A COMPARISON OF TWINS AND MUTUAL FRIENDS

IN REGARD TO PERSONALITY TRAITS

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A COMPARISON OF TWINS AND MUTUAL FRIENDS

IN REGARD TO PERSONALITY TRAITS

THESIS

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By

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CHAPTER I

INTRODUCTION

Many studies have been made on twins, and the fact that identical twins are very similar in intellectual and physical traits has been reasonably well established. Also, it is apparent from some studies that non-identical twins may be quite different in intellectual abilities and in physical appearance.\(^1\)

The presence of twins in a family serves to create a special social situation.\(^2\) The social factors involved are different for twins than for any one single child. Therefore, it is desirable to study twins with regard to personality traits involved in social situations.

Probably the foremost pioneer in the study of twins was Francis Galton in his study of individual differences. Galton assumed that the most direct way of evaluating the influence of immediate ancestry is through the study of twins, since identical twins are the nearest representation of identical heredity.\(^3\) These studies were followed in 1905 by Edward L. Thorndike who made the first quantitative


\(^3\)Henry E. Garrett, *Great Experiments in Psychology*, p. 77.
investigation of twin similarities. It is interesting to note that these and other investigators such as Merriman, Louterback, and McNemar are convinced that native factors are more potent than environmental factors in fixing the initial amount of an individual's aptitudes and capacities, which may be developed.

Nature of Problem and Purpose

The purpose of this study is to compare the personality traits of twins with the personality traits of mutual friends, as measured by a personality rating scale. In this study an attempt will be made to answer two questions. First, how do twins compare with mutual friends on personality traits? Second, are certain traits more predominant among twins than among mutual friends? Perhaps there is a tendency for both twins to be either emotionally stable or emotionally maladjusted.

Description of Rating Scale Used in Securing Data

This Personality Rating Scale was devised by M. E. Bonney, professor of psychology at North Texas State Teachers College, Denton, Texas. There are two forms, both of which are divided into four sections. They are composed of the same questions except that Form I is stated in second person and Form II is stated in third person.

\(^4\text{Ibid.}, p. 78.\)

\(^5\text{Ibid.}, p. 79.\)
In sections I and II of both forms the questions were checked on a five-point scale to indicate the degree that the questions were true for the person rating himself or the person he was rating. In section I of both forms the questions were answered according to the following scale:

1---means almost never
2---means seldom
3---means sometimes
4---means usually
5---means nearly always

Items in section II of both forms were selected according to the scale below.

1---means much less than most people you know.
2---means a little less than most people you know.
3---means almost the same as most people you know.
4---means a little more than most people you know.
5---means much more than most people you know.

Items in section III of both forms were checked on a six-point scale ranging from zero to five, and selected according to the following scale:

0---means no ability.
1---means very little ability.
2---means fair but below average.
3---means about average for the group he is in.
4---means above average.
5--means one of the best in his usual group.
Section IV of Form I was not used in this study.
The personality traits measured by this scale are as follows:

1. Physical characteristics: appearance, health, vigor.

2. Emotional stability and control.

3. Social aggressiveness--initiation of social contacts and social events.

4. Adaptability and tolerance.

5. Dependability--a sense of obligation in social relationships.

6. Dependency on others for assistance and emotional support.

7. Being a source of new experience to others.

8. Social service motivation--an attitude of good-will toward others.


Method of Securing Data

The data for this study were collected during the spring semester of 1948 from students at North Texas State Teachers College, Texas State College for Women, and Oklahoma College for Women.

The twins were asked to rate themselves as honestly and accurately as possible on a self rating personality scale.
Then each of the twins was asked to rate his twin likewise, on a "rating of others" scale. All twins were assured that the persons they rated would not be allowed to see the rating.

A group of non-twin population was asked to rate themselves and their best friend in the same manner as that used by the twins: first rating themselves, then their best friend as accurately as possible on the same rating scale as that used by the twins.

Subjects Used in This Study

The subjects used in this study consist of twenty-six pairs of twins and twenty-six pairs of mutual friends. Sufficient information was not available to distinguish between identical and non-identical twins. However, in so far as the twins knew, and according to their statements, twenty-five pairs were identical and one pair was non-identical. This group included six pairs of male twins, nineteen pairs of female twins, and one pair of unlike sex twins. The age range for the twins was from sixteen to twenty-four years with a mean age of 18.5 years.

The mutual friends ranged in age from nineteen to twenty-three years, with a mean age of 18.3 years. This group included four pairs of male mutual friends and twenty-two pairs of female mutual friends. Thus all pairs of
mutual friends and twenty-five pairs of the twins were of like sex. A large number of the subjects in each group were female, but the proportions of males and females in each group are very similar.

In selecting mutual friends only those persons were used whose mutual friendship had existed for a minimum of seven years, and ranging up to seventeen years. This gave an average mutual friendship of eleven years for the total group of mutual friends. Several pairs of the mutual friends have been friends since early childhood, and in the case of three pairs they had been mutual friends as long as they could remember.

There is considerable evidence that the socio-economic status is quite similar for all subjects. There were no subjects in either the twins group or the mutual friends group who were married or who had ever been married. All subjects were enrolled in similar types of institutions; and, as a group they were pursuing similar courses of study, as indicated in Table 1. It appears that the mutual friends group is more homogeneous when only the majors are considered because a much larger per cent of the mutual friends have a tendency to group toward the top of the table than do the twins. With the exception of business administration, the twins are fairly well distributed through all the fields of interest as can be seen in Table 1.
TABLE 1

A COMPARISON OF THE MAJOR FIELDS OF INTEREST OF TWINS AND MUTUAL FRIENDS

<table>
<thead>
<tr>
<th>Major</th>
<th>Twins</th>
<th></th>
<th>Mutual Friends</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Per Cent</td>
<td>Number</td>
<td>Per Cent</td>
</tr>
<tr>
<td>Business Adm.</td>
<td>19</td>
<td>36.8</td>
<td>25</td>
<td>48</td>
</tr>
<tr>
<td>Physical Education</td>
<td>3</td>
<td>5.7</td>
<td>4</td>
<td>7.7</td>
</tr>
<tr>
<td>Home Economics</td>
<td>2</td>
<td>3.85</td>
<td>8</td>
<td>15.7</td>
</tr>
<tr>
<td>Education</td>
<td>4</td>
<td>7.7</td>
<td>4</td>
<td>7.7</td>
</tr>
<tr>
<td>Pre-Med</td>
<td>3</td>
<td>5.7</td>
<td>1</td>
<td>1.9</td>
</tr>
<tr>
<td>English</td>
<td>3</td>
<td>5.7</td>
<td>1</td>
<td>1.9</td>
</tr>
<tr>
<td>Music</td>
<td>2</td>
<td>3.85</td>
<td>1</td>
<td>1.9</td>
</tr>
<tr>
<td>Psychology</td>
<td>2</td>
<td>3.85</td>
<td>1</td>
<td>1.9</td>
</tr>
<tr>
<td>Industrial Arts</td>
<td>2</td>
<td>3.85</td>
<td>1</td>
<td>1.9</td>
</tr>
<tr>
<td>Biology</td>
<td>2</td>
<td>3.85</td>
<td>1</td>
<td>1.9</td>
</tr>
<tr>
<td>Math</td>
<td>1</td>
<td>1.9</td>
<td>1</td>
<td>1.9</td>
</tr>
<tr>
<td>Journalism</td>
<td>1</td>
<td>1.9</td>
<td>1</td>
<td>1.9</td>
</tr>
<tr>
<td>History</td>
<td>2</td>
<td>3.85</td>
<td>1</td>
<td>1.9</td>
</tr>
<tr>
<td>Speech</td>
<td>2</td>
<td>3.85</td>
<td>1</td>
<td>1.9</td>
</tr>
<tr>
<td>Art</td>
<td>1</td>
<td>1.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sociology</td>
<td></td>
<td></td>
<td>1</td>
<td>1.9</td>
</tr>
<tr>
<td>Undecided</td>
<td>3</td>
<td>5.7</td>
<td>2</td>
<td>3.8</td>
</tr>
</tbody>
</table>

According to Table 1, a large per cent of the persons
in both groups are found in the four major fields of interest which are listed first in the table.

Another factor which might bear mentioning is the classification of the subjects: that is, the number of twins and mutual friends who are freshmen, sophomores, juniors, or seniors as illustrated in Table 2.

**TABLE 2**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Twins</th>
<th>Mutual Friends</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Per Cent</td>
</tr>
<tr>
<td>Freshmen</td>
<td>34</td>
<td>65.35</td>
</tr>
<tr>
<td>Sophomores</td>
<td>5</td>
<td>9.7</td>
</tr>
<tr>
<td>Juniors</td>
<td>11</td>
<td>21.1</td>
</tr>
<tr>
<td>Seniors</td>
<td>2</td>
<td>3.35</td>
</tr>
</tbody>
</table>

It is evident from this table that the number of twins and mutual friends corresponding with the classification would make for considerable similarity between the two groups in regard to classification in college.

In all except three pairs of twins both siblings were classified the same. In no case were the subjects of either group separated by more than one year in classification.

The last factor to be mentioned here which might exert some influence on the findings of this study is the church
affiliation of the subjects in each group. Table 3 clearly indicates the similarity between the twins and mutual friends in respect to the church to which each subject belongs.

**TABLE 3**

**A COMPARISON OF TWINS AND MUTUAL FRIENDS ON CHURCH AFFILIATION**

<table>
<thead>
<tr>
<th>Church</th>
<th>Twins</th>
<th></th>
<th>Mutual Friends</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Per Cent</td>
<td>Number</td>
<td>Per Cent</td>
</tr>
<tr>
<td>Baptist</td>
<td>26</td>
<td>50</td>
<td>29</td>
<td>55.8</td>
</tr>
<tr>
<td>Methodist</td>
<td>18</td>
<td>34.6</td>
<td>16</td>
<td>30.8</td>
</tr>
<tr>
<td>Christian</td>
<td>4</td>
<td>7.7</td>
<td>2</td>
<td>3.85</td>
</tr>
<tr>
<td>Church of Christ</td>
<td>2</td>
<td>3.85</td>
<td>3</td>
<td>5.7</td>
</tr>
<tr>
<td>Presbyterian</td>
<td></td>
<td></td>
<td>2</td>
<td>3.85</td>
</tr>
<tr>
<td>Lutheran</td>
<td>2</td>
<td>3.85</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This table shows 84.6 per cent of twins and 86.6 per cent of the mutual friends belong to either the Baptist or Methodist church; The mutual friends having 5.3 per cent more Baptist and the twins having 3.8 per cent more Methodist.

The persons belonging to the Christian Church, the Church of Christ, the Presbyterian Church and the Lutheran Churches are few in number and are somewhat varied between the two groups. However, since the per cent of persons belonging to all these churches is so small, it would have little significance in regard to the total group.
All twin pairs were members of the same church. That is, they were both Baptist or Methodist, but never one Baptist and one Methodist. In the mutual friends group only fifteen pairs had mutual church affiliation.
CHAPTER II

RELATED STUDIES

A number of studies that are similar to the present study have been made on different aspects of both twins and mutual friends. Several of these related studies will be reviewed in this chapter.

Thorndike's 1905 study was the first quantitative investigation of twin resemblances.\(^1\) He measured fifty pairs of twins on several mental tests, comparing the correlation between their scores with the correlation of siblings on the same test. The mean correlation for the twins was .77, while the coefficient for the siblings averaged about .30.

Thorndike concluded that the evidence favored heredity as the cause of twins resemblances because the older twins were less similar than the younger ones.

In the second study to be reviewed, twelve pairs of twins were matched with twelve pairs of siblings by Lillian Parterier in an effort to determine how twinning as a social factor influences personality.\(^2\) The subjects in this study were of the same sex, approximately of the same age and social status. The tests administered were the Bernreuter Personality

\(^1\)Henry E. Garrett, Great Experiments in Psychology, p. 78.

\(^2\)Lillian Parterier, "Twinning as a Factor in Influencing Personality," Psychological Bulletin, XXXV (May, 1938), 711.
Inventory, Waller Character Sketches, Strong Vocational Interest Blank, and North Carolina Rating Scale. While all of the findings are not statistically reliable, the tentative conclusions indicate the traits on which the twin pairs differ more than the sib pairs. These traits are: neurotic tendencies, introversion-extroversion, dominance-submission, confidence in self, sociability, personal adjustment, and readiness to confide. The twins were found to be more submissive, to have less self-confidence, and to be somewhat less well-adjusted than the sibs.

A study of eighteen preschool and fifty-one school-age triplets was made by Ruth W. Howard in regard to personality.\(^3\) Personality here includes a variety of factors classified under emotions, attitudes, and interests. Personal data were obtained from questionnaires filled out by the subjects, observation, testimony of parents and teachers, and results on the Woodworth-Matthews Personality Test [Part seven]. All of these measures indicate that this group of triplets have personalities considered normal for single-born children of the same status. On masculinity-femininity, the triplets had interests and attitudes normal for their sex. One should bear in mind that the majority of these triplets were from rural districts and the lower socio-economic level.

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\(^3\) Ruth W. Howard, "Intellectual and Personality Traits of a Group of Triplets," *Journal of Psychology*, XXI (September, 1946), 25-36.
In a study by H. D. Carter, responses were secured on the Bernreuter Personality Inventory from California high schools at San Jose, Palo Alto, Redwood City, and San Francisco. The subjects included forty identical pairs, forty-four like sexed fraternal pairs, and thirty-four unlike sexed pairs. The age range was from twelve to nineteen years, with a mean of 16.2 years. The results of the Bernreuter Inventory were analyzed to study the twins with respect to emotional stability, self-sufficiency, introversion, dominance, self-confidence, and sociability. Also, a more general analysis was made to investigate similarity in answering of the individual questions.

The conclusions indicated by these data were as follows:

1. Twins were found to be more introvert, more stable, and more self-confident than children in general. They also appear to be more sociable and gregarious. The difference in dominance and self-sufficiency was not found to be reliable.

2. Identical twins appear to be more similar than fraternal twins in all the traits considered, except in self-sufficiency and sociability.

3. Similar answers were given to the questions more often by the identical twins than by the fraternal twins; however, the item analysis indicated that this was not true for all questions.

---

4. The only scales which show any appreciable correlation with age are those for measuring dominance and sociability, with a correlation of fifteen hundredths and twenty-four hundredths respectively. The older children appear to be slightly more dominant and less sociable.

5. Raw scores indicate a reliable sex difference. Girls are more introverted, less dominant, more neurotic, less self-sufficient, less self-confident, and more sociable than boys.

Harold D. Carter made another study of the personality traits of twins by administering the Berenreter Personality Inventory to a group of 133 pairs of twins. This group consisted of both like-sexed and unlike-sexed pairs. The group included fifteen pairs of mature individuals, varying in age from twenty to sixty-five years. The remainder of the group represented a random selection from the junior and senior high schools of San Jose, Palo Alto, and San Francisco. The twins were classified into monzygotic and dizygotic groups, using the techniques described by Bonnevie, Siemens, Newman, and others.


6K. Bonnevie, "Studies of Papillary Patterns of Human Fingers," Journal of Genetics, XV (June, 1924), 1-111.


Findings of this study indicate that the traits measured by the Bernreuter Personality Inventory are practically independent of age influence and of intelligence as measured by the Terman Group Test. The older group appears to be slightly more neurotic, but the difference was far from being significant.

Greater similarity of monozygotic twins is evident in the measures of dominance, neurotic tendencies, and self-sufficiency, but not in introversion. Like-sex pairs were more similar in introversion, neurotic tendencies, and dominance than unlike-sex pairs. A negative correlation was found between like-sex fraternal twins in self-sufficiency.

In a study made by L. J. Averitt of thirty pairs of mutual friends in a senior high school, it was concluded that personality and character traits have much influence upon friendship. This study indicates that similarities do exist in subjects preferred, intelligence, academic grades, and social and emotional adjustments. It was also evident from this study that vocational preferences and abilities have some influence upon mutual friendship. Averitt found insufficient evidence that health and home adjustments and frequency of holding office have any influence upon mutual friendship.

Yucon Younger made a study of friendships in high school in an effort to determine what personality traits are related to success in friendships.\(^{10}\)

A group of students were given a personality scale wherein each rated himself, and on a very similar scale he rated his best friend. As a result of these ratings, forty-one reciprocal friends and twenty-nine unreciprocal friends were found. Reciprocal friends are those in which one person chose another as his best friend, and was in return chosen by this person. Unreciprocal friends refer to one person choosing another person as his best friend, and he, in return, is not chosen by this person.

It was indicated by this study that reciprocal friends show a close similarity on all of the personality traits considered in this study. Reciprocal friends were found to be more alike in emotional stability and control, social aggressiveness, and being a source of new experience to others.

Students in the unreciprocal friends group scored highest on such traits as being a source of new experience to others, physical characteristics, social service motivation, and social aggressiveness.

On the self rating of reciprocal friends the least agreement was found on dependability, while unreciprocal friends scored lowest on this same trait.

Chapter III

Presentation and Analysis of the Data

The primary purpose of this chapter is to analyze the data and to compare the findings on the twins with that of the mutual friends. Findings on the two groups are compared on each trait individually. This will show which group has the highest scores on each trait, and the degree of similarity between the self and "others ratings" for each group.

It will probably be easier to understand what the data mean if one understands the procedure used in tabulating and analyzing them. This procedure can best be presented by the following illustration of the sheet on which the data was tabulated.

<table>
<thead>
<tr>
<th>Trait One - Physical Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item Number</td>
</tr>
<tr>
<td>N. Smith Self-Rating</td>
</tr>
<tr>
<td>Others Rating</td>
</tr>
<tr>
<td>N. Smith Self-Rating</td>
</tr>
<tr>
<td>Others Rating</td>
</tr>
</tbody>
</table>
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ...
| Total for Each Item, Self-Rating | 191 | 247 | 232 | 225 | 199 | 172 | 158 | 153 |
| Total for Each Item, Others Rating | 193 | 228 | 222 | 227 | 192 | 184 | 179 | 179 |

Fig. 1.--- tabulation sheet
The first one of the nine traits to be considered, physical characteristics, was used in this illustration. It may be observed that M. Smith gave herself a "two" on item one of this trait, the rating given by N. Smith to M. Smith on this item. N. Smith gave herself a rating of "one" on item one while M. Smith gave her a "three" in the "others rating" on item one. The responses of every individual to each item were tabulated in the same manner as that indicated for M. and N. Smith. This same procedure was used in tabulating each of the nine traits for both the twins and the mutual friends.

Then, to get a total of the individual's score for each trait, the number representing the response for each item was added horizontally. It may be noted that the total score on self ratings for M. Smith is twenty-six, while the total "others rating" score for M. Smith is twenty-seven on the same trait. For N. Smith the total self and "others rating" scores are twenty-three and twenty, respectively, on trait number one.

In order to make a comparison of the twins and the mutual friends, the self ratings were correlated with the "others ratings" for each group. The results of these correlations will be given later in this chapter.

To make a further analysis of these data another approach was used. The responses were added vertically to get a total
score on each item of the self and "other ratings" for the total group of twins. The totals given in the illustration are the actual totals on each item of trait number one. The total for the fifty-two self ratings was 191 on item one and 247 on item two. The totals for the "others ratings" on items one and two are 193 and 226 respectively. One is impressed when observing the large differences between these total scores on each item. However, it is not the purpose of this study to make an item analysis. The primary concern here is to make a comparison between the total scores on the self and "others ratings." When all of the totals were secured for each item on both the self and "others ratings" these item totals were added together to get a total for the entire trait on the self and "others ratings."

When all of the totals of the self ratings were added together, this sum was divided by eight, the number of items on trait number one. To get the mean score for the twins on the self ratings this quotient was divided by fifty-two, the number of ratings. In like manner, the total mean score was computed for the self and "others ratings" of the mutual friends on each trait. There is a considerable amount of variation between these totals, but this is due to the varying number of items on each trait. These total mean scores for the twins and the mutual friends on both the self and "others ratings" are given for each trait in Table 4.
TABLE 4

THE TOTAL MEAN SCORES FOR THE TWINS AND MUTUAL FRIENDS ON BOTH THE SELF AND "OTHERS RATINGS" FOR EACH TRAIT

| Trait No. | Twins | | | | | | | | Mutual Friends | | | | | | | |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|           | Mean Self | Mean Others | Mean Self | Mean Others | |
| Trait I   | 3.767   | 3.887   | 3.615   | 3.743   | |
| Trait II  | 3.852   | 3.700   | 3.753   | 3.123   | |
| Trait III | 3.399   | 3.460   | 3.294   | 3.294   | |
| Trait IV  | 3.987   | 3.877   | 3.889   | 3.735   | |
| Trait V   | 4.299   | 4.192   | 4.268   | 4.140   | |
| Trait VI  | 3.603   | 3.474   | 3.561   | 3.452   | |
| Trait VII | 3.084   | 3.251   | 3.153   | 3.117   | |
| Trait VIII| 3.978   | 3.819   | 3.738   | 3.566   | |
| Trait IX  | 2.152   | 2.245   | 1.956   | 2.050   | |

It is interesting to note in this table that the total mean score on the self rating is in each trait higher for the twins, with the exception of trait number seven. This trait is, "being a source of new experience to others." Therefore, with the exception of trait number seven, the twins rated themselves higher on all traits. The largest difference between the mean self ratings of the two groups is on trait number nine, "abilities." This was to be expected because the responses for this trait were made on a
six-point scale which gave a wider range over which difference might spread. The responses made on the other eight traits were made on a five-point scale.

It is also indicated in Table 4 that the twins have a higher mean score on the "others ratings" for each trait than have the mutual friends. This shows that the twins rated each other consistently higher on these traits than did the mutual friends. Here again, at least part of the wide difference found on trait number nine might be attributed to the fact that the responses were made on a six-point scale.

From mere observation of Table 4, it may easily be seen that the differences between the mean scores of the two groups on any one trait are very small. However, in order to determine the significance of the difference between the mean scores of the two groups, it will be necessary to make a further analysis.

It will first be necessary to find the standard deviation. The critical ratios can then be computed by a formula which will give the probable error of the difference between the two means.

The standard deviations are given for each trait of both groups in Table 5. These standard deviations appear to be very small, although when one takes into consideration the fact that the range is only five, it would indicate a wider spread than is at first apparent.
# Table 5

Standard Deviation Scores for Twins and Mutual Friends on Each Trait

<table>
<thead>
<tr>
<th>Trait No.</th>
<th>Twins</th>
<th>Mutual Friends</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S.D. Self</td>
<td>S.D. Others</td>
</tr>
<tr>
<td>1</td>
<td>.6336</td>
<td>.3966</td>
</tr>
<tr>
<td>2</td>
<td>.2648</td>
<td>.2309</td>
</tr>
<tr>
<td>3</td>
<td>.5399</td>
<td>.4345</td>
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<tr>
<td>4</td>
<td>.3835</td>
<td>.4184</td>
</tr>
<tr>
<td>5</td>
<td>.2712</td>
<td>.2309</td>
</tr>
<tr>
<td>6</td>
<td>.4419</td>
<td>.4456</td>
</tr>
<tr>
<td>7</td>
<td>.6468</td>
<td>.7157</td>
</tr>
<tr>
<td>8</td>
<td>.5727</td>
<td>.4977</td>
</tr>
<tr>
<td>9</td>
<td>.5223</td>
<td>.5078</td>
</tr>
</tbody>
</table>

There are several interesting comparisons that can be made between the scores in Table 5. The greatest difference found between the self and "others ratings" for either group is found on trait number one. On no other trait do the scores for either group vary more than one-tenth of a point between the "two ratings." ("Two ratings" meaning the self and "others ratings" for either twins or mutual friends when referred to in this study hereafter.) This shows that there was more agreement for both groups on the "others ratings" of trait number one than on the self ratings.
A high degree of agreement between the ratings is indicated by the scores on trait number two, "emotional stability and control," and trait number five, "dependability, a sense of obligation in social relationships." Both the self and "others ratings" have a consistently smaller standard deviation for both groups on these two traits.

The largest standard deviations were found on trait number seven, "being a source of new experience to others," for both groups. These large standard deviations show more disagreement between the "two ratings" of each group on this trait than any other trait. The next largest standard deviations were found on trait number eighty "social service motivation, an attitude of good will toward others." Here also, the standard deviations were large for each group on both the self and "others ratings."

The probable error of the difference of two means was computed by substituting in the formula $PE_d = \sqrt{PE_{\beta_1}^2 + PE_{\beta_2}^2}$.

As a result of these computations, the critical ratios were secured which may be observed in Table 6. The correlations are also given in this table because this will facilitate a quick comparison between these scores, and because the remainder of this chapter is concerned primarily with the comparison of these scores.

\[ PE_d = \sqrt{PE_{\beta_1}^2 + PE_{\beta_2}^2} \]

\[ \text{As a result of these computations, the critical ratios were secured which may be observed in Table 6. The correlations are also given in this table because this will facilitate a quick comparison between these scores, and because the remainder of this chapter is concerned primarily with the comparison of these scores.} \]

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<table>
<thead>
<tr>
<th>Trait No.</th>
<th>Critical Ratios of Mean Differences</th>
<th>Correlations</th>
<th>Critical Ratios of Mean Differences</th>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.70</td>
<td>.650</td>
<td>2.31</td>
<td>.376</td>
</tr>
<tr>
<td>2</td>
<td>1.87</td>
<td>.517</td>
<td>2.87</td>
<td>.312</td>
</tr>
<tr>
<td>3</td>
<td>.960</td>
<td>.522</td>
<td>.000</td>
<td>.304</td>
</tr>
<tr>
<td>4</td>
<td>2.10</td>
<td>.404</td>
<td>2.85</td>
<td>.323</td>
</tr>
<tr>
<td>5</td>
<td>3.20</td>
<td>.454</td>
<td>2.97</td>
<td>.189</td>
</tr>
<tr>
<td>6</td>
<td>2.18</td>
<td>.221</td>
<td>2.57</td>
<td>.113</td>
</tr>
<tr>
<td>7</td>
<td>1.96</td>
<td>.270</td>
<td>.436</td>
<td>.420</td>
</tr>
<tr>
<td>8</td>
<td>.629</td>
<td>.510</td>
<td>.240</td>
<td>.171</td>
</tr>
<tr>
<td>9</td>
<td>1.535</td>
<td>.620</td>
<td>1.576</td>
<td>.000</td>
</tr>
</tbody>
</table>

The significance of these scores will be discussed and evaluated separately with each corresponding trait. One should keep in mind that a low critical ratio indicates a small difference between the means or a high degree of similarity between ratings. Therefore, a small critical ratio would support
a large correlation which would also be indicative of a high
degree of similarity between the ratings.

Comparison of the Twins and the Mutual
Friends on Each of the Nine Traits

Trait number one, "physical characteristics: appearance,
health, and vigor."

Sample items selected from trait number one are:

From the standpoint of physical vigor, do you feel
"up to" the requirements of your work?

Do you feel refreshed and "ready to go" when you
wake up in the morning?

How do you compare with others of your own sex in
regard to general personal appearance, i.e., in
being good looking, handsome, or beautiful?

The critical ratios for the twins and mutual friends are
1.7 and 2.31 respectively. These scores indicate that the
difference is not significant for either group, since the
critical ratio is not four times as large as the probable
error. Therefore, if a similar group were studied the differ-
ence between the means might be found to vary in either
direction. A correlation of .65 for the twins and .37 for
the mutual friends indicates a considerable amount of agreement
for each group on the "two ratings." These correlations are
both clearly significant at the .01 level.²

The larger correlation for the twins is indicative of
greater similarity in their ratings on trait number one.

²Ibid., p. 346.
Since the critical ratios are low and the correlations fairly high, it is practically certain that there is not a true difference between the self and "others ratings" of either group.

Trait number two, "Emotional stability and control."

Sample items selected from trait number two are:

When some very unexpected and shocking circumstance arises, such as reception of bad news, or a serious disappointment,--do you adapt yourself to these facts without crying, demands for sympathy, or excessive discouragement?

Can you accept well-intentioned criticism from your friends or co-workers without showing resentment and anger?

When you are disturbed or anxious over an unpleasant situation, do you "rise above" it rather quickly (as opposed to letting it "get you down")?

The critical ratio of 1.87 on this trait shows a larger difference between the means for the twins than between the means for the mutual friends, since the critical ratio for the latter is .877. However, neither of these critical ratios approach four, the critical ratio needed to indicate statistical reliability. The low critical ratio is supported by a positive correlation of .51 for the twins and .31 for the mutual friends. The .51 correlation is highly significant at the .01 level while the correlation of .31 is significant at the .05 level.

Trait number three, "Social aggressiveness--initiation of social contact and social events."
Sample items selected from trait number three are:

When a new game is introduced at a party or a picnic, are you one of the first ones to volunteer to learn how to play it?

In informal conversations with other persons, do you draw them out on things which are of particular interest to them?

In group situations, do you take the initiative in introducing people to others they do not know?

A fairly high degree of similarity between the two ratings is indicated for both groups on this trait. Critical ratios were both less than one and the correlations were .52 and .30 for twins and mutual friends respectively. The correlation of .52 is very significant at the .01 level, and the correlation of .30 is significant at the .05 level.

Trait number four, "adaptability and tolerance."

Sample items from trait number four are:

Are you friendly with associates who have weaknesses and faults which irritate you?

When your personal plans are blocked due to such factors as a change in the weather, unexpected visitors, or illness in the family, do you adapt yourself to these facts without much fuss or irritability?

Do you get along quite well with all kinds of people (rather than just a few selected ones)?

There is not only similarity within the group on trait number four, but also there is a likeness between the two groups. This can be seen by comparing the scores in Table 6. The twins tend to have a slight advantage over the mutual friends. Correlation of .40 for twins is significant at the
.01 level. The correlation of .30 for the mutual friends is significant only at the .05 level.

Trait number five, "dependability—-a sense of obligation in social relationships."

Sample items selected from trait number five are:

Do you carry out an obligation when to do so means that you are prevented from going somewhere else to have a good time?

Are your verbal statements to others true and accurate as far as you know?

When a group of which you are a member has a problem before it, do you offer suggestions on how it might be met (as contrasted to letting the others work it out unassisted by you?

The difference between the means came closer to being reliable on this trait than any other trait, because of the critical ratio of 3.20 for the twins and 2.97 for the mutual friends is the highest for both groups. The correlation of .45 for the twins is highly significant at the .01 level. Correlation of .18 that indicated for the mutual friends on this trait was not found to be significant.

Trait number six, "Dependence on other for assistance and emotional support."

Sample items selected from trait number six are:

Do you modify your ideas about how something should be done as a result of suggestions offered by your associates?

Would you rather work at something you are interested in with three or four other persons, as contrasted with doing it all by yourself?
Do you ask your friends for advice and suggestions regarding your personal affairs (even though you do not always follow the assistance offered)?

The same general trend is evident from the scores on this trait, as that indicated in all other traits thus far. That is, the twins have a higher correlation and lower critical ratio than the corresponding scores indicate for the mutual friends on trait number six. The small difference between these scores can be observed in Table 6. Neither correlation was found to be statistically significant.

Trait number seven, "Being a source of new experience to others."

Sample items selected from trait number seven are:

Can you relate experiences, or report things you have seen or read, in an interesting manner?

Is your ability to amuse others by humorous remarks, jokes, nonsense, etc., expressed only when you are with a few of your best friends (as contrasted to larger social groups)?

Can you think of a clever remark when you are kidded, or "put on the spot" about something you have done—do you respond with a "snappy comeback"?

Do you amuse others by telling humorous stories?

Do you play pranks or practical jokes on others whom you know quite well?

Can you see the funny side of situations?

Do you tell jokes on yourself, or report embarrassing things you have done?

Do you have a stock of jokes, tricks, riddles, or stunts that you can draw upon to amuse others when opportunities arise?

Are you good at any one of the following: fortune telling, palmistry, hypnotism?
Are you good at one of the following: card tricks or parlor magic?

Do you amuse others by making wise-cracks and clever remarks?

In talking to others, do you dramatize or obviously exaggerate things you have read or experienced just to make your account more interesting to your listeners?

Do you surprise or shock your associates by making unusual remarks, or by stating stimulating points of view?

Do you "kid" or tease others in a good-natured way?

Do you "act a fool," "cut up," or engage in nonsense when among friends?

The small critical ratios found for both the groups is indicative of a very unreliable difference between the means on trait number seven. On every trait so far in this study the twins have had the highest correlation, but this is an exception. The highest correlation of .42 was found on trait number seven for the mutual friends while the lowest, .27, was found for the twins on this trait. Only the correlation of .42 is significant and that is significant at the .01 level.

One probable explanation for the above findings is that twins seem to feel more a part of one another because of certain hereditary and environmental factors. In several cases twins have made comments similar to the following: "When only we two are in our room we each feel as though we were alone." When we go to the show, or to church, we usually get someone to go with us because if we don't it's just like going by yourself."
These statements are apparently true indications of the way twins feel toward each other. Being so, one can readily see why they would not be a "source of new experience" to each other. On the other hand, friends are often mutually attracted because they are a source of new experience, or they meet a need in each other.

Trait number eight, "Social service motivation—an attitude of good will toward others."

Sample items selected from trait number eight are:

Are you friendly with all members of your usual groups regardless of how low their social status may be (not cliquish)?

Do you do your best in working on a group project, when you know that if success is attained the recognition will be given to the group as a whole rather than to you individually?

Do you give your time (without the expectation of pay) to various kinds of social-service work, such as teaching a Sunday School class, singing in a church choir, working with underprivileged children, etc.?

The critical ratios are very small on trait number eight, also indicating an unreliable difference between the means, but a highly significant correlation, .51 was found for the twins. The mutual friends had a low positive correlation of .17 on trait number eight. This was too low to be significant.

Trait number nine, "Abilities."

The items from trait nine are marked on the amount of ability possessed:
"Large muscle" group games (football, basketball, hockey, baseball, etc.)

Competitive "large muscle" sports not necessarily involving organized groups (track, tennis, boxing, wrestling, handball, etc.)

Competitive games not involving a high degree of "large muscle" activity (volleyball, golf, bowling, pool, ping-pong, horseshoes, squash, etc.)

Individual sports, usually not involving competition (swimming, archery, hunting, fishing, rowing, horseback riding, skating, bicycling, etc.)

"Sitting down" games (bridge, checkers, chess, dominoes, poker, etc.)

Participation in competitive musical contests.

Participation in competitive writing contests.

Participation in debate or other forms of competitive speaking contests.

Planning social events and parties.

Public speaking (not involving contests).

Dramatics.

Writing for publication (include school publications).

Singing.

Instrumental music.

Management of a project (such as a school newspaper, athletic event, or program).

Conducting a meeting (as in the capacity of chairman or president).

Social dancing.

Almost identical critical ratios were found on trait number nine for both groups. The critical ratio for the twins was 1.53 as compared with 1.57 for the mutual friends.
However, a more significant difference was found between the correlation. A zero correlation for the mutual friends as compared with .62 correlation for the twins would indicate a much higher degree of similarity in the ratings of the twins on this trait. Correlation of .62 is significant at a .01 level.

Interpretation of Findings

How do twins compare with mutual friends on these personality traits? Naturally, this question can be answered only in relation to the groups used in this study, and as measured by the same questionnaire.

The present findings indicate a greater degree of similarity between the twins than the mutual friends on the following traits:

1. Physical characteristics, appearance, health and vigor.
2. Emotional stability and control.
3. Social aggressiveness.
4. Tolerance and adaptability.
5. Dependability.
7. Abilities and skills.
The correlations for these traits were found to be significant at the .01 level. This means that only once in one hundred trials would a correlation as high as those found on each of these traits appear by accidents of sampling if the population correlation were actually .00.  

Greater similarity was indicated for the twins than for the mutual friends on trait number six, but a significant correlation was not found for either group on this trait.

On trait number seven, the low positive correlation of .27 was not found to be statistically reliable for the twins; however, the correlation for the mutual friends of .42 on this trait was significant at the .01 level. A partial explanation for these findings was offered earlier in this chapter in discussing trait number seven.

The correlations on traits number one, two, three, and four, were also found to be significant for the mutual friends, but only at the .05 level. This means that only five times in one hundred trials would a correlation this high be found by accidents of sampling if the population correlations were .00.

The findings on these particular groups, as measured by the scale used in this study, show that on both the self and "others ratings" the twins:

\[3^{\text{Ibid.}, \ p. \ 300.}\]
1. Rate higher in physical characteristics such as appearance, health, and vigor.

2. Have greater emotional stability and control.

3. Are more socially aggressive, and more readily initiate social contacts.

4. Are more adaptable and tolerant.

5. Are more dependable and have a greater sense of obligation in social relationships.

6. Rate higher in "social service motivation on attitude of good will toward others."

7. Rate much higher in skills and abilities such as football, golf, bridge, and public speaking.

Mutual friends were found to rate significantly higher than the twins on only one trait. This trait was, "being a greater source of new experience to others."

The greatest similarity among the twins was found in trait number one, "physical characteristics, appearance, health, and vigor," and trait number nine, "abilities." A probable explanation for this is that these traits are more closely related to heredity. It is fairly well established that twins are more similar in physical characteristics and abilities than non-twin population.

Can it be assumed that heredity is responsible for a greater similarity between the twins for all traits on which they were found to be more similar?
If the traits that have been considered in this study are dependent primarily upon heredity, one would expect results similar to those found. For example, if emotional stability is dependent largely upon hereditary factors, the twins should certainly be more similar than mutual friends on this trait.

The picture would be very similar if the traits are developed through environmental influences. This would be true because the environment of twins is more alike than that for mutual friends. Since the mutual friends are less similar in physical structure and intellectual ability, they cannot carry on the same activities with equal success. Some of the physical differences are clearly of hereditary origin, and these heredity differences have a tendency to make for environmental differences.
CHAPTER IV

SUMMARY AND CONCLUSIONS

In this study of college students, a comparison was made between twenty-six pairs of twins and twenty-six pairs of mutual friends on nine personality traits. All subjects rated themselves on a self rating scale and their twin or mutual friend on a "rating of others" scale.

The findings show that:

1. The twins rate higher in physical characteristics such as appearance, health, and vigor; have greater emotional stability and control; are more socially aggressive, and more readily initiate social contacts; are more adaptable and tolerant; are more dependable and have a greater sense of obligation in social relationships; rate higher in skills and abilities such as football, golf, bridge and public speaking.

2. The mutual friends rated higher on trait number seven, "being a source of new experience to others."

3. The findings indicate a greater degree of similarity between the self and "others ratings" of the twins than for the mutual friends on all of the traits considered, with the exception of trait number seven.

4. The traits on which the twins showed the greatest similarity were trait number one, "physical characteristics,"
and trait number nine, "abilities." Twins were least similar on trait number six, "dependence on others for assistance and emotional support," and trait number seven, "being a source of new experience to others."

5. The ratings of the mutual friends were most similar on trait number one, "physical characteristics," and trait number seven, "being a source of new experience to others." However, the only trait on which the ratings of the mutual friends were more similar than those of the twins was on trait number seven. The mutual friends showed the least amount of similarity on trait number six, "dependence on others for assistance and emotional support," and trait number nine, "abilities."

In making an overall evaluation, these data show that the twins are decidedly more similar on personality traits than the mutual friends even though the period of mutual friendship had existed for an average of eleven years, and regardless of the fact that the two groups were very similar in age and socio-economic status. The findings on this study are supported by other similar studies in that the traits on which the twins were found to be most similar were those most closely related to heredity, which are "physical characteristics" and "skills and abilities." It is assumed that the great similarity found in the personality of twins is largely due to heredity.
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