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Scholastic Records and Personality and Character  
Traits of the Public-school Trained and the  
Parochial-trained Students of the Graduating Class  
of 1952, Central High School, Aberdeen, South  
Dakota

John J. Woodruff

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SCHOLASTIC RECORDS AND PERSONALITY AND CHARACTER TRAITS OF  
THE PUBLIC-SCHOOL TRAINED AND THE PAROCHIAL-TRAINED STUDENTS  
OF THE GRADUATING CLASS OF 1952, CENTRAL HIGH SCHOOL,  
ABERDEEN, SOUTH DAKOTA

by

John J. Woodruff

A Problem submitted to the Faculty of the South Dakota  
State College of Agriculture and Mechanic Arts  
in partial fulfillment of the requirements  
for the Degree of Master of Science

July, 1953

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## ACKNOWLEDGMENT

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The writer wishes, also, to acknowledge the valuable assistance given him by Associate Professor S. A. Smdet of the State College Education Department.

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## SECTION I

### INTRODUCTION

#### Justification of the Study

For many years at Aberdeen, South Dakota, a difference of opinion has existed regarding the relative academic achievement, rank in class, and social adjustments of the students in the public-school system and the parochial-school system.

The advocates of the two school systems have based their opinions on observations only and without the benefit of statistical evidence. To present impartial evidence upon which the proponents may form a more logical conclusion was the purpose of the investigator.

#### Statement of the Problem

The purpose of this study was to compare the students who had received the first nine years of their training in a parochial school with those who had received their training in a public school to see if there were any statistical differences in their performance during the last three years of their high-school training in the public school. They were compared in mental ability, academic achievement, rank in class, and social ability development by the investigation of the high-school records of the graduating class of 1952. The school performances made by these students grouped into their respective origins were the records used in making the comparisons.

Since the two schools operate similarly through the first nine grades, the investigator felt that the situation was ideal for a comparison. The parochial-school system offers six years of elementary

school and three years of junior high school. The parochial students then complete their education in the three year public-high school. The public schools of Aberdeen are arranged in accordance with the 6-3-3 plan; consequently, the students from both school systems begin their high school at the tenth grade in the public school.

### Objectives of the Study

The general objectives of this study were to note if there were any significant differences of performances in the two groups.

The specific objectives are stated below:

- (1) To make a comparison of the means of the mental ability of the groups studied.
- (2) To make comparisons of the means of achievement as measured by marks in English, science, history, and mathematics.
- (3) To make a comparison of the means of the rank in class of the groups investigated.
- (4) To make a comparison of the means of the extra-class activity participation.
- (5) To make comparisons of the means of the personality and character rating given to the students by the teachers in high school, in-so-far as the school rating system existed.

### Delimitation of the Problem

The foregoing objectives served as a basis for the delimitation of the problem. These objectives were limited to two areas: the academic



area and the social area of each student. The investigator limited the data to the available records of the graduating class of 1952. At no time were tests or measurements of any kind employed in this study except those recorded in the records.

## SECTION II

### PROCEDURE

#### Groups Used

The two groups used in this study may be referred to as public-school trained and parochial-school trained.

The public-school group of ninety-four students attended the Aberdeen city schools during the six years of elementary training and during the three years of junior high school. The students in this group had their entire training in the public schools of Aberdeen. Those transferring in to the system from rural schools, other localities, and parochial schools were discarded.

The parochial-school group of forty-nine students attended the Aberdeen Catholic schools during the six years of elementary training and during the three years of junior high school. The students in this group had their entire training in the Aberdeen parochial schools; and those that had transferred in to the schools from rural schools, parochial schools of other localities, or from the public schools were discarded.

#### Sources of Information

The evidence for these two groups was obtained from the records of the graduating class of 1952, at Aberdeen, South Dakota, (See appendix A and B). The data obtained from the Permanent Record and the Personality and Character Rating card were used directly in this study.

#### The Methods of Tabulation

In the scholastic achievement area the data for each student were recorded first in columnar form with the number of A, B, C, D, and F marks

a student received in each of the basic subjects over the three year period in high school. Then the mean of the mental ability tests: namely, Otis and the California Mental Ability, was computed and entered in the student's column. The student's rank in class, which had already been computed and recorded in the Permanent Record card, was also entered on this columnar form.

In an attempt to have some kind of measurement of the social adjustment, the number of activities in which a student participated was entered into five separate columns: student government, music, speech, athletics, and teacher help. Instead of treating each activity separately, the investigator totalled the number of activities in which the student had participated during the three years of high school. The ratings on the Personality and Character Rating card, in-so-far as the school rating system existed, were recorded in columnar form. The number of teachers awarding a certain degree of achievement in each personality and character trait was also recorded.

In the scholastic attainment and the social adjustment areas a second tabulation (see Appendix E) of each student was then initiated using percentages for the ranking of each student in the basic subjects and in the personality and character ratings. Each subject mark was assigned a numerical value, four for an A, three for a B, two for a C, one for a D, and zero for a F. This total of numerical values, then, represented the mark achievement in this subject. The total number of semesters completed in a subject by the student was then multiplied by four to make up a total possible numerical achievement. This ratio

between the numerical value of marks actually attained over the total possible numerical achievement was then multiplied by one-hundred to obtain the percentage. This procedure was also followed in the personality and character ratings given to the students. Four for excellent, three for above average, two for average, one for below average, and zero for poor. The same arithmetical process as used in computing the percentages of the marks was then employed. This tabulation was necessary because of the fact that the number of semesters required to complete a major or a minor in the student's field varied. The number of teachers rating students in personality and character traits also varied.

These data were treated statistically by the use of the "t" test of significance. In general, this "t" test of significance indicates whether or not a difference of means is statistically significant.

#### The "t" Test of Significance

Fisher's "t" test was used in this investigation as it was recommended for "... the comparison of the performance of different groups under similar situations".<sup>1</sup> This "t" value technique was found to be acceptable in educational research in comparable studies. The 5% level of significance was arbitrarily chosen. It was believed that for purposes of this study the test at the 5% level was rigorous enough to impose upon the data.

If the investigator had found a value of "t" indicating that there was a difference in means at the 5% level of significance, then he had

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<sup>1</sup> Helen M. Walker, Elementary Statistical Methods, Henry Holt and Company, New York, 1949, p. 286.

a 95% chance of being correct in the assumption that a statistically significant difference of means existed. In other words, when a difference of means is significant at the 5% level, there is only one chance in twenty that differences between means of this magnitude could have been caused by the operation of sampling error alone. If there was indicated any computed "t" score value of less than the tabular "t" value at the 5% level, the difference was not considered significant. When the calculated "t" score value equaled or exceeded the tabular value of "t" at the 5% level, the difference between means was considered significant.

The following formula was used in the computation of the "t" score value found in this study<sup>2</sup> (see Appendix D).

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sigma_{\bar{X}_1 - \bar{X}_2}}$$

When

$$\sigma_{\bar{X}_1 - \bar{X}_2} = \sqrt{\frac{S_1^2}{N-1} + \frac{S_2^2}{N-1}}$$

When

$$S^2 = \frac{\sum X^2}{N} - (\bar{X})^2$$

When

$$\bar{X} = \frac{\sum X}{N}$$

<sup>2</sup> Ibid., p. 119; p. 349.

## SECTION III

## TREATMENT OF DATA

In the following five tables of statistical computations the investigator has followed the same plan for each one. The tables show the means and difference of means; and with the exception of rank in class, the computed "t" score and the "t" value at the 5% level of significance. The brief discussion shows the difference of the means found and summarizes the results.

Mental Ability as the Basis Upon Which the Groups Are Compared

The mean of the two mental ability tests; the Otis and the California Mental Ability, was used to compare the public-school trained and the parochial-school trained students in respect to I. Q. scores. The "t" test of the difference of means at the 5% level of significance proved to be insignificant.

Table I. I. Q. as the Measure of Mental Ability

Area	Parochial- Trained Mean	Public- Trained Mean	Difference of Means	Computed "t"	Value of "t" 5% level of Significance
I. Q.	104.34	107.67	3.35	1.871	1.976

The "t" score computed from the means and variance of the groups compared was 1.871. Fisher's table (see Appendix D) at the 5% value at 140 degrees of freedom<sup>3</sup> produces the value of 1.976. The computed "t" score was less than the value at the 5% level of significance; therefore,

<sup>3</sup> R. L. C. Butsch, How to Read Statistics, Bruce Publishing Company, Milwaukee, 1946, p. 159.

there was no significant difference in the mental abilities of the two groups.

The difference of means of 3.35 was based on the normal Intelligence Quotient (I. Q.) scale. When the difference of means was tested for significant difference by the use of the "t" test at the 5% level of significance, no difference was indicated.

#### Marks Received in High School in the Basic Subjects Compared

Because of the fact that there was no significant difference of the means in the I. Q. of the groups compared, the "t" test technique was also utilized in the comparison of means in the basic subjects.

Table II. Comparison of Marks Received by the Public-School and Parochial-School Students

Subject	Parochial- Trained Mean	Public- Trained Mean	Difference of Means	Computed "t"	Value of "t" 5% level of Significance
English	64.51	63.21	*1.30	.341	1.976
Science	55.91	59.55	*-3.64	.928	1.976
History	61.40	59.32	2.08	.569	1.976
Mathematics	56.87	57.52	- .65	.157	1.976

\*-Difference of means favors the parochial-trained students

\*Difference of means favors the public-trained students

The difference in means favored the parochial students in English and history, whereas a difference of means favored the public school students in science and mathematics. In no case, however, in any of the subjects considered was a significant difference apparent as evidenced by the comparison of the "t" scores with the 5% level of significance in Table II.

All comparisons were tested at the 5% level of significance. No

significant differences in achievement in respect to the marks attained in English, science, history, and mathematics in high school were indicated by the test.

Rank in Class as a Basis Upon Which the Groups Are Compared

Because of the fact that the marks attained in the basic subjects did not make up the total composite attainment in that many other subjects were taken by the students, the investigator employed the rank of students in class to describe total composite mark attainment of the groups.

Table III. Comparison of Rank in Class of the Public-Trained and Parochial-Trained Students

Area	Parochial-Trained Mean	Public-Trained Mean	Difference of Means
Rank of Student in Class	116.63	110.21	6.42

The student's rank in class was taken from the permanent record of the student. This rank had previously been computed by the school authorities. The student with the rank of one had received the best composite mark achievement in the entire class; the student with the rank of 226 had received the poorest composite mark achievement in this graduating class. The mean of the public-school group was 110.21, whereas the mean of the parochial-school group was 116.63. The difference in means was 6.42, favoring the public-school group, because the lower mean more nearly approached the best rank of one.

Because the data here did not conform to a normal frequency curve



as the others did, the "t" test and the standard deviation measure appear not to be applicable in this situation. For this reason only the mean of each group and the difference of means are shown in Table III.

Extra-Class Activity Participation in High School Compared

The "t" tests and the comparison of rank in class of the two groups concluded the research in the achievement area. Next to be considered was the comparisons in the social area, which included extra-class activity participation and personality and character ratings.

Table IV. Comparison of the Extra-Class Participation of the Public-Trained and Parochial-Trained Students

Area	Parochial-Trained Mean	Public-Trained Mean	Difference of Means	Computed "t"	Value of "t" 5% level of Significance
Extra-Class Participation	6.02	7.58	1.56	2.108	1.976

The difference of means was 1.56. This difference was comparatively great as the unit 1.0 is indicative of one complete activity in which the student was engaged. The mean of the public-school group was 7.58 and the mean of the parochial-school group was 6.02. This difference of means may then be interpreted to indicate that the average public-school student engaged in 1.56 more activities than did the average parochial-school student.

The investigator was inclined here to point out that there may be some extenuating circumstances for the difference of means described above. The writer was aware of the fact that the activities offered in

the public junior high schools were of a more similar nature to the high-school activities than were the activities of parochial junior high. The adjustments of the parochial-school student may be supposed to be more critical than that of a public-junior-high student to the curriculum, to procedures of passing to class, to activities offered, and to departmentalization. The entire program apparently was less familiar to the parochial student than to the public-school student.

The "t" score computed from the differences of the means in this case was 2.11. This number, using Fisher's table, indicated a significant difference at the 5% level but not at the 1% level. However, this significant difference of means indicated that there was one chance in twenty that this significant difference of means could be in error.

#### Personality and Character Ratings Compared

The second part of the comparison in the social area, that of personality and character ratings, was tested for significant difference.

Table V. Comparison of the Ratings in Personality and Character Traits of the Public-Trained and Parochial-Trained Students

Trait	Parochial-Trained Mean	Public-Trained Mean	Difference of Means	Computed "t"	Value of "t" 5% level of Significance
Personal Appearance	69.55	71.48	* / 1.93	1.261	1.976
Social Maturity	67.59	70.01	/ 2.42	1.475	1.976
Cooperation	71.24	73.23	/ 1.99	1.087	1.976
Dependability	68.59	71.52	/ 2.93	1.502	1.976
Leadership	56.48	60.77	/ 4.29	2.568	1.976
Initiative	60.02	63.36	/ 3.34	1.748	1.976
Industry	60.24	63.72	/ 2.48	1.158	1.976
Thoroughness	61.83	64.20	/ 2.37	1.144	1.976

\* / Difference in means favors the public-trained students

The basic data employed in this study were taken from the Personality and Character Rating card (see Appendix B). Each student was rated in each trait approximately twenty-five times by as many as twelve to eighteen different teachers. It was noted, but not proved statistically, that there was in almost every case a tendency of the frequencies to cluster at a certain degree of success in each trait. As an example, where twenty-six teachers had rated a student in a personality and character trait, twenty-three thought him to be above average, one considered him to be excellent and two considered him to be average. There were, of course, variations from excellent on one hand to average on the other, but the tendency was to cluster at a certain attainment in each trait.

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All of the "t" scores in Table V with the exception of the "t" score of the leadership comparison, are smaller than those at the 5% level of significance value. The investigator assumed that all other differences of the means indicated were insignificant at that level. The "t" score in leadership was 2.568. This was larger than the 5% level value but smaller than the 1% level and was, therefore, indicative of a significant difference in the means of the two groups at the 5% level of significance.

This significant difference in leadership may have stemmed from the only other significant difference in activity participation. There may have been a relationship between the participation in an activity and leadership. In other words, leadership ability might not normally be developed unless there were activity participation.

All differences in means in all traits were found to favor the public-trained students. The only significant difference in means, however, was found in the rating the teachers gave the students of the respective groups in the leadership trait. The only other significant difference found in this study by the use of the "t" test was in the activity participation of the two groups. One conclusion which one might draw from this difference in means in leadership could be based on the lack of participation in activities by parochial students.

The value of Section III of the study should not be overestimated. These comparisons in this phase of the social area were severely handicapped by the following limitations:

- (1) Greene, Jorgensen, and Gerberich<sup>4</sup> state that teachers ratings in the less tangible traits are often less accurate than the more readily observable characteristics.
- (2) The teachers may have been guilty of giving high ratings to the quiet, unobtrusive, but maladjusted student, and of giving low ratings to the extrovert.
- (3) Personality and character of an individual have proved to be illusive and difficult to measure under the very best of controlled conditions.

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<sup>4</sup> Harry A. Greene, Albert N. Jorgensen, and J. Raymond Gerberich, Measurement and Evaluation in the Secondary School, Published for the United States Armed Forces Institute, Longmans, Green and Company, 1943, p. 250.

## SECTION IV

### SUMMARY AND CONCLUSIONS

For the convenience of the reader, the summary and conclusions of the study have been divided into two parts: a general summary statement and a summarization of conclusions, with an over-all table (Table VI) to show the results of all comparisons.

#### General Summary Statement

The purpose of this study was to compare the students on the basis of their scholastic attainment and social adjustment who received the first nine years of their training in a parochial school with those who had received their training in a public school to see if there were any statistical differences in their performance during the last three years of their high-school training in the public high school.

Since the parochial and public-trained students were of the same population in terms of mental ability, it must be said that in terms of achievement no statistical differences as tested at the 5% level of significance existed.

In terms of social adjustment, however, two significant differences of means at the 5% level of significance were at once apparent. One significant difference was indicated by the "t" test in activity participation, and the other significant difference was indicated in the leadership trait. One must not, however, in the case of the personality and character trait of leadership, make too definite conclusions because of the unreliability of teacher ratings.

## Conclusions Drawn from the Study

The main conclusions from the study will be summarized in this section under mental ability, marks, rank in class, activity participation, and personality and character traits. The data can be found in Tables I, II, III, IV, and V.

### Part I. Mental Ability

In mental ability there was a difference of means of 3.35 points on the I. Q. scale which favored the public-school group. When this difference in means was tested for significant difference by the use of the "t" test at the 5% level, no significant difference was noted.

### Part II. Marks Received in High School

The difference in means in marks received favored the parochial students in English and history, whereas a difference in means favored the public-school pupils in science and mathematics. When the comparisons were tested at the 5% value of significance, there was noted no significant difference in respect to the marks received by the groups in English, science, history, and mathematics.

### Part III. Rank of Student in Class

The difference of means in rank of student in class favored the public-school group. Although there may be some importance in this difference of means, the "t" test cannot be used because the data did not have the distribution of a normal curve.

### Part IV. Extra-Class Activity

The difference in means of the extra-class activity was 1.56, which may be interpreted to mean that the public-school student participated

in 1.56 more activities on the average than did the parochial student. When this was tested at the 5% level of significance, a significant difference was apparent.

#### Part V. Personality and Character Rating

The differences of means in the area of personality and character rating favored in every case the public-school group. When these differences of means were tested by use of the "t" score value, all the differences proved to be insignificant with the exception of the leadership trait which was found to have a significant difference at the 5% level.

#### Part VI. The Conclusions in Table Form

The conclusions based upon data concerning pupils in terms of I. Q. scores, subject achievement, rank in class, activity participation, and personality and character traits can best be presented to the reader in the summary Table VI. The "t" scores that represent a significant difference are shown by an asterisk. The difference of means that favors the parochial group are shown by minus signs. The difference of means which cannot be tested by the "t" test of significance is shown by double asterisks. The / sign indicates that the difference of means favors the public-school group.

Table VI. Summarized Computed Data Concerning I. Q.,  
Achievement Measures, and Social Adjustment Factors

Area	Parochial- Trained Mean	Public- Trained Mean	Difference of Means	Computed "t"	Value of "t" 5% level of Significance
I. Q.	104.34	107.69	$\nearrow$ 3.35	1.871	1.976
English	64.51	63.21	-1.30	.341	1.976
Science	55.91	59.55	$\nearrow$ 3.64	.928	1.976
History	61.40	59.32	-2.08	.569	1.976
Mathematics	56.87	57.52	$\nearrow$ .65	.157	1.976
Rank in Class	116.63	110.21	$\nearrow$ **6.42		
Activities	6.02	7.58	$\nearrow$ 1.56	*2.108	1.976
Appearance	69.55	71.48	$\nearrow$ 1.93	1.261	1.976
Maturity	67.59	70.01	$\nearrow$ 2.42	1.475	1.976
Cooperation	71.24	73.23	$\nearrow$ 1.99	1.087	1.976
Dependability	68.59	71.52	$\nearrow$ 2.93	1.502	1.976
Leadership	56.48	60.77	$\nearrow$ 4.29	*2.568	1.976
Initiative	60.02	63.36	$\nearrow$ 3.34	1.748	1.976
Industry	60.24	63.72	$\nearrow$ 2.48	1.158	1.976
Thoroughness	61.83	64.20	$\nearrow$ 2.37	1.144	1.976

\* Statistically significant at the 5% level

- Difference in means favors the parochial-school group

\*\* Cannot be tested by the "t" test of significance

$\nearrow$  Differences in means favors the public-school group



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**A P P E N D I X**

Last Name *Doe* First *John* Middle *D* Boy  Girl   
 Place of Birth *Aberdeen* Date of Birth *Jan 1, 1934*

PERMANENT RECORD  
 CENTRAL HIGH SCHOOL  
 Aberdeen, S. D.

YEAR	9		10		11		12	
Semester	B	A	B	A	B	A	B	A
English	B	A	B	C	C	B	B	B
Science			B	B	C	C		
History	A	A	A	A	B	B	B	C
Math	C	C	C	C				
Latin								
Foreign Language								
Commercial								
Shorthand								
Typewriting					B	B	C	C
Home Economics								
Art								
Industrial Metals								
Woodwork	B	B						
Art Drawing								
Printing							B	B
Journalism								
Drama								
Placement								
Band								
Orchestra								
Cappella								

Entered Sr. H. S. *Sept. 49* From *Simmons Jr. High*  
 Withdrawn Reason  
 Re-entered  
 Graduation *1952*  
 Rank in Class *74* Rank in Sex

INTELLIGENCE TESTS					
Test	Date	Score	C A	M A	I Q
<i>Ohio</i>					<i>113</i>
<i>Calif. M.M.</i>					<i>117</i>

PREFERENCE TEST, ETC.

- English  
 11 B—Speech  
 11 A—Am. Lit.
- Science  
 10—Biology  
 11—Chemistry  
 12—Physics
- History  
 9—Social Studies  
 10—World History  
 11—Am. History  
 12—Modern Problems

KEY TO MARKING SYSTEM	
A	94 to 100
B	87 to 93
C	80 to 86
D	75 to 79
E	Below 75

- Mathematics  
 9—Algebra  
 10—Geometry  
 11 B—Advanced Algebra  
 11 A—Solid Geometry  
 12 B—Trigonometry
- Commercial  
 9—Jr. Business  
 10—Bookkeeping  
 12—Office Practice
- Home Economics  
 11—Home Ec Service

*Personality and Character Rating.....*

CENTRAL HIGH SCHOOL  
Aberdeen, South Dakota

NAME Doe, John D.

EXCELLENT			ABOVE AVERAGE			AVERAGE			BELOW AVERAGE			POOR		
PERSONAL APPEARANCE: Consider the cleanness and neatness of his clothing and person and the appropriateness of his dress as they contribute to his appearance.														
Attractive, Exceedingly particular.			Careful, Well-groomed.			Acceptable, Generally neat.			Seldom well-groomed, Careless			Untidy, Unclean, Offensive.		
10	11	12	10	11	12	10	11	12	10	11	12	10	11	12
2	1	1	5	10	10	4								
SOCIAL MATURITY: Consider his ability to adjust socially as shown by his sense of social responsibility, his poise, manners, and emotional balance.														
Outstanding in consideration for others and poise.			Self-controlled, Has social balance.			Usually well-mannered, Shows some poise.			Unsocial, Little self-control.			Anti-social, Lacks self-control, Discourteous.		
10	11	12	10	11	12	10	11	12	10	11	12	10	11	12
1	1		8	6	10	3	2	2						
COOPERATION: Consider his ability to get along with others, his adaptability, and his willingness to do his share of the work.														
Highly cooperative, Loyal, Willing to do extra.			Cooperates well and cheerfully			Usually willing to cooperate.			Slow to respond, Needs persuasion			Antagonistic, Disagreeable.		
10	11	12	10	11	12	10	11	12	10	11	12	10	11	12
2	2	3	7	6	7	1	1	3						
DEPENDABILITY: Consider his ability to work without supervision, his reliability and punctuality.														
Absolutely dependable.			Supervision seldom needed.			Usually prompt, Reliable on most occasions.			Often needs supervision.			Always needs supervision.		
10	11	12	10	11	12	10	11	12	10	11	12	10	11	12
2	3	4	3	6	8	4	2							

Table of "t" Probability Scale\*

Degrees of Freedom	5%	1%	Degrees of Freedom	5%	1%
1	12.706	63.657	32	2.037	2.739
2	4.303	9.925	34	2.032	2.728
3	3.182	5.841	36	2.027	2.718
4	2.776	4.604	38	2.025	2.711
5	2.571	4.032	40	2.021	2.704
6	2.447	3.707	42	2.017	2.696
7	2.365	3.499	44	2.015	2.691
8	2.306	3.355	46	2.012	2.685
9	2.262	3.250	48	2.010	2.681
10	2.228	3.169	50	2.008	2.678
11	2.201	3.106	55	2.005	2.668
12	2.179	3.055	60	2.000	2.660
13	2.160	3.012	65	1.998	2.653
14	2.145	2.977	70	1.994	2.648
15	2.131	2.947	80	1.990	2.638
16	2.120	2.921	90	1.987	2.632
17	2.110	2.898	100	1.984	2.626
18	2.101	2.878	125	1.979	2.616
19	2.093	2.861	150	1.976	2.609
20	2.086	2.845	200	1.972	2.601
21	2.080	2.831	300	1.968	2.592
22	2.074	2.819	400	1.966	2.588
23	2.069	2.807	500	1.965	2.586
24	2.064	2.797	1000	1.962	2.581
25	2.060	2.787	$\infty$	1.960	2.576
26	2.056	2.779			
27	2.052	2.771			
28	2.048	2.763			
29	2.045	2.756			
30	2.042	2.750			

\* Edwards, Allen L., Statistical Analysis, Rinehart and Company, Inc., New York, 1951, p. 330.

SAMPLE COMPUTATION

Appendix D

TO OBTAIN THE "t" VALUE SCORE

24

*On a farm*

Title I. Q.

Score 1.871

$$S^2 = \frac{1,100,019}{77} - (107.69)^2$$

$$S^2 = \frac{538,364}{49} - (104.34)^2$$

$$S^2 = 11,702 - 11,597$$

$$S^2 = 10,987 - 10,887$$

$$S^2 = 105$$

$$S^2 = 100$$

$$\sigma_{\bar{X}_1 - \bar{X}_2} = \sqrt{\frac{105}{77} + \frac{100}{49}}$$

$$\sigma_{\bar{X}_1 - \bar{X}_2} = \sqrt{1.12 + 2.08}$$

$$\sigma_{\bar{X}_1 - \bar{X}_2} = \sqrt{3.20}$$

$$\sigma_{\bar{X}_1 - \bar{X}_2} = 1.79$$

$$\bar{X}_1 = 107.69$$

$$L = \frac{3.35}{1.79}$$

$$\bar{X}_2 = 104.34$$

$$L = 1.871$$

Case No.

Public Co's

Case No.	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	X <sub>7</sub>	X <sub>8</sub>	X <sub>9</sub>	X <sub>10</sub>	X <sub>11</sub>	X <sub>12</sub>	X <sub>13</sub>	X <sub>14</sub>	X <sub>15</sub>
	Public	Public	Public	Public	Public	Public	Public	Public	Public	Public	Public	Public	Public	Public	Public
	Company	Company	Company	Company	Company	Company	Company	Company	Company	Company	Company	Company	Company	Company	Company
1.	40%	33%	40%	33%	116	0	212	45%	55%	53%	45%	44%	54%	42%	45%
4.	54%	50%	46%	44%	101	2	123	45%	45%	68%	76%	74%	51%	55%	60%
5.	60%	50%	50%	25%	95	3	106	67%	62%	75%	69%	57%	61%	61%	65%
6.	100%	100%	82%	74%	121	5	6	77%	90%	87%	78%	64%	73%	69%	85%
9.	42%	50%	37%	37%	85	2	245	67%	60%	70%	59%	51%	49%	54%	51%
10.	55%	50%	49%	25%	101	4	72	66%	85%	84%	83%	59%	70%	73%	76%
11.	66%	75%	58%	54%	114	9	113	63%	70%	74%	73%	55%	57%	54%	52%
12.	79%	81%	75%	94%	115	5	33	88%	74%	77%	80%	66%	79%	83%	73%
13.	94%	100%	96%	97%	116	14	5	91%	79%	89%	89%	84%	83%	83%	85%
33.	46%	25%	50%	37%	109	10	177	80%	69%	62%	62%	57%	61%	59%	52%
36.	100%	88%	92%	88%	118	9	14	81%	85%	92%	88%	71%	80%	85%	87%
40.	88%	88%	83%	94%	115	15	22	81%	81%	83%	84%	71%	74%	78%	80%
51.	75%	75%	67%	72%	116	11	66	75%	70%	74%	72%	70%	68%	67%	67%
53.	58%	50%	67%	50%	113	6	80	77%	86%	84%	87%	63%	67%	67%	64%
56.	69%	50%	46%	37%	109	5	134	79%	70%	75%	72%	54%	59%	66%	65%
57.	42%	50%	37%	25%	82	7	208	75%	74%	72%	71%	66%	60%	58%	59%
58.	66%	81%	37%	56%	108	19	113	82%	72%	91%	97%	68%	68%	68%	71%
59.	75%	50%	67%	37%	114	11	75	80%	82%	82%	86%	87%	75%	77%	77%
61.	50%	50%	54%	88%	119	3	61	65%	64%	67%	65%	58%	61%	61%	52%
62.	59%	56%	53%	37%	105	11	123	63%	63%	67%	63%	57%	57%	53%	56%
63.	100%	100%	100%	100%	119	23	6	79%	73%	84%	81%	82%	79%	84%	83%
65.	88%	88%	54%	88%	96	2	97	71%	70%	54%	53%	53%	57%	54%	62%
69.	41%	44%	37%	25%	83	4	185	69%	66%	75%	72%	67%	80%	86%	87%
70.	36%	25%	29%	37%	94	3	166	54%	57%	69%	69%	58%	56%	57%	54%
73.	46%	75%	72%	25%	100	5	83	75%	73%	77%	77%	50%	58%	63%	61%
74.	63%	63%	58%	63%	102	13	126	71%	88%	79%	77%	66%	65%	63%	62%
75.	29%	25%	32%	50%	94	5	196	69%	64%	71%	67%	77%	58%	55%	58%
76.	54%	37%	50%	37%	94	3	177	63%	62%	64%	63%	52%	56%	51%	55%
77.	58%	75%	50%	50%	103	4	157	76%	70%	75%	47%	54%	56%	58%	59%
78.	88%	75%	67%	75%	105	9	26	77%	80%	79%	83%	72%	78%	78%	80%
79.	88%	100%	92%	83%	118	18	16	90%	89%	89%	90%	83%	81%	83%	85%
81.	75%	63%	67%	50%	112	11	80	70%	72%	80%	81%	70%	68%	73%	70%
82.	42%	50%	50%	50%	110	9	140	70%	70%	71%	63%	57%	62%	54%	54%
83.	88%	63%	70%	69%	118	8	51	77%	70%	74%	65%	66%	67%	64%	67%
85.	29%	37%	29%	44%	98	13	208	47%	54%	62%	56%	55%	55%	49%	49%
87.	100%	92%	100%	100%	121	9	1	84%	80%	91%	90%	86%	85%	83%	87%
89.	79%	88%	80%	80%	112	11	26	82%	79%	86%	83%	66%	71%	73%	76%
90.	66%	75%	81%	69%	115	10	54	63%	62%	64%	63%	52%	56%	51%	54%
91.	67%	80%	80%	25%	105	4	144	74%	66%	63%	65%	49%	54%	57%	59%
92.	71%	75%	79%	63%	106	6	54	78%	72%	75%	75%	66%	64%	74%	74%
93.	63%	44%	46%	100%	110	2	144	68%	64%	64%	62%	50%	58%	49%	44%
94.	46%	50%	50%	50%	100	3	174	73%	72%	75%	68%	52%	50%	57%	63%
96.	37%	75%	91%	50%	98	7	69	75%	78%	80%	80%	60%	65%	70%	72%
99.	54%	50%	75%	50%	116	4	118	71%	72%	76%	73%	61%	64%	71%	66%
99.	63%	46%	54%	63%	97	7	123	77%	69%	72%	70%	53%	61%	63%	66%
100.	83%	75%	75%	25%	126	9	149	75%	79%	80%	83%	72%	74%	67%	78%
102.	63%	50%	59%	50%	98	4	141	72%	74%	75%	70%	56%	62%	62%	65%
104.	88%	56%	10%	69%	111	3	141	71%	67%	63%	61%	34%	61%	54%	55%

Public Schools

Case No.	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	X <sub>7</sub>	X <sub>8</sub>	X <sub>9</sub>	X <sub>10</sub>	X <sub>11</sub>	X <sub>12</sub>	X <sub>13</sub>	X <sub>14</sub>	X <sub>15</sub>	X <sub>16</sub>
	English	Science	History	Math	S.G.	Activity	Rank	Special	Reading	Art	Music	Health	Physical	Character	Industry	Attendance
105.	87%	60%	63%	63%	130	12	54	82%	69%	79%	69%	65%	69%	67%	67%	
106.	59%	63%	67%	54%	120	10	126	67%	64%	64%	64%	70%	61%	55%	62%	
109.	58%	63%	58%	50%	108	12	118	75%	70%	73%	69%	63%	71%	68%	66%	
110.	67%	56%	63%	50%	105	10	89	78%	64%	69%	64%	56%	58%	63%	62%	
111.	85%	75%	92%	88%	115	6	10	83%	87%	98%	98%	67%	76%	80%	84%	
112.	54%	31%	57%	25%	110	12	133	64%	59%	62%	59%	51%	53%	51%	54%	
113.	74%	75%	75%	75%	105	5	42	73%	75%	77%	73%	59%	67%	71%	75%	
114.	54%	37%	69%	50%	96	11	157	69%	64%	66%	55%	61%	60%	49%	49%	
115.	71%	88%	54%	81%	113	4	48	69%	71%	72%	76%	52%	61%	63%	64%	
116.	42%	63%	37%	100%	111	3	149	66%	67%	79%	63%	43%	46%	45%	56%	
118.	83%	88%	79%	75%	116	6	73	78%	77%	82%	83%	73%	74%	75%	79%	
119.	54%	68%	52%	37%	112	8	137	64%	61%	62%	59%	56%	70%	84%	53%	
120.	85%	75%	71%	50%	97	10	43	85%	86%	84%	82%	74%	73%	85%	76%	
121.	94%	94%	50%	100%	140	6	2	82%	90%	95%	97%	88%	79%	90%	88%	
122.	37%	50%	46%	25%	106	3	141	52%	58%	58%	62%	63%	54%	54%	55%	
123.	84%	96%	79%	94%	121	9	17	79%	78%	86%	98%	72%	77%	78%	76%	
130.	91%	88%	78%	97%	125	8	18	81%	79%	82%	83%	68%	65%	63%	63%	
132.	62%	63%	71%	54%	112	17	189	72%	70%	77%	66%	68%	65%	63%	63%	
133.	39%	33%	42%	33%	107	3	188	66%	67%	68%	65%	77%	53%	51%	57%	
134.	42%	50%	44%	50%	98	7	166	71%	63%	66%	66%	52%	77%	76%	84%	
136.	42%	25%	37%	25%	94	3	174	70%	62%	74%	69%	54%	54%	55%	57%	
138.	54%	82%	64%	60%	97	10	148	64%	66%	66%	67%	68%	66%	63%	63%	
140.	37%	25%	29%	37%	89	6	190	56%	59%	58%	55%	52%	58%	47%	52%	
141.	54%	50%	46%	69%	105	4	149	66%	61%	70%	77%	53%	57%	56%	58%	
142.	71%	75%	79%	92%	113	4	37	55%	59%	66%	61%	62%	59%	57%	58%	
143.	83%	75%	79%	100%	118	10	42	79%	82%	85%	80%	73%	75%	77%	82%	
145.	92%	25%	50%	75%	91	4	88	65%	64%	67%	74%	42%	57%	77%	52%	
149.	42%	25%	29%	37%	102	4	214	63%	52%	52%	44%	42%	44%	47%	50%	
152.	72%	75%	66%	25%	100	15	90	71%	77%	82%	81%	69%	70%	67%	68%	
19.	25%	25%	29%	37%	89	9	198	60%	61%	59%	57%	64%	49%	73%	52%	
21.	64%	75%	67%	83%	118	15	61	77%	79%	97%	86%	85%	69%	69%	69%	
22.	64%	75%	67%	83%	118	15	61	77%	79%	97%	86%	85%	69%	69%	69%	
28.	50%	29%	42%	31%	104	5	198	64%	67%	67%	63%	43%	44%	46%	46%	
29.	72%	83%	90%	79%	120	6	44	62%	75%	91%	90%	65%	69%	74%	75%	
31.	78%	88%	75%	71%	120	4	51	69%	72%	90%	91%	59%	67%	69%	69%	
41.	46%	42%	42%	37%	108	9	211	63%	56%	59%	53%	46%	85%	50%	48%	
42.	64%	75%	67%	83%	118	15	61	77%	79%	97%	86%	85%	69%	69%	69%	
F.	37%	25%	46%	25%	110	7	194	65%	67%	66%	63%	44%	44%	54%	54%	
G.	44%	37%	28%	37%	98	6	198	56%	58%	60%	60%	58%	45%	46%	49%	
H.	50%	50%	46%	37%	100	6	185	73%	66%	66%	60%	70%	52%	54%	53%	
J.	37%	25%	29%	37%	93	6	219	56%	46%	44%	53%	49%	47%	11%	46%	
L.	64%	75%	67%	83%	118	15	61	77%	79%	97%	86%	85%	69%	69%	69%	
M.	44%	37%	68%	31%	106	5	195	76%	69%	76%	76%	67%	51%	51%	54%	
O.	84%	75%	63%	92%	118	9	31	77%	76%	76%	80%	68%	73%	75%	74%	
Total	54%	50%	50%	42%	115	3	128	55%	57%	63%	55%	56%	54%	61%	53%	
Subtotal	63%	50%	47%	25%	97	10	166	82%	69%	72%	71%	62%	64%	65%	66%	

Comparisons Sur. 2



Case No.	<i>Technical Schools</i>														
	English	Science	History	Math	Art	Music	Physical	Business	Social Studies	Occupation	Spelling	Reading	Writing	Industry	Character
2	71%	75%	68%	63%	92	1	67	74%	69%	76%	66%	56%	64%	63%	65%
24	44%	53%	39%	50%	193	2	166	64%	65%	70%	71%	48%	58%	57%	60%
37	54%	67%	50%	50%	180	4	142	60%	63%	62%	64%	44%	44%	53%	55%
39	84%	69%	75%	75%	111	14	50	81%	73%	82%	67%	77%	76%	75%	
39	94%	87%	82%	63%	110	3	29	76%	78%	80%	85%	64%	73%	77%	
43	88%	91%	84%	75%	109	8	26	73%	78%	89%	81%	67%	74%	71%	69%
44	58%	69%	61%	50%	103	6	69	58%	66%	71%	71%	52%	60%	61%	62%
45	56%	50%	46%	50%	108	11	185	68%	61%	73%	53%	54%	63%	60%	51%
46	54%	25%	54%	37%	96	2	215	70%	70%	70%	65%	44%	54%	54%	57%
47	67%	37%	25%	25%	91	5	226	64%	65%	65%	63%	54%	57%	54%	70%
48	77%	65%	83%	84%	119	16	25	79%	74%	81%	81%	72%	75%	71%	74%
49	71%	44%	35%	63%	104	4	75	76%	73%	75%	74%	60%	64%	64%	62%
50	81%	50%	67%	63%	113	9	26	90%	75%	83%	82%	73%	71%	76%	74%
52	91%	66%	67%	63%	108	12	75	68%	63%	65%	68%	68%	62%	60%	55%
54	29%	25%	25%	25%	100	7	225	67%	54%	45%	47%	37%	42%	38%	41%
55	27%	37%	46%	50%	100	2	185	66%	65%	74%	60%	44%	54%	51%	49%
60	29%	37%	30%	37%	97	4	223	64%	64%	65%	59%	46%	48%	48%	48%
64	42%	25%	46%	50%	93	1	185	70%	67%	65%	58%	48%	53%	52%	53%
66	72%	56%	64%	46%	106	4	90	70%	76%	73%	75%	47%	55%	61%	62%
67	92%	89%	100%	89%	124	8	6	75%	79%	86%	85%	72%	80%	86%	87%
68	66%	83%	83%	69%	112	13	67	74%	79%	82%	82%	70%	69%	69%	68%
71	58%	50%	42%	37%	92	4	139	74%	73%	71%	64%	57%	81%	59%	59%
72	28%	25%	25%	50%	86	0	221	54%	44%	53%	49%	36%	37%	43%	46%
80	83%	69%	75%	75%	108	9	37	70%	72%	74%	69%	56%	57%	64%	60%
84	37%	37%	42%	63%	106	6	198	61%	59%	57%	56%	49%	50%	46%	51%
86	92%	63%	71%	100%	99	4	37	72%	60%	62%	72%	61%	70%	81%	73%
89	54%	44%	46%	50%	98	3	162	74%	67%	66%	66%	45%	57%	58%	54%
95	58%	46%	58%	37%	110	7	162	64%	59%	79%	76%	57%	57%	53%	54%
97	71%	37%	37%	25%	97	5	141	61%	63%	67%	65%	51%	58%	57%	60%
103	75%	88%	92%	75%	106	5	32	71%	75%	80%	77%	66%	69%	76%	77%
107	42%	50%	37%	25%	94	1	245	55%	60%	58%	57%	43%	44%	50%	50%
108	46%	88%	88%	75%	117	9	23	82%	78%	82%	62%	76%	74%	76%	76%
117	88%	63%	63%	75%	115	3	69	75%	65%	70%	60%	55%	56%	61%	57%
124	100%	89%	96%	100%	103	8	11	75%	78%	83%	80%	71%	74%	81%	79%
125	58%	25%	46%	50%	93	1	161	68%	66%	74%	83%	50%	57%	56%	60%
126	54%	37%	50%	50%	100	4	157	67%	70%	73%	65%	53%	53%	53%	56%
127	100%	92%	96%	100%	131	14	4	87%	84%	91%	89%	78%	81%	84%	83%
128	42%	44%	54%	50%	111	6	181	61%	57%	53%	55%	44%	50%	49%	53%
129	59%	42%	67%	44%	108	6	118	71%	71%	73%	71%	61%	62%	63%	61%
131	50%	17%	42%	50%	93	9	208	62%	64%	75%	67%	53%	60%	62%	59%
135	41%	37%	37%	25%	105	13	220	67%	63%	62%	60%	52%	40%	52%	42%
137	75%	63%	71%	75%	116	6	54	74%	69%	75%	70%	61%	63%	71%	71%
139	79%	58%	83%	63%	103	4	84	72%	73%	76%	76%	56%	63%	62%	65%
144	79%	75%	89	75%	117	3	44	75%	76%	74%	78%	65%	64%	73%	74%
146	100%	100%	100%	100%	121	15	6	73%	84%	88%	86%	79%	81%	86%	85%
147	42%	50%	46%	50%	92	3	109	71%	65%	72%	70%	55%	51%	49%	53%
148	50%	50%	67%	83%	100	5	128	62%	60%	64%	62%	60%	54%	43%	53%
150	46%	50%	42%	50%	106	3	166	59%	58%	56%	52%	50%	55%	55%	51%
151	53%	37%	37%	25%	99	3	222	54%	37%	48%	48%	36%	42%	36%	41%