miscellanies"	5.9
		5.7

With the help of this scale, the individual records were turned into numerical values. If a student had several records in any one quality, then all the transmuted values were combined representing his total credit therein. These individual records, then, in terms of numerical values were correlated with the judgments of associates and the coefficients were represented in Table XIII.

TABLE XIII

SHOWING THE CORRELATIONS OF JUDGMENTS WITH INDIVIDUAL RECORDS

CORRELATION OF	NO. OF CASES	<i>r</i>
The Judgment of Associates with Individual Records in Scholarship.....	58	.706 ± .044
The Judgment of Associates with Individual Records in Leadership.....	145	.623 ± .034
The Judgment of Associates with Individual Records in Knowledge of English.....	44	.793 ± .038
The Judgment of Associates with Individual Records in Knowledge of Chinese.....	47	.543 ± .070

From these correlation coefficients, it is evident that the judgment of associates agrees better with individual records than with other data heretofore given. This would indicate that the judgment was largely based upon a knowledge of the accomplishments of the person judged, and further that the acquaintance among any group of Chinese students in this study had reached the stage where thorough knowledge of one another's accomplishment was hardly to be doubted.

2. A DISCUSSION ON THE VALIDITY OF THE JUDGMENT OF ASSOCIATES

In order to find out which source of data agrees best with the judg-

ment, a résumé of all the correlation coefficients showing the validity of the judgment from the previous chapters is shown in Table XIV.

TABLE XIV

SHOWING THE CORRELATION OF THE JUDGMENT WITH TEST SCORES, HIGH SCHOOL AND COLLEGE MARKS, AND INDIVIDUAL RECORDS

CORRELATION OF	SCHOLARSHIP	LEADERSHIP	KNOWLEDGE OF ENGLISH	KNOWLEDGE OF CHINESE
The Judgment with Test Scores.....			.430	
The Judgment with High School Marks.....	.421		.307	.374
The Judgment with College Marks.....	.414			
The Judgment with Individual Records.....	.706	.623	.793	.543

This table shows that the judgment in scholarship is checked up three times; in English three times; in Chinese twice; and in leadership only once. It is also seen that judgments agree best with individual records and practically equally well with test scores, high school marks, and college marks. As has been hinted, this substantial correlation between the judgment and individual records shows conclusively the reliance of the former upon the latter. This reliance rids the judgment of personal prejudices and whims and adds a greater weight to it.

The fact that the judgment in leadership is only checked up once raises the question as to whether its validity has been sufficiently proved. The answer is that any human trait like leadership partakes of such elusive character that, for the present at least, the only way to judge or measure it is to resort to subjective opinions, directly or indirectly, of the largest possible number of competent judges. The procedure, in the light of the present investigation, must needs meet the following few requirements: (1) a thorough acquaintance of the judge with his subjects; (2) a sufficient number of judges (this investigation shows that a total of twelve judges will yield a self-correlation coefficient of about .90); (3) a fairly common understanding of the qualities to be judged; and (4) the use of rankings.

CHAPTER VII

YEARS SPENT IN AMERICA AS A FACTOR

In the preceding chapters it has been shown that knowledge of English rather than knowledge of Chinese is more closely associated with success in America, academic and non-academic. The next question that comes consequent upon this conclusion is: How can knowledge of English be better secured? To put it differently, is it more profitable to spend more *initial* years studying English in China, or is it more profitable to spend more *additional* years in America? How is the number of years spent in America associated with scholarship, leadership, knowledge of English, and knowledge of Chinese? Questions 4 and 6 in the questionnaire sheet tell us the number of years a student spent in China in studying English and the time of his arrival in America. With the data supplied therefrom, it is possible to work out the correlation coefficients as shown in Table XV.

TABLE XV

SHOWING THE CORRELATION OF THE NUMBER OF YEARS SPENT IN AMERICA WITH SCHOLARSHIP, LEADERSHIP, KNOWLEDGE OF ENGLISH, AND KNOWLEDGE OF CHINESE

CORRELATION OF	NO. OF CASES	r
Years Spent in America with Scholarship.....	276	.119 ± .040
Years Spent in America with Leadership.....	279	.218 ± .038
Years Spent in America with Knowledge of English	282	.205 ± .038
Years Spent in America with Knowledge of Chinese	263	-.090 ± .042

It must also be stated here for later comparisons that the correlation between the *initial* number of years spent in studying English in China and the knowledge of English in America is .212 with 277 cases, while the correlation between the *additional* number of years spent in America and the knowledge of English is .205 with 282 cases, as shown in Table XV. The correlation between the *initial* number of years spent in China in studying English and the years

spent in America is $-.522$ with 287 cases. If we designate the knowledge of English in America as 1, the initial years in China in studying English as 2, and the years spent in America as 3, then by using the usual partial correlation formula,

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

the following two partial correlation coefficients are yielded:

$$\begin{aligned} r_{12.3} &= .382 & (1) \\ r_{13.2} &= .378 & (2) \end{aligned}$$

Equation (1) reads that the correlation between the knowledge of English in America and the initial years spent in China in studying English, with the influence of the disturbing factor of years spent in America eliminated or equalized, is $.382$. Equation (2) reads that the correlation between the knowledge of English and the additional years spent in America, with the influence of the disturbing factor of the initial years spent in China in studying English eliminated or equalized, is $.378$.

Interpretation of the correlation is important. In the first place, it should be noticed that neither the initial years spent in studying English in China nor the additional years spent in America (it must be noted that these additional years are not spent primarily in studying the English language, but in acquiring it as a matter of course) has any very high correlation with the knowledge of English. This would point to the fact that knowledge of English does not depend, to any great extent, upon the number of years spent in studying it before coming to this country, other factors such as individual difference and environmental effect being, perhaps, of much greater influence. This is what we expect.

In the second place, but in a more striking manner, it should be noticed that the two partial correlation coefficients of $.382$ and $.378$ would show that the initial years spent in studying English in China and the additional years spent in America have practically an equal influence upon one's knowledge of English. This does not argue, however, that the initial years spent in America in studying English would have the same effect upon one's knowledge of English as the initial years spent in China in studying it. In all probability, the former would exert a much greater influence. The significance of

these two coefficients lies in the fact that after one has spent a reasonable number of years in studying English in China, so as to acquire a knowledge of speaking and reading, then if he comes to America the number of years he stays here will not mean more to his further acquisition of English than his initial years in China would mean to his initial improvement in it.

The low correlation between the number of years spent in America with both scholarship and leadership ($r = .119$; $r = .218$) bring us to a discussion of the problem of preparing students in China that are to be sent to America. We have seen that scholarship and leadership in America depend largely upon knowledge of English; that knowledge of English does not depend so much (as we presumed) upon the years of stay in America provided a reasonable number of years is spent in China in studying it. Thus, scholarship, leadership, and knowledge of English, which are more or less substantially correlated with one another, all have an equally very low correlation with the years of stay in America. Substantially, the years spent in America as a factor have very little significance in respect to the qualities in our study.

The correlation of $-.552$ between the years spent in China in studying English and the number of years spent in this country is merely a result of chance. It can be explained by the fact that when the study was made more than one-third of the students in this study had been in this country for a short time, about 6 months, and had, nevertheless, spent about five or six years in China in studying English; at the same time there were those older students who had been in America long and who had spent generally fewer years in China in studying English. This phenomenon indicates clearly that students of more recent years had a more thorough preparation in English in China than those of the older days.

The very slightly negative correlation ($r = -.090$) between the years spent in America and knowledge of Chinese simply means that knowledge of Chinese, once acquired, whatever its amount may be, does not decrease with the lack of practice resulting from staying a few years longer in America. The correlation $-.090$ is so small that it amounts practically to zero. Its significance should rid us of the current fear that a few years' stay in America tends to result in the retrogression of knowledge of Chinese. What actually happens is in all probability that, through lack of practice, the

ability of reading and writing Chinese temporarily lies in a state of dormancy which to some people may seem to be in the state of retrogression but which, upon a renewal of study and practice in China, will regain its normal condition.

CHAPTER VIII

CONCLUSIONS AND SUGGESTIONS

Some of the larger conclusions of the study may be restated as follows:

1. Scholarship is correlated rather high with leadership ($r = .592$).
2. Knowledge of English is correlated rather high with both scholarship ($r = .719$) and leadership ($r = .679$).
3. Knowledge of Chinese is correlated low with both scholarship ($r = .389$) and leadership ($r = .309$).
4. Knowledge of English and knowledge of Chinese have a very slightly negative correlation or are practically uncorrelated, or independent of each other ($r = -.024$).

Other findings that are of import are (1) scholarship, leadership, and knowledge of English are all correlated low with the length of time spent in America ($r = .119$; $r = .218$; $r = .205$ respectively); (2) knowledge of Chinese is practically uncorrelated with the length of time spent in America ($r = -.090$); and (3) the initial years spent in studying English in China and the additional years spent in America both have equally low correlations with knowledge of English ($r = .382$ and $r = .378$ respectively).

In the light of the foregoing conclusions, a few suggestions may be here presented which may be of use to a consideration of the policies governing the process of preparation and selection of Chinese students to be sent to America.

In the first place, since knowledge of English is correlated rather high with both scholarship and leadership and since knowledge of Chinese is correlated rather low with both of them, it is evident that in the preparation of Chinese students to be sent to America more emphasis should be placed upon knowledge of English and less upon the knowledge of Chinese if these students are expected to do well in scholarship and leadership in America. It is to be regretted that it has not been possible to find out the intelligence of these students in this study, but it is very likely and safe to say that intelligence has a high correlation with both knowledge of English and of Chinese and that if intelligence is "partialed out,"

there will still be a fair correlation of knowledge of English with both scholarship and leadership; but there will be perhaps a zero correlation of knowledge of Chinese with both scholarship and leadership. Thus the scholarship and leadership of a Chinese student in America is determined by intelligence and knowledge of English, while knowledge of Chinese is almost indifferent to the attainment of both. While this is true, it by no means proposes to neglect the study of Chinese. Knowledge of Chinese, while it is impotent in the career of a Chinese student in America, will certainly be important upon his return to China. For this reason, it is suggested that in the preparation of Chinese students to be sent to America attention should be directed to an equal attainment of knowledge of both English and Chinese so that these students not only will best succeed during their period of education in America by means of their knowledge of English but also will do well during their entire life of service in China by means of their knowledge of Chinese.

In the second place, since knowledge of English and knowledge of Chinese are uncorrelated or independent of each other, it will be in the future worth our greatest effort to teach these two languages in such wise that improvement in one will be associated, and if possible, closely associated with, improvement in the other. Besides the schools giving equal emphasis upon both English and Chinese, there are many other schools in China that are unfortunately divided into two extremes: one places the emphasis on the study of Chinese at the expense of the study of English and the other does just the reverse. The suggestion is to build up a reasonably secure foundation in Chinese at an early period in a student's school life and then, but not until then, to take up the study of English in a rather systematic fashion until a good speaking and reading knowledge of English is adequately attained. When such is the case, it is highly probable that the correlation between knowledge of both English and Chinese will be positive.

In the third place, since scholarship, leadership, and knowledge of English all have low correlations with the length of time spent in America, it is evident that these traits are affected only to a small extent by a longer stay in America, and that they are more or less constant, just as intelligence with which they must be highly associated. One of the unsolved problems in connection with the sending of Chinese students to America is the number of years they should

stay here. Approximately it varies from one to ten years. Inasmuch as a longer stay will bring with it only slight improvement in scholarship, leadership, and knowledge of English, and inasmuch as it will involve greater financial expenses as well as prolong the detachment of these students from their own country, it is here suggested that it would be desirable to shorten the period of their sojourn in America. But the shortening of the period necessitates maturity of both knowledge and age. If a student is sent to America to begin with the Freshman year in a college, it will require on the average seven years to finish the graduate work, which is entirely too long. It is therefore suggested that in order to acquire advanced knowledge in a short period, say, three or four years, it is almost imperative to send out only those students who have received the A.B. degree in China or who have had a training which will qualify them to enter the graduate schools in America. This plan of sending out advanced and mature students for a short period of three or four years of stay in America will bring with it at once many advantages: (1) it will save the educational cost; (2) it will avoid the danger of many students becoming unfamiliar with their own country, less appreciative of their own culture and civilization, and therefore less ready to render their service to it; (3) it will take in only students who will better judge Western civilization and can thus make a better selection of what is desirable; and (4) it will include only those students who, because of their maturity, have already, before their coming to America, gained a considerable respect of their own people and who, therefore, upon their return, will make their influence more readily felt and their work more productive. While this suggestion is borne out by the results of this study, it happily meets with the rising consciousness among educators in China which is gradually expressing itself in the process of reshaping educational policies respecting the education of Chinese students in America.

APPENDIX

The following are samples of tables containing the original data used in this study, which are now kept in the Library of Teachers College, Columbia University.

TABLE I A

THE JUDGMENT IN SIGMA VALUES AND THE NUMBER OF JUDGES IN EACH CASE FOR 664 CHINESE STUDENTS IN AMERICA IN THE QUALITIES OF (I) SCHOLARSHIP, (II) LEADERSHIP, (III) KNOWLEDGE OF ENGLISH, AND (IV) KNOWLEDGE OF CHINESE

The first column under each quality is the number of judges; the second column under each quality is the average value of their judgments transmuted in terms of sigma. The table should read "Individual i was rated by 3 judges in Scholarship, the average of the judgments being .18 sigma; he was not judged at all in Leadership; he was judged by 3 judges in Knowledge of English, the average of the judgments being .73 sigma; he was not rated at all in Knowledge of Chinese."

Ind.					Ind.				
No.	I	II	III	IV	No.	I	II	III	IV
1	3	.18			34	8	.39	8	1.10
2	4	.25	3	.62	35	8	.20	7	-.09
3	3	-.49	3	.20	36	8	.17	7	.28
4	3	-.61	4	.70	37	6	-.07	5	-.25
5			3	-.89	38	7	-.14	7	.05
6	3	-.85	3	-1.25	39	8	-.07	8	.49
7	3	-.38	3	.43	40	7	.28	5	-.42
8			3	1.51	41	7	-.78	7	.27
9	3	1.35	3	-.37	42	7	-.20	6	-.69
			3	-.05				7	.72
			3	1.37				7	-.24

TABLE II A

THE SCORES IN ENGLISH TESTS FOR 42 CHINESE STUDENTS IN AMERICA
 I. THORNDIKE ALPHA 2, PART II. III. READING TEST II.
 II. READING TEST I. IV. THORNDIKE VOCABULARY TEST

Ind.					Ind.				
No.	I	II	III	IV	No.	I	II	III	IV
16	8.6	70	37.5	50	301	8.6	74	12	128
17	7.7	80.5	50	163	305	7.9	67.5	34.5	125
18	7.1	45	25	50	306	8.6	78	64.5	41
106	7.0	51.5	15	65	312	8.4	66.5	23	104
110	8.1	77	0	158	385	7.7	57	0	133

TABLE III A

MARKS IN HIGH SCHOOL IN CHINA FOR 78 CHINESE STUDENTS IN AMERICA

I. GENERAL AVERAGE FOR FOUR YEARS. II. MARKS IN ENGLISH FOR
III. MARKS IN CHINESE FOR FOUR YEARS. FOUR YEARS.

Ind.				Ind.				Ind.			
No.	I	II	III	No.	I	II	III	No.	I	II	III
12	84	79	84	169	83	82	87	390	85	83	89
16	75	75	86	170	84	89	82	403	86	86	94
19	76	81	84	174	83	81	84	406	78	77	78
64	85	87	75	177	74	89	89	414	87	82	76
67	82	84	81	188	82	79	82	416	88	93	94

TABLE IV A

COLLEGE MARKS IN AMERICAN COLLEGES FOR 122 CHINESE STUDENTS IN AMERICA

Ind.		General		Ind.		General		Ind.		General	
No.		Average		No.		Average		No.		Average	
12		88		133		85		284		89	
16		70		134		82		289		91	
18		75		137		79		296		89	
19		77		154		86		299		92	
46		68		165		85		301		79	

TABLE V A

INDIVIDUAL RECORDS OF 156 CHINESE STUDENTS IN AMERICA ON A POINT SCALE
FOR THE QUALITIES OF (I) SCHOLARSHIP; (II) LEADERSHIP;
(III) KNOWLEDGE OF ENGLISH; AND (IV) KNOWLEDGE
OF CHINESE

Ind.					Ind.				
No.	I	II	III	IV	No.	I	II	III	IV
1	5.2	20.4			133	11.6	10.5		24.0
7	7.0	19.0			134		19.0		
8	5.2	17.8			137		13.5		18.3
9		4.8			159		9.5		
10		14.8			160		22.5		

TABLE VI A

LENGTH OF TIME IN TERMS OF MONTHS THAT 286 CHINESE STUDENTS IN AMERICA
(I) STUDIED ENGLISH BEFORE COMING TO AMERICA AND (II) HAVE
BEEN IN AMERICA

Ind.			Ind.			Ind.		
No.	I	II	No.	I	II	No.	I	II
1	84	19	90	60	44	179	96	19
7	48	61	92	36	59	183	94	20
8	120	19	93	84	8	184	72	43
9	60	19	94	36	125	186	24	31
10	48	55	95	0	151	187	84	19

VITA

JENNINGS PINKWEI CHU was born at Kiangsun, Chekiang, China, December 2, 1895. He received his early education in the modern elementary and middle schools of Chekiang. He went to Tsing Hua College, Peking, in 1911, graduating from that college in 1916. In the same year, he was sent out by Tsing Hua College to the United States, and studied at Johns Hopkins University from 1916-1919, where he received his A.B. degree in 1918 and was a graduate student for the year 1918-1919. He was also a student at the Cornell University Summer School in 1917 and at the Chicago University Summer School in 1919. He studied at Teachers College, Columbia University, from 1919-1922; received his A.M. degree from Teachers College in 1920, and was Research Scholar in Teachers College during the year 1921-1922. He was Lecturer in Chinese Language at New York University, 1920-1922.

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