

ABSTRACT

MacNitt, Reginald DeKoven. "Introversion and Extroversion In The High School - Their Relation to Age, Sex, Academic Success and Leadership". A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in the University of Michigan, 1930.

A survey of previous studies reveals that introversion and extroversion are quite obviously very significant traits leading to a better understanding of human personality, whether normal or abnormal. The previous lack of an instrument to measure these tendencies in high school pupils, the uncertainty about sex and age differences, and the absolute dearth of studies of high school pupils showing the relationship between these traits and achievement in school subjects, gave evidence of the need for such an investigation as this.

Test items suited to the high school level were prepared for sixty traits and administered to representative groups of junior and senior high school pupils. Subjecting these results to statistical treatment resulted in the selection of thirty items for the final form of the Test for Introversion and Extroversion. This test correlated $.883 \pm .014$ with the criterion accepted as representing the best placement of a pupil on the introversion-extroversion scale, $.865^* \pm .019$ with 856 associate ratings, and

*Corrected for attenuation.

.763* † .024 with 139 teacher ratings. The reliability of the test is .842† † .019 when odd and even scores are correlated and .871 † .028 when the test was repeated four weeks later. The distribution of scores on the test approximates the normal probability curve.

The results from the study of 964 junior and senior high school pupils analyzed on the basis of age, support those studies which have found age differences. There was a gradual increase towards introversion on the basis of grade, age, and grade-at-age from younger to older pupils. For retarded pupils, the tendency was towards introversion in Grades VII and VIII with a drop occurring in the ninth grade and the tendency from there on definitely towards extroversion. For accelerated pupils, the tendency was towards extroversion in Grades VII to X and markedly towards introversion in Grades XI and XII.

This study is in harmony with those which have revealed significant sex differences. For 964 junior and senior high school pupils, extremely significant sex differences existed. While the mean scores of the boys in grade-at-age remained relatively constant, the girls were more extroverted than the boys in Grades VII and VIII, approximately the same in Grades IX and X, and more introverted in Grades XI and XII. Girls one year retarded in Grades XI and XII tended toward extroversion in contrast with

† Predicted for the entire test.

a tendency towards introversion for girls in the same grades who were accelerated.

Analysis of the results of introversion-extroversion in relation to school marks of 964 junior and senior high school pupils lead to the following conclusions:

1. On the average, those pupils with extrovert tendencies received the better grades in Grade VII and VIII, also in the grade-at-age groups in general.
2. There was no reliable difference in marks for introverts and extroverts in Grades IX and X and in the retarded groups in general.

When the results were analyzed for 721 junior high school pupils to determine the influence of popularity with the classmates and number of offices held in organized groups, a relationship was established. The mean introvert-extrovert scores of boys and girls named ten or more times as the most popular in their home room were definitely more extroverted than the group as a whole. For both boys and girls, there was also a definite trend towards extroversion with an increase in the number of offices to which the pupils had been elected. The mean scores of those pupils who had been elected to no offices were slightly more introverted than the average for the group as a whole.

While this investigation has contributed something towards

the measurement of introversion-extroversion traits in high school pupils and established a limited number of relationships, it should accomplish much more in pointing the way for further experimentation.

INTROVERSION AND EXTROVERSION IN THE HIGH SCHOOL

and

**Their Relation to Age, Sex, Academic Success,
and Leadership**

by

Reginald DeKoven Mac Nitt

**A Dissertation Submitted in
Partial Fulfillment of the Requirements
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R.D.M.

"The individual soul is not explained through classification, yet at the same time, through the understanding of psychological types, a way is opened to better understanding of human psychology in general."

--Jung.

CONTENTS

Chapter	Page
I. History of the Development of the Concepts Introversion-Extroversion.....	1
II. Definitions and Descriptions Relating to the Concepts of Introversion-Extroversion.....	27
III. Causes of Introversion and Extroversion.....	37
IV. Survey of Previous Studies.....	41
V. Preparation of the Psychological Interview.....	59
VI. Age and Introversion-Extroversion Tendencies in Junior and Senior High School Pupils.....	93
VII. Sex and Introversion-Extroversion Tendencies in Junior and Senior High School Pupils.....	113
VIII. Introversion-Extroversion in Relation to School Achievement.....	138
IX. Number of Siblings in Relation to Introversion- Extroversion.....	166
X. Introversion-Extroversion and Popularity.....	171
XI. Membership in Organized Groups as Related to Introversion-Extroversion.....	173
XII. Organization Officers in Relation to Introversion-Extroversion.....	176
XIII. Summary and Conclusions.....	180
Appendix	
I. Bibliography.....	186
II. Experimental Forms of the Psychological Interview Test.....	191
III. Teachers' Rating Scale.....	214
IV. Final Form of Psychological Interview Test.....	217
V. Table for Estimating the Probable Significance of Statistical Constants, By Pearl and Miner.....	222

CHAPTER I

HISTORY OF THE DEVELOPMENT OF THE CONCEPTS INTROVERSION-EXTROVERSION

Our knowledge of the attempts to classify man according to types goes back to the fifth century before¹ Christ. At that time, Hippocrates maintained that the human body was composed of four elements, air, water, fire, and earth. Four substances corresponding to the above elements could be found in the living body, namely: blood, phlegm, yellow and black bile. Claudius Galen, a Greek physician, living in the second century after Christ, using the four classical elements made the first attempt to account for differences in temperament of man from a physiological standpoint. It was his idea that different mixtures of blood, phlegm, and yellow and black bile produced a distinct type. When blood predominated, the sanguine type resulted; phlegm produced the phlegmatic type; yellow bile, the choleric type and black bile the melancholic. Thus he made four fundamental classifications which curiously enough are concerned with the emotional behavior of men. This classification endured for many years.

Coming down to modern times, we find several attempts² to classify men according to temperament. Nietzsche divided men into two types. Those individuals whose interests centered

1. Redman, John - Writings of Hippocrates and Galen. Epitomised from the Original Latin Translations. 1846. Lindsay & Blakeston, Sec. III, p. 148.

2. Menchen, H. L. - The Philosophy of Fredrick Nietzsche. Boston, 1908.

around epic poetry, sculpture, painting, and story telling belonged to the "apollonic" type, because that was not life, but one's visualized idea of life. Those whose interests were concerned with dancing, and the great deeds were of the "dionysian" type as those were a part of life itself.

Learned men and geniuses were divided into two classes by Ostwald³, romanticists and classicists, who differed in reaction time; the romanticist was extremely prompt in his production of ideas and projects which the classicist produced slowly and with much effort. Other differences presented were that the romanticist was an enthusiastic, brilliant teacher who was well liked by all of his pupils while the classicist was poorly fitted for teaching and lacked enthusiasm. The former had a great personal influence with all whom he came in contact, while the latter lived a shut-in life, having few friends and little influence, as his whole aim was the production of a perfect piece of work. Thus it was that the classicist many times did not become known until after his death and after his life's work had been discovered by others.

Following Ostwald's suggestion, Bloch⁴ has divided scientist into two groups. He calls our attention to the hesitating and painstaking methods of the classicist in science as compared with the vigorous, carefree romanticist who has no instinctive inhibitions or caution and who is unafraid of new ideas. While the classicist in science is anticipating all

3. Ostwald W. Grosse Männer. Leipzig, 1910. pp. 180-181.
4. Bloch, E. - Romantiker und Klassiker. Int. Zsch. f. Individual Psy., 1929, No. 1, pp. 27-36.

possible objections to any position he might take, the romanticist is following new ideas optimistically and finding a partial solution on which to base a new problem.

We might consider with some seriousness why he believed individuals develop such different attitudes and methods of action, for he considered childhood experiences and the attitude of the parents as the primary conditioning factors. Romanticists are considered by him to have had a fortunate childhood with plenty of free expression while the classicists have been treated harshly and so developed an attitude of timidity which makes it difficult to meet various economic or social situations. The appeal to inherited factors is considered by Bloch as being unnecessary.

5

William James made an attempt to classify individuals according to types. He not only made two general classifications, but also classified individuals in various lines of endeavor.

These may be summarized briefly as follows:

I Manners	(1) formalists (2) free and easy
II Government	(1) authoritarians (2) anarchists
III Literature	(1) purists or academics (2) realists
IV Art	(1) classics (2) romantics
V Philosophy	(1) rationalists (2) empiricists

5. James W. - What is an Emotion? Mind, 1884, V, IX, pp. 188-205.

5. James W. - Körperleben und Bewusstsein. Kritische Studien der Philosophie, 1929, V, 1929, pp. 1-10.

James divided groups as a whole into tough-minded (extroverts) and tender-minded (introverts).

From the Field of Psychopathology

While this study is not directly concerned with abnormal phenomena, it is important to note that many theories have been advanced and concepts developed which relate rather closely to introversion-extroversion in this field. It will suffice to mention one or two of these, the most important of which probably is the work of Kretschmer. While Kretschmer does not mention the terms introversion-extroversion for quite obvious reasons, the distinctions he makes under the terms cycloids and schizoids are strikingly similar to Jung's "psychological types." According to Kretschmer, those individuals whom he would classify as cycloids (extroverts) render themselves liable to a type of neurosis called manic-depressive while schizoids (introverts) as a group are liable to schizophrenia. Jung as we shall see later shows that abnormal tendencies lead to hysteria and neurasthenia.

The findings of Kretschmer which one is most apt to challenge are those which lead him to maintain that there is a close correlation between his mental types and physical peculiarities. He describes cycloids as commonly being of a round, compact, full-bodied type and the schizoids of a more varied physical type. However, a critical evaluation, based on the results of many workers, as reported by Polen,⁷ maintains that

6. Kretschmer, E. - Physique and Character. Chap. IX, X, XI. Harcourt-Brace Company. New York City, 1925.

7. Polen, L. - Körperbau und Charakter. Darstellung und kritische Würdigung der Kretschmerscher Untersuchung. Arch.f.d. ges., 1928, v LXVI, pp. 1-116.

the bodily types as proposed by Kretschmer exist, although it is impossible to compare his observations directly with those of others. This same monograph adds that there are few pure types and many mixed ones which give rise to much arbitrariness in classification. The types are not definitely determined by sex, age, or environment and the question of a relationship between physique and psychoses is yet far from being settled.

⁸
Kempf, whose work is likewise in the field of abnormal psychology, connects introversion-extroversion with affective dissociation. He asserts that "individuals who are predisposed to affective dissociation are usually characterized by tendencies to brood, be irritable, and eccentric. They belong to the 'shut-in' type because they have chronic tendencies to inhibit or conceal their affections. Fear of permitting the affect free play, such as in curiosity, friendliness, love seeking, prevents it from attaining practical contact with reality and the environment, and forces it to use endogenous forms of counter stimulations, as day-dreams, imagination, hallucinations, etc." It is in this way that Kempf believes the individual becomes introverted and he would look upon the opposite condition as extroverted. He also makes the comment that he believes in normal life a compromise exists between extroversion and introversion tendencies with the extroversion tendencies slightly dominating.

8. Kempf, E. - Autonomic Function and the Personality. Nervous Mental Disease Monograph, Series No. 28.

Jung's Conception of Introversion and Extroversion

An entire volume⁹ has been taken by Jung to develop his concepts of introversion and extroversion which he earlier submitted for consideration. A very brief summary of this remarkable work will be attempted at this point. In developing these concepts, which had their beginning in his first outstanding work, "The Psychology of the Unconscious", Jung devoted considerable time and space to "types in history". He brings out the point that throughout the course of human history, individuals have been conditioned by the various degrees of interest they have attached to objects and the relationships which have existed between these objects and their inner selves. These chapters are intensely interesting, but for our purpose, his general description¹⁰ is of more value.

The general description of the types is pursued under four headings:

1. General attitude of consciousness.
2. Attitude of the unconscious.
3. Peculiarities of the basic psychological functions.
4. Summary

1. General Attitude of Consciousness

Extrovert Type. Jung first distinguished between extroverted attitude and extroverted type. We may think of an extroverted attitude when decisions and actions are determined by objective facts and

9. Jung, Carl G. - Psychological Types. Harcourt, Brace & Co. New York, 1923.

10. Chap. X.

objects. If this attitude becomes habitual, we have the extroverted type. When a man comes to the point that objective conditions claim his feelings, actions, and thinking, then he has joined the ranks of the extroverted type. This does not mean that he has no subjective values, but that subjective values have little or no power in determining action as his entire consciousness looks outward to the world.

Introverted Type. Just as objective factors hold the upper hand with the extroverted type, so do subjective factors control introverted consciousness. The external world is perceived of course, but decision as to what course to follow rests with the subjective determinants. The introverted attitude and introverted type depend in part on one's habits of thinking and acting. Jung considers "the point of view which inclines to describe this attitude as philautic, autoerotic, egocentric, subjective, or egoistic to be both misleading in principle and definitely depreciatory". He believes it is the result of the bias of the extrovert against the nature of the introvert and calls attention to the fact that all perception and cognition is not purely objective, but conditioned by subjective factors. In other words, the world is seen not only as it exists, but also as it appears. Jung very carefully defines the term "subjective factor" as "that psychological action or reaction which, when merged with the effect of the object, makes a new psychic fact". So this subjective factor is just as much a fact as the length of a room or the distance between New York and Chicago. It can,

therefore, not be excluded from consideration.

Why does the introvert tend to confuse his "ego" with the "self"? Jung believes this is because the introverted attitude is largely determined by heredity and hence governed by the psychological structure of the individual. Subjective tendencies are stronger than the influence of objective conditions, so they are superimposed upon all impressions. As the psychic value of such tendencies is higher, it is not hard to understand why the introvert wonders how the object in and of itself can dominate. So the extrovert with the highest value placed on the object never ceases wondering at the introverted attitude and he usually comes to the conclusion that the introvert is either a "conceited egoist or a fantastic doctrinaire." However, self and work are commensurable factors; hence a normal introverted attitude is just as valid and has as good a right to existence as a normal extroverted attitude.

2. Attitude of the Unconscious

Extroverted Type. The general relation of the unconscious in both extroverted and introverted types is compensatory. It is the balance wheel, so to speak, which keeps the individual from overstepping the bounds of normality.

We have seen that the extroverted type places special stress on the object as a guide to thinking and action. He is constantly yielding in favor of the objective conditions. This being the case, the problem of the unconscious in the form of

psychic compensation is to place emphasis upon the subjective factors, that is to develop a strong egocentric tendency in the unconscious. So the attitude of the unconscious would be definitely introverting in character to provide the necessary balance, directing psychic energy upon the subjective factors which are repressed by a too extroverted conscious attitude. Hysteria is the most frequent neurosis with the extroverted type. This is simply an exaggeration of the normal attitude made more complicated by various physical disorders.

Introverted Type. Just as the unconscious in the extroverted type lays stress upon the subjective factors, so in the introvert, as the ego oversteps its claims, a compensation naturally develops in the unconscious which reinforces the influence of the object and objective conditions. Such a change sooner or later commands attention. "The subject's freedom of mind is chained to an ignominious financial dependence, his unconcernedness of action suffers now and again a distressing collapse in the face of public opinion, his moral superiority gets swamped in inferior relationships, and his desire to dominate ends in a pitiful craving to be loved." The unconscious is concerned primarily with the relation to the object. In abnormal cases, the objects take on terrifying dimensions until the individual finally cuts himself off completely from the object. But this requires a constant inner struggle which leads to psychoasthenia which is typical neurosis of the introverted type. This neurosis is characterized by extreme sensitiveness and a great liability to exhaustion and chronic fatigue.

3. Peculiarities of the Basic Psychological Functions

In discussing the peculiarities of the basic psychological functions, Jung further divides his types into rational and irrational. He calls the thinking and feeling types of extroverts and introverts the rational type because they are characterized by "the supremacy of the reasoning and judging functions." This reasoning judgment is based upon objective and subjective data (objective in the case of the extrovert and subjective in the case of the introvert). The sensation and intuition types are called by Jung the irrational types because the intensity of perception rather than reasoned judgment govern their thinking and actions.

Rational Types

Extroverted - Introverted Thinking

Thinking in general is fed from two sources:

1. subjective and unconscious
2. objective data (revealed through sense perceptions)

Introverted thinking is largely conditioned by the first of the above sources, while extroverted thinking is influenced to a large degree by the second source. Introverted thinking leads from concrete experience to subjective content as external facts are not the aim and origin of thinking. It begins in the subject and ends in the subject, while extroverted thinking begins with concrete experience and ends with objective things. In introverted thinking, facts are collected only as evidence for

a theory, but in extroverted thinking only those conclusions are drawn which agree with the data, if any conclusions are drawn at all.

Kant often stands as an example of the normal introverted thinking type, while Darwin is said to have been the normal extroverted thinking type. "Darwin ranges over the wide fields of objective facts, while Kant restricts himself to a critique of knowledge in general."

The extroverted thinking type is often pictured as an individual who measures everything in objective terms according to objective data. Good and bad, just and unjust, beauty and ugliness are all measured in terms of conclusions based entirely upon objective facts. This formula which so dominates his own personality must also be obeyed by others, and the man who dares to come to other conclusions is wrong, for no exceptions are allowed. Even tolerance for the needy is lacking unless provided for in his formula, and, should this same formula happen to be wide enough to include a reasonably active social life, we find this individual acting as a reformer or promoting what he considers "public good." We also find this type neglecting his own health as well as the health and happiness of his family unless, as happens in rare cases, they can be used in the service of his ideal.

Now contrast for a moment the introverted thinking type. As is the extroverted thinking type, he is influenced by ideas, but their origin is entirely different. Objective data

are not used as the basis for these ideas, as they rest on a subjective foundation. He follows his ideas inwardly and his aim is intensity rather than extensity. We have seen that the extroverted thinking type through his activities as a reformer or a promotor tries to sell his ideas to others. This is not at all the case with the introvert. When it comes time for his ideas to be transplanted in the world of reality, he merely exposes them, making no effort to see that they get a foot hold. This gives us another point of contrast between the types, for while the introverted-thinking type is making no effort to sell the world his stock of ideas, thereby being impractical, the extroverted-thinking type is applying them wherever possible.

In further describing the introverted-thinking type, Jung says, "In pursuit of his ideas, he is stubborn, headstrong, and quite unamenable to influence.....his style is usually loaded and complicated by all sorts of accessories, qualifications, saving clauses, doubts, etc., which spring from his exacting scrupulousness. He is called inconsiderate and domineering.... To people who judge him from afar, he appears prickly, inaccessible, haughty... He has little influence as a personal teacher, since the mentality of his pupils is strange to him. Teaching interests him little except as it provides him with a theoretical problem. He is a poor teacher, because, while teaching, his thought is engaged with the actual material and will not be satisfied with its mere presentation."

...also very often of a... The

Extroverted-Introverted Feeling Types

Just as with extroverted-introverted-thinking types, so extroverted-introverted-feeling types are determined principally by objective factors in one case and subjective factors in the other. Extroverted-feeling agrees with objective values and leads such an individual who has this attitude to call a thing good because that is the thing to do, or call a picture beautiful because it was painted by a famous artist or is owned by a prominent individual. Introverted-feeling is only secondarily concerned with the object and so comes much less to the surface. For this reason it is very often misunderstood. Introverted-feeling makes one silent and difficult to get access to without making the individual sensitive. It may often be recognized because of the negative feeling which is put forth - an attitude of indifference. Introverted-feeling speaks to the heart, while extroverted-feeling appeals to the senses and to reason.

Jung tells us that the introverted-feeling types are found mostly among women. The extroverted-feeling type of woman is the one who is completely adjusted in terms of objective conditions. She does the right thing at the right time, loves the right man (right in that he has the proper social standing, capacity, respectability, height, etc.,) and represses thinking as much as possible just as the extroverted-thinking type represses feeling. The introverted-feeling type of woman is mostly silent, inaccessible and extremely hard to understand. She is also very often of a melancholic temperament. The

impression is given one that they have no desire to impress or influence, or change others in any way, so their real motive generally remains hidden. No type will take the wind out of the sails of enthusiasm more quickly, leaving one to doubt the value of his own existence in view of the superiority and criticism often directed toward him. So a rather cold and reserved front is manifested by this type, but one should not measure her feelings in this way, as her feelings are deep and intensive rather than extensive. Sympathy which is so easily expressed by the extroverted-feeling type looks like coldness when expressed by the introverted-feeling type. This can only be true to the blind eyes of the extrovert, because, shut off of most means of expression, this sympathy gains a passionate depth.

The extrovert expresses his feelings freely in both word and deed at the right time and right place, but how does the introvert express his feelings which are so often misunderstood. Jung says, "This deeper feeling may, however, express its aim and content in a concealed religiosity anxiously shielded from profane eyes, or in intimate poetic forms equally safeguarded from surprise, or women often express much of it in their children, letting their passionateness flow secretly into them".

When unconscious thinking compensates for feeling, these types are normal. But when unconscious thinking is even repressed, two types of neuroses develop. The extrovert type

develops "hysteria with the characteristic infantile sexuality of its unconscious world of ideas". The introverted type begins to feel what others think, follows rumors and finally neurasthenic neurosis develops.

Irrational Types

Extroverted-introverted Sensation Types

In the extroverted attitude, sensation is conditioned by the object with the subjective phase inhibited or repressed. In the introverted attitude, sensation is based upon the subjective side of perception. To illustrate the difference, let us imagine we had several painters who were assigned the work of painting the same landscape. Even if our instructions to them were to reproduce it just as it is, each painting would differ. No doubt the artist with the extroverted attitude (if you can think of such an individual) would produce the one most closely associated with reality, but the individual with the introverted attitude whose subjective factor has produced its effect and consequently altered the sense-perception at its very source, would produce a painting with a decided psychic variation, both in general mood and in treatment of color and form. So we see that the extroverted attitude is interested primarily in concrete, sensuously perceived objects which give out sensations that please for their own sake and do not lead to reflective thought which will produce an experience that can be profited from. The introvert perceives the same things, only he never stops at the purely objective sensations, but is more concerned with the subjective

perception which is released by the stimulus. "Introverted sensation convey~~w~~ an image whose effect is not so much to reproduce the object as to throw over it a wrapping whose lustre is derived from age-old subjective experience and still unborn future event". Stated in terms of meaningful experience, the extroverted attitude with its momentary seizure of sensation leaves much to be wanted.

In realism, the extroverted-sensation type cannot be equalled. His life is just one contact after another with concrete objects for the sensation they produce, but, as little depth of meaning is produced, he makes little or no use of his experience. The extreme introvert-sensation type is also not a development to be hoped for as he is estranged from the reality of the object in accordance with the intensity of the subjective sensation. He may come to move in a mythological world and it is practically impossible to foretell what will impress him and what will not.

The function most often repressed in both introverted and extroverted-sensation types is intuition or unconscious perception. The extreme extroverted-sensation type becomes a "crude pleasure seeker" or an "unscrupulous designing sybarite", while the extreme introverted-sensation type attends to "every ambiguous, gloomy, dirty, and dangerous possibility in the background of reality".

Extroverted-Introverted-Intuitive Types

Intuition is largely a function of the unconscious,

consequently, in the case of both introverted and extroverted-intuitive types, the conscious apprehension of its nature is very difficult. "In consciousness, the intuitive function is presented by a certain attitude of expectation, a perceptive and penetrating vision, wherein only the subsequent result can prove how much was perceived into and how much actually lay in the object". Intuition is more than a perception. It has a creative nature also, building into the object just as much as it has taken from it. "The primary function of intuition is to transmit mere images, or perceptions of relations and conditions, which could be gained by the other functions, either not at all or only by very roundabout ways. Such images have the value of definite discernments and have a decisive bearing upon action, whenever intuition is given the chief weight."

Intuition in both types tries to run down the greatest number of possibilities in any situation. It must create new paths and new possibilities in life, so the extroverted-intuitive type is continually looking for possibilities in the world of reality while the introvert moves from image to image "chasing after every possibility in the teeming world of the unconscious." In everyday life, there is the type of individual who is always present where possibilities exist, especially among women who are continually making the most of every social opportunity. "They establish right social connections; they seek right lovers with the possibilities, only to abandon everything again for the sake of a new possibility". Everyone recognizes the importance

of the promoter both from the standpoint of general culture and economic grounds, but this attitude also has great dangers as such an individual may waste his whole life running from one thing to another. The introverted-intuitive attitude is also commonly seen in everyday life. The mystical dreamer is not so common, but the artist is and may be considered the normal case for this type. It is this introverted-intuition which leads the artist to record the unusual things which may be very lovely or grotesque.

Absurd projections reveal themselves in the extreme extroverted-intuitive type which deal with sexual, financial, and other suspicions, while the extreme introverted-intuitive type develops a form of compulsion neurosis which exhibits symptoms "that are partly hypochondriacal manifestations, partly hypersensibility of the sense organs, and partly compulsive ties to definite persons or other objects".

Summary of Jung's Concepts

"In the foregoing descriptions", Jung says, "I have no desire to give my readers the impression that such types occur at all frequently in actual practice.

"The products of all functions can be conscious, but we speak of the consciousness of a function only when not merely its application is at the disposal of the will, but when at the same time its principle is decisive for the orientation of consciousness. The absolute sovereignty always belongs empirically to one function alone, and can belong only to one function, since equally independent intervention of another function would

necessarily yield a different orientation which would at least partially contradict the first. Other functions can only have a secondary importance, coming into play as an auxiliary or complementary function. Naturally only those functions can appear as auxiliary whose nature is not opposed to the leading function. Feeling can never act as a second to thinking for there is too strong a contrast and thinking must exclude feeling.

"Experience shows that the secondary function is always different from but not antagonistic to the leading function.....

"For all the types appearing in practice, the principle holds good that besides the conscious main functions there is also a relatively unconscious auxiliary function which is in every respect different from the nature of the main function."

10

In a later work, Jung again describes his concepts of introversion and extroversion in perhaps more understandable form. He first raises the question as to what is "real personality". This in short he finds to be that which one finds in himself which distinguishes him from others and that which ^{is} in common and therefore unessential in the judgment of others. So if one wishes to define this individuality in satisfying terms, he must consider that attitude or condition which considers a normal state of mind as his criterion. This being the case, one must be chiefly concerned with conscious motives and tendencies, certain groups of individuals, characterized by an obvious conformity in their manner of motivation, can be differentiated."

10. Jung, Carl G. - Contributions to Analytical Psychology. pp. 295-312. Harcourt-Brace & Co., New York, 1928.
hensible, but it is perfectly clear to me. These describe

So it is that all come upon individuals who in all their conclusions and actions are motivated largely by external factors or weight is given in this direction. Jung illustrates from a saying of St. Augustine: "I would not believe in the Evangels if the authority of the Church did not compel it." Also, a daughter says, "I could not think of something that would be displeasing to my father." We further illustrate by calling attention to the person who finds music beautiful because everyone else seems to find it beautiful; or the girl who marries the man whom her parents wish her to marry and in the way most pleasing to them; or those individuals who are happy when exciting envy in others; or persons who create trouble to be able to enjoy the sympathy of their neighbors. Of course, Jung is thus briefly describing his extrovert type.

Just as some individuals are motivated largely by external factors, so the actions of others are conditioned by an internal or subjective factor. Returning to the illustrations, the following statements would indicate a quite different state of mind which might also be considered normal. Suppose St. Augustine had said, "I should believe in the Evangels if the authority of the Church did not coerce me to it"; or the lady had said, "I know I could give my father the greatest pleasure if I did thus and so, but nevertheless I have a different idea about it"; or the person who says, "I see the weather is vile, but in spite of it I shall carry out the plan I made yesterday"; or the individual who remarks, "Apparently my book is incomprehensible, but it is perfectly clear to me". These describe

Jung's introverted types.

But Jung calls attention to a third type which Conklin has termed the ambivert in which it is hard to tell whether motivation is derived from within or without.

"As a rule only careful observation and weighing of evidence permits a sure classification..... The individual soul is not explained through classification, yet at the same time, through the understanding of psychological types, a way is opened to better understanding of human psychology in general."

An excellent concluding summarization of Jung's concepts is given by Briggs¹¹ in what she calls a "Personality Paint Box."

The Personality Paint Box

If you are able to locate your primary function below, your two balancing functions will be in the diagonally opposite quarter of the box, while your undifferentiated and childish (unconscious) function will be touching corners with the primary in the quarter of the box directly opposite.

11. Briggs, Katherine Cook. - Meet Yourself. New Republic, 1926 v. 49; pp. 129-134.

Extroverted Sensation

Makes the extreme realist very observant, living in the present and most at home in enjoyment attitude. Untroubled by theories, guided by custom and convention, valuing above all else material possessions and concrete enjoyment

Introverted Sensation

Impressionistic and visionary, observant, but seeing everything differently from other people. At home in the enjoyment attitude, but very uncommunicative, often appearing perplexed. Sensitive to atmosphere, valuing above all else his own subjective impressions.

Extroverted Intuition

Makes the explorer, inventor, organizer or promoter, living in the expectant attitude, always ready to sacrifice the present for the immediate project, enthusiastic, impulsive, keen-minded, impatient and often fickle, valuing opportunity above all else.

Introverted Intuition

Makes philosophers, religious leaders, and prophets, artists queer geniuses and cranks, living in the expectant attitude, with a passion for understanding, impulsive, eager for some new view of life, valuing inspiration and insight above all else.

Extroverted Feeling

Makes interpretive artists, orators, philanthropists, supporters of cultural movements and activities, living in the personal attitude and strong in the art of friendship for its own sake, sociable and tactful, but too fluent to be brief and business-like. Valuing harmonious social relationships above all else.

Introverted Feeling

Makes a reserved and inaccessible personality, silent and deep, outwardly reposeful or even cold, with no desire to impress or influence others. At home in the personal attitude, but intensely averse to violent display of emotion. Values above all else the inner emotional life for its own sake.

Extroverted Thinking

Makes reformers, executives, systematists, and men of applied science. Stubborn, dogmatic, skeptical, practical, and dominating, living in an analytical attitude strictly in accordance with an intellectually derived formula, and expecting others to live by it. Strong in will power, but weak in aesthetic activities

Introverted Thinking

Makes the scholar, theorist, and abstract thinker in science mathematics, economics, philosophy, etc. Dogmatic and egotistical if he mistakes his world of ideas for his own mental processes. Lives in an analytical attitude, but is more tolerant than the extroverted thinker, less critical

Cont'd. from P. 22.

Extroverted Thinking

and the art of friendship.
Values above all else the concrete facts of life.

Introverted Thinking

and less inclined to force his judgments upon others. Values understanding.

Hinkle's Conception of Introversion-Extroversion

At approximately the same time that Jung was elaborating on his concepts of extroversion, Hinkle¹² was also developing a theory, the foundation of which was taken from an earlier work of Jung.

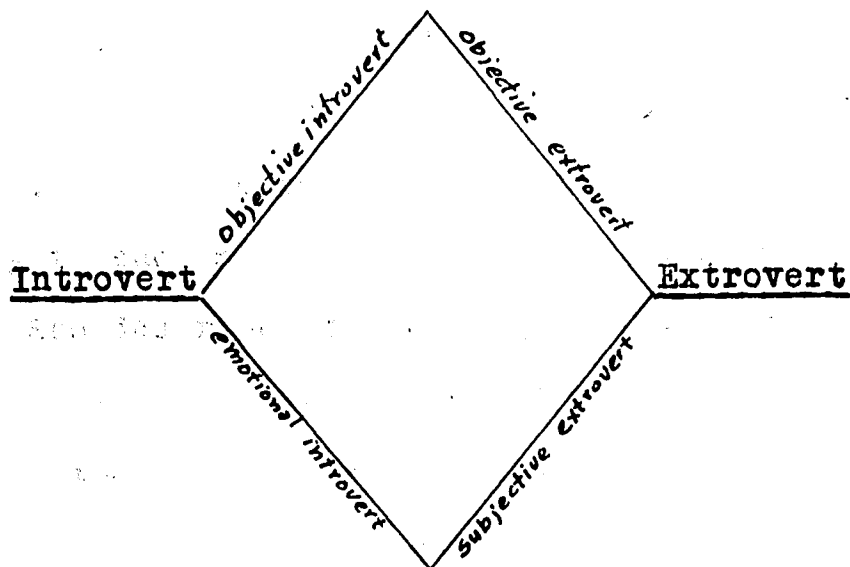
Her investigation led her to divide introversion and extroversion into three groups, namely:

1. the simple extrovert or introvert
2. the objective extrovert or introvert
3. the subjective extrovert or introvert

Subjective extroverts are those in which the major movement of the libido is outwards towards the object, while emotional (subjective) introverts are those in which the major movement is inward toward the ego. She distinguishes subjective from simple in that the simple extrovert's or introvert's conscious interest is turned wholly to the outer or inner world. The objective types "possess little or no differentiation of the subjective function of feeling and intuition, but are limited to the simple sense perception of things, apperception playing a minor role, and are quite unaware that values exist".

Hinkle distinguishes between six types of individuals as shown by the following diagram. She contends that the main two divisions are as definitely defined in the psychological field as male and female are in the biological field.

12. Hinkle, Beatrice M. - *Recreating of the Individual*.
Chap. V. Harcourt-Brace & Co. New York City, 1923.



"All normal persons possess in some degree, regardless of type, the capacity for both extroversion and introversion of the libido." The differences are so clearly revealed in simple extroversion and simple introversion that she regards these as the standard comparison for all modifications within types.

1. Objective extroverts

The attitude of mind is the chief characteristic of this group according to Hinkle. This attitude has a tendency to reduce all things to their simplest forms defining everything in terms of qualities which are measured by concrete sense perceptions. Thus practical utility becomes the watchword with this group with imagination wanting. She describes the objective extrovert as one who practically develops no thought function, is agreeable and pleasant, and lives on a purely sensuous plan, seeking sensuous gratifications. The objective introvert is described as one lacking appreciation, conducting life in a logical way, and having a personality which is easily taken advantage of.

2. Subjective or Bisexual Types

According to Dr. Hinkle, these types possess all possibilities with the power to emphasize any one phase of personality to such a degree as to make it appear to be dominant. She describes the emotional introvert as one whose emotions and feelings have escaped from the influence of thought function, so such reactions are quick and of great intensity with little discrimination. Such a type tends towards extremes and is not dependable, has a strongly developed sense of intuition, and is many times homosexual.

The subjective extrovert is described as one who is orientated to the outer world. In such a type qualities of imagination, intuition, and feeling generally refer to some object, so we may place promoters, explorers, and speculators in such a grouping. Of course the weakness of such a group is the result of not enough emphasis in the thought process with the result that they must learn from experience.

CHAPTER II

DEFINITIONS AND DESCRIPTIONS RELATING TO THE CONCEPTS OF INTROVERSION AND EXTROVERSION

This chapter must of necessity be composed mostly of quotations from various sources. The present writer does not wish to define these concepts, but simply bring together at this point all such definitions and descriptions which have been made and point out elements in common among them.

Quite naturally should come first Jung's definitions of his own concepts. Of extroversion, Jung says, "When orientation to the object and the objective facts is so predominant that the most frequent and essential decisions and actions are determined, not by subjective values, but by objective relations, one speaks of an extroverted attitude. When this becomes habitual, one speaks of the extroverted type. Unlike the extroverted type, the introverted type is prevailingly orientated by subjective factors. Introverted consciousness doubtless views the external conditions, but it selects the subjective determinants as the decisive ones."

12

In another work, Jung describes the extrovert and introvert as follows: "The psychic life is as it were (extroverted attitude) displayed outside the individual in objects and in relationships to objects. In especially marked cases, there

13. Jung, Carl G. - Contributions to Analytical Psychology, pp. 295-312. Harcourt-Brace & Co. New York, 1928. and Extroversion and Allied Concepts. Journal of Theoretical Psychology, 1932, v. 17, pp. 357-381.

occurs a sort of blindness for his own individuality.....

The introvert, on the contrary, always behaves towards the objects as though the latter possessed a superior power over him, against which he had to defend himself. But his real world is the inner one, his subject. Each type is a one-sided development. One develops his outer relations and neglects the inner, while the other develops inwardly, while remaining externally at a standstill".

14

Conklin, who has given the concepts a considerable amount of his attention, believes that a satisfactory definition of the terms can come only through the psychology of attention with some emphasis on the psychology of emotions. He defines extroversion "as a more or less prolonged condition in which attention is controlled by the objective conditions of attention more than by the subjective and in which the content of the subjective conditions is most closely related to the objective". Conklin calls introversion "the reverse of the above" and defines it "as a more or less prolonged condition in which attention is controlled more by the subjective than by the objective conditions and in which the content of the subjective conditions is of a more abstract nature and not so intimately related to the objective conditions".

Conklin is also the originator of a third term in dealing with these concepts, namely: ambiversion, which he says "grows directly out of the two preceding and is to be stated

14. Conklin, Edmund S. - Definition of Introversion and Extroversion and Allied Concepts. Journal of Abnormal Psychology. 1922, v. 17, pp. 367-382.

as a condition of development in which attention is controlled by either objective or subjective conditions of attention and in which the content of the subjective conditions is so varied as to make possible more or less prolonged periods of either extroversion or introversion".

15

Freyd, whose fifty-four traits gave the present writer the basic idea for this study, defines an introvert as "an individual in whom exists an exaggeration of the thought processes in relation to directly observable social behavior, with an accompanying tendency to withdraw from social contacts". Accordingly an extrovert is "an individual in whom exists a diminution of the accompanying tendency to make social contacts." He concludes that: "The extrovert is a calloused individual who makes a good impression in others and cares little what others say about him. The introvert is readily rebuffed by his social environment, and in time develops a social set. His sensitiveness steers him from society and he takes to philosophic, religious, artistic, or mechanical tasks. His ability in these lines may lead him to fame or institutional care. The extrovert may be a social lion or a maniac".

16

McDougall tells us that "The well-marked extroverts are those whose emotions flow out easily into bodily expression and action. They are the vivid, vivacious, active persons who claim us by their ease and freedom of expression, their frankness, their quick sympathetic responses.....; they are essentially

15. Freyd, Max. - Introverts and Extroverts. Psychological Review, 1924. v. XXXI, pp. 74-87.

16. McDougall, William - Is America Safe for Democracy? pp. 85. Scribner's Sons. New York, 1921. pp. 218.

objective and are interested directly and primarily in the outer world about them. The introvert, on the other hand is slow and reserved in the expression of his emotions. He has difficulty in adequately expressing himself. His nervous and mental energies instead of flowing out freely to meet and play upon the out world, seem apt to turn inward....."

In another work, MacDougall says that in physiological terms, "The essential mark of the extreme introvert is the tendency to internal activity of the brain, especially to an excess of those activities of the highest level in which self-conscious reflection and control of lower level processes bulk so largely. The essential mark of the extrovert is the ready passing over of the effective urge into action and expression, without the modification and control of it by cerebral processes of the highest level".

17

Hinkle writes that the "Extrovert is chiefly recognized by his responding to stimuli with feeling and action. He feels his way as it were into the situation and identifies himself with the objects so that the ego and the object become one. The thought function is less developed as he 'acts first and thinks afterwards'. The introvert is the exact contrary as he reacts to stimuli by thinking and tends to withdraw from the object to think it over". According to Hinkle, action with the introvert is difficult and he is apt to substitute, for action

17. Hinkle, Beatrice M. - Relation of Psychological Types to Functional Neuroses. Journal of Abnormal Psychology. 1919, v. XIV, pp. 173-189.

and quick adjustment, theories, philosophies, and logical reasoning.

18

Nicoll tells us that "The introvert type, in its most characteristic expression is reserved, outwardly cold, guarded, watchful, difficult to understand. Unlike the extrovert, who hides little, the introvert hides everything because he dreads the exposure of his emotions because they are too raw and intense. They have not been worked up into useful feelings. He reveals himself only to his most intimate friends and then only in part. He is thoroughly aware of his inner life, and is a keen and serious critic of himself. His tendencies lie in the direction of self-depreciation, which he often counterbalances by an out air of self-appreciation. His approach to everything is critical and suspicious. Anxiety is a constant state of mind with him; he is anxious about the future and anxious about the present. Fear is the predominant factor behind his psychology, and this causes him, when in a position of responsibility to leave nothing to chance".

On extroversion, Nicoll writes that, "Extroversion to some people presents no difficulties. They come in contact with life eagerly, spontaneously, without preparation or plan. If they show any timidity at all, the slightest encouragement has an immense effect upon them. They are that large group of people who are sociable and who accept social values unquestioningly.

They are fond of amusement and are not greatly burdened by the

traits: Their Classification and Measurement, Journal of

18. Nicoll, Maurice. - Dream Psychology. Chap. XIV.

Oxford University Press. 1920.

Chap. X, pp. 23-24. Macmillan Company, New York, 1920.

problems of this world. They flow out into action and into emotional contacts very easily; they express sympathy, delight, sorrow, appreciation, disgust, indignation and jealousy without any difficulty. They love movement, bustle, and excitement, and respond to what is going on around them with great facility. Studied closely, it is possible to see that between their feelings and the expression of these feelings, there is little or no barrier".

19

Allport states that, "The extroverted person is one whose mental images, thoughts and problems find ready expression in overt behavior. Mental conflicts trouble him but little and he appears to have nothing to repress or to avoid. The introvert, on the other hand, dwells largely in a realm of imagination, creating inwardly a more desirable ideal world rather than adjusting himself outwardly to the real one. He is not always a misfit, however, for if given sufficient ability, his internal or covert reactions may be the vision of the poet or artist. On the whole he takes things too personally, is anxious and self-searching, if not actually afraid of the repressions and conflicts which have not found a salutary neural outlet or resolution".

20

White says, "The introverted person is one who, instead of transferring his libido to external objects, receives, so to speak, these objects, or their effects, within himself and so he views the world from within, he considers the world according

19. Allport, Floyd H., and Allport, Gordon W. - Personality Traits: Their Classification and Measurement. Journal of Abnormal Psychology. 1922, v. XVI. pp. 6-45.

20. White, William A. - Mechanisms of Character Formation. Chap. X, pp. 232-236. Macmillan Company, New York. 1926.

to the effect it has upon him. Taking our viewpoint from the external world, this is brought about by the process of what is called introjection, or an entering into the individual of influence from without....."

Continuing, he states that, "Introversion brings about a return to a less clearly defined individuality and a greater range of identification with the environment. Withdrawal from reality is a withdrawal from contact at higher levels, but a return to a phylogenetically older and more diffuse form of contact".

21

Tansley takes a different view, calling extroversion a primitive biological function of the mind. He defines extroversion as "the thrusting out of the mind on to life, the use of the mind in practical affairs, the pouring out of the libido on external objects". Introversion, according to Tansley is "the turning in of the mind upon itself, involving a withdrawal from the external world and the cultivation of an internal mental life". He, however, concedes that there are types only in extreme cases where an individual shows a definite tendency towards a lack of balance. Normally these opposed tendencies make for a desirable balance in dealing with life situations. Continuing, he says, "The extrovert lives in and for the world, his interest is always projected upon it, his thoughts and feelings are always at its service, but he has little or no internal life of the mind, whose cultivation is always superficial. The introvert is absorbed

with his own mental processes and is notably cut off from the life of the world around him. He generally has a profound knowledge of himself and though he always shrinks from contact with the world, his habits of intense mental concentration give him remarkable powers of penetration in any sphere to which he can successfully devote himself". Tansley also concludes that sometimes the introvert can come in contact with reality to a larger extent, meeting the increased demands of civilization because of his tendency to develop a higher, richer, mental life. It being difficult for the extrovert to develop this inner life, his personality becomes shallow and falls short on everyday demands of life.

22

Bingham defines introversion as "the tendency of interest to shift from the object to the subject". He believes as does Freyd that this shift is very evident in social situations and may be measured to some extent by the degree of self-consciousness. Bingham also defines introversion in behavioristic terms saying that such a definition of "introversion stresses the exaggerated tendencies to delay response, to inhibit overt emotional expression, and to withdraw from social contacts".

The findings of Bingham lead him to believe that some relationship exists between vocation and introversion. Persons with introverted tendencies are found more frequently in vocations "requiring mainly the ability to deal with ideas, symbols, written words, numbers, diagrams and abstractions. Accountants, statisticians, inventors, engineers, mechanics, or poets are often

introverts. Where success demands efficiency in social contacts, as politics, management, supervision, or selling, the extroverted personalities are more common."

23

A most recent work in Social Psychology by Ewer also includes descriptions of the terms introversion and extroversion in its chapter on Personality. "The introverted person", Ewer says, "is one whose attention is constantly determined by subjective factors, whose experience is continually and strongly tinged with self-consciousness..... Every event reminds him of himself, and he perceives everything in relation to his own purposes and self-appreciation. He makes subtle internal adjustments to the social environment. The extrovert, on the other hand, has his attention, thought, emotion, and action determined predominantly by objective facts. He is more spontaneous and unreflective than the introvert. Self-appreciation, approval or condemnation, plays a smaller or less subtle part in his life. This type is by nature mentally out-reaching, whereas the former is naturally ingrowing in its conscious activity."

Ewer also brings out points which most others have emphasized such as blushing, brooding, embarrassment, worry, suspiciousness, sensitivity, etc., being characteristic of the introvert and concludes that "in general the steady advances of civilization are due to extrovert leadership and the strikingly new discoveries and novel works of genius come from introverted sources".

This summary of the various definitions and descriptions of introversion and extroversion, discovers some emphasizing

the direction of psychic energy (Tansley, Hinkle, etc.) some describing the differences on a basis of emotional expression (MacDougall, Nicoll and others), some defining in terms of the psychology of attention (Conklin, and Bingham), but all show the importance of the social environment. Whether introversion in an individual is the result of an inward flow of psychic energy, the inhibition of overt emotional expression, or the prolonged control of attention by subjective factors, the fact remains that the individual's reactions to the social situations provide a standard for measuring the degree this introversion has attained.

1921. Tansley, Hinkle, etc. ...
1922. MacDougall, Nicoll and others ...
1923. Conklin, and Bingham ...
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CHAPTER III

CAUSES OF INTROVERSION AND EXTROVERSION

Practically no experimental evidence is available which throws any light on the conditioning factors which result in an individual developing introverted or extroverted tendencies. However, several theories have been advanced.

²⁵
Freyd believes that a glandular explanation might help, suggesting that there might be some relation between introversion-extroversion and the function of the thyroid, adrenal, or sex glands. Individuals who have had certain kinds of experiences like (1) a petted or only child, (2) a member of minority group, (3) a person with a physical defect are more likely to be introverted, in his opinion. He also calls attention to the fact that introversion and extroversion may be the result of inherited predispositions.

²⁶
Tansley says, "The basic mind-structures on which the two types respectively are based are no doubt inherited and are easily recognized in childhood, but the extrovert can be taught to reflect, to weigh, to judge, and to pause before taking action, while the introvert can be encouraged by every means to come into the open, not fear contact with the world, and to use his mental powers for practical ends. But it is only during the periods of

25. Freyd, Max - Introverts and Extroverts. Psychological Review, 1924, v. XXXI, pp. 74-87.

26. Tansley, A.G. - New Psychology. Chap.VIII. Dodd-Mead & Co., New York. 1925.

childhood and adolescence that the best balance between the two tendencies of which the individual mind is capable can be attained."

27

Jung maintains that these tendencies in individuals are determined very early in the child's life, "so early that in certain cases, one must speak of it as being innate".

28

McDougall believes that the extroversion-introversion scale is one of temperament. The position any individual has on such a scale is a "function of some quite general property of his nervous system; and we may assume with considerable probability that this property again is a function of some chemical product or products of metabolism. In short, each subject's position in the introversion-extroversion scale is mainly determined by some chemical influence of the nature of a hormone or endocrine secretion, or some complex chemical resultant of the general metabolism".

To support his claims, McDougall offers evidence of the fact that the subject's position in the scale can be changed through the agency of drugs, especially alcohol. When an introvert indulges in alcoholic beverages, he is pushed by them towards the other end of the scale, his reserve is broken down, oral and emotional expression become easy for him and he "falls upon the neck of his neighbor or comes to blows with him with equal ease". He also maintains that the degree of introversion maintains a relationship to the quantities of alcohol necessary to make an individual extrovert. An extreme introvert needs much more to relieve him from the heavy burden of reflective thought than an

27. Jung, Carl G. - Contributions to Analytical Psychology. Harcourt, Brace Co., New York, 1928.

28. McDougall, William - Outlines of Abnormal Psychology. Chap. XXVIII. Charles Scribner's Sons, New York, 1926.

individual with slight introvert tendencies. Following this to its logical conclusion, extroversion might be defined as a state of intoxication and introversion as day dreaming. In fact, McDougall holds that just as extroversion may be induced by alcohol, so introversion results from the use of such a drug as opium.

To further support his claims, McDougall offers some experimental evidence. A small wheel was set up in a laboratory and driven at the rate of one revolution every three seconds. Using but one eye, the subjects were told to observe its motion from a certain angle and note each reversal of direction of movement as it became apparent. He found that the rates of alternation were very different for different subjects, the introverts' rate of alternation being more rapid than the extroverts' rate. When chloroform or alcohol was administered a marked slowing of the rate of alternation was noted, while morphine, tea, coffee, or opium increased the rate. McDougall believes that these experiments prove his hypothesis. He also found that the extrovert was more readily susceptible to hypnosis than the introvert.

29

Another interesting suggestion is presented by Hinkle, and founded upon Rank's birth trauma theory. She says, "The primary shock of birth might be found an important factor bearing upon the great distinction between extroversion and introversion. The introvert seems to have experienced the more profound shock of the two in the wrench from the protecting peace and harmony of the womb. The sensation of the change, the pain and pressure have made a deeper effect on his organism, therefore assimilation

of the experience has been more difficult. The immediate and present situation is unpleasant, painful, and disliked and produced a great contrast between what is and what was.

"The extrovert carries the primary feeling of paradise with him into the outer world and birth terrors seem to have had little effect upon his primary psychic condition.....He projects his paradise state upon the objects of reality, with which he identifies himself, expecting the same happy relationship as he originally possessed in the womb. The introvert has left his paradise behind while the extrovert takes it with him."

30

Faithfull Believes that most humans have a personality which is definitely either extroverted or introverted. He says the female is the introvert and the male the extrovert, so if the female characteristics predominate, the individual is introverted and if the male characteristics predominate, the individual is extroverted.

While no conclusions may be drawn concerning the causes of introversion-extroversion, it is perhaps safe to say that this conditioning takes place very early in the child's life.

30. Faithfull, T.J. - Bisexuality: an essay on extroversion and introversion. London: Bale, 1927. Pp. 96.

CHAPTER IV

SURVEY OF PREVIOUS STUDIES

Practically all the studies concerning the concepts of introversion and extroversion have been made within the last five years and many of these have been based on the list of traits proposed by Freyd.³¹

One of the first experimental studies was made by Marston³² with one hundred children between the ages of two and six years. Fifty-six of these comprised the main experimental group and forty-four, the control group. His first task was to develop a rating scale. This contained twenty traits of introversion, each paired with the opposing trait of extroversion, and was based on Freyd's list. The reliability of this scale was reported as .95 for boys and .91 for girls with the reliability of the raters at $.71 \pm .06$. Besides rating the children, they were placed in four situations which were supposed to measure social resistance, compliance, interest, and self-assertion.

As a result of this study, Marston made six conclusions as follows:

1. Marked individual differences in introversion and extroversion exist among young children ranging over sixty points of a possible eighty.

³¹. Freyd, Max.-Introverts and extroverts. Psych.Rev., 1924, v.31, pp.74-87.

³². Marston, Leslie R. - The Emotions of Young Children. An experimental study in introversion and extroversion. Iowa City, University of Iowa Studies in Child Welfare, V.III, No. 3.

2. Rating records suggest three types:

a. introvert b. extrovert c. ambivert.

3. The contrasting traits are diagnostic of introversion and extroversion.

4. The rating method is a reliable method for investigating introversion and extroversion of young children.

5. The results from the experiments indicate that they measure traits which are expressions of a general factor of extroversion.

Also experiments are valid measures of introversion and extroversion.

(Correlations between sum of scores of three experiments and rating, --.41 for boys and .56 for girls.

6. Sex differences are revealed. Boys are more extroverted than girls. Also interest is a better measure of introversion and extroversion in boys than in girls.

33

Downey believes that her will-temperament test distinguishes between introversion and extroversion. Introvert traits, according to her, can be determined by (1) slowness of movement and decision, (2) inertia and tension, (3) inflexibility, (4) interest in detail, (5) volitional perseveration, while extrovert traits can be revealed by (1) speed of movement and decision, (2) little inertia, (3) flexibility, (4) little interest in detail and (5) lack of volitional perseveration.

Using Freyd's list, Heidbreder attempted to answer two questions:

1. What information can be gained about introversion and extroversion by applying this scale (Freyd's list of 54 traits) to a group of normal individuals (900 students in psychology at the University of Minnesota) as an instrument of measurement?
2. Do the traits in question actually distinguish between introverts and extroverts?

Her results may be summarized as follows:

1. Treating statistically the results from two hundred of the nine hundred students who rated themselves and were rated by two others, a distribution taking the form of the normal curve was found.
2. The central tendency was towards extroversion.
3. The associates' ratings were more extrovert than the self-ratings.
4. The correlation between the two associates' ratings was .40.
5. The correlation between the self-rating and the associates' was .55.
6. The Freyd's list seems to have diagnostic value.

35

Laird working with more than one hundred traits developed his "Personal Inventory" scale C for measuring introversion. Two forms of this scale are available, one for self-rating and one for associate-rating. The reliability of this scale as

34. Heidbreder, Edna - Measuring introversion and extroversion. Journal of Abnormal Psychology, 1926, V.XXI. pp. 120-134.

35. Laird, Donald A. - How Personalities Are Found in Industry.

36
reported by Hoitsma is $.45 \pm .003$ when the first half is correlated with the second and $.674 \pm .039$ when the test was repeated two weeks later. Laird has found that women are almost without exception more introverted than men. Heidbreder in a later study 37 found no sex differences. It should be noted that the Laird scale is for adults and has been used chiefly with college students, also in the industrial world. From its application to industrial situations, Laird has found that

1. Bench mechanics tend toward ambiversion.
2. Office clerks are inclined towards introversion.
3. Foremen and executives are distinctly extrovert.
4. Inspectors, accountants, and research engineers are introvert in their tendencies.

38
In a study by Caldwell and Wellman of one hundred thirteen junior high school pupils, chronological age, mental age, scholarship, extroversion, height, and physical achievements were related to leadership. Six types of leaders were studied as follows:

1. class presidents
2. student council members
3. junior high school magazine-staff members
4. athletic captains and assistant captains
5. science club officers
6. citizenship representatives

36. Hoitsma, Ralph K. - The Reliability and Relationships of the Colgate Mental Hygiene Test. Journal of Applied Psychology, 1925, V. IX, pp. 293-303.

37. Heidbreder, Edna - Introversion and Extroversion in Men and Women. Journal of Abnormal Psychology, 1927, V. XXII, pp. 52-61

38. Caldwell, Otis W. and Wellman, Beth. - Characteristics of School Leaders. Journal of Educational Research, 1926, V. XIV.

Extroversion among the girls was most marked in the science club chairmen, student-council members, and magazine-staff members. In all types of leadership except athletics, the girls were ranked as extroverts. The athletic leaders were ranked as ambiverts or a balance between introversion and extroversion. The boys tended to be more extroverted than introverted, but the results seemed to show that this was not true to such a marked degree as it was with the girls. Two exceptions were noted to the above. The magazine-staff representatives were noticeably introverted.

39

Downey attempted to classify the members of the American Psychological Association on the basis of extroversion and introversion by asking them to rate themselves with no definition or list of traits given. The results of such a study could not be of any value with such an indefinite set-up. However, returns were received from two hundred twenty-four men and fifty-six women. The results may be summarized as follows:

1. Twenty-six per cent of the men and ten per cent of the women declined to classify themselves.
2. The terms were criticised as
 - a. mythological
 - b. unscientific
 - c. without significance
 - d. a silly classification
3. About fifteen per cent of the men described themselves as the balanced or mixed type, twenty-five

39. Downey, June E. - How the Psychologist Reacts to the Distinction "Extrovert-Introvert" With Observations Concerning Lateralization of Function. Journal of Abnormal Psychology, 1926, V.XX, pp. 407-415.

per cent as extroverts, and thirty-four per cent as introverts.

4. Twenty-one per cent of the women classified themselves as ambiverts, thirty-five per cent as extroverts, and thirty-two per cent as introverts.
5. The traits which often determined their decisions were as follows:

Extrovert

- a. not egocentric
- b. easy social contacts and social interests
- c. more interested in things than ideas
- d. aggressive, active, expressive
- e. attitude toward reality (to face)

Introvert

- a. pronounced self-reference
- b. more interested in ideas than in actions or things
- c. difficulty in making social contacts
- d. difficulty in getting into action
- e. day-dreaming

40

Wells found that out of two hundred men those showing the highest number of primary contacts involving five or more women were of the extrovert type. This was brought out with the following traits:

- a. makes friends readily
- b. mixes with college associates

- c. social leadership
- d. talkative
- e. free at home
- f. spends rather than saves
- g. talks easier than writes
- h. likes to work with others

Believing that Laird and Heidbreder had stressed the abnormal side of the question too much, Conklin, ⁴¹ who gave us the term ambiversion or the mixed or balance type, developed a test to detect differences within normality. He prepared a list of forty proposals in infinitive form, twenty of which revealed extroversion and twenty, introversion. It will be remembered that Conklin defined Introversion-Extroversion on a basis of attention; so he believes that his likes and dislikes test will indicate the established conditions of attention.

The results as reported by Conklin may be summarized as follows:

1. Conklin scale correlated $\pm .05$ with intelligence (159 cases).
2. A correlation of .37 was obtained between Conklin scale and Laird, showing that the two measures are somewhat different.
3. Large sex differences were found, so large that separate norms are given for each sex.
4. There seems to be some indication that rather

41. Conklin, Edmund S. - Determination of Normal Extrovert-Introvert Interest Differences. Pedagogical Seminary, 1927, V.XXXIV, pp. 28-37.

reliable advice could be given the college student on the basis of the test results. This is shown in the following results:

	Average Score	No.
Journalism majors (female)	117.50	20
Journalism majors (male)	100.90	15
English Literature (female)	97.14	22
Physical Education (female)	76.46	13
Pre-Law (male)	79.89	18
Pre-Medical (male)	77.25	32
Business Admin. (male)	66.92	40

5. Twenty-one life insurance salesmen made an average score of 66.43 as opposed to a score of 94.56 which was made by twenty-three female bank employees.
6. The self-correlation of the ratios obtained on the Conklin scale is .92.

42

Young made a study of college failures to try to discover some non-intelligence factors which were involved. A standard intelligence test and the Colgate University Mental Hygiene tests were given a group of freshmen at Colgate University. The first year failures of the class of 1928 were equally distributed among men of high and low intelligence. They were also equally divided among introverts and extroverts. At the end of the second year, extroverts were leading the list of failures with a ratio of eight to three. Combining the records

42. Young, J. Bateman - How Emotional Traits Predispose to College Failure, Journal of Educational Psychology, 1927, V. XVIII, pp. 631-636.

of the two years, it was found that for every eighteen extroverts dismissed from Colgate there were only thirteen introverts dismissed. The groups were then divided into four classes as follows:

1. Above average intelligence and introvert
2. Above average intelligence and extrovert
3. Below average intelligence and introvert
4. Below average intelligence and extrovert

The first group had less than half its quota of failures.

43

Steen and Estabrooks undertook a study to see if there was any relationship between introversion-extroversion and vocational choice. Two groups were used in the experiment.

1. Alumni for Colgate Classes of '25, '26, '27 who were already located.
2. Entire freshman class.

The alumni had already taken the Laird test (C1) and the freshmen were given the C2 form of the Laird test. Of the eighty in the alumni group forty-four had entered professional occupations such as teaching, law, medicine, etc., while thirty-six had entered industrial occupations such as general business, insurance, real estate, etc. The mean score of the professional group was 15.1 P.E. 2.38 and the business group 14.7 P.E. 3.04. Of the freshman group one hundred thirty-nine were undecided as to what profession they wished to enter while one hundred and thirty-four had definitely decided this question for themselves. The means scores in this group were practically

43. Steen, F.H. & Estabrooks, G.H. - The Relation Between Introversion and Vocational Choice. Vocational Guidance Mag. 1927, V. VI, pp. 327-328.

the same as the alumni group so no results were revealed which would indicate any relation between introversion and vocational choice.

Results quite opposed to those of Laird, Marston, and Conklin concerning sex differences were found in the further analysis of the results obtained from the nine hundred University of Minnesota students in psychology who rated themselves and were rated by others on Freyd's list. ⁴⁴Heidbreder presents her results in three parts as follows:

1. Sex similarities in Introversion and Extroversion.

a. Central tendency for men - 11.41 \pm .44

for women-11.12 \pm .42

b. Variability

S.D. for men 11.20 P.E. .31

S.D. for women 10.90 P.E. .30

c. Traits which were diagnostic of introversion and extroversion in one sex were diagnostic in the other also. Thirty-seven of the fifty-three traits were diagnostic for both men and women.

2. Sex differences in particular traits.

Some items were found to be more characteristic of men, other of women.

3. Sex differences and differences in introversion and

extroversion acted as independent variables. That

44. Heidbreder, Edna - Introversion and Extroversion in Men and Women. Journal of Abnormal Psychology, 1927, V. XXII, pp. 52-61.

is, the same list which revealed differences between introversion and extroversion brought out differences between men and women on individual traits.

45

Young making a study of the relationship of college majors and introversion-extroversion found that emotional reasons may be fully as important as the factor of intelligence. This study concerned itself with students majoring in Chemistry-Biology, Chemistry-Geology, Economics-History, and Literature. Those majoring in Chemistry-Biology were predominately extrovert, the ratio being ten to twenty-one. The same was true of the Chemistry-Geology and Economics-History groups which had ratios of eight to eighteen and nine to seventeen in favor of the extrovert. When he came to the group specializing in literature a predominance of introverts was found, the ratio being seventeen to eight.

46

Hunter and Brunner tried to determine whether or not student gamblers were of the introvert or extrovert type. They obtained intelligence test and Personal Inventory (Psychoneurotic tendencies B2 and Introversion-Extroversion C2) test records for students from several colleges who indulged to a large extent in games of chance. In the case of introversion-extroversion, the scores of the gamblers and control groups were the same, but the gamblers were divided into two equal groups of

45. Young, J. Bateman - Selection of College Majors as a Personality Expression. School and Society, 1928, V. XXVII, pp. 119-120.

46. Hunter, James & Brunner, Arthur - The Emotional Outlets of Gamblers. Journal of Abnormal Psychology, 1928, V. XXIII, pp. 39-40.

introverts and extroverts, while the general student body falls in the ambivert group. They conclude that gambling may be an emotional outlet for both extrovert and introvert types.

47

Whitman tried to throw some light on age and sex differences. His study was concerned with two hundred seventy-two college men and one hundred sixty-five college women as compared with seventy-nine adult men and seventy-nine adult women. All of these students had taken Laird's C2 test of introversion-extroversion. No significant sex differences were noted, but valid age differences were revealed.

College Group

Women Mean score 15.49 S.D. 5.1

Men Mean score 15.37 S.D. 4.4

Adult Group

Women Mean score 17.83 S.D. 4.9

Men Mean score 17.35 S.D. 4.9

A difference of 2.01 in the case of men and 2.54 in the case of women is, according to Whitman, about three times the S.D.

48

Hovery made a study to discover if the extrovert was more affected by sensory distractions than the introvert. He used three measures of introversion-extroversion, Conklin's Extrovert-Introvert Interest Ratio, Laird's Personal Inventory C2, and the Freyd-Heidbreder List. The Army Alpha Examination Form 6 was given under ordinary test conditions and Alpha 7

47. Whitman, Roswell H. - Sex and Age Differences in Introversion-Extroversion. *Journal of Abnormal Psychology*, 1929, V. XXIV, pp. 207.

48. Hovery, Birnet H. - Measures of Extroversion-Introversion Tendencies and Their Relation to Performance Under Distraction. *Journal of Genetic Psychology*, 1929, V. XXXVI, pp. 319-328.

given under distraction to the experimental group. The distractors were ..

1. seven bells and five buzzers of various sizes and pitches.
2. 5500 watt spotlight.
3. 90,000 volt rotary spark gap.
4. phonograph.
5. two adjustable organ pipes and three large metal whistles, 14, 24, 26 inches long.
6. fifty-five pound circular saw 36' in diameter.
7. mounted camera operated by a well-known photographer.
8. four men performing stunts.

The experimental group was composed of 204 college students, 112 female and 92 male. One hundred twenty-four, 59 females and 65 males, made up the control group. The results seem to show that distraction had very little effect, if any, on the ability of the subjects to score on the tests. The extroverts were not much more susceptible to distraction than the introverts. No matter how the results were analyzed, no relations were found between susceptibility to general distraction and extroversion.

No relationship was established by Steen and Huntington
49 between introversion and choice of sports when two hundred and forty-nine college men were tested at Colgate University.

50

Estabrooks and Huntington determining handedness by

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49. Steen, F. H. & Huntington, E. C. - Intelligence, Introversion, and Psycho-neurotic Traits in Relation to Choice of Sports. American Phys. Education Rev. 1929, V. XXXIV, p. 216.
 50. Estabrooks, G.H. & Huntington, E.C. - The Relation of Left-handedness to Psycho-neurotic Traits and to Introversion. Journal of Applied Psychology 1929, V. XIII, p. 192.

the relative strength of grip, as measured by a dynamometer, of two hundred eighty freshmen at Colgate failed to find correlations high enough to show any relationship with introversion.

51

Broom made a critical study of the Laird Personal Inventory C2 and came to the following conclusions after giving it to some 329 students, 62 men and 329 women:

- 1. that there are no appreciable sex differences as measured by the Laird Inventory.
- 2. that more stability could be desired of its norms.
- 3. that the test seems to be a valuable supplement to Thorndike's Intelligence Examination for High School Graduates, in prognosticating scholarship.

52

Wellman studied 113 boys and girls in the junior high school grades of the Lincoln School, New York City. The number of times the children were seen together during a period of five months was the basis of the study. It was found that the girls who paired off were more alike in scholarship than any other characteristic. The boys were more alike in height, intelligence, age, and less alike in extroversion, scholarship, and mental age.

In one of the latest and most extensive studies concerned with the concepts of introversion and extroversion

53

Schwegler, selected by a modified form of the Marston scale 103 introverts and 103 extroverts which were paired on the basis of age, sex, race, grade placement, and social status. Twelve

51. Broom, M.E. - A Critical Study of a Test of Extroversion-Introversion Traits. Journal of Juv. Research, 1929, V. XIII, pp. 104-123.
 52. Wellman, B.- The School Child's Choice of Companions. Journal of Educational Research, 1926, V. XIV, pp. 126-132.

tests were given these two groups as follows:

1. A multiple choice test to measure speed of emotionally conditioned choice.
2. Choosing the heavier of three boxes, all three being equal in weight.
3. Suggestibility, based on the manner in which the choice of boxes was made.
4. Motor output, speeded and unspeeded, based on Dewney's test "Freedom from Load."
5. A free association test of one hundred words, based on Jung's technique.
6. Choosing one of five cards, a cash prize rewarding the drawing of a "king".
7. Response to standard ink blots.
8. Suggestibility based on response to questions asked about the Dutch home picture of the Binet Series.
9. Color-naming, using the Woodworth-Wells technique.
10. McCall's Multimental Scale, Elementary Form I.
11. An Abbreviated Questionnaire modelled after Woodworth.
12. An Abbreviated Form of Travis' Character Test.

This study is far too extended to review in any detail at this time, but the author's conclusions will be given.

1. There are definite measurable and reliable differences between some aspects of the behavior of in-

53. See P.54. Schwegler, Raymond Alfred - A Study of Introvert-Extrovert Responses to Certain Test Situations. Teachers College Contributions to Education No.361 Bureau of Publications, Teachers College, Columbia University, 1929, New York City.

trovert and extrovert children between the ages of twelve and eighteen.

2. These behavior differences involve the speed of manual movement, the speed of aesthetic decision, the speed of responding to verbal stimuli, the quality of the response to verbal stimuli, the quality and quantity of response to ink blots, the ability to make high scores on the multimental test, the tendency to be aware of neurasthenoid, psychasthenoid, and autistic symptoms or habits, and probably the amount of emotional output.
 3. The tendency for introverts and extroverts to present the characteristic trends noted above is not affected by chronological age, within the limits here considered.
 4. It is doubtful whether the behavior trends are greatly affected by ordinary limits of normal intelligence.
 5. In addition to the statistically established differences, there is a mass of evidence of an unscored type relative to emotional responses. Introverts make the impression of having a flatter, less vivid affect life than do extroverts. In any case, their overt expressions of affect were far less numerous, and far more rigorously censored than were those of the extrovert group.
- educational literature.

From a review of the studies already completed, it may be concluded:

- a. that there are marked individual differences in introversion-extroversion tendencies in young children as well as adults.
- b. that these differences represent degrees on a scale.
- c. that distributions take the general form of a normal frequency curve.
- d. that the problem of sex and age differences is still open to question.
- e. that no test or rating device has yet been devised which adequately meets the needs of research workers seeking to answer some of these questions.
- f. that practically no experimental evidence is available concerning the introversion-extroversion tendencies of junior and senior high school pupils as a whole normal group.
- g. that no studies have been made to show the relationships between introversion-extroversion and school achievement.
- h. that only a small amount of evidence is available concerning these concepts and vocational and mental hygiene problems.
- i. that the concepts have taken hold and are appearing with increasing frequency in the psychological and educational literature.

THE PURPOSE OF THIS STUDY

It is proposed in this study:

1. To develop a test of introversion-ambiversion-extroversion for use in junior and senior high schools.
2. To study the relation between the test results from a large number of junior and senior high school students and school achievement in general, and achievement in separate school subjects.
3. To study age and sex differences of this group.
4. To study the relation between test results and the number of brothers and sisters, qualities of leadership, and popularity.

CHAPTER V

PREPARATION OF THE PSYCHOLOGICAL INTERVIEW*

The present study differs from previous work in this field in three important particulars: first, all other inquiries have employed rating scales, the separate items of which seemingly have been selected without reference to their value as this might be statistically determined. Secondly, the present test is the only one which is adapted to the junior and senior high school level. And thirdly, the final selection of items was made on the basis of pupil, not of teacher, judgments.

To illustrate, - the Marston Scale⁵⁶ was developed for pre-school children. Later, Schwegler⁵⁷ arbitrarily revised the scale to suit, as he believed, the high school level, but teachers and not pupils did the rating. Laird,⁵⁸ Conklin,⁵⁹

*A diagnostic test measuring those tendencies commonly termed introverted, ambiverted, or extroverted, developed at the University of Michigan, School of Education. Copyright 1930 by R. D. MacNitt, Ann Arbor, Michigan.

56. Marston, Leslie R. The Emotions of Young Children. An Experimental Study in Introversion and Extroversion. University of Iowa Studies, v. 3, No. 3. pp. 13-17.

57. Schwegler, Raymond Alfred. A Study of Introvert-Extrovert Responses to Certain Test Situations. Teachers College Contributions to Education, No. 361. pp. 13-17.

58. Laird, Donald A. A Mental Hygiene and Vocational Test. Journal of Educational Psychology, 1925, v. 16, pp. 419-422.

59. Conklin, Edmund S. The Determination of Normal Extrovert-Introvert Interest Differences. The Pedagogical Seminary and Journal of Genetic Psychology, 1927, v. XXXIV, pp. 28-37.

Prepared by the author for the Psychological Department of the University of Michigan, Ann Arbor, Michigan. This study was developed from a series of tests administered to a group of graduate students in psychology at the University of Michigan. The results of these tests were considered in the development of the present test. From these tests, the present test was developed which is today known as the Marston Scale.

and Freyd have employed rating devices for use with college students and Neymann and Kohlstedt⁶¹ have prepared a test for psychopathic adults.

*

In constructing this test, Freyd's list of introvert traits was used as a starting point. The literature on the subject was then carefully reviewed with the result that several traits were added. The enlarged list, stated in terms of introversion, with the source of each trait follows:

Freyd

1. Limits his acquaintances to a select few
2. Feels hurt readily. Apparently sensitive about remarks or actions which have reference to himself.
3. Is suspicious of the motives of others.
4. Worries over possible misfortunes.
5. Indulges in self-pity when things go wrong.
6. Gets rattled easily; loses his head in excitement or moments of stress.
7. Keeps in the background on social occasions; avoids leadership at social affairs and entertainments.
8. Is critical of others.
9. Prefers to work alone rather than with people; prefers to work at tasks that do not bring him into contact with people.
10. Has ups and downs in mood without apparent cause.
11. Is meticulous; is extremely careful about his dress and painstaking about his personal property.
12. Blushes frequently; is self-conscious.
13. Pays attention to rumors.
14. Expresses himself better in writing than in speech.
15. Resists discipline and orders.
16. Limits his acquaintances to members of his own sex.

60. Freyd, Max. Introverts and Extroverts. Psychological Review 1924. v. 31, pp. 74-87.

61. Neymann, Clarence A., and Kohlstedt, Kenneth D. A New Diagnostic Test for Introversion-Extroversion. Journal of Abnormal Psychology, 1929, v. 23, pp. 482-485.

*Freyd collected at times from several psychologists and graduate students in psychology statements of what they considered introvert and extrovert traits. From these, he developed what is today known as the "Freyd list."

17. Avoids all occasions for talking before crowds. Finds it difficult to express himself.
18. Is a radical; wants to change the world instead of adjusting himself to it.
19. Is outspoken; says what he considers the truth regardless of how others may take it.
20. Introspects; turns his attention inward toward himself.
21. Prefers participation in competitive intellectual amusements to athletic games.
22. Is strongly motivated by praise.
23. Daydreams.
24. Is selfish.
25. Dislikes and avoids any process of selling or persuading anyone to adopt a certain point of view (except in religious field).
26. Is sentimental.
27. Prefers to read a thing rather than experience it.
28. Is extremely careful about the friends he makes; must know a person pretty thoroughly before he calls him a friend.
29. Shrinks from action which demands initiative and nerve.
30. Prefers to work things out on his own hook; hesitates to accept or give aid.
31. Talks to himself.
32. Derives enjoyment from writing about himself.
33. Keeps a diary.
34. Shrinks when facing a crisis.
35. If he unburdens at all, he does so only to close personal friends or relatives.
36. Is reticent and retiring; does not talk spontaneously.
37. Is creative of new and sometimes eccentric ideas and things.
38. Works by fits and starts.
39. Is a poor loser; considerably upset and indisposed after the loss of a competitive game.
40. Depreciates his own abilities, but assumes an outward air of conceit.
41. Is absentminded.
42. Hesitates in making decisions on ordinary questions in the course of the day.
43. Believes in "mind cures"; accepts an idealistic philosophy.
44. Has ups and downs in mood with apparent cause.
45. Rewrites his social letters before mailing them.
46. Is slow in movement.
47. Is governed by reason rather than impulse or emotion. Is a good rationalizer; can give good reasons for his actions.

48. Admires perfection of form in literature.
49. Makes mistakes in judging the character and ability of others
50. Is thrifty and careful about making loans.
51. Is effeminate (if a man)
52. Is persistent in his beliefs and attitudes.
53. Takes up work which requires painstaking and delicate manipulation.
54. Is conscientious.

Baker (with Trow) 62

Limits acquaintances within sex to those with his own interests.

63

Traits stressed by Jung , but apparently not included in the Freyd list.

1. Does not necessarily adjust his personality in relation to objective conditions and general values. (Does not do a thing because "it is the thing to do", or does not necessarily like a picture because it is a masterpiece.)
2. Does not devote life to experience with concrete objects simply for the sensations they produce, but makes use of any such experience.
3. Very seldom present where possibilities exist, but more interested after they have become generally recognized values.
4. Measures everything in terms of a formula, but is not inclined to force others to live up to it or obey it.
5. Makes no attempt to transplant ideas, simply exposes them; is impractical.
6. Deeply passionate, but maintains an outward attitude of coldness.
7. Extremely artistic temperament revealing the unusual in art.

64

Webb's personality traits which bear some relationship to introversion-extroversion.

1. Low degree of corporate spirit.
2. Low degree of excitability.
3. Lack of cheerfulness.

62. Baker, Gerald, and Trow, William Clark. The Selection of Criteria of Introversion and Extroversion. An unpublished article. School of Education, University of Michigan.

63. Jung, Carl G. Psychological Types or the Psychology of Individualization. Translated by H. G. Baynes. New York, Harcourt, Brace Co. 1926. Chap. V.

64. Webb, Edward. Character and Intelligence. British Journal of Psychology Monograph Supplement, 1915, vi, No. 3.

4. Anger not easily aroused to action.
5. Lack of humor.
6. Pure-minded.

65

Suggested from Neymann-Kohlstedt material.

1. Likes to spend his vacations or spare time at a quiet place rather than a lively one.
2. Distrusts people he has just met.
3. Plans out work before beginning it.

From this enlarged list of seventy-one traits, test items adapted to junior and senior high school students were prepared for sixty (eleven were omitted because they were considered unsuited to high school students). These sixty items formed the experimental edition of the test which was prepared in three forms.* Form A was designed for the pupil's use in placing himself on the introversion-extroversion scale, while the wording, chiefly of the pronouns, was slightly changed in Forms B and G for boys and girls respectively to make it possible for associate-ratings.

Application of the Experimental Forms. The experimental forms of the test were submitted to two groups of high school pupils in Michigan schools: fifty-eight junior high school pupils from the Tappan School, Ann Arbor and eighty-five senior high school pupils, the total enrolment of the Lincoln Consolidated School, Ypsilanti. The junior high school

65. Neymann, Clarence A., and Kohlstedt, Kenneth D. A New Diagnostic Test for Introversion-Extroversion. *Journal of Abnormal Psychology*, 1929, V. 23, pp. 482-485.

*See appendix for complete experimental editions of the test. Groups receive units for all school activities, such as social, academic, and physical.

pupils consisted of two cross-section** groups each of which represented a typical junior high school population, as to sex, grade, age, and scholastic achievement. To make the senior high school group somewhat comparable with the junior high school group, fifty-six were selected to form a cross-section group representing a typical senior high school population.

Form A of the experimental test was applied by the author under conditions common to the application of any objective test. Before writing the test, a list of six boy and six girl friends was obtained from each of the students participating in the preliminary experiment. Under the direction of the teachers in charge, with the author supervising, each pupil was asked at a later time to rate four boy and four girl friends (using Form B for the boys and Form G for the girls). These associate-ratings were controlled with the aid of the lists which the pupils had handed in as representing their friends within the groups being tested. As a consequence, one self-rating and eight associate-ratings, (four of boys and four of girls) were obtained from each of one hundred and seven pupils of the one hundred forty-three taking part in this part of the experiment.

**In place of the traditional grade groupings, the Ann Arbor junior high school system is composed of thirty-three cross-section groups. The purpose of this grouping is to make each section a typical junior high school situation, so the sexes and grades are evenly divided and the normal curve approximated as to age, intelligence, achievement, and social status. These groups become units for all school activities such as social, athletic, citizenship, etc.

It was decided that the nearest approximation to the pupils' correct placement on the introversion-extroversion scale would be a composite of the eight associate-ratings and his own rating, each counting fifty per cent of the placement score. This composite score is called the "Criterion" score. An individual's personality is made up of that which is in varying degrees common to all and that which distinguishes him from all others. It is quite evident, therefore, that on some traits, an individual's friends would be better able to rate him than he would himself. The measurement of other traits would be more valid if the individual himself had a hand in the rating. As the test items for the sixty traits were made as attractive as possible, so that an individual would not hesitate to answer in accordance with his true feelings, it was believed that his own rating would add materially to the validity of the placement score.

In scoring each of the items, an extrovert response was given 1 point; ambivert, 2 points; and introvert, 3 points. Figure 1 shows the distribution of the "Criterion" scores as a result of this preliminary experiment.

Selection of Items for the Test. From the results of this intensive study of introversion-extroversion in 107 junior and senior high school pupils, each being rated by himself and eight of his friends, three groups were selected to represent the three tendencies, introversion, ambiversion,

Mean 194.18
 S.D. 8.94
 P.E. 6.04

Frequency	1	0	2	14	18	23	22	18	5	1	2	1
Scores	165	170	175	180	185	190	195	200	205	210	215	220
	169	174	179	184	189	194	199	204	209	214	219	224

Figure 1. Distribution of "Criterion" Scores of 107 Junior and Senior High School Pupils on the Experimental Form of the Psychological Interview Test.

and extroversion. The introverted and extroverted groups were chosen from the ends of the distribution to the left and right of ± 1 P.E. respectively. The ambiverted group was chosen from that part of the distribution within the limits of $\pm .5$ P.E. of the central ordinate. As ± 1 P.E. represents fifty per cent of the distribution, it is evident that a distance equal to $\pm .5$ P.E. or approximately twelve per cent separated the introvert and extrovert groups from the ambivert group.

The next step was to determine how these three groups had responded to each test item. This was done by determining the per cent of introvert, ambivert, and extrovert responses to each item for each group. One would naturally expect the percentage of proportion to be in favor of the extrovert response in the extrovert group, ambivert response in the ambivert group, and introvert response in the introvert group. This was the result in the majority of items as Tables I, II, and III, which give these percentages together with the probable error of percentage (P.E. _p), ^{66, 67} reveal; but occasionally the proportion is in favor of the unexpected response. Item 34, Table I, is an example of this. This table, dealing with

66. Yule, G. Udney. An Introduction to the Theory of Statistics. p. 257. J. B. Lippincott Co. 1924. The formula given for Standard Error of a proportion is

$$S.E. \substack{p} = \sqrt{\frac{Pq}{n}}$$

where p equals the percentage of proportion, q equals the difference between p and 1.00, and n equals the number of cases.

67. Edgerton, Harold A., and Paterson, Donald G. Tables of Standard Errors and Probable Errors of Percentage of Varying Number of Cases. Journal of Applied Psychology, 1926, v. 10, pp. 378-391.

Edgerton and Paterson have prepared tables for calculating S.E.

the extrovert group, would be expected to show the largest percentage of response in the extrovert column, the ambivert next, and the introvert, the smallest. Just the reverse is shown by item 34. This does not necessarily mean that that particular trait is not a measure of introversion-extroversion, but it does mean that the test item chosen to measure that trait is not adequately prepared to perform its task.

67. (Cont'd. from p. 67)
 and $P.E._p$ ($P.E._p$ being 0.6745 multiplied by the $S.E._p$)

TABLE I

PERCENTAGES OF INTROVERT, AMBIVERT, AND EXTROVERT RESPONSES
WITH PROBABLE ERROR OF PERCENTAGE FOR THE
EXTROVERT GROUP

Item No.	Introvert Response		Ambivert Response		Extrovert Response	
	%	P.E.	%	P.E.	%	P.E.
1.	4	2.6	23	5.6	73	5.9
2.	12	4.3	23	5.6	65	6.3
3.	4	2.6	38	6.4	58	6.5
4.	8	3.6	15	4.7	77	5.6
5.	4	2.6	27	5.9	69	6.1
6.	0	- -	15	4.7	85	4.7
7.	54	6.6	23	5.6	23	5.6
8.	0	- -	35	6.3	65	6.3
9.	20	5.3	38	6.4	42	6.5
10.	4	2.6	23	5.6	73	5.9
11.	0	- -	38	6.4	62	6.4
12.	50	6.6	23	5.7	27	5.9
13.	46	6.6	31	6.1	23	5.6
14.	30	6.1	35	6.3	35	6.3
15.	4	2.6	23	5.6	73	5.9
16.	38	6.4	16	4.9	46	6.6
17.	42	6.5	35	6.3	23	5.6
18.	4	2.6	38	6.4	58	6.5
19.	0	- -	38	6.4	62	6.4
20.	8	3.6	19	5.2	73	5.9
21.	8	3.6	42	6.5	50	6.6
22.	31	6.1	46	6.6	23	5.6
23.	12	4.3	19	5.2	69	6.1
24.	12	4.3	8	3.6	80	5.3
25.	4	2.6	54	6.6	42	6.5
26.	8	3.6	35	6.3	57	6.5
27.	12	4.3	30	6.1	58	6.5
28.	19	5.2	54	6.6	27	5.9
29.	8	3.6	27	5.9	65	6.3
30.	35	6.3	23	5.6	42	6.5
31.	8	3.6	42	6.5	50	6.6
32.	8	3.6	4	2.6	88	4.3
33.	8	3.6	15	4.7	77	5.6
34.	42	6.5	38	6.4	20	5.3
35.	8	3.6	19	5.2	73	5.9
36.	0	- -	23	5.6	77	5.6
37.	15	4.7	27	5.9	58	6.5
38.	15	4.7	73	5.9	12	4.3
39.	4	2.6	27	5.9	69	6.1
40.	50	6.6	30	6.1	20	5.3

TABLE I (Continued)

Item No.	Introvert Response		Ambivert Response		Extrovert Response	
	%	P.E.	%	P.E.	%	P.E.
41.	31	6.1	31	6.1	38	6.4
42.	35	6.3	30	6.1	35	6.3
43.	4	2.6	19	5.2	77	5.6
44.	31	6.1	46	6.6	23	5.6
45.	4	2.6	42	6.5	54	6.6
46.	31	6.1	57	6.5	12	4.3
47.	23	5.6	31	6.1	46	6.6
48.	0	- -	23	5.6	77	5.6
49.	19	5.2	27	5.9	54	6.6
50.	0	- -	12	4.3	88	4.3
51.	42	6.5	23	5.6	35	6.3
52.	0	- -	23	5.6	77	5.6
53.	8	3.6	27	5.9	65	6.3
54.	4	2.6	38	6.4	58	6.5
55.	12	4.3	23	5.6	65	6.3
56.	0	- -	65	6.3	35	6.3
57.	8	3.6	69	6.1	23	5.6
58.	19	5.2	27	5.9	54	6.6
59.	65	6.3	27	5.9	8	3.6
60.	4	2.6	61	6.5	35	6.3

TABLE II

PERCENTAGES OF INTROVERT, AMBIVERT, AND EXTROVERT RESPONSES
WITH PROBABLE ERROR FOR THE AMBIVERT GROUP

Item No.	Introvert Response		Ambivert Response		Extrovert Response	
	%	P.E.	%	P.E.	%	P.E.
1.	15	4.7	62	6.4	23	5.6
2.	15	4.7	54	6.6	31	6.1
3.	4	2.6	77	5.6	19	5.2
4.	27	5.9	38	6.4	35	6.3
5.	0	-	54	6.6	46	6.6
6.	12	4.3	54	6.6	34	6.3
7.	38	6.4	54	6.6	8	3.6
8.	4	2.6	81	5.2	15	4.7
9.	15	4.7	77	5.6	8	3.6
10.	12	4.3	58	6.5	30	6.1
11.	4	2.6	81	5.2	15	4.7
12.	58	6.5	27	5.9	15	4.7
13.	54	6.6	31	6.1	15	4.7
14.	42	6.5	27	5.9	31	6.1
15.	4	2.6	77	5.6	19	5.2
16.	24	5.6	38	6.4	38	6.4
17.	23	5.6	46	6.6	31	6.1
18.	19	5.2	50	6.6	8	3.6
19.	0	-	77	5.6	23	5.7
20.	4	2.6	54	6.6	42	6.5
21.	4	2.6	84	4.9	12	4.3
22.	46	6.6	31	6.1	23	5.7
23.	4	2.6	61	6.5	35	6.3
24.	0	-	50	6.6	50	6.6
25.	4	2.6	96	2.6	0	-
26.	4	2.6	77	5.6	19	5.2
27.	23	5.6	54	6.6	23	5.6
28.	38	6.4	58	6.5	4	2.6
29.	19	5.2	54	6.6	27	5.9
30.	46	6.6	38	6.4	4	2.6
31.	31	6.1	65	6.3	4	2.6
32.	4	2.6	50	6.6	46	6.6
33.	12	4.3	27	5.9	61	6.5
34.	38	6.4	62	6.4	0	-
35.	12	4.3	38	6.4	50	6.6
36.	0	-	65	6.3	35	6.3
37.	15	4.7	65	6.3	20	5.3
38.	42	6.5	50	6.6	8	3.6
39.	8	3.6	77	5.6	15	4.7
40.	35	6.3	65	6.3	0	-

TABLE II (Continued)

Item No.	Introvert Response		Ambivert Response		Extrovert Response	
	%	P.E.	%	P.E.	%	P.E.
41.	46	6.6	38	6.4	16	4.7
42.	35	6.3	50	6.6	15	4.7
43.	19	5.2	50	6.6	31	6.1
44.	42	6.5	38	6.4	20	5.3
45.	4	2.6	85	4.7	11	4.3
46.	38	6.4	62	6.4	0	- -
47.	23	5.6	50	6.6	27	5.9
48.	8	3.6	54	6.6	38	6.4
49.	4	2.6	77	5.6	19	5.3
50.	0	- -	65	6.3	35	6.3
51.	46	6.6	42	6.5	12	4.3
52.	0	- -	88	4.3	12	4.3
53.	12	4.3	77	5.6	11	4.3
54.	23	5.6	65	6.3	12	4.3
55.	15	4.7	58	6.5	27	5.9
56.	4	2.6	85	4.7	11	4.3
57.	8	3.6	77	5.6	15	4.7
58.	8	3.6	69	6.1	23	5.6
59.	58	6.5	38	6.4	4	2.6
60.	15	4.7	77	5.6	8	3.6

TABLE III

PERCENTAGES OF INTROVERT, AMBIVERT, AND EXTROVERT RESPONSES
WITH PROBABLE ERROR FOR THE INTROVERT GROUP

Item No.	Introvert Response		Ambivert Response		Extrovert Response	
	%	P.E.	%	P.E.	%	P.E.
1.	46	6.6	42	6.5	12	4.3
2.	50	6.6	27	5.9	23	5.6
3.	34	6.3	28	5.9	38	6.4
4.	69	6.1	4	2.6	27	5.9
5.	27	5.9	38	6.4	35	6.3
6.	42	6.5	31	6.1	27	5.9
7.	81	5.2	15	4.7	4	2.6
8.	31	6.1	50	6.6	19	5.2
9.	69	6.1	23	5.6	8	3.6
10.	65	6.3	12	4.3	23	5.6
11.	65	6.3	20	5.3	15	4.9
12.	70	6.1	15	4.7	15	4.7
13.	88	4.3	4	2.6	8	3.6
14.	80	5.3	12	4.3	8	3.6
15.	58	6.5	27	5.9	15	4.7
16.	54	6.6	23	5.6	23	5.6
17.	73	5.6	23	5.6	4	2.6
18.	65	6.3	12	4.3	23	5.6
19.	46	6.6	38	6.4	16	4.9
20.	31	6.1	15	4.7	54	6.6
21.	38	6.4	62	6.4	0	-
22.	81	5.2	4	2.6	15	4.7
23.	61	6.5	8	3.6	31	6.1
24.	15	4.7	31	6.1	54	6.6
25.	69	6.1	27	5.9	4	2.6
26.	62	6.4	23	5.6	15	4.7
27.	42	6.5	30	6.1	28	5.9
28.	62	6.4	30	6.1	8	3.6
29.	50	6.6	8	3.6	42	6.5
30.	92	3.6	4	2.6	4	2.6
31.	50	6.6	27	5.9	23	5.6
32.	30	6.1	35	6.3	35	6.3
33.	15	4.7	20	5.3	65	6.5
34.	88	4.3	8	3.8	4	2.6
35.	42	6.5	31	6.1	27	5.9
36.	27	5.9	38	6.4	35	6.3
37.	65	6.3	15	4.7	20	5.3
38.	77	5.6	15	4.7	8	3.6
39.	54	6.6	31	6.1	15	4.7
40.	92	3.6	8	3.6	0	-

TABLE III (Continued)

Item No No.	Introvert Response		Ambivert Response		Extrovert Response	
	%	P.E.	%	P.E.	%	P.E.
41.	62	6.4	15	4.7	23	5.6
42.	84	4.9	4	2.6	12	4.3
43.-	46	6.6	12	4.3	42	6.5
44.	81	5.2	15	4.7	4	2.6
45.	15	4.7	73	5.9	12	4.3
46.	77	5.6	15	4.7	8	3.6
47.	65	6.3	12	4.3	23	5.6
48.	23	5.6	27	5.9	50	6.6
49.	50	6.6	38	6.4	12	4.3
50.	8	3.6	50	6.6	42	6.5
51.	77	5.6	15	4.7	8	3.6
52.	35	6.3	42	6.5	23	5.6
53.	58	6.5	34	6.3	8	3.6
54.	58	6.5	15	4.7	27	5.9
55.	58	6.5	15	4.7	27	5.9
56.	62	6.4	38	6.4	0	- -
57.	85	4.7	11	4.1	4	2.6
58.	35	6.3	35	6.3	30	6.1
59.	88	4.3	8	3.6	4	2.6
60.	35	6.3	54	6.6	11	4.1

15

In order to determine the differentiating value of each of the sixty items, four comparisons were made as follows:

1. Extrovert response in the extrovert group with the extrovert response in the introvert group.
2. Introvert response in the introvert group with the introvert response in the extrovert group.
3. Ambivert response in the ambivert group with the ambivert response in the extrovert group.
4. Ambivert response in the ambivert group with the ambivert response in the introvert group.

In making extrovert response comparisons, one expects the percentage of difference to be in favor of the extrovert group, if the item is differentiating in the expected direction. In a like manner, this would be true for the other comparisons, a percentage of response difference in favor of the ambivert group when making ambivert comparisons, and in favor of the introvert group when making introvert comparisons. In addition to there being a difference in the expected direction, it must be large enough to be statistically reliable. Tables IV, V, VI, and VII present the results from these comparisons.

As these tables formed the basis for making the final selection of the test items, it may be well to make clear the meaning of the important concepts involved. Assuming that the errors of random sampling are distributed according to the normal

TABLE IV

EXTROVERT RESPONSES WITHIN EXTROVERT AND INTROVERT
GROUPS TOGETHER WITH THE DIFFERENCE,
P.E.diff., and D FOR THE
P.E.diff.
60 EXPERIMENTAL ITEMS ON THE TEST

Extrovert Responses					
Item No.	Extrovert Group %	Introvert Group %	Difference %	P.E. Diff.	<u>D</u> P.E.diff.
1 *	73	4	69	6.5	10.6
2 *	65	23	42	8.5	4.7
3 *	58	38	20	9.2	2.2
4 *	77	27	50	8.1	6.2
5	69	35	34	8.8	3.8
6 *	85	27	58	7.5	7.7
7	23	4	19	6.2	3.1
8 *	65	19	46	8.2	5.6
9 *	42	8	34	7.4	4.6
10 *	73	23	50	8.1	6.1
11 *	62	15	47	8.0	5.8
12	27	15	12	7.5	1.6
13	23	8	15	6.6	2.3
14	35	8	27	7.3	3.7
15 *	73	15	58	7.5	7.7
16	46	23	23	8.7	2.6
17	23	4	19	6.2	3.1
18 *	58	23	35	8.6	4.1
19 *	62	16	46	8.0	5.8
20	73	54	19	8.8	2.2
21 *	50	0	50	6.6	7.6
22	23	15	8	7.3	1.1
23 *	69	31	38	8.7	4.4
24	80	54	26	8.4	3.1
25 *	42	4	38	7.0	5.4
26 *	57	15	42	8.1	5.2
27	58	28	30	8.8	3.4
28	27	8	19	6.9	2.7
29 *	65	42	23	9.4	2.4
30 *	42	4	38	7.0	5.4
31	50	23	27	8.7	3.1
32	88	35	53	7.6	7.0
33	77	65	12	8.4	1.4
34	20	4	16	5.3	3.0
35 *	73	27	46	8.3	5.5

*Items selected for final form of test.

TABLE IV (Continued)

Extrovert Responses						
Item No.	Extrovert Group %	Introvert Group %	Difference %	P.E. Diff.	D P.E. Diff.	
36 *	77	35	42	8.4	5.0	
37 *	58	20	38	7.8	5.0	
38	12	4	8	5.6	1.4	
39 *	69	15	54	7.7	7.0	
40 *	20	0	20	5.2	3.8	
41	38	23	15	8.5	1.8	
42	35	12	23	7.7	3.0	
43 *	77	42	35	8.6	4.1	
44	23	4	19	6.2	3.1	
45	54	12	42	7.9	5.3	
46	12	8	4	5.6	.7	
47	46	23	23	8.7	2.6	
48 *	77	50	27	8.7	3.1	
49 *	54	12	42	7.9	5.3	
50	88	42	46	7.8	5.9	
51	35	8	27	7.3	3.7	
52 *	77	23	54	7.9	7.0	
53 *	65	8	57	7.3	7.8	
54 *	58	27	31	8.8	3.5	
55 *	65	27	38	8.0	4.7	
56 *	35	0	35	6.3	5.5	
57	23	4	19	6.2	3.1	
58	54	30	24	9.0	2.7	
59	8	4	4	4.5	10.9	
60	35	11	24	7.6	3.2	

*Items selected for final form of the test.

32	21	51	30	7.7	0.8	
33	12	51	39	7.1	1.0	
34	1	51	50	7.4	0.3	
35	1	51	50	7.7	0.7	
36	1	51	50	7.7	0.3	
37	12	51	39	7.5	1.0	
38	12	51	39	7.2	5.2	
39	1	51	50	7.5	2.6	
40	1	51	50	7.5	7.8	
41	8	51	43	7.6	0.8	
42	8	51	43	7.3	3.1	
43	2	51	49	6.3	1.2	
44	42	51	9	7.5	5.8	
45	8	42	34	7.5	4.5	

*Items selected for final form of the test.

TABLE V

INTROVERT RESPONSES WITHIN INTROVERT AND EXTROVERT
GROUPS TOGETHER WITH THE DIFFERENCE,
P.E.diff., and \bar{D} FOR THE
P.E.diff.

60 EXPERIMENTAL ITEMS ON THE TEST

Item No.	Introvert Responses		Differ- ence %	P.E. Diff.	\bar{D} P.E.diff.
	Extrovert Group %	Introvert Group %			
1 *	4	46	42	7.1	5.9
2 *	12	50	38	9.2	4.1
3 *	4	34	30	6.8	4.4
4 *	8	69	61	7.1	8.5
5 *	4	27	23	6.4	3.6
6 *	0	42	42	6.5	6.5
7 *	54	81	27	8.4	3.2
8 *	0	31	31	6.1	5.1
9 *	20	69	49	8.1	6.0
10 *	4	65	61	6.9	8.8
11 *	0	65	65	6.4	10.1
12 *	50	70	20	9.0	2.2
13 *	46	88	42	7.0	6.0
14 *	30	80	50	8.0	6.2
15 *	4	58	54	7.1	7.6
16 *	38	54	16	9.2	1.7
17 *	42	73	31	8.6	3.6
18 *	4	65	61	6.9	8.8
19 *	0	46	46	6.6	7.0
20 *	8	31	23	7.1	3.2
21 *	8	38	30	7.2	4.2
22 *	31	81	50	7.7	6.5
23 *	12	61	49	7.1	7.0
24 *	12	15	3	6.4	0.5
25 *	4	69	65	6.7	9.7
26 *	8	62	54	7.2	7.5
27 *	12	42	30	7.8	4.0
28 *	19	62	43	8.2	5.2
29 *	8	50	42	7.5	5.6
30 *	35	92	57	7.3	7.8
31 *	8	50	42	7.5	5.6
32 *	8	30	22	7.0	3.1
33 *	8	15	7	5.9	1.2
34 *	42	88	46	7.8	5.8
35 *	8	42	34	7.5	4.5

*Items selected for final form of the test.

TABLE V (Continued)

Item No.	Extrovert Group %	Introvert Responses		Differ- ence %	P.E. Diff.	D P.E.diff.
		Introvert Group %				
36 *	0	27		27	5.9	4.6
37 *	15	65		50	7.9	6.3
38	15	77		62	7.3	8.5
39 *	4	54		50	7.1	7.0
40 *	50	92		42	7.5	5.6
41	31	62		31	8.9	3.5
42	35	84		49	7.9	6.2
43 *	4	46		42	7.1	6.0
44	31	81		50	8.0	6.2
45	4	15		11	5.4	2.0
46	31	77		46	8.3	5.5
47	23	65		42	8.4	5.0
48	0	23		23	5.6	4.1
49 *	19	50		31	8.4	3.7
50	0	8		8	3.6	2.2
51	42	77		35	8.6	4.1
52 *	0	35		35	6.4	5.5
53 *	8	58		50	7.5	6.7
54 *	4	58		54	7.1	7.6
55 *	12	58		46	7.8	5.9
56 *	0	62		62	6.4	9.7
57	8	85		77	5.9	13.0
58	19	35		16	8.2	2.0
59	65	88		23	7.7	3.0
60	4	35		31	6.9	4.5

*Items selected for final form of the test.

TABLE VI

AMBIVERT RESPONSES WITHIN AMBIVERT AND EXTROVERT
 GROUPS TOGETHER WITH THE DIFFERENCE,
 P.E.diff., and $\frac{D}{P.E.diff.}$ FOR THE
 60 EXPERIMENTAL ITEMS OF THE TEST

Ambivert Responses					
Item No.	Extrovert Group %	Ambivert Group %	Difference %	P.E. Diff.	$\frac{D}{P.E.diff.}$
1 *	23	62	39	8.5	4.6
2 *	23	54	31	8.7	3.5
3 *	38	77	39	8.5	4.6
4 *	15	38	23	8.0	2.9
5	27	54	27	8.8	3.1
6 *	15	54	39	8.1	4.8
7	23	54	31	8.7	3.6
8 *	35	81	46	8.2	4.6
9 *	38	77	39	8.5	4.6
10 *	23	58	35	8.6	4.1
11 *	38	81	43	8.2	5.2
12	23	27	4	8.1	0.5
13	31	31	0	8.7	0.0
14	35	27	- 8	8.6	-0.9
15 *	23	77	54	7.9	6.8
16	16	38	22	8.6	2.6
17	35	46	11	9.2	1.2
18 *	38	50	12	9.2	1.3
19 *	38	77	39	8.5	4.6
20	19	54	35	8.4	4.2
21 *	42	84	42	8.1	5.2
22	46	31	-15	9.0	-1.6
23 *	19	61	42	8.3	5.1
24	8	50	42	7.5	5.6
25 *	54	96	42	7.1	6.0
26 *	35	77	42	8.4	5.0
27	30	54	24	9.0	2.6
28	54	58	4	9.3	0.4
29 *	27	54	27	8.8	3.1
30 *	23	38	15	8.5	1.8
31	42	65	23	9.1	2.5
32	4	50	46	7.1	6.5
33	15	27	12	7.5	1.6
34	38	62	24	9.0	2.7
35 *	19	38	19	8.2	2.3

*Items selected for final form of the test.

TABLE VI (Continued)

Ambivert Responses					
Item No.	Extrovert Group %	Ambivert Group %	Difference %	P.E. diff.	<u>D P.E. diff.</u>
36 *	23	65	42	8.4	5.0
37 *	27	65	38	8.6	4.4
38	73	50	-23	8.8	-2.6
39 *	27	77	50	8.1	6.2
40 *	30	65	35	8.7	4.0
41	31	38	7	8.9	0.8
42	30	50	20	9.0	2.2
43 *	19	50	31	8.4	3.7
44	46	38	-8	9.2	-0.9
45	42	85	43	8.1	5.3
46	57	62	5	9.2	0.5
47	31	50	19	9.0	2.1
48	23	54	31	8.7	3.5
49 *	27	77	50	8.1	6.2
50	12	65	53	7.7	7.0
51	23	42	19	8.6	2.2
52 *	23	88	65	7.1	9.1
53 *	27	77	50	8.1	6.2
54 *	38	65	27	9.0	3.0
55 *	23	58	35	8.6	4.1
56 *	65	85	20	7.9	2.6
57	69	77	8	7.9	1.0
58	27	69	42	8.5	5.0
59	27	38	11	8.7	1.3
60	61	77	16	8.6	1.9

*Items selected for final form of the test.

*Items selected for the final form of the test.

TABLE VII

AMBIVERT RESPONSES WITHIN AMBIVERT AND INTROVERT
GROUPS TOGETHER WITH THE DIFFERENCE,
P.E.diff., and D FOR THE
P.E.diff.
60 EXPERIMENTAL ITEMS OF THE TEST

Item No.	Ambivert Responses				
	Introvert Group %	Ambivert Group %	Differ- ence %	P.E. diff.	<u>D</u> P.E.diff.
1 *	42	62	20	9.1	2.2
2 *	27	54	27	8.8	3.1
3 *	28	77	49	8.1	6.0
4 *	4	38	34	6.9	4.9
5	38	54	16	9.2	1.7
6 *	31	54	23	9.0	2.5
7	4	54	50	7.1	7.0
8 *	50	81	31	8.4	3.7
9 *	23	77	54	7.9	6.8
10 *	12	58	46	7.8	5.9
11 *	20	81	61	7.4	8.2
12	15	27	12	7.5	1.6
13	4	31	27	6.7	4.0
14	12	27	15	7.3	2.1
15 *	27	77	50	8.1	6.2
16	23	38	15	8.5	1.8
17	23	46	23	8.7	2.6
18 *	12	50	38	7.9	4.8
19 *	38	77	39	8.5	4.6
20	15	54	39	8.1	4.7
21 *	62	84	22	8.0	2.8
22	4	31	27	6.7	4.0
23 *	8	61	53	7.4	10.4
24	31	50	19	9.0	2.1
25 *	27	96	69	6.4	10.8
26 *	23	77	54	7.9	6.8
27	30	54	24	9.0	2.6
28	30	58	28	8.9	3.2
29 *	8	54	46	7.5	6.1
30 *	4	38	34	6.9	4.9
31	27	65	38	8.6	4.4
32	35	50	15	9.1	1.6
33	20	27	7	7.9	0.9
34	8	62	54	7.4	7.3
35 *	31	38	7	8.8	0.8

*Items selected for the final form of the test.

TABLE VII (Continued)

Ambivert Responses					
Item No.	Extrovert Group %	Introvert Group %	Difference %	P.E. Diff.	D P.E. diff.
36 *	38	65	27	9.0	3.0
37 *	15	65	50	7.9	6.3
38	15	50	35	8.1	4.3
39 *	31	77	46	8.3	5.5
40 *	8	65	57	7.3	7.8
41	15	38	23	8.0	2.8
42	4	50	46	7.1	6.5
43 *	12	50	38	7.9	4.8
44	15	38	23	8.0	2.8
45	73	85	12	7.5	1.6
46	15	62	47	7.9	6.0
47	12	50	38	7.9	4.8
48	27	54	27	8.8	3.1
49 *	38	77	39	8.5	4.6
50	50	65	15	9.2	1.6
51	15	42	27	8.1	3.3
52 *	42	88	46	7.8	5.9
53 *	34	77	43	8.4	5.1
54 *	15	65	50	8.0	6.2
55 *	15	58	43	8.1	5.3
56 *	38	85	47	8.0	5.9
57	11	77	66	7.0	9.3
58	35	69	34	8.8	4.0
59	8	38	30	7.3	4.1
60	54	77	23	8.7	2.6

*Items selected for the final form of the test.

curve, and using tables of the probability integral such as Sheppard⁶⁸ has prepared, it is possible to determine the probability of occurrence of a deviation as great or greater than the assigned deviation. Tables to facilitate this work have been prepared by Pearl and Miner,⁶⁹ in which probabilities are expressed in per cent. Perhaps an example will make the use of this table more clear. Referring to Table IV, item 4, 77 per cent of the extrovert group and 27 per cent of the introvert group responded extrovertively. The difference between these two percentages is 50 with a probable error of difference* of 8.1 per cent. When dividing this difference by the probable error of difference a quotient of 6.2 results. Referring to the probabilities table (See Appendix) just discussed, it will be noted that such a quotient of 6.2 means that such a difference by chance alone would occur but .0052 times in 100 trials; or the odds in favor of the difference being reliable are 19,230 to 1.

68. Sheppard, W. F. Tables of the Probability Integral. Biometrika, v. II, pp. 174-190. (Also see Kelley, Truman, L. Statistical Method, p. 103, Published by Macmillan Co. 1924, New York).

69. Pearl, Raymond and Miner, John Rice. A Table for Estimating the Probable Significance of Statistical Constants. Papers from the Biological Laboratory of the Maine Agriculture Experiment Station No. 63.

*Edgerton and Paterson (67) give the formula for the probable error of the difference as:

$$PE. \text{ diff.} = \sqrt{P.E.^2_{p_1} + P.E.^2_{p_2}}$$

In selecting the items for the final form of the test, no item whose difference divided by the probable error of difference ($\frac{D}{P.E. \text{ diff.}}$) was below 3.5 when comparing introvert responses with extrovert responses or extrovert with introvert, or below 2.5 when comparing introvert responses with ambivert or extrovert with ambivert was included in the test.* This criterion was held to on all four counts in the majority of the cases or at least three counts with the fourth only slightly below but always in the expected direction. It will be noted that some items were differentiating between two or even three points, but failed to differentiate on all four. Such an item was not included in the final form.

Scoring the Test. Since many of the items revealed greater differentiating properties than others, it was thought wise to prepare a weighting system for the thirty items selected for the test. The basis for this weighting system was the amount of $\frac{D}{P.E. \text{ diff.}}$. In Table VIII appear the weighted values which were assigned each test item. For example: referring to Table IV, the $\frac{D}{P.E. \text{ diff.}}$ for item 4 is 6.2. Referring to Table VIII under

*With a deviation/P.E. of 2.5, the probable occurrence of such a difference as great or greater in 100 trials due to chance alone is 9.18 or the odds are 9.89 to 1 in favor of a significant difference. With the quotient increased to 3.5, chance is reduced to 1.82 in 100 trials with odds increased to 53.95 to 1. See Appendix for complete table.

TABLE VIII

DERIVATION OF WEIGHTED SCORES ASSIGNED TO ITEMS OF THE
PSYCHOLOGICAL INTERVIEW TEST FORM A

Scoring Scale								
0	1	2	3	4	5	6	7	8
Extrovert Response								
$\frac{D}{P.E.}$ 10.0	$\frac{D}{P.E.}$ 7.0	$\frac{D}{P.E.}$ 5.0	$\frac{D}{P.E.}$ 4.0	$\frac{D}{P.E.}$ 3.0				
8.5 -	8.4 - 6.0	5.9 - 4.5	4.4 - 3.5	3.4 - 2.5				
Introvert Response								
		$\frac{D}{P.E.}$ 3.0	$\frac{D}{P.E.}$ 4.0	$\frac{D}{P.E.}$ 5.0	$\frac{D}{P.E.}$ 4.0	$\frac{D}{P.E.}$ 5.0	$\frac{D}{P.E.}$ 7.0	$\frac{D}{P.E.}$ 10.0
		2.5 - 3.4	3.5 - 4.4	4.5 - 5.9	6.0 - 8.4	8.5 -		
Ambivert Response								
$\frac{D}{P.E.}$ 1.0	$\frac{D}{P.E.}$ 2.0	$\frac{D}{P.E.}$ 1.5	$\frac{D}{P.E.}$ 2.5	$\frac{D}{P.E.}$ 3.0	$\frac{D}{P.E.}$ 2.4	$\frac{D}{P.E.}$ 1.4		
0.5 - 1.4	1.5 - 2.4	2.5 - 2.5 or above	2.4 - 1.5	1.4 - 0.5				

extrovert responses, one finds that a $\frac{D}{P.E. \text{ diff.}}$ between 6.0 and 8.4 receives a score of 1, so if an individual responds extrovertively to item 4, he receives a score of 1 on that item. The $\frac{D}{P.E. \text{ diff.}}$ for the same item when the response is introverted is 8.5 (Table V). Table VIII under introvert responses reveals that a $\frac{D}{P.E. \text{ diff.}}$ of 8.5 or above receives a score of 8 on that item. The ambivert score on this item is 4 because the $\frac{D}{P.E. \text{ diff.}}$ for the ambivert response is in this case above 2.5.

The effect of this weighting is shown in Table IX.

It is apparent that this weighting has increased the validity of the test approximately fifteen per cent in terms of error of prediction ⁷⁰ when considering thirty items only. The weighted scores for thirty items are producing practically the same results as the unweighted scores for sixty items.

Reliability of the Test. Two methods of self-correlation were used to determine the reliability of the test; correlation of odd and even items and the repetition of the test four weeks later. This also included two entirely different

70. McCall, William A. How to Measure In Education, p. 394. Published by Macmillan Company, 1922, New York.

TABLE IX

71

COEFFICIENTS SHOWING THE EFFECT OF WEIGHTING SCORES

	N	r	P.E.
1. "Criterion" score and self unweighted score for 30 items.....	107	.768	.027
2. "Criterion" score and self weighted score for thirty items.....	107	.883	.014
3. "Criterion" score and self-unweighted score for sixty items.....	107	.881	.014
4. Unweighted self score for sixty items and weighted score for thirty items...	107	.850	.018

71. All coefficients of correlation in this study were calculated with the use of the Otis Correlation Chart, published by the World Book Co. New York, 1922. The coefficient by this chart is exactly the same to any number of decimal places as if calculated by the Pearson's "product moment formula." The formula is as follows:

$$r = \frac{(\sum X^2 + \sum Y^2 - \sum V^2) - 2 \sum X \sum Y \div N}{2 \sqrt{(\sum X^2 - (\sum X)^2 \div N) (\sum Y^2 - (\sum Y)^2 \div N)}}$$

in which V = Y-X and X, Y, and V are measured from arbitrary zero points.

(See Otis, William L. *How to Measure in Education*, pp. 387, 388. Harcourt Company, New York, 1928).

groups, the odd and even reliability coefficient being computed from the experimental group and the repetition reliability coefficient being computed from a group in the Lincoln School, Milwaukee, Wisconsin. On the basis of the coefficient of reliability between odd and even scores, the reliability of the entire test was predicted by the Spearman's prophecy formula.⁷²

TABLE X

RELIABILITY COEFFICIENTS FOR THE PSYCHOLOGICAL INTERVIEW TEST

	N	r	P.E.
1. Odd and Even Scores	107	.728	.031
Predicted for Entire Test		.842	.019
2. Repetition After Four Week Interval	31	.871	.028

Validity of the Test. Several measures of validity were applied to the test and will be reported at this point. It will be remembered that the "criterion" score which was considered the nearest approximation to an accurate placement on the introversion-extroversion scale was composed of eight associate ratings and one self-rating, each having a weight of

72. The Spearman's prophecy formula is:

$$r_x = \frac{N r}{1 + (N-1) r}$$

(See McCall, William A. How to Measure In Education, pp. 397. Macmillan Company, New York, 1922).

fifty per cent. The relationship between this score and the weighted individual score on the final form might be called one measure of validity. Another measure, one which would avoid the spurious results due to having a part of the self-rating in both variables, would be the relationship between the eight associate ratings and the final weighted individual score. Still a third measure would be the relationship between the final weighted individual scores and teacher's ratings.* The first two measures of validity are based on the results obtained from the experimental group; the third is based on an entirely different group of pupils. It was not possible to obtain several ratings by teachers for each pupil, so the thirty-one teachers who participated in this part of the experiment were instructed to rate only those pupils in their room whom they knew well. It was felt that one good rating would be better than several rather hurried ratings of pupils whom the teacher did not know especially well. The total enrollment of the group in question was 915 and were composed of junior high school pupils in the Ann Arbor school system. Thirty-three advisory teachers have charge of this group or an average of 27.7 for each teacher (only thirty-one teachers were asked to rate as the other two were in charge of a part of the experimental group). Each of the thirty-one teachers rated an average of 4.5 pupils with a range of 0 to 11. That is, some of them felt that they

*Reliability coefficient for teacher-ratings is:

*See Appendix for copy of teachers' rating blank used in this study.

did not know any of the pupils well enough to rate them, the average knew about five well enough and some knew as many as eleven.

Table XI presents validity coefficients for the above measures.

TABLE XI

VALIDITY COEFFICIENTS FOR THE PSYCHOLOGICAL INTERVIEW TEST

	N	r	P.E.
1. "Criterion" Score and Individual Score.....	107	.883	.014
2. Associates' Score and Individual Score.....	107	.688	.034
Corrected*for Attenuation ⁷³.....		.865	.019
3. Teacher-Rating and Individual Score	139	.652	.032
Corrected**for Attenuation.....		.763	.024

Standardization of the Test. Form A of the Psychological Interview Test for introvert-extrovert tendencies has been administered to 1877 junior and senior high school pupils. As only slight age and grade differences were found for boys, but one table has been prepared for them. Table XII gives

73. The formula for correcting for attenuation is:

$$r_{xy} = \frac{r_{xy}}{\sqrt{r_{xx} r_{yy}}}$$

(See Otis, Arthur S. Statistical Method in Educational Measurement. p. 229. World Book Company, New York, 1925).

*Reliability coefficient for associate ratings is:

$$r = .751 \quad \text{P.E.} \quad .028$$

**Reliability coefficient for teacher-ratings is:

$$r = .865 \quad \text{P.E.} \quad .015$$

b
f
H
II

the percentile rank, median, mean, standard deviation, and probable error of the mean for 963 boys and 914 girls whose ages ranged from 11 to 18. Norms for the girls are given on the basis of two year age periods. Sex differences have been considered in a later chapter, so it will suffice at this point to call attention to the fact that they exist and are plainly evident when considering either central tendencies or measures of variability.

M
d
A
c

TABLE XII

PERCENTILE RANK, CENTRAL TENDENCIES, VARIABILITY FOR BOYS AND GIRLS AGES 11 TO 18

Score	Boys		Girls		Girls		Girls		Girls	
	11 Freq.	18 P.R.	11 Freq.	12 P.R.	13 Freq.	14 P.R.	15 Freq.	16 P.R.	17 Freq.	18 P.R.
160										
155	2	100							1	100
150	3	99							2	99
145	14	99							4	98
140	32	98							3	95
135	35	94							5	92
130	75	91							13	88
125	98	83							20	78
120	142	73							22	62
115	130	58							23	44
110	148	44							23	26
105	136	29							11	17
100	81	15							9	9
95	36	7							8	4
90	18	3							1	
85	9	1								
80	3	.4								
75	1	.1								
N	963		104		345		340		125	
Median	116.90		116.19		117.07		120.00		121.75	
Mean	117.41		115.96		115.82		119.23		122.16	
S.D.	12.81		11.27		11.62		12.33		12.77	
P.E.mean	.28		.74		.41		.45		.77	

CHAPTER VI

AGE AND INTROVERSION-EXTROVERSION TENDENCIES IN JUNIOR AND SENIOR HIGH SCHOOL PUPILS

The effect of age on introversion has not been investigated very extensively. Schwegler⁷⁴ in studying the age differences of 206 high school pupils, concludes "that within the limits of the ages considered (12-19), introversion-extroversion, in so far as it exists at all, exists quite without reference to chronological age". Whitman⁷⁵ found reliable age differences between college and middle-aged men and women.

The present age study resulted from administering the author's Psychological Interview Test for Introversion and Extroversion to 964 junior and senior high school pupils in the Lincoln School, Milwaukee, Wisconsin.

The results have been analyzed in several ways as follows:

1. By grades in which there is considerable overlapping of age, but a gradual increase.
2. By ages regardless of grade which includes overlapping of grades, but a gradual increase towards the twelfth.

74. Schwegler, Raymond Alfred.- A Study of Introvert-Extrovert Responses to Certain Test Situations. Chap. III, pp. 28-32. Teachers College Contributions to Education No. 361, Bureau of Publication, Columbia University, New York. 1929.

75. Whitman, Roswell H. - Sex and Age Differences in Introversion-Extroversion. Journal of Abnormal Psychology. 1929, v. XXIV, pp. 207f.

3. By grade at age which includes only the normal progressing groups.
4. By grade with pupils one year retarded, which includes only those who are for various reasons moving more slowly than the average.
5. By grade with pupils one year accelerated which included only those who are advancing more rapidly than the average.

Comparison by Grades. Table XIII presents measures of central tendency, variability, and probable error of mean scores for Grades VII to XII regardless of age distributions. A study of Table XIV reveals few statistically reliable differences between any two grades. The largest difference is between Grades X and XI where the odds are 8.48 to 1 in favor of a significant difference. When comparing three grades, the largest difference occurs between Grades IX and XI; and for four grades, between Grades VIII and XI. All the comparisons between five and six grades yield reliable differences with odds from 11.58 to 1 at the worst and at their best from 44.87 to 1 in favor of significant differences. This of course indicates that the higher grades are scoring more introvertedly than the lower - introversion increasing with grade increases.

TABLE XIII

A COMPARISON OF MEAN INTROVERT-EXTROVERT TENDENCIES
OF PUPILS IN GRADES VII TO XII

N=964

Grade	VII	VIII	IX	X	XI	XII
Mean	116.56	116.95	117.95	118.28	120.43	119.81
S. D.	12.34	10.84	12.88	11.01	11.34	12.13
P.E. mean	1.07	.52	.56	.59	.66	.66

TABLE XIV

INTERPRETATION OF MEAN GRADE DIFFERENCES IN
INTROVERSION-EXTROVERSION IN TERMS OF PROBABILITY OF
OCCURRENCE

N=964

Grades Compared	Difference in Mean Scores	P.E. Diff.	$\frac{D}{P.E.}$ Diff.	Percentage of Probable Occurrence by Chance	Odds in favor of Difference
XI-XII	-.62	.93	-.67	above 50	less than 1 to 1
X-XI	2.15	.88	2.44	10.55	8.48 to 1
X-XII	1.53	.88	1.74	25.15	2.98 to 1
IX-X	.33	.81	.41	above 50	less than 1 to 1
IX-XI	2.48	.87	2.85	5.90	15.95 to 1
IX-XII	1.86	.87	2.14	15.67	5.38 to 1
VIII-IX	1.00	.76	1.31	38.06	1.63 to 1
VIII-X	1.33	.79	1.68	25.15	2.98 to 1
VIII-XI	3.48	.84	4.14	.569	174.75 to 1
VIII-XII	2.86	.84	3.40	2.18	44.87 to 1
VII-VIII	.39	1.19	.33	above 50	less than 1 to 1
VII-IX	1.39	1.20	1.16	41.83	1.39 to 1
VII-X	1.72	1.22	1.41	34.50	1.90 to 1
VII-XI	3.87	1.26	3.07	3.65	26.40 to 1
VII-XII	3.25	1.26	2.58	7.95	11.58 to 1

Comparison by Ages. Table XV presents measures of central tendency, variability, and probable error of the mean scores for ages 13 to 18 regardless of grade. As was the case with grade comparisons, few statistically reliable differences are found between any two consecutive ages. (See Table XVI) These differences are, however, in the expected direction and increase gradually until differences of four years or more between the ages of 13 to 18 yield odds from 7.28 to 1 to 142.26 to 1 in favor of a significant difference. With chance reduced to .698 in 100 trials as revealed by a $\frac{D}{P.E.}$ diff. of 4.0 when comparing ages 13 and 18, one may well conclude that the older pupils in this group are more introverted on the average than the younger ones.

TABLE XV

A COMPARISON OF MEAN INTROVERT-EXTROVERT TENDENCIES
IN PUPILS WITH AGES FROM 13 TO 18

N=964

Age	13	14	15	16	17	18
Mean.....	115.94	117.51	118.12	118.44	119.94	121.05
S. D.	11.87	12.25	11.22	11.94	12.28	13.18
P. E. mean	.83	.63	.50	.68	.68	.98

TABLE XVI

INTERPRETATION OF MEAN AGE DIFFERENCES IN
INTROVERSION-EXTROVERSION IN TERMS OF PROBABILITY OF OCCURRENCE

N=964

Ages Compared	Difference in Mean Scores	P.E. Diff.	$\frac{D}{P.E.}$ Diff.	Percentage of Probable Occurrence by Chance	Odds in Favor of Difference
17-18	1.11	1.19	.93	(above 50)	(less than 1 to 1)
16-17	1.50	.97	1.55	28.05	2.57 to 1
16-18	2.61	1.19	2.19	13.78	6.26 to 1
15-16	.32	.84	.38	(above 50)	(less than 1 to 1)
15-17	1.82	.84	2.16	15.67	5.38 to 1
15-18	2.93	1.10	2.66	6.86	13.58 to 1
14-15	.61	.81	.75	(above 50)	(less than 1 to 1)
14-16	.93	.93	1.00	50.00	1.00 to 1
14-17	2.43	.93	2.61	7.95	11.58 to 1
14-18	3.54	1.17	3.03	4.30	22.26 to 1
13-14	1.57	1.04	1.51	31.17	2.21 to 1
13-15	2.18	.97	2.25	13.78	6.26 to 1
13-16	2.50	1.07	2.34	12.08	7.28 to 1
13-17	4.00	1.07	3.74	1.26	78.37 to 1
13-18	5.11	1.28	4.00	.698	142.26 to 1

Comparison by Grade at Age. From Table XVII, approximately the same situation is found as in Table XIX which gives the comparison by ages.

TABLE XVII

A COMPARISON OF MEAN INTROVERT-EXTROVERT TENDENCIES
OF PUPILS IN GRADES VII TO XII
AT AGE

N=380

Grade-Age	VII-13	VIII-14	IX-15	X-16	XI-17	XII-18
Mean	115.95	117.12	118.41	119.71	120.98	120.95
S. D.	12.29	10.95	12.12	11.14	11.92	13.78
P.E. mean	1.69	.85	.82	.90	1.10	1.23

However, Table XVIII should again prove interesting in interpreting these grade at age differences. The most reliable difference is noted between Grades VIII and XI.

TABLE XVIII

INTERPRETATION OF MEAN GRADE-AT-AGE DIFFERENCES IN
INTROVERSION-EXTROVERSION IN TERMS OF PROBABILITY OF OCCURRENCE

N=380

Grade- At Age Compared	Difference in Mean Scores	P.E. Diff.	$\frac{D}{P.E.}$ Diff.	Percentage of Probable Occur- rence By Chance	Odds in Favor of Difference
XI-XII	-.03	1.65	-.02	(above 50)	(less than 1 to 1)
X-XI	1.27	1.42	.90	(above 50)	(less than 1 to 1)
X-XII	1.24	1.52	.81	(above 50)	(less than 1 to 1)
IX-X	1.30	1.21	1.07	45.81	1.18 to 1
IX-XI	2.57	1.37	1.88	20.00	4.00 to 1
IX-XII	2.54	1.48	1.71	25.15	2.98 to 1
VIII-IX	1.29	1.18	1.09	45.81	1.18 to 1
VIII-X	2.59	1.24	2.08	15.67	5.38 to 1
VIII-XI	3.86	1.39	2.78	5.90	15.95 to 1
VIII-XII	3.83	1.49	2.57	7.95	11.58 to 1
VII-VIII	1.17	1.89	.62	(above 50)	(less than 1 to 1)
VII-IX	2.46	1.88	1.31	38.06	1.63 to 1
VII-X	3.76	1.91	1.96	17.73	4.64 to 1
VII-XI	5.03	2.02	2.49	9.18	9.89 to 1
VII-XII	5.00	2.09	2.39	10.55	8.48 to 1

Comparison by Grade With Pupils One Year Retarded. When tabulating the results for 219 pupils who were one year retarded for their grade, two distinct groups appear. Table XIX presents these results.

TABLE XIX

A COMPARISON OF MEAN INTROVERT-EXTROVERT TENDENCIES OF PUPILS IN GRADES VII TO XII, ONE YEAR RETARDED FOR THEIR GRADE

N=219

Grade-Age	VII-14	VIII-15	IX-16	X-17	XI-18	XII-19
Mean	121.17	120.12	116.73	116.64	116.25	114.51
S. D.	13.11	9.95	12.41	9.09	7.81	10.30
P.E. mean	1.80	.90	1.12	1.16	1.00	1.34

The most interesting fact brought out by this analysis is the difference between the mean scores of Grades VIII and IX. This difference (see Table XX) of 3.39 could occur only 10.55 times in 100 trials due to chance alone or the odds are 8.48 to 1 that the ninth grade group who are one year retarded for their grade are more extroverted than the eighth grade group. In the normal progressing group, a gradual increase toward introversion was noted. With the retarded group, the reverse is true with a sudden decrease between the eighth and ninth grades. Apparently those out of adjustment in the seventh and eighth grades tend towards introversion, while those out of adjustment in the remaining grades, tend toward extroversion. (See Table XXI)

TABLE XX

A COMPARISON OF MEAN INTROVERT-EXTROVERT TENDENCIES
OF PUPILS IN GRADE VIII WITH GRADE IX,
ONE YEAR RETARDED FOR THEIR GRADE

	Grade VIII	Grade IX
Mean.....	120.12	116.73
S.D......	9.95	12.41
P.E.mean.....	.90	1.12
Difference between mean scores.....	3.39	
P.E.diff.....	1.43	
D/P.E.diff.....	2.37	
Percentage of probable occurrence by chance.....	10.55	
Odds in favor of difference.....	8.48 to 1	

TABLE XXI

A COMPARISON OF MEAN INTROVERT-EXTROVERT TENDENCIES
OF PUPILS IN GRADE VII WITH GRADE XII,
ONE YEAR RETARDED FOR THEIR GRADE

	Grade VII	Grade XII
Mean.....	121.17	114.51
S.D.....	13.11	10.30
P.E.mean.....	1.80	1.34
Difference between mean scores.....	6.66	
P.E.diff.....	2.24	
D/P.E.diff.....	2.97	
Percentage of probable occurrence by chance	4.30	
Odds in favor of difference.....	22.26 to 1	

It is also apparent that the seventh and eighth grade pupils who are one year retarded are more introverted than the normal group, while those in Grades IX, X, XI, and XII are more extroverted. This fact is revealed better in Tables XXII and XXIII and pictured clearly in Figure 2.

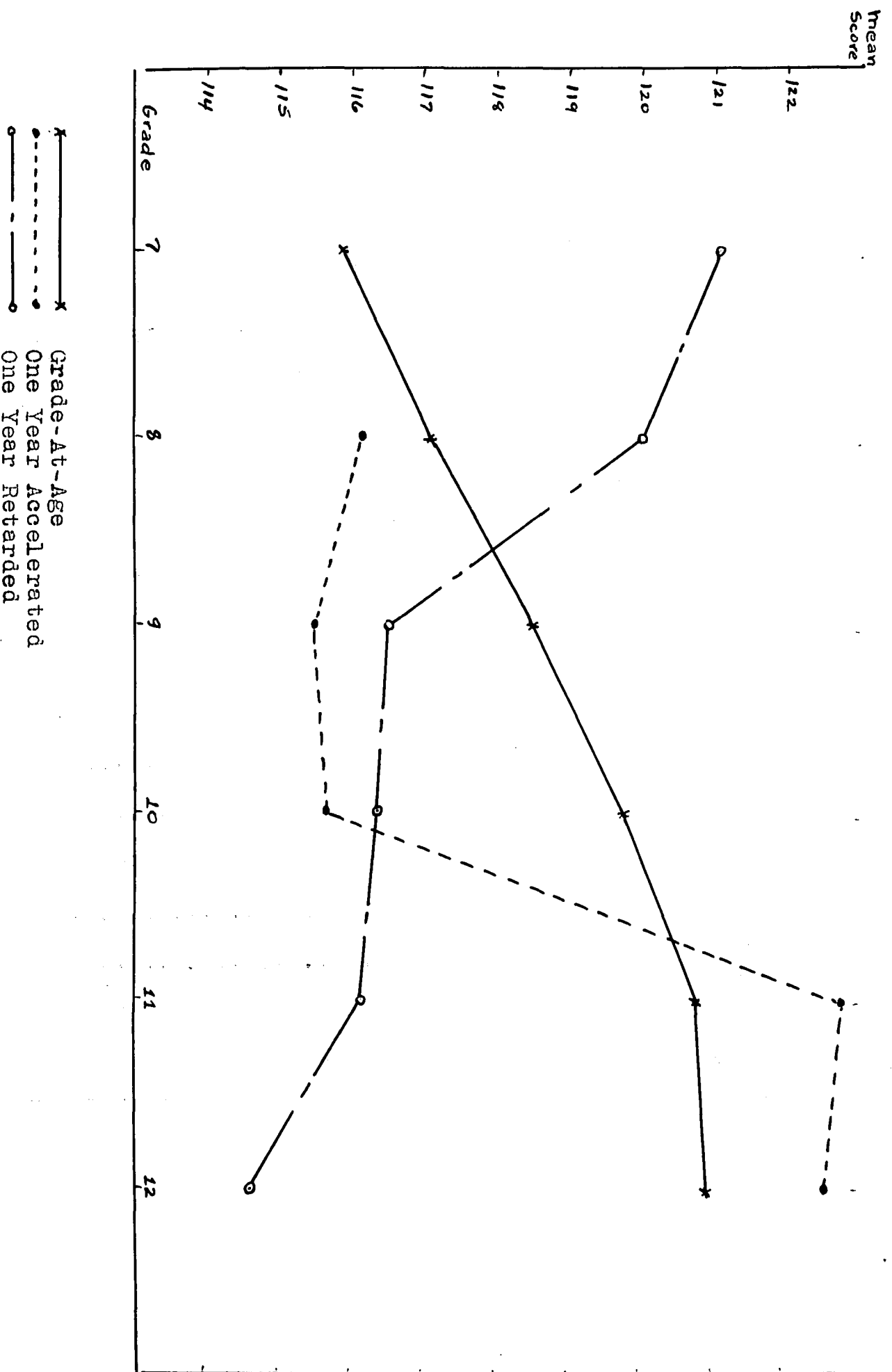


Figure 2. Comparison of Mean Introvert-Extrovert Tendencies of Groups in Grade-at-Age, One Year Retarded, and One Year Accelerated.

TABLE XXII

A COMPARISON OF MEAN INTROVERT-EXTROVERT TENDENCIES OF PUPILS IN GRADES VII AND VIII AT AGE WITH THOSE IN THE SAME GRADE, ONE YEAR RETARDED FOR THEIR GRADE

N=180

	Grades VII and VIII At Age	Grades VII and VIII One Year Retarded
Mean.....	116.50	120.64
S.D.....	11.62	11.53
P.E.mean.....	.78	.87
Difference between mean scores.....		4.14
P.E.diff.....		1.17
D/P.E.diff.....		3.45
Percentage of probable occurrence by chance		2.18
Odds in favor of difference.....		44.87 to 1

TABLE XXIII

A COMPARISON OF MEAN INTROVERT-EXTROVERT TENDENCIES
OF PUPILS IN GRADES IX, X, XI, and XII AT AGE WITH THOSE
IN THE SAME GRADE, ONE YEAR RETARDED

N=419

	Grade At Age	One Year Retarded
Mean.....	120.00	116.00
S.D.....	12.24	12.40
P.E.mean.....	.49	.71
Difference between mean scores.....	4.00	
P.E.diff.....	.86	
D/P.E.diff.....	4.65	
Percentage of probable occurrence by chance	.192	
Odds in favor of difference.....	519.83 to 1	

It will be shown later that those in the eleventh and twelfth grades who are one year accelerated are decidedly more introverted on the average than those of the eighth, ninth, and tenth grades. This is quite in contrast to the retarded group. Tables XXIV and XXV, also Figure 2, bring out these differences clearly.

TABLE XXIV

A COMPARISON OF MEAN INTROVERT-EXTROVERT TENDENCIES
OF PUPILS IN GRADE VIII, ONE YEAR ACCELERATED
WITH THOSE ONE YEAR RETARDED

N=116

	One Year Accelerated	One Year Retarded
Mean.....	116.16	120.12
S.D.....	11.66	9.95
P.E.mean.....	1.01	.90
Difference between mean scores.....	3.96	
P.E.diff.....	1.55	
D/P.E.diff.....	2.93	
Percentage of probable occurrence by chance	5.05	
Odds in favor of difference.....	18.80 to 1	

TABLE XXV

A COMPARISON OF MEAN INTROVERT-EXTROVERT TENDENCIES
 OF PUPILS IN GRADES XI AND XII, ONE YEAR ACCELERATED
 WITH THOSE ONE YEAR RETARDED

N=151

	One Year Accelerated	One Year Retarded
Mean.....	122.71	115.38
S.D.....	12.56	9.05
P.E.mean.....	.86	.82
Difference between mean scores.....		7.33
P.E.diff.....		1.19
D/P.E.diff.....		6.16
Probable chance occurrence in 100 trials.		.0052
Odds in favor of difference.....		19,230.00 to 1

Comparison by Grade with Pupils One Year Accelerated. The results presented in Table XXVI reveal somewhat of a contrast with those of the retarded pupils. There is growth from extroversion to introversion as was the case with the normal group, but this curve of growth rises abruptly between Grades X and XI. As will be seen in Tables XXVII and XXVIII, there is a statistically reliable difference with odds of 95 to 1 when comparing the eighth grade with the twelfth and 1052 to 1 when comparing the tenth and eleventh grades.

TABLE XXVI

A COMPARISON OF MEAN INTROVERT-EXTROVERT TENDENCIES
OF PUPILS IN GRADES VIII TO XII, ONE YEAR ACCELERATED
FOR THEIR GRADE

N= 274

Grade-Age	VIII-13	IX-14	X-15	XI-16	XII-17
Mean.....	116.16	115.54	115.49	122.97	122.45
S.D.....	11.66	12.73	10.79	10.97	14.15
P.E.mean.....	1.01	1.06	1.00	1.15	1.29

TABLE XXVII

A COMPARISON OF MEAN INTROVERT-EXTROVERT TENDENCIES
OF PUPILS IN GRADE VIII WITH GRADE XII, ONE YEAR ACCELERATED

	Grade VIII	Grade XII
Mean.....	116.16	122.45
S.D.....	11.66	14.15
P.E.mean.....	1.01	1.29
Difference between mean scores.....	6.29	
P.E.diff.....	1.64	
D/P.E.diff.....	3.83	
Percentage of probable occurrence by chance	1.04	
Odds in favor of difference.....	95.15 to 1	

TABLE XXVIII

A COMPARISON OF MEAN INTROVERT-EXTROVERT TENDENCIES OF PUPILS IN GRADE X WITH GRADE XI, ONE YEAR ACCELERATED

	Grade X	Grade XI
Mean.....	115.49	122.97
S.D.....	10.79	10.97
P.E.mean.....	1.00	1.15
Difference between mean scores.....		7.48
P.E.diff.....		1.52
D/P.E.diff.....		4.92
Percentage of probable occurrence by chance		.095
Odds in favor of difference.....		1051.63 to 1

SUMMARY OF THE STUDY OF AGE DIFFERENCES

1. The results of this study of age differences in 964 junior and senior high school pupils from the Lincoln School, Milwaukee, Wisconsin, shows that there is a gradual increase towards introversion on the basis of grade, age and grade-at-age.
2. The introversion-extroversion differences between two grades or two ages are not large enough to be statistically reliable, but these differences between three or more grades or ages are statistically reliable and increase in reliability with increase between grades or ages.
3. The one year retarded group reveals a situation quite unique as compared to age, grade, and grade-at-age groups. Those in the seventh and eighth grade tend toward introversion; a drop occurs at the ninth grade level and from there to the twelfth, the tendency is definitely towards extroversion.
4. The one year accelerated group shows an increase from extroverted tendencies to introverted tendencies, but not a gradual increase. A definite rise between the tenth and eleventh grade levels is revealed in the results.
5. Within the limits of ages 12 to 19 statistically reliable age differences exist.

CHAPTER VII

SEX AND INTROVERSION-EXTROVERSION TENDENCIES IN JUNIOR AND SENIOR HIGH SCHOOL PUPILS

Studies of sex differences in relation to introversion-
extroversion have been equivocal. Heidbreder⁷⁶ and Whitman⁷⁷
found no sex differences, while Marston,⁷⁸ Conklin,⁷⁹ and Laird⁸⁰
have found women to be more introverted than men on the basis of
statistically reliable differences.

A study of 964 junior and senior high school pupils
from the Lincoln School, Milwaukee, Wisconsin discovers sub-
stantial sex differences. These results have been analyzed as
follows:

1. By grade regardless of age.
2. By age regardless of grade.
3. By grade at age.
4. By grade with pupils one year retarded.
5. By grade with pupils one year accelerated.

76. Heidbreder, Edna - Introversion and Extroversion in Men and Women. Journal of Abnormal Psychology, 1927, v. XXII, pp. 52-61.

77. Whitman, Roswell H. - Sex and Age Differences in Introversion-Extroversion. Journal of Abnormal Psychology, 1929, v. XXIV, pp. 207.

78. Marston, Leslie R. - The Emotions of Young Children. An Experimental Study in Introversion and Extroversion. Iowa City, University of Iowa Studies in Child Welfare, v. III No. 3.

79. Conklin, Edmund S. - Determination of Normal Extrovert-Introvert Interest Differences. Pedagogical Seminary, 1927, v. XXXIV, pp. 28-37.

80. Laird, Donald A. - How Personalities Are Found in Industry. Industrial Psychology, 1926, v. 1, pp. 1-9.

Sex differences by grade. Central tendencies, a measure of the variabilities, and probable errors of the mean scores for 512 boys and 452 girls are presented in Table XXIX. It will be noticed that the boys' mean scores remain approximately the same while the girls' mean scores gradually advance towards introversion. A careful study of Table XXX shows that the chances are 1.63 to 1 that the girls are more extroverted than the boys in Grades VII and VIII and 116.23 to 1 that they are more introverted than the boys in Grades XI and XII, being about the same in Grades IX and X.

TABLE XXIX

A COMPARISON OF INTROVERT-EXTROVERT TENDENCIES OF BOYS AND GIRLS IN GRADES VII TO XII

N=512 Boys		N=452 Girls		
Grades	Sex	Mean	S.D.	P.E.mean
VII-VIII	Boys	117.31	12.27	.69
	Girls	115.99	11.35	.70
IX-X	Boys	117.73	11.83	.55
	Girls	118.45	12.06	.57
XI-XII	Boys	118.45	11.48	.62
	Girls	122.07	11.98	.70

TABLE XXX

INTERPRETATION OF MEAN SEX DIFFERENCES* BY GRADES
IN INTROVERSION-EXTROVERSION IN TERMS OF PROBABILITY
OF OCCURRENCE

N=964

Grades Compared	Difference in Mean Scores Extrovert-Introvert	P.E. diff.	$\frac{D}{P.E.}$ diff.	Percentage of Probable Occurrence By Chance	Odds in Favor of Difference
VII-VIII	1.32	.98	1.35	38.06	1.63 to 1
IX-X	.72	.79	.91	(above 50)	{less than 1 to 1}
XI-XII	3.62	.93	3.89	.853	116.23 to 1

*Girls are compared with boys, not boys with girls.

Sex differences by ages. Results similar to those found for grades are shown in Tables XXXI and XXXII for ages regardless of grade. Girls 13 and 14 years of age tend to be more extroverted than boys of that age, while girls 17 and 18 are more introverted with those of 15 and 16 approximately the same.

TABLE XXXI

A COMPARISON OF INTROVERT-EXTROVERT TENDENCIES OF BOYS AND GIRLS FROM THIRTEEN TO EIGHTEEN YEARS OF AGE

N=478 Boys		N=450 girls		
Ages	Sex	Mean	S.D.	P.E.mean
13-14	Boys	117.49	12.61	.73
	Girls	115.95	11.37	.68
15-16	Boys	118.08	11.80	.54
	Girls	118.48	11.54	.53
17-18	Boys	118.57	12.65	.76
	Girls	122.42	13.22	.86

TABLE XXXII

INTERPRETATION OF MEAN SEX DIFFERENCES* BY AGES
IN INTROVERSION-EXTROVERSION IN TERMS OF PROBABILITY OF OCCURRENCE

N=928

Ages Compared	Difference in Mean Scores Extrovert-Introvert	P.E. diff.	$\frac{D}{P.E.}$ diff.	Percentage of Probable Occurrence By Chance	Odds in Favor of Difference
13-14	1.54	.99	1.55	28.05	2.57 to 1
15-16	.40	.75	.53	(above 50)	(less than 1 to 1)
17-18	3.85	1.14	3.38	2.18	44.87 to 1

*Girls are compared with boys, not boys with girls.

Sex Differences by Grade at Age. It is with this group that sex differences are most apparent. They are also more meaningful in that the group is more carefully controlled and a better understanding of the significance of the results is obtained.

Table XXXIII reveals five important conditions as follows:

1. The mean scores of the 187 boys in grade at age are practically the same.
2. The variability of this group as measured by the standard deviation shows no statistically reliable difference.
3. The mean scores of the 195 girls in grade at age vary greatly from the seventh to the twelfth grades.

4. The girls and boys mean scores are practically the same in Grades IX and X.
5. The girls become more variable as they become more introverted. This is shown by the gradual increase in the standard deviation through the various grades.

TABLE XXXIII

A COMPARISON OF MEAN INTROVERT-EXTROVERT
TENDENCIES OF BOYS AND GIRLS FROM GRADES VII TO XII AT AGE

N=187 Boys		N=195 Girls		
Grade at Age	Sex	Mean	S.D.	P.E.mean
VII-VIII 13-14	Boys	119.36	11.40	1.04
	Girls	114.33	10.77	1.02
IX-X 15-16	Boys	119.15	12.28	.94
	Girls	118.95	11.36	.80
XI-XII 17-18	Boys	119.18	11.04	1.01
	Girls	123.00	13.30	1.18

TABLE XXXIV

INTERPRETATION OF MEAN SEX DIFFERENCES* BY GRADES
AT AGE IN INTROVERSION-EXTROVERSION IN TERMS OF PROBABILITY
OF OCCURRENCE

N=382

Grades at Age Compared	Differences in <u>Mean Scores</u> Extrovert-Introvert	P.E. diff.	$\frac{D}{P.E.}$ diff.	Percentage of Probable Occurrence By Chance	Odds in Favor of Difference
VII-13 VIII-14	5.03	1.46	3.44	2.18	44.87 to 1
IX-15 X-16	.20	1.23	.16	(above 50)	(less than 1 to 1)
XI-17 XII-18	3.82	1.55	2.46	9.18	9.89 to 1

*Girls are compared with boys, not boys with girls.

TABLE XXXV

INTERPRETATION OF VARIABILITY INTROVERT-EXTROVERT
DIFFERENCES OF GIRLS FROM GRADES VII TO XII AT AGE IN TERMS OF
PROBABILITY OF OCCURRENCE

N=195					
Grades At Age Compared	Difference in Standard Deviations	P.E. diff.	$\frac{D}{P.E.}$ diff.	Percentage of Probable Occurrence By Chance	Odds in Favor of Difference
VII-13 <u>VIII-14</u> IX-15 X-16	.59	.65	.90	(above 50)	(less than 1 to 1)
VII-13 <u>VIII-14</u> XI-17 XII-18	2.53	.78	3.24	3.09	31.36 to 1
IX-15 <u>X-16</u> XI-17 XII-18	1.94	.71	2.73	6.86	13.58 to 1

TABLE XXXVI

INTERPRETATION OF MEAN INTROVERT-EXTROVERT DIFFERENCES
OF GIRLS FROM GRADES VII TO XII AT AGE IN TERMS OF PROBABILITY
OF OCCURRENCE

N=195

Grades at Age Compared	Difference in Mean Scores	P.E. diff.	$\frac{D}{P.E.}$ diff.	Percentage of Probable Occurrence By Chance	Odds in Favor of Difference
VII-13 VIII-14	4.62	1.30	3.55	1.52	64.79 to 1
IX-15 X-16					
VII-13 VIII-14	8.67	1.56	5.56	.0052	19,230 to 1
XI-17 XII-18					
IX-15 X-16	4.05	1.42	2.85	5.90	15.95 to 1
XI-17 XII-18					

The interpretation of these differences is found in Tables XXXIV, XXXV, and XXXVI from which may be deduced that:

1. Significant sex differences occur in Grades VII and VIII at age and again in Grades XI and XII at age.
2. No significant difference occurs in Grades IX and X at age.
3. The seventh and eighth grade girls are less variable than the eleventh and twelfth grade girls. This is also true of the ninth and tenth grade girls in comparison to the eleventh and twelfth grade girls.
4. Significant differences occur between girls in Grades VII and VIII as compared to IX and X; Grades IX and X as compared to XI and XII; and Grades VII and VIII as compared to XI and XII.
5. These differences show that the girls gradually become more introverted while the boys remain practically the same.

Figure 3 illustrates these deviations graphically.

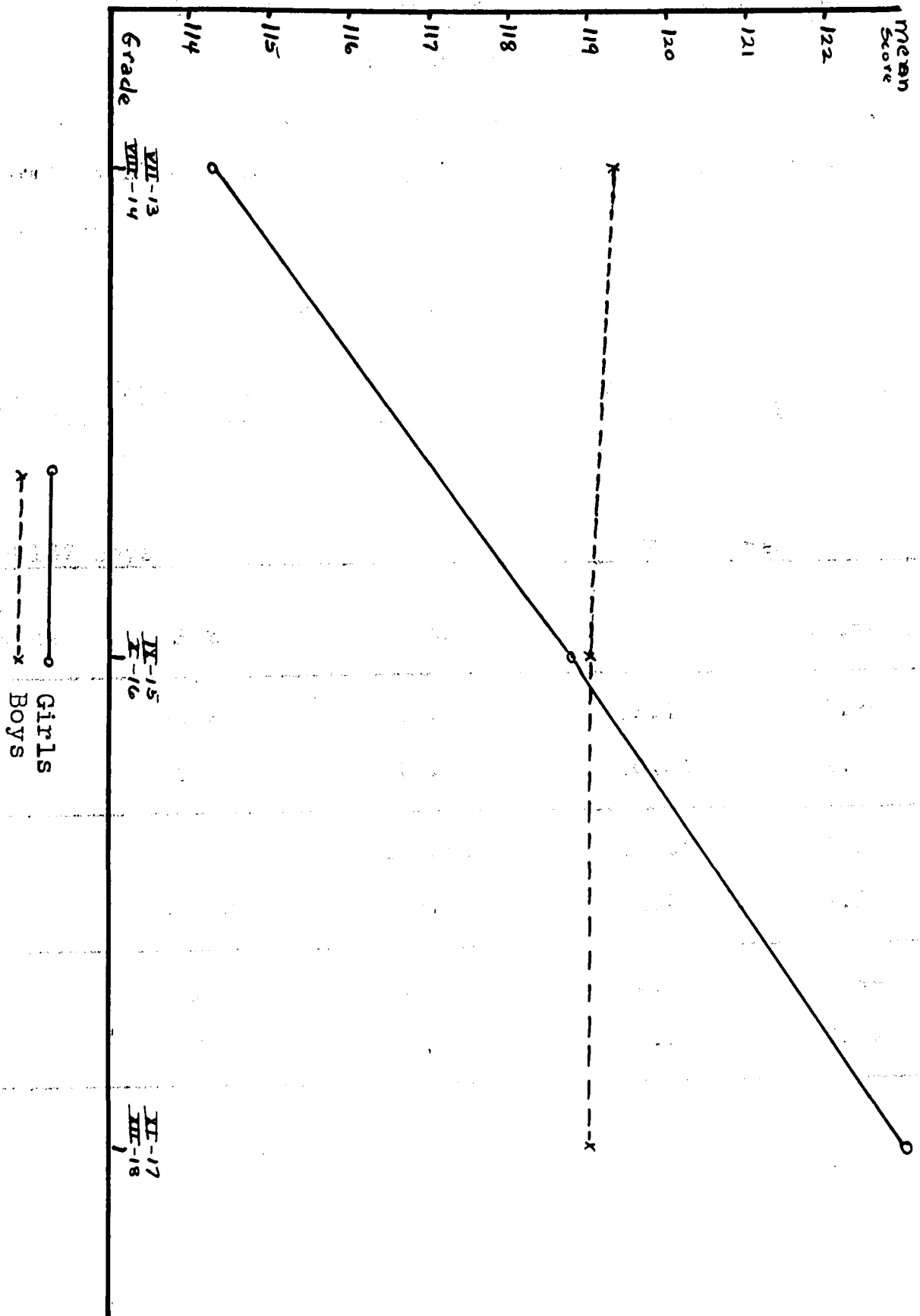


Figure 3. Comparison of Mean Introvert-Extrovert Tendencies of Boys and Girls in Grade at Age

Sex Differences of Pupils One Year Retarded. Table XXXVII shows that the retarded girls are more extroverted than the retarded boys in each consecutive grade comparison, and the higher the grade the more extroverted, especially in the case of the girls. Those in Grades XI and XII, one year retarded, are more extroverted than any group so far analyzed.

TABLE XXXVII

A COMPARISON OF MEAN INTROVERT-EXTROVERT TENDENCIES OF BOYS AND GIRLS ONE YEAR RETARDED FOR THEIR GRADE

N=137 Boys		N=81 Girls		
Grade One Year Retarded	Sex	Mean	S.D.	P.E.mean
VII-VIII	Boys	122.27	12.17	1.20
	Girls	117.87	10.54	1.24
IX-X	Boys	118.60	12.04	1.18
	Girls	115.11	11.31	1.25
XI-XII	Boys	118.37	9.16	.94
	Girls	112.73	8.31	1.69

TABLE XXXVIII

INTERPRETATION OF MEAN INTROVERT-EXTROVERT SEX
DIFFERENCES* OF PUPILS ONE YEAR RETARDED FOR THEIR GRADE IN TERMS
OF PROBABILITY OF OCCURRENCE

N=218

Grades One Year Retarded Compared	Differences in Mean Scores <u>Extrovert-Introvert</u>	P.E. diff.	<u>D</u> P.E. diff.	Percentage of Probable Occurrence By Chance	Odds in Favor of Difference
VII-14	4.40	1.76	2.50	9.18	9.89 to 1
VIII-15					
IX-16	3.49	1.72	2.04	17.73	4.64 to 1
X-17					
XI-18	5.64	1.93	2.92	5.05	18.80 to 1
XII-19					

*Girls are compared with boys, not boys with girls.

TABLE XXXIX

INTERPRETATION OF MEAN INTROVERT-EXTROVERT DIFFERENCES
OF BOYS ONE YEAR RETARDED IN TERMS OF PROBABILITY OF OCCURRENCE

N=137

	Grades VII-VIII 14-15	Grades XI-XII 18-19
Mean.....	122.27	118.37
S.D.....	12.17	9.16
P.E.mean.....	1.20	.94
Difference between mean scores.....		3.90
P.E.diff.....		1.52
D/P.E.diff.....		2.56
Percentage of probable occurrence by chance..		7.95
Odds in favor of difference.....		11.58 to 1

Table XXXVIII shows the validity of the sex differences for the one year retarded group. While not high, it will be noted that the girls are more extrovert than the boys in every comparison. This is quite different from the results of the grade at age analysis. Tables XXXIX and XL reveal that both the boys and girls become more extroverted with increased grade while with the normal group it was found that the boys' mean scores did not change materially and the girls' mean scores gradually advanced towards introversion.

Sex Differences of Pupils One Year Accelerated For Their Grade.

Sex differences within this group are not so marked with the exception of the eleventh and twelfth grades. Mean score comparisons are contained in Table XLI.

TABLE XL

INTERPRETATION OF MEAN INTROVERT-EXTROVERT DIFFERENCES
OF GIRLS ONE YEAR RETARDED IN TERMS OF PROBABILITY OF OCCURRENCE

N=81

	Grades VII-VIII 14-15	Grades XI-XII 18-19
Mean.....	117.87	112.73
S.D.....	10.54	8.31
P.E.mean.....	1.24	1.69
Difference between mean scores.....	5.14	
P.E.diff.....	2.09	
D/P.E.diff.....	2.46	
Percentage of probable occurrence by chance...	9.18	
Odds in favor of difference.....	9.89 to 1	

TABLE XLI

A COMPARISON OF MEAN INTROVERT-EXTROVERT TENDENCIES
OF BOYS AND GIRLS ONE YEAR ACCELERATED FOR THEIR GRADE

N=131 Boys		N=141 Girls		
Grades One Year Accelerated	Sex	Mean	S.D.	P.E.mean
VIII 13	Boys	115.41	10.95	1.42
	Girls	116.33	11.40	1.34
IX-X 14-15	Boys	114.35	10.77	.93
	Girls	116.23	12.45	1.11
XI-XII 16-17	Boys	119.32	12.82	1.32
	Girls	125.35	12.61	1.19

It was found that the girls one year retarded were more extroverted than the boys who were one year retarded. The reverse is true with the accelerated groups, the girls being more introverted in every comparison. Table XLII shows this fact together with the validity of these comparisons.

TABLE XLII

INTERPRETATION OF MEAN INTROVERT-EXTROVERT SEX DIFFERENCES*
OF PUPILS ONE YEAR ACCELERATED FOR THEIR GRADE IN TERMS
OF PROBABILITY OF OCCURRENCE

N=272

Grades One Year Accelerated Compared	Differences in Mean Scores Extrovert-Introvert	P.E. diff.	D P.E. diff.	Percentage of Probable Occurrence By Chance	Odds in Favor of Difference
VIII 13	.92	1.95	.47	(above 50)	(less than 1 to 1)
IX-X 14-15	1.88	1.45	1.30	38.06	1.63 to 1
XI-XII 16-17	6.03	1.77	3.41	2.18	44.87 to 1

*Girls are compared with boys, not boys with girls.

Just as the one year retarded groups became more extroverted as they progressed through the grades, so the one year accelerated groups become more introverted. This is shown in Table XLIII for the boys and Table XLIV for the girls.

TABLE XLIII

INTERPRETATION OF MEAN INTROVERT-EXTROVERT DIFFERENCES
OF BOYS ONE YEAR ACCELERATED IN TERMS OF PROBABILITY OF OCCURRENCE

N=70

	Grade VIII 13	Grades XI-XII 16-17
Mean.....	115.41	119.32
S.D.....	10.95	12.82
P.E.mean.....	1.42	1.32
Difference between mean scores.....	3.91	
P.E.diff.....	1.94	
D/P.E.diff.....	2.01	
Percentage of probable occurrence by chance.	17.73	
Odds in favor of difference.....	4.64 to 1	

TABLE XLIV

INTERPRETATION OF MEAN INTROVERT-EXTROVERT DIFFERENCES
OF GIRLS ONE YEAR ACCELERATED IN TERMS OF PROBABILITY OF OCCURRENCE

N=141

	Grade VIII 13	Grades XI-XII 16-17
Mean.....	116.33	125.35
S.D.....	11.40	12.61
P.E.mean.....	1.34	1.19
Difference between mean scores.....		9.02
P.E.diff.....		1.79
D/P.E.diff.....		5.04
Percentage of probable occurrence by chance.		.074
Odds in favor of difference.....		1350.35 to 1

Two additional comparisons will complete this study of sex deviation. It may be interesting to know how the accelerated group of boys compare with the retarded group of boys. This same comparison for the girls will be the last one made at this time. Table XLV reveals the substantial difference existing between retarded and accelerated boys in Grades VII and VIII, while Table XLVI shows the difference in the opposite direction for girls in Grades XI and XII.

TABLE XLV

INTERPRETATION OF MEAN INTROVERT-EXTROVERT DIFFERENCES OF BOYS IN GRADES VII AND VIII, ONE YEAR ACCELERATED AND ONE YEAR RETARDED IN TERMS OF PROBABILITIES OF OCCURRENCE

N=74

	Accelerated	Retarded
Mean.....	115.41	122.27
S.D.....	10.95	12.17
P.E.mean.....	1.42	1.20
Difference between mean scores.....	6.86	
P.E.diff.....	1.86	
D/P.E.diff.....	3.68	
Percentage of probable occurrence by chance..	1.26	
Odds in favor of difference.....	78.37 to 1	

TABLE XLVI

INTERPRETATION OF MEAN AND STANDARD DEVIATION INTROVERT-EXTROVERT DIFFERENCES OF GIRLS IN GRADES XI AND XII, ONE YEAR ACCELERATED AND ONE YEAR RETARDED, IN TERMS OF PROBABILITY OF OCCURRENCE

N=62

	Accelerated	Retarded
Mean.....	125.35	112.73
S.D.....	12.61	8.31
P.E.mean.....	1.19	1.69
Difference between mean scores.....	12.62	
P.E.diff.....	2.07	
D/P.E.diff.....	6.01	
Percentage of probable occurrence by chance	.0052	
Odds in favor of difference.....	19,230.00 to 1	
Difference between S.D.....	4.30	
P.E.diff.....	1.45	
D/P.E.diff.....	2.97	
Percentage of probable occurrence by chance	4.30	
Odds in favor of difference.....	22.26 to 1	

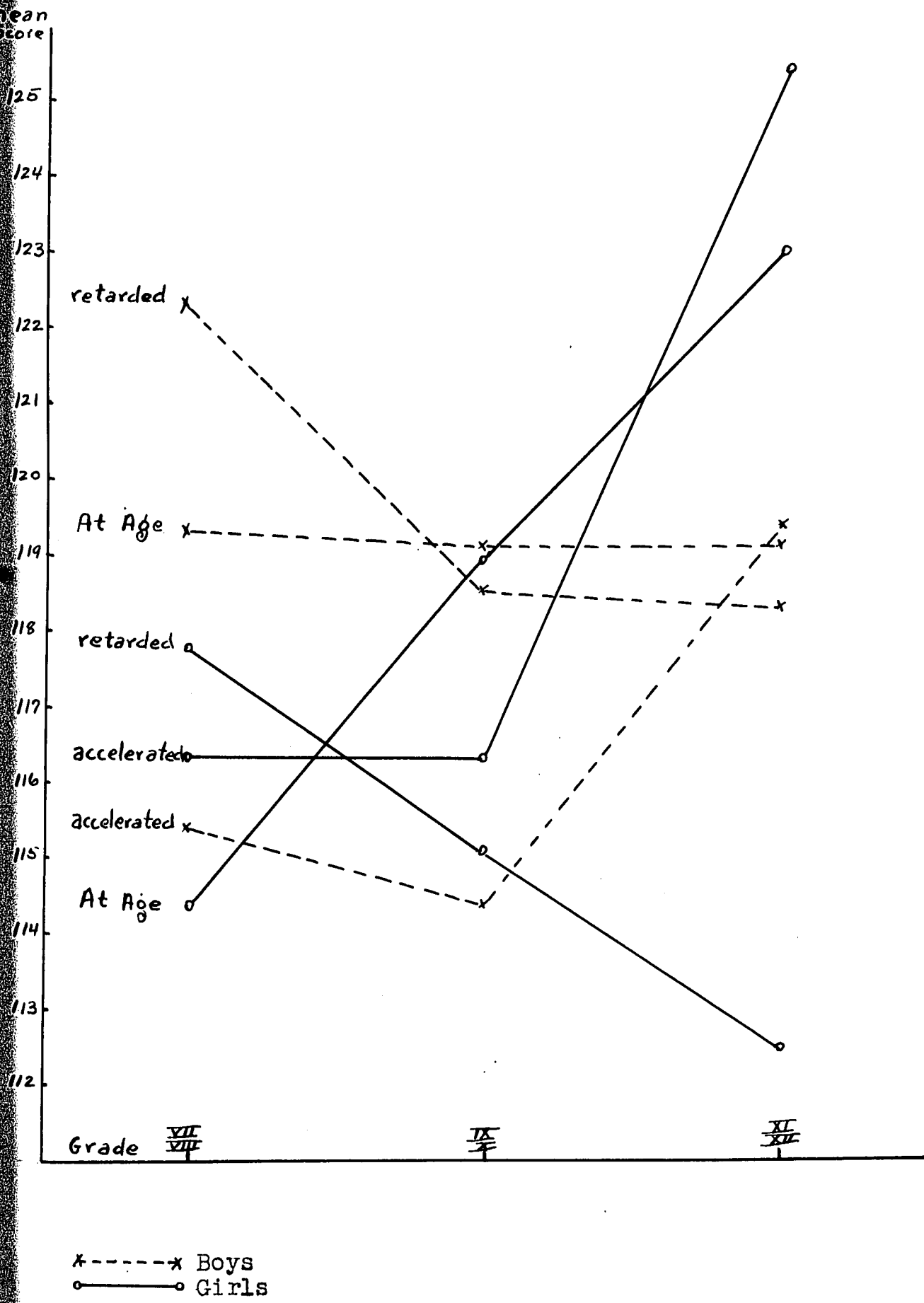


Figure 4. Comparison of Mean Introvert-Extrovert Tendencies of Boys and Girls in Grades at Age, One Year Accelerated, and One Year Retarded.

It will also be noticed from Table XLVI that the chances are 22.26 to 1 that the extroverted retarded groups of girls are less variable than the introverted accelerated group of girls. Figure 4 combines the important results, which have been presented, in graphic form. The additional fact set forth in this graphic presentation is that the boys in Grades VII and VIII represent three definite tendencies as follows: retarded, introvert; grade at age, ambivert; and accelerated, extrovert. When we follow this through to Grades XI and XII, we notice that the tendencies are reduced to one, this being the ambiverted tendency. Quite a different picture is presented in the case of girls. All three groups in Grades VII and VIII tend in varying degrees towards extroversion. Only two tendencies are represented in Grades XI and XII; the grade at age group has changed its position from extrovert tendency to introvert; the accelerated group has done the same to even a more marked degree; and the retarded group, which bordered on an ambivert tendency, has definitely taken its stand in favor of extroverted tendencies.

SUMMARY OF THE STUDY OF SEX DIFFERENCES
IN INTROVERSION-EXTROVERSION

1. The results of this study of sex differences in introversion-extroversion of 964 junior and senior high school pupils from the Lincoln School, Milwaukee, Wisconsin shows that extremely important sex differences exist.
2. The mean scores of boys in grade at age remain relatively constant from Grades VII to XII.
3. Girls in grade at age are more extroverted than boys in Grades VII and VIII; approximately the same in Grade IX and X; and more introverted in Grades XI and XII.
4. Girls one year retarded in Grades XI and XII tend the most towards extroversion of any group studied.
5. Girls one year accelerated in Grades XI and XII tend the most towards introversion of any group analyzed.
6. This study agrees in part with those studies which found important sex differences.

CHAPTER VIII

INTROVERSION-EXTROVERSION IN RELATION TO SCHOOL ACHIEVEMENT

The studies of introversion and extroversion have not shown relationships between these traits and performance in junior and senior high school achievement in school subjects. ⁸¹ Conklin's study of college majors in relation to introversion-extroversion resulted in reliable differences being revealed for those specializing in Journalism, English Literature, Physical Education, Pre-Law, Pre-Medical, and Business Administration (above running from introvert to extrovert tendencies). So significant were the differences that he believed his test results could be used as a basis for reliable advice to college students.

⁸² Young found that the introverts of above average ⁸³ intelligence failed the least in college; and in another study that those majoring in Chemistry-Biology, Economics-History, and Chemistry-Geology were predominantly extrovert while those majoring in English Literature, were mainly introvertive.

81. Conklin, Edmund S. Determination of Normal Extrovert-Introvert Interest Differences. Pedagogical Seminary, 1927, v. XXXIV, pp. 28-37.

82. Young, J. Bateman. How Emotional Traits Predispose to College Failure. Journal of Educational Psychology, 1927, v. XVIII, pp. 631-636.

83. Young, J. Bateman. Selection of College Majors As a Personality Expression. School and Society, 1928, v. XXVII, pp. 119-120.

The present study is the result of analyzing introversion-extroversion differences in relation to school subjects for 964 junior and senior high school pupils from the Lincoln School, Milwaukee, Wisconsin. Besides the results from the Psychological Interview Test for Introversion-Extroversion, averages of the pupils' marks in all their subjects for three months previous to taking the test, were obtained. Not only were relationships between introversion-extroversion and the average school marks studied, gymnasium, domestic science, manual arts, and extra-curricular activities excluded, but also between introversion-extroversion and marks in English, mathematics, social science, physical science, and foreign language. These relationships have been analyzed in two ways: first, by the method of correlation, which utilizes the whole group; and second, by the method of group comparisons, which omits the middle forty per cent of the distribution and results in a comparison of those pupils to the right and left of ± 1.5 S.D.- the introvert and the extrovert groups, respectively.

**AVERAGE SCHOOL MARKS IN RELATION TO
INTROVERSION-EXTROVERSION**

By Grade Regardless of Age.

Correlating introversion-extroversion test scores with average school marks resulted in small and unreliable coefficients. Table XKVII, however, shows that these coefficients become less in favor of the extrovert and more in favor of the introvert group through the grades.

TABLE XLVII

CORRELATION BETWEEN INTROVERSION AND SCHOOL MARKS FOR PUPILS IN GRADES VII TO XII

Grade	N	r	P.E.
VII-VIII	251	-.138	.042
IX-X	401	-.042	.034
XI-XII	266	+.039	.041

When omitting the middle forty per cent of the distribution and comparing the marks made by the introvert tendency group with those of the extrovert tendency group, small, but consistent differences are noted. From Table XLVIII it will be observed that the introvert group in Grades VII and VIII received on an average lower marks than the extrovert group. This situation is reversed in Grades XI and XII with the introvert group receiving on the average higher marks. The reliability of these differences with their interpretation, as shown in Table XLIX, reveals odds of 267 to 1 in favor of the extrovert's receiving higher marks in Grades VII and VIII and 3 to 1 in favor of the introvert in Grades XI and XII. This same trend was revealed also by the coefficients of correlation just discussed.

TABLE XLVIII

A COMPARISON OF MEAN SCHOOL MARKS OF THE INTROVERT AND EXTROVERT GROUPS IN GRADES VII TO XII
N = 552

Grade	Group	Mean	S.D.	P.E.mean
VII-VIII	Introvert	74.73	7.28	.62
	Extrovert	78.23	6.40	.53
IX-X	Introvert	78.82	6.33	.41
	Extrovert	79.65	6.31	.40
XI-XII	Introvert	81.79	5.95	.44
	Extrovert	80.70	5.60	.41

TABLE XLIX

INTERPRETATION OF MEAN SCHOOL MARKS OF INTROVERT GROUPS IN GRADES VII TO XII IN TERMS OF PROBABILITY OF OCCURRENCE
N = 552

Grade	Difference in Mean Scores in Favor of Extrovert-Introvert	P.E. diff.	D P.E. diff.	Percentage of Probable Occurrence By Chance	Odds In Favor of Difference
VII-VIII	3.50	.81	4.32	.373	267.10 to 1
IX-X	0.83	0.57	1.46	31.17	2.21 to 1
XI-XII	1.09	.60	1.82	22.47	3.45 to 1

in favor of the extroverts in Grade VII through Grade X.

By Grade At Age. Analysis of results on a grade-at-age basis reveals substantially the same trends as shown on the grade basis regardless of age. Table L, however, shows a higher negative correlation for school marks in Grades VII and VIII than was found on the grade basis. This of course means that the school marks are more in favor of the extrovert than was found in the other case.

TABLE L

CORRELATIONS BETWEEN INTROVERSION AND SCHOOL MARKS
FOR PUPILS IN GRADES VII TO XII AT AGE

Grade	N	r	P.E.
VII-VIII	96	-.282	.063
IX-X	167	-.113	.051
XI-XII	102	+.007	.067

Group comparisons (see Table LI) again show the introvert group receiving lower marks in Grades VII, VIII, IX and X and the same average marks in Grades XI and XII. One also notices a gradual increase in school marks for the introverted group, with the extroverted group's marks remaining approximately the same. Interpretation of these group differences found in Table LII show more reliable differences in favor of the extrovert in Grade VII through Grade X.

TABLE LI

A COMPARISON OF MEAN SCHOOL MARKS OF THE INTROVERT AND EXTROVERT GROUPS IN GRADES VII TO XII AT AGE
N = 266

Grade-at-Age	Group	Mean	S.D.	P.E.mean
VII-VIII	Introvert	75.69	7.35	.84
	Extrovert	80.29	5.12	.58
IX-X	Introvert	76.50	6.24	.53
	Extrovert	78.94	5.92	.52
XI-XII	Introvert	80.94	5.00	.55
	Extrovert	80.94	5.66	.63

TABLE LII

INTERPRETATION OF MEAN SCHOOL MARKS OF INTROVERT AND EXTROVERT GROUPS IN GRADES VII TO XII AT AGE IN TERMS OF PROBABILITY OF OCCURRENCE
N = 266

Grade At Age	Difference in Mean Scores In Favor of Extrovert-Introvert	P.E. diff.	D P.E.diff.	Percentage of Probable Occurrence By Chance	Odds In Favor of Difference
VII-VIII	4.60	1.02	4.51	.240	415.67 to 1
IX-X	2.44	.74	3.30	2.60	37.46 to 1
XI-XII	0	.84	0	----	-----

By Grade, Pupils One Year Retarded. Correlations

for the one year retarded groups, shown in Table LIII, are also small but show a definite change from higher marks for the extrovert group in Grades VII and VIII to higher marks for the introvert group in Grades IX to XII.

TABLE LIII

CORRELATIONS BETWEEN INTROVERSION AND SCHOOL MARKS FOR PUPILS ONE YEAR RETARDED FOR THEIR GRADE

Grade	N	r	P.E.
VII-VIII	75	-.232	.073
IX-X	81	+.134	.074
XI-XII	51	+.133	.094

Group comparisons reveal the same trend as the correlations. As before, the extroverted group's marks tend to remain about the same while the introverted group's marks show a tendency to increase. Tables LIV and LV present the results.

TABLE LIV

A COMPARISON OF MEAN SCHOOL MARKS OF THE INTROVERT AND EXTROVERT GROUPS IN GRADES VII TO XII, ONE YEAR RETARDED
N = 126

Grade	Group	Mean	S.D.	P.E.mean
VII-VIII	Introvert	74.25	5.45	.75
	Extrovert	77.21	7.62	1.05
IX-X	Introvert	79.95	5.57	.82
	Extrovert	77.36	6.56	.94
XI-XII	Introvert	79.00	6.24	1.05
	Extrovert	77.52	4.12	.62

TABLE LV

INTERPRETATION OF MEAN SCHOOL MARKS OF INTROVERT AND EXTROVERT GROUPS IN GRADES VII TO XII, ONE YEAR RETARDED, IN TERMS OF PROBABILITY OF OCCURRENCE
N = 126

Grade	Difference in Mean Scores In Favor of Extrovert-Introvert	P.E. diff.	$\frac{D}{P.E. diff.}$	Percentage of Probable Occurrence By Chance	Odds in Favor of Difference
VII-VIII	2.96	1.29	2.28	12.08	7.28 to 1
IX-X	2.59	1.24	2.09	15.67	5.38 to 1
XI-XII	1.48	1.23	1.20	41.83	1.39 to 1

By Grades, Pupils One Year Accelerated. Few reliable facts present themselves in the analysis of this group of pupils. So few pupils in Grades VII and VIII were accelerated that no analysis was made for those grades. The correlations for the remaining grades are small, but positive and the group comparisons are unreliable and inconsistent. Tables LVI, LVII, and LVIII present the findings.

TABLE LVI

CORRELATIONS BETWEEN INTROVERSION AND SCHOOL MARKS FOR PUPILS ONE YEAR ACCELERATED FOR THEIR GRADE

Grade	N	r	P.E.
IX-X	113	+ .071	.064
XI-XII	90	+ .093	.070

TABLE LVII

A COMPARISON OF MEAN SCHOOL MARKS OF THE INTROVERT AND EXTROVERT GROUPS IN GRADES IX TO XII, ONE YEAR ACCELERATED

showing N = 124

Grade	Group	Mean	S.D.	P.E. mean
IX-X	Introvert	81.76	5.83	.66
	Extrovert	80.76	6.24	.72
XI-XII	Introvert	82.19	6.48	.77
	Extrovert	82.94	5.34	.64

TABLE LVIII

INTERPRETATION OF MEAN SCHOOL MARKS OF INTROVERT
AND EXTROVERT GROUPS IN GRADES IX TO XII, ONE YEAR
ACCELERATED, IN TERMS OF PROBABILITY OF
OCCURRENCE

N = 124

Grade	Difference in Mean Scores In Favor of <u>Extrovert-Introvert</u>	P.E. diff.	P.E. <u>diff.</u>	Percent- age of Probable Occurrence By Chance	Odds In Favor of Differ- ence
IX-X	1.00	.97	1.03	50.00	1.00 to 1
XI-XII	.75	1.00	.75	(above 50)	(less than 1 to 1

Summary of Relationships Between School Marks and Introversion-
Extroversion.

1. In general, the correlations between average school marks and introversion-extroversion as measured by the Psychological Interview are low and unreliable.
2. The general trend of the correlations is quite consistent, showing that those tending towards extroversion receive on the average higher marks than the introverts in Grades VII and VIII; slightly higher in Grades IX and X; and lower marks in Grades XI and XII.
3. Group comparisons show the same trend to a more

marked degree with statistically reliable differences in favor of the extrovert group in Grades VII and VIII. These differences are not so great in Grades IX and X and are reversed in Grades XI and XII, the introvert group receiving the higher marks. The reliability of these differences is not as great, however, as it is for the extrovert difference in the lower grades.

4. The differences are less marked for the retarded and accelerated groups, being especially unreliable for the accelerated group.
5. Those in the introvert group seem to increase their school marks on the average through the various grades, the extroverts' marks remaining on the average approximately the same.
6. In general, there is a substantial relationship between introversion-extroversion and average school marks.

AVERAGE SUBJECT MARKS IN RELATION TO INTROVERSION-EXTROVERSION

By Grade Regardless of Age. Although the trend of decreasing differences in favor of those with extrovert tendencies that was revealed when dealing with average school marks, continues to manifest itself, certain exceptions will be noted in dealing with subject marks. In mathematics,

correlations in favor of the extrovert continue through all the grades. Foreign language is another exception, but group comparisons do not agree with the trend of the correlations. There are four reliable though relatively low correlations in the eleventh and twelfth grade groups. Three of these are in favor of the introvert, physical science, social science and English, while the fourth, mathematics in favor of the extrovert, has been spoken of already. Tables LIX, LX, and LXI give the correlations, central tendencies, variability, and interpretation of differences for the various school subjects analyzed.

TABLE LIX

CORRELATIONS BETWEEN INTROVERSION AND SUBJECT MARKS FOR PUPILS IN GRADES VII TO XII.

Grade	Subject	N	r	P.E.
VII-VIII	English	251	-.098	.042
	Mathematics	251	-.115	.042
	Social Science	251	-.125	.042
IX-X	English	393	-.041	.034
	Mathematics	342	-.092	.036
	Social Science	256	-.005	.042
	Foreign Language	142	-.115	.056
XI-XII	English	256	+.163	.041
	Mathematics	134	-.341	.052
	Social Science	179	+.281	.046
	Physical Science	73	+.327	.070
	Foreign Language	62	-.057	.087

TABLE IX

A COMPARISON OF MEAN SUBJECT MARKS OF THE
INTROVERT AND EXTROVERT GROUPS IN GRADES VII TO XII
N = 552

Grade	Subject	Group	Mean	S.D.	P.E. mean
VII-VIII	English	Introvert	73.89	9.63	.83
		Extrovert	77.43	7.78	.65
	Mathematics	Introvert	74.97	8.29	.72
		Extrovert	78.44	7.43	.62
	Social Science	Introvert	75.42	7.96	.68
		Extrovert	78.73	8.29	.69
IX-X	English	Introvert	77.50	7.60	.43
		Extrovert	79.47	8.24	.53
	Mathematics	Introvert	80.03	7.38	.51
		Extrovert	79.03	6.67	.43
	Social Science	Introvert	78.92	6.50	.79
		Extrovert	80.88	7.83	.88
XI-XII	Foreign Language	Introvert	80.66	7.77	.87
		Extrovert	78.42	7.31	.79
	English	Introvert	82.59	7.28	.54
		Extrovert	80.82	7.93	.59
	Mathematics	Introvert	76.93	7.52	.75
		Extrovert	79.73	5.88	.50
Social Science	Introvert	82.01	7.64	.68	
	Extrovert	82.17	7.05	.69	
Physical Science	Introvert	80.70	5.54	.63	
	Extrovert	79.50	5.19	.60	

Since the need for consistent and reliable measures of the
measured in this study of the relationship of introversion to
extroversion to school achievement. Table IX presents the
correlations for the various subjects compared.

TABLE LXI

INTERPRETATION OF MEAN SUBJECT MARKS OF INTROVERT AND EXTROVERT GROUPS IN GRADES VII TO XII IN TERMS OF PROBABILITY OF OCCURRENCE

N = 552

Grade	Subject	Difference in Mean Scores in Favor of Extrovert-Introvert	P.E. diff.	D P.E. diff.	Percentage of Probable Occurrence By Chance	Odds In Favor of Difference
VII-VIII						
	English	3.54	1.05	3.37	2.18	44.87 to 1
	Mathematics	3.47	.95	3.65	1.26	78.37 to 1
	Social Science	3.31	.96	3.24	3.09	31.36 to 1
IX-X						
	English	1.97	.68	2.89	5.05	18.80 to 1
	Mathematics	1.00	.66	1.51	31.17	2.21 to 1
	Social Science	1.96	1.18	1.66	25.15	2.98 to 1
	Foreign Language	2.24	1.17	1.91	20.00	4.00 to 1
XI-XII						
	English	1.77	.80	2.21	13.78	6.26 to 1
	Mathematics	2.80	.90	3.11	3.65	26.40 to 1
	Social Science	.16	.97	.16	(above 50)	(less than 1 to 1)
	Physical Science	1.20	.87	1.38	34.50	1.90 to 1

By Grade At Age. A selection of those in grade-at-

age for computing correlations and making group comparisons

yields the most interesting and reliable differences so far

considered in this study of the relationship of introversion-

extroversion to school achievement. Table LXII presents the

correlations for the various subjects compared.

TABLE LXII

CORRELATIONS BETWEEN INTROVERSION AND SUBJECT MARKS
FOR PUPILS IN GRADES VII TO XII AT AGE

Grade	Subject	N	r	P.E.
VII-VIII	English	95	-.379	.059
	Mathematics	96	-.484	.053
	Social Science	96	-.331	.061
IX-X	English	163	-.127	.053
	Mathematics	123	-.479	.047
	Social Science	70	-.192	.077
	Foreign Language	48	-.089	.095
XI-XII	English	98	+.043	.067
	Mathematics	44	-.459	.079
	Social Science	68	+.380	.069
	Physical Science	49	+.489	.073
	Foreign Language	25	-.494	.101

These correlations reveal several important trends and relationships as follows:

1. The substantial correlation in favor of the extrovert in English, Grades VII and VIII, becomes a low correlation in Grades IX and X and a positive though low correlation in favor of the introvert in grades XI and XII.

2. The same trend is noticeable to even a greater extent in social science where the correlations range from -.331 in Grade VII and VIII, and -.192 in Grades IX and X to +.380 in Grades XI and XII.

3. Correlations in foreign language show an increase in favor of the extrovert, being $-.089$ in Grades IX and X and $+.494$ in Grades XI and XII.
4. The correlations continue to be substantially in favor of the extrovert in mathematics through all the grades, being $-.484$ in Grades VII and VIII, $-.479$ in Grades IX and X, and $-.459$ in Grades XI and XII.
5. A substantial correlation in favor of the introvert receiving the higher marks in physical sciences of $+.489$ in Grades XI and XII furnishes a sharp contrast to the $-.459$ correlation in mathematics in the same grades.

Table LXIII presents the mean marks in the various subjects and Table LXIV interprets the differences. The odds of 19,230 to 1 in favor of the extrovert receiving higher marks in English in Grades VII and VIII are reversed to odds to 1.18 to 1 in favor of the introvert group in Grades XI and XII. Similar results are shown in analyzing the marks in social science. The odds continue to be in favor of the extrovert in mathematics through all the grades.

TABLE LXIII

A COMPARISON OF MEAN SUBJECT MARKS OF THE
INTROVERT AND EXTROVERT GROUPS IN GRADES VII TO XII
AT AGE
N = 266

Grade	Subject	Group	Mean	S. D.	P.E. mean
VII-VIII	English	Introvert	74.37	8.60	.98
		Extrovert	82.38	8.54	.99
	Mathematics	Introvert	76.91	8.06	.92
		Extrovert	80.29	5.66	.65
	Social Science	Introvert	76.28	7.14	.81
		Extrovert	82.03	7.21	.82
IX-X	English	Introvert	77.10	7.81	.67
		Extrovert	79.68	6.55	.57
	Mathematics	Introvert	77.64	7.07	.69
		Extrovert	80.16	7.68	.70
	Social Science	Introvert	77.12	8.43	1.42
		Extrovert	80.24	8.18	1.20
XI-XII	Foreign Language	Introvert	77.55	9.06	1.44
		Extrovert	80.90	6.93	1.04
	English	Introvert	83.40	7.87	.87
		Extrovert	81.97	7.94	.90
	Mathematics	Introvert	73.41	6.48	.93
		Extrovert	82.18	4.47	.65
Social Science	Introvert	81.87	7.42	.90	
	Extrovert	80.04	8.18	1.06	
Physical Science	Introvert	83.08	6.08	.85	
	Extrovert	76.47	5.48	.85	

TABLE LXIV

INTERPRETATION OF MEAN SUBJECT MARKS OF INTROVERT AND EXTROVERT GROUPS IN GRADES VII TO XII AT AGE, IN TERMS OF PROBABILITY OF OCCURRENCE

N = 266

Grade	Subject	Difference in Mean Scores in Favor of		P.E. diff.	D P.E. diff.	Percentage of Probable Occurrence By Chance	Odds In Favor of Difference
		Extro-vert	Intro-vert				
VII-VIII							
	English	8.01		1.39	5.72	.0052	19,2300.00 to
	Mathematics	3.38		1.13	3.00	4.30	22.26 to
	Social Science	5.75		1.15	5.00	.074	1350.35 to
IX-X							
	English	2.58		.88	2.93	5.05	18.80 to
	Mathematics	2.52		.98	2.57	7.95	11.58 to
	Social Science	3.12		1.86	1.78	22.47	3.45 to
	Foreign Language	3.35		1.79	1.89	20.00	4.00 to
XI-XII							
	English		1.43	1.25	1.14	45.81	1.18 to
	Mathematics	8.77		1.14	7.69	.000000068	1,470,588,234.00 to
	Social Science		1.83	1.39	1.32	38.06	1.63 to
	Physical Science		6.63	1.20	5.51	.0052	19,230.00 to

By Grades, One Year Retarded and One Year Accelerated.

Correlations and group comparisons for pupils one year retarded or accelerated are not so consistent and in many cases contradictory to the results already presented. Tables LXV to LXX give these correlations and comparisons in the usual form.

TABLE LXV

CORRELATIONS BETWEEN INTROVERSION AND SUBJECT MARKS FOR PUPILS IN GRADES VII TO XII, ONE YEAR RETARDED

Grade	Subject	N	r	P.E.
VII-VIII	English	74	-.207	.075
	Mathematics	74	-.082	.077
	Social Science	73	-.081	.077
IX-X	English	77	+.048	.078
	Mathematics	63	+.155	.081
	Social Science	29	+.312	.110
	Foreign Language	27	+.207	.129
XI-XII	English	46	-.051	.100
	Mathematics	29	-.147	.132
	Social Science	38	-.093	.106
	Physical Science	22	-.080	.150
	Foreign Language	16	+.301	.137

TABLE LXVI

CORRELATIONS BETWEEN INTROVERSION AND SUBJECT MARKS OF PUPILS IN GRADES IX TO XII, ONE YEAR ACCELERATED

Grade	Subject	N	r	P.E.
IX-X	English	113	+.097	.064
	Mathematics	100	-.016	.067
	Social Science	30	+.063	.123
	Foreign Language	55	+.202	.087
XI-XII	English	88	+.180	.069
	Mathematics	40	+.106	.106
	Social Science	53	-.106	.090
	Physical Science	29	-.244	.107
	Foreign Language	21	-.222	.145

An accelerated group of grades IX and X and in the first of the retarded group of grades XI and XII are two exceptions to the above. From tables LXV and LXVI it will be noted that the reliability of the differences that increased is in most cases low.

All of the above correlations are low and unreliable. While the results for foreign language in the retarded group are consistently in favor of the introvert, which is the opposite to that revealed by the grade-at-age group, the accelerated group shows a + .202 correlation in Grades IX and X and a -.222 correlation in Grades XI-XII. The correlation of physical science with introversion shows the opposite trend in the accelerated group to what it did in the grade-at-age group, but is not large enough to be reliable. Results in mathematics continue to be quite consistently in favor of the extrovert group.

One of the first facts to be observed from an inspection of Tables LXVII and LXVIII is that the accelerated pupils, whether introverted or extroverted, are receiving on the average higher marks than the retarded pupils. This is also true for their average school marks in all their subjects. A second fact to be noted in these tables is that the differences are much smaller than was the rule with the grade-at-age groups. These differences are, however, in agreement in the majority of cases with the results from the method of correlation. The same inconsistencies and contradictory results are revealed by the group comparisons as were shown by the coefficients of correlations. Results from group comparisons in social science in the accelerated group of Grades IX and X and in English in the retarded group of Grades XI and XII are two exceptions to the above. From Tables LXIX and LXX it will be noted that the reliability of the differences just discussed is in most cases low.

TABLE LXVII

A COMPARISON OF MEAN SUBJECT MARKS OF THE
EXTROVERT AND INTROVERT GROUPS IN GRADES VII TO XII,
ONE YEAR RETARDED

N=126

Grade	Subject	Group	Mean	S.D.	P.E.mean
VII-VIII	English	Introvert	75.17	6.71	.94
		Extrovert	78.04	8.37	1.16
	Mathematics	Introvert	73.83	8.43	1.16
		Extrovert	77.71	9.75	1.34
	Social Science	Introvert	75.30	6.56	.92
		Extrovert	78.00	7.55	.98
IX-X	English	Introvert	78.90	8.06	1.25
		Extrovert	77.19	8.43	1.24
	Mathematics	Introvert	81.16	6.86	1.06
		Extrovert	76.10	6.40	.96
XI-XII	English	Introvert	78.89	8.60	1.50
		Extrovert	76.22	5.20	.83
	Mathematics	Introvert	76.80	7.48	1.59
		Extrovert	78.15	6.55	1.18

TABLE LXVIII

A COMPARISON OF MEAN SUBJECT MARKS OF THE INTROVERT AND EXTROVERT GROUPS IN GRADES IX TO XII, ONE YEAR ACCELERATED

N=124

Grade	Subject	Group	Mean	S.D.	P.E. mean	
IX-X	English	Introvert	81.43	6.78	.75	
		Extrovert	79.44	6.64	.74	
	Mathematics	Introvert	81.82	7.48	.94	
		Extrovert	81.30	7.07	.83	
	Social Science	Introvert	80.73	4.58	.80	
		Extrovert	81.53	7.48	1.30	
	Foreign Language	Introvert	83.78	6.48	1.03	
		Extrovert	75.95	7.68	1.19	
	XI-XII	English	Introvert	84.03	8.00	.97
			Extrovert	81.90	8.77	1.08
Mathematics		Introvert	80.57	8.60	1.65	
		Extrovert	78.87	6.86	1.19	
Social Science		Introvert	82.15	7.87	1.04	
		Extrovert	84.30	5.92	.89	
Physical Science		Introvert	78.33	5.00	.97	
		Extrovert	82.53	4.90	.85	
Foreign Language		Introvert	81.28	6.08	1.55	
		Extrovert	84.82	5.57	1.13	

TABLE LXIX

INTERPRETATION OF MEAN SUBJECT MARKS OF INTROVERT AND
EXTROVERT GROUPS IN GRADES VII TO XII, ONE YEAR RE-
TARDED, IN TERMS OF PROBABILITY OF OCCURRENCE
N = 126

Grade	Difference in Mean Scores in Favor of		P.E. diff.	D P.E.diff.	Percent- age of Probable Occurrence By Chance	Odds in Favor of Difference
	Extro- vert	Intro- vert				
VII-VIII						
English	2.87		1.49	1.92	20.00	4.00 to 1
Mathematics	3.88		1.77	2.19	13.78	6.26 to 1
Social Science	2.70		1.31	2.06	15.67	5.38 to 1
IX-X						
English	1.71		1.76	.97	(above 50)	(less than 1 to 1)
Mathematics	5.06		1.46	3.46	1.82	53.95 to 1
XI-XII						
English	2.65		1.71	1.55	28.05	2.57 to 1
Mathematics	1.35		1.98	.68	(above 50)	(less than 1 to 1)

TABLE LXX

INTERPRETATION OF MEAN SUBJECT MARKS OF INTROVERT AND EXTROVERT GROUPS IN GRADES IX TO XII, ONE YEAR ACCELERATED, IN TERMS OF PROBABILITY OF OCCURRENCE
N = 124

Grade	Difference in Mean Scores In Favor of		P.E. diff.	D P.E.diff.	Percent- age of Probable Occurrence By Chance	Odds Favorable
	Extro-vert	Intro-vert				
IX-X						
English		1.99	1.05	1.89	20.00	4
Mathematics		.52	1.25	.41	(above 50)	(less than 50)
Social Science	.80		1.53	.52	(above 50)	(less than 50)
Foreign Language		7.83	1.57	4.98	.074	1350
XI-XII						
English		2.13	1.45	1.47	31.17	2
Mathematics		1.70	1.77	.96	(above 50)	(less than 50)
Social Science	2.15		1.37	1.57	28.05	2
Physical Science	4.20		1.29	3.26	2.60	37
Foreign Language	3.54		1.91	1.85	20.00	4

TABLE LXX

INTERPRETATION OF MEAN SUBJECT MARKS OF INTROVERT AND
EXTROVERT GROUPS IN GRADES IX TO XII, ONE YEAR
ACCELERATED, IN TERMS OF PROBABILITY OF
OCCURRENCE

N = 124

Grade	Difference in Mean Scores In Favor of		P.E. diff.	D P.E.diff.	Percent- age of Probable Occur- rence By Chance	Odds in Favor of Difference
	Extro- vert	Intro- vert				
IX-X						
English		1.99	1.05	1.89	20.00	4.00 to 1
Mathematics		.52	1.25	.41	(above 50)	(less than 1 to 1)
Social Science	.80		1.53	.52	(above 50)	(less than 1 to 1)
Foreign Language		7.83	1.57	4.98	.074	1350.35 to 1
XI-XII						
English		2.13	1.45	1.47	31.17	2.21 to 1
Mathematics		1.70	1.77	.96	(above 50)	(less than 1 to 1)
Social Science	2.15		1.37	1.57	28.05	2.57 to 1
Physical Science	4.20		1.29	3.26	2.60	37.46 to 1
Foreign Language	3.54		1.91	1.85	20.00	4.00 to 1

TABLE IX

SUMMARY OF CORRELATIONS BETWEEN INTROVERSION AND AVERAGE SCHOOL AND SUBJECT MARKS FOR PUPILS IN GRADES VII TO XII, GRADE-AT-AGE, ONE YEAR RETARDED, AND ONE YEAR ACCELERATED

NE860

Grade	Average School Marks			English			Mathematics			Social Science			Physical Science		
	Ret.	At Age	Accel.	Ret.	At Age	Accel.	Ret.	At Age	Accel.	Ret.	At Age	Accel.	Ret.	At Age	Accel.
VIII	-.238	-.288	....	-.207	-.379	....	-.082	-.464	....	-.081	-.531	....	....	....	....
IX	+.134	-.113	+.071	+.048	-.127	+.097	+.155	-.479	-.016	+.512	-.192	+.065	....	....	....
XI	+.133	+.007	+.093	-.051	+.045	+.180	-.147	-.459	+.106	-.095	+.380	+.106	-.060	+.489	-.244
Foreign Language															
X							+.207	-.089	+.202						
XII							+.501	-.494	-.222						

TABLE LXXII

SUMMARY OF INTROVERT-EXTROVERT GROUP COMPARISONS FOR AVERAGE SCHOOL MARKS IN GRADES VII TO XII, PUPILS GRADE-AT-AGE, ONE YEAR RETARDED, AND ONE YEAR ACCELERATED, IN TERMS OF D/P.E.diff.

N=516

Grade	Average School Marks			English			Mathematics			Social Science			Physical Science		
	Ret.	At Age	Accel.	Ret.	At Age	Accel.	Ret.	At Age	Accel.	Ret.	At Age	Accel.	Ret.	At Age	Accel.
I-VIII	2.28	4.51	.....	1.92	5.72	.....	2.19	3.00	.....	2.06	5.00	.....	.....	.....	.....
I-X	2.09	3.50	1.05	.97	2.95	1.89	3.46	2.57	.41	.....	1.76	.52	.....	.....	.....
I-XII	1.20	0	.75	1.55	1.14	1.47	.68	7.69	.96	.....	1.52	1.57	.....	.....	5.51
Foreign Language															
I-X	.....	1.89	4.98	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
I-XII	.....	.....	1.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

E denotes difference in favor of extrovert group.
 I denotes difference in favor of introvert group.

SUMMARY OF THE STUDY OF INTROVERSION-
EXTROVERSION IN RELATION TO SCHOOL ACHIEVEMENT

From Tables LXXI and LXXII which summarize the results presented in this chapter, the following results are significant:

1. In Grades VII and VIII, those pupils with extrovert tendencies receive on an average better marks, whether retarded or in grade-at-age.
2. In Grades IX and X, the differences are less in favor of the extrovert and in some cases in favor of the introvert tendency pupils.
3. The average differences in Grades XI and XII are slightly in favor of pupils with introvert tendencies with the exception of marks in foreign language and mathematics which are in favor of the pupils with extrovert tendencies.
4. The coefficients of correlation agree substantially with the results from group comparisons in which the middle forty per cent were excluded.
5. If the number of r's are compared, it is found that:
 - a. for the retarded pupils, there is no preponderance either way - 7 of the 15 r's favor those with introvert tendencies and 8 the extrovert.
 - b. for the grade-at-age pupils, the extrovert's are in the lead - 11 of the 15 r's.

c. for the accelerated pupils, the introverts are superior - 8 out of 11 r's.

6. If the D/P.E.diff's are compared:

a. for the retarded pupils, 5 of these difference ratios favor each group.

b. for the grade-at-age pupils, the extroverts lead with 10 of the 13 comparison in their favor.

c. for the accelerated pupils, the introverts are slightly in the lead with 6 of the 11 comparisons to their credit.

7. It may be concluded that in the retarded groups both those with introvert and extrovert tendencies receive about the same school marks in general; in the grade-at-age groups, the extroverted pupils tend to receive the better marks; in the accelerated group, the introverted pupils receive the better marks as a rule.

8. The results reveal that in the population studied a definite relationship exists between introversion-extroversion as measured by the Psychological Interview Test and marks in the various school subjects.

CHAPTER IX

NUMBER OF SIBLINGS IN RELATION TO INTROVERSION-EXTROVERSION

84

It was Freyd⁸⁴ who suggested that an only child might tend more towards introversion than one with brothers or sisters. Two experimental studies have attempted to answer this question. Buseman⁸⁵ in his study of 400 children as to sibling status, school ability and character, which represented an average group socially and economically found that fewness of siblings decidedly favored introversion.

86

Stuart⁸⁶ studied the "undesirable emotional outlets" of 465 young men with the aid of Laird's Personal Inventory. While he was only indirectly concerned with introversion-extroversion as such, no evidence was found to support a claim that any deviation from the normal was dependent on the number of siblings.

In the present study the Psychological Interview Test for Introversion-Extroversion was administered to 721 junior high school pupils in the Ann Arbor schools. The number of siblings was obtained for each pupil taking the test.

84. Freyd, Max. Introverts and Extroverts. Psychological Review, v. 31, p. 81.

85. Buseman, A. Geschwisterschaft, Schultüchtigkeit, und Charakter. Zsch. f. Kinderforsch, 1928, v. 34, pp. 1-52.

86. Stuart, John Cameron. Data On Alleged Psychopathology of the Only Child. Journal of Abnormal Psychology, 1925-26, v. 20, p. 441.

In treating the results, the pupils were divided into three age groups (11-12; 13-14; and 15-16) and four sibling groups (1; 2; 3 or 4; and 5 or more). The sexes were approximately equal in number. Tables LXXIII and LXXIV present the results in the usual form.

Table LXXIII reveals some interesting though statistically unreliable tendencies as follows:

1. In the case of the "only child", the mean scores slightly increase towards introversion from ages eleven to sixteen.
2. With the appearance of one brother or sister, the mean scores decrease towards extroversion from ages eleven to sixteen.
3. The "only child" eleven or twelve years of age is more extrovert on the average than the pupil of the same age having one brother or sister. The reverse is true for pupils fifteen or sixteen years of age.
4. Where there are five or more siblings, the mean scores increase slightly from ages eleven to sixteen.
5. With the exception of the cases where there is one brother or sister, for pupils fifteen or sixteen, an increase in the number of siblings increases the mean score or tendency towards introversion. This is also true to a slight extent with pupils thirteen or fourteen years of age, but not true with pupils eleven or twelve.

TABLE LXXIII

INTROVERSION-EXTROVERSION DIFFERENCES IN RELATION TO THE
NUMBER OF SIBLINGS

N = 721

No. Sib- lings	Ages 11-12			Ages 13-14			Ages 15-16		
	Mean	S.D.	P.E. Mean	Mean	S.D.	P.E. Mean	Mean	S.D.	P.E. Mean
1	114.85	15.65	2.30	115.67	11.92	1.15	117.00	14.35	2.50
2	119.26	12.53	1.30	117.34	10.44	.69	113.55	12.88	1.29
3 or 4	117.91	15.39	1.40	117.51	14.14	.79	119.40	12.08	.99
5 or more	115.65	13.03	1.72	117.35	12.96	.90	120.00	15.17	1.35

Table LXXIV shows few reliable differences, but interesting trends as follows:

1. The most reliable difference occurs in the fifteen-sixteen age groups where the odds are 45 to 1 in favor of a pupil with four or more brothers and sisters being more introverted than a pupil with only one.
2. Quite the reverse of this is true in the case of pupils eleven and twelve years of age where the odds are 3 to 1 in favor of the pupils with four or more brothers and sisters being more extroverted.
3. Apparently the appearance of a brother or sister for pupils fifteen and sixteen makes for a more extroverted condition, while the reverse is true of pupils eleven and twelve.

TABLE LXXIV

INTERPRETATION OF MEAN EXTROVERT-INTROVERT DIFFERENCES
 IN RELATION TO THE NUMBER OF SIBLINGS, IN TERMS OF
 PROBABILITY OF OCCURRENCE
 N = 721

Age	No. Siblings	Differences Between Mean Scores	P.E. diff.	D P.E. diff.	Percentage of Probable Occurrence By Chance	Odds in Favor of Difference
11-12	1	-4.41	2.64	-1.67	25.15	2.98 to 1
11-12	2	+3.61	2.16	+1.67	25.15	2.98 to 1
15-16	1	+3.45	2.81	+ 1.23	41.83	1.39 to 1
15-16	2	-6.45	1.87	-3.45	2.18	44.87 to 1
	5					

SUMMARY OF THE STUDY OF NUMBER OF SIBLINGS IN RELATION
 TO INTROVERSION-EXTROVERSION

Little or no evidence was produced to support the theory that an only child might tend towards introversion. From the evidence available, it would be easier to prove the reverse, but the differences are small and statistically unreliable. The results from the experiment suggest that if conditions were more carefully controlled, some evidence might be forthcoming to show the influence of brothers and sisters on the factors of introversion and extroversion. The conditions

needing better control are sex, age of siblings, age position of pupils in relation to brothers and sisters, and the socio-economic status of the family.

The results from this study would justify more intensive study of this problem.

CHAPTER X

INTROVERSION-EXTROVERSION AND POPULARITY

Seven hundred and fifteen boys and girls in the junior high schools of Ann Arbor, were asked to write on an especially provided blank the name of the boy or girl in their home room whom they considered the most popular. Fifty-one girls and forty-nine boys were mentioned ten or more times. The mean introvert-extrovert scores of this group of 100 boys and girls are contained in Table LXXV.

In observing the results set forth in Table LXXV, it is apparent that the mean scores of the popular boys and girls show a decided tendency towards extroversion. One also observes that those named as the most popular are less variable in their introversion-extroversion test scores. The reliability of both mean score and standard deviation differences is relatively high as shown by the low probability of such a difference occurring by chance and the high odds in favor of the difference.

It may be concluded, therefore, that these pupils who were considered popular with their classmates by the 715 junior high school pupils show a decided tendency on the average to be more extroverted than the group as a whole.

TABLE LXXV

COMPARISON OF MEAN INTROVERT-EXTROVERT SCORES OF A GROUP OF POPULAR GIRLS AND BOYS WITH THE STANDARDS FOR THEIR GROUPS, AGES TWELVE TO SIXTEEN

	Girls	Standard	Boys	Standard
Mean scores.....	113.57	117.52	112.61	117.41
S. D.	9.75	11.97	9.76	12.81
P.E. mean.....	.92	.31	.94	.28
P.E.s.d.....	.66	.20	.67	.19
Difference between mean scores.....	3.95			4.80
P.E. diff.....	.97			.98
D/P.E.diff.....	4.07			4.90
Percentage of probable occurrence by change .....	.569			.095
Odds in favor of difference.....	174.75 to 1			1051.63 to 1
Difference between standard deviations.....	2.22			3.05
P.E.diff.....	.69			.69
D/P.E.diff.....	3.22			4.42
Percentage of probable occurrence by chance.....	3.09			.300
Odds in favor of difference.....	31.36 to 1			332.33 to 1

CHAPTER XI

MEMBERSHIP IN ORGANIZED GROUPS AS RELATED TO INTROVERSION-EXTROVERSION

Descriptions of the extrovert tendencies of individuals often lead one to suppose that they are more active socially, greatly enjoy being with others, and are more often members of social organizations than those with introvert tendencies. For the purpose of testing the validity of one of these suppositions, 721 junior high school pupils in the Ann Arbor Schools were asked to state the number of social organizations they actively belonged to both in and out of school. Such organizations as the Boy Scouts, Girl Scouts, Young Peoples, Campfire, Torchbearer Club, King's Guard, etc. are examples.

The results from the Psychological Interview Test for Introversion-Extroversion for these pupils were tabulated separately for four organization groups. Table LXXVI gives the mean scores for boys and girls belonging to no organizations, one, two or three, four or more. It will be noted from this table that the mean scores of the boys in all four groups are approximately the same. No tendency for "joiners" to be more extrovert than "non-joiners" appears from these results. In the case of girls, the same is true with one exception. A decided decrease towards extroversion in the mean score appears for those belonging to four or more organized groups. The reliability of this difference is shown in Table LXXVII.

TABLE LXXVI

**A COMPARISON OF MEAN INTROVERT-EXTROVERT SCORES IN
RELATION TO MEMBERSHIP IN ORGANIZED GROUPS**

N=721

Sex	Number of Organizations			
	0	1	2-3	4 or more
Girls				
Mean	118.72	118.32	118.14	112.82
S.D.	12.08	14.07	12.96	11.27
P.E.mean	1.37	.94	.71	1.00
Boys				
Mean	115.00	116.73	116.32	116.47
S.D.	12.49	14.90	12.25	10.77
P.E.mean	1.25	.97	.68	.89

TABLE LXXVII

**RELIABILITY OF THE MEAN INTROVERT-EXTROVERT DIFFERENCE
FOR GIRL MEMBERS OF NO AND FOUR OR MORE ORGANIZED GROUPS**

	No	Four or More
Mean Score.....	118.72	112.82
S.D.....	12.08	11.27
P.E.Mean.....	1.37	1.00
Difference between mean scores.....	5.90	
P.E.diff.....	1.70	
D/P.E.diff.....	3.47	
Percentage of probable occurrence by chance	1.82	
Odds in favor of difference.....	53.95 to 1	

Apparently little or no relationship exists between introversion-extroversion and the number of organized groups in which junior high school pupils are active members. There may be one exception to this in the case of girls who belong to four or more organizations. A statistically reliable difference shows this group to be more inclined towards extroversion than the others.

It might be of value to carry on a carefully controlled experiment in which the type of organized group and the offices held if any are taken into consideration. It may, however, be concluded that those of introvert tendencies are, on the average, members of as many organizations as those with extrovert tendencies.

CHAPTER XII

ORGANIZATION OFFICERS IN RELATION TO
INTROVERSION-EXTROVERSION

Only one study has been made which endeavored to show the relationship between school leaders and introversion-extroversion. Caldwell and Wellman⁸⁷ studied 113 junior high school pupils, relating leadership to chronological age, mental age, scholarship, height, physical achievement, and extroversion. They concluded that school leaders tend towards extroversion, especially girls where extroversion was most marked. The exception noted to the above was in the case of magazine-staff representatives, who tended towards introversion.

Seven hundred and fourteen Ann Arbor junior high school pupils in the present study checked the types of office to which they had been elected according to the following form:

- | | |
|--|--|
| <input type="checkbox"/> president | <input type="checkbox"/> captain of team |
| <input type="checkbox"/> vice-president | <input type="checkbox"/> historian |
| <input type="checkbox"/> secretary or scribe | <input type="checkbox"/> chairman of a committee |
| <input type="checkbox"/> treasurer | <input type="checkbox"/> editor or assistant editor of school paper |
| <input type="checkbox"/> patrol leader | <input type="checkbox"/>
any other office not listed above. |

The mean introvert-extrovert scores for boys and girls having held or holding none, one, two or three, and four or more offices are contained in Table LXXVIII. This table reveals not

87. Caldwell, Otis W. and Wellman, Beth - Characteristics of School Leaders, Journal of Educational Research, 1926, v.XIV, pp. 1-20.

only that the mean scores decrease gradually toward extroversion with the number of offices held, but also that the variability of the groups decreases with the increase in the number of offices. It will also be noted that the girls' mean score remains constantly slightly higher than the boys with the exception of those who have held two or three offices. Caldwell and Wellman found that girl school leaders were markedly more extrovert than boy leaders. Their findings are not in accord with those of the present study according to which girls become more extroverted with an increase in the number of offices held, but not to a greater extent than the boys.

TABLE LXXVIII

A COMPARISON OF MEAN INTROVERT-EXTROVERT SCORES FOR BOYS AND GIRLS HOLDING NO OFFICE, ONE, TWO OR THREE, OR FOUR OR MORE IN ORGANIZED GROUPS

Sex	Number of offices			
	0	1	2 or 3	4 or more
Girls				
N	126	82	85	44
Mean	119.70	117.06	114.76	115.04
S.D.	13.57	13.75	12.65	11.00
P.E.mean	.81	1.02	.93	1.12
Boys				
N	128	124	86	39
Mean	118.40	116.97	115.95	114.18
S.D.	14.21	13.30	10.77	10.86
P.E.mean	.85	.81	.78	1.17

The differences shown in Table LXXIX for girls and Table LXXX for boys reveal that the pupils who hold one office are slightly more extroverted on the average than those holding no offices. The reliability of the differences for the four groups increases gradually until those who hold four or more are almost certain to be more extroverted on the average than the pupils who have never been elected to an office of some type.

TABLE LXXIX

INTERPRETATION OF MEAN INTROVERT-EXTROVERT DIFFERENCES FOR GIRLS HOLDING VARIOUS NUMBERS OF OFFICES IN ORGANIZED GROUPS

N=337

Groups Compared	Differences in Mean Scores	P.E. diff.	D P.E. diff.	Percentage of Probable Occurrence By Chance	Odds in Favor of Difference
0					
1	2.64	1.30	2.03	17.73	4.64 to 1
0					
2-3	4.94	1.23	4.02	.698	142.26 to 1
0					
4-	4.66	1.38	3.38	2.18	44.87 to 1
1					
2-3	2.30	1.38	1.67	25.15	2.98 to 1
1					
4-	2.02	1.51	1.34	38.06	1.63 to 1
2-3					(less than
4-	-.28	1.46	-.19	(above 50)	1 to 1)

TABLE LXXX

INTERPRETATION OF MEAN INTROVERT-EXTROVERT DIFFERENCES FOR BOYS HOLDING VARIOUS NUMBERS OF OFFICES IN ORGANIZED GROUPS

N=377

Groups Compared	Differences in Mean Scores	P.E. diff.	D. P.E. diff.	Percentage of Probable Occurrence By Chance	Odds in Favor of Difference
0 1	1.43	1.17	1.22	41.83	1.39 to 1
0 2-3	2.45	1.15	2.13	15.67	5.38 to 1
0 4-	4.52	1.44	3.14	3.65	26.40 to 1
1 2-3	1.02	1.12	.91	(above 50)	(less than 1 to 1)
1 4-	2.79	1.42	1.96	17.73	4.64 to 1
2-3 4-	1.77	1.41	1.25	38.06	1.63 to 1

It might be profitable to analyze the results on a basis of the type of office to reveal, for example, if those pupils elected to the office of president are more or less extroverted than those elected to the editorship of the school paper, etc.

However, it may be concluded from the present investigation that school leadership as measured by election to an office in an organized group bears a relationship to introversion-extroversion, pupils so elected being more extroverted than those not elected.

CHAPTER XIII

SUMMARY AND CONCLUSIONS

At the present time in the field of educational and experimental psychology a growing emphasis is being placed upon factors of personality other than intelligence. The concepts of introversion and extroversion are increasingly aiding in the better understanding of personality problems even in their present ill-defined state, and are leading educators to consider them when attempting individual adjustments.

While many attempts have been made to define and determine the causes of introversion and extroversion, the majority of the authorities in the field agree that:

- a. whether it is an inward or outward flow of psychic energy, whether overt expression is inhibited or not, or whether attention is turned in one direction or the other, the fact remains that the individual's reactions to social situations provide a means of measuring the degree introversion or extroversion has attained.
- b. characteristics, which show that the conditioning process resulting in introversion-extroversion has taken place, appear very early in the child's life.

A survey of previous studies reveals that introversion and extroversion are quite obviously very significant traits leading to a better understanding of human personality, whether normal or abnormal. While the majority of the studies have been concerned with college students, enough experimental work has been carried on with young children to prove conclusively that the concepts can be used to advantage in the grades. The previous lack of an instrument to measure these tendencies of introversion-extroversion in high school pupils, the uncertainty about sex and age differences and the absolute dearth of studies of high school pupils showing the relationship between these traits and achievement in school subjects, gave evidence of the need for such an investigation as this.

A review of the traits supposedly characteristic of introversion and extroversion resulted in more agreement than one might naturally expect in view of their comparatively recent origin. Test items suited to the high school level were prepared for sixty traits and administered to representative groups of junior and senior high school pupils. Eight of their friends were also asked to rate each of the 107 pupils participating in the preliminary experiment. Subjecting these results to statistical treatment resulted in the selection of thirty items for the final form of the Psychological Interview Test for Introversion and Extroversion. This test correlates $.883 \pm .014$ with the criterion accepted as representing the best placement

of a pupil on the introversion-extroversion scale, $.865^* \pm .019$ with 856 associate ratings, and $.763^* \pm .024$ with 139 teacher ratings. The reliability of the test is $.842^{**} \pm .019$ when odd and even scores are correlated and $.871 \pm .028$ when the test was repeated four weeks later.

The distribution of scores on the test approximates the normal probability curve as shown by the following existing conditions:

1. It is uni-modal in nature.
2. The mode, median, and mean are approximately the same.
3. The range of about 90 points in most distributions out of a possible 144 is nearly 7 times the standard deviation for the majority of cases.
4. The points of inflection of the curves approximate ± 1 S. D. with a slight skewness toward extroversion.

The results from the study of 964 junior and senior high school pupils analyzed on the basis of age, support those studies which have found age differences. In brief, the following age differences were revealed:

1. There is a gradual increase towards introversion on the basis of grade, age and grade-at-age from younger to older pupils.

* Corrected for attenuation.

**Predicted for the entire test.

2. For retarded pupils, the tendency is towards introversion in Grades VII and VIII with a drop occurring in the ninth grade and the tendency from there on definitely towards extroversion.
3. For accelerated pupils, the tendency is towards extroversion in Grades VII to X and markedly towards introversion in Grades XI and XII.

This study is in harmony with those which have revealed significant sex differences.

1. For the 964 junior and senior high school pupils in the Lincoln School, Milwaukee, extremely significant sex differences exist.
2. While the mean scores of the boys in grade-at-age remain relatively constant, the girls are more extroverted than the boys in Grades VII and VIII, approximately the same in Grades IX and X, and more introverted in Grades XI and XII.
3. Girls one year retarded in Grades XI and XII tend towards extroversion in contrast with a tendency towards introversion for girls in the same grades who are accelerated.

Analysis of the results of introversion-extroversion in relation to school marks of 964 junior and senior high school

pupils leads to the following conclusions:

1. On the average, those pupils with extrovert tendencies receive the better marks in Grades VII and VIII also in the grade-at-age groups in general.
2. There is no reliable difference in marks for introverts and extroverts in Grades IX and X and in the retarded groups in general.
3. The average difference in marks favors the introvert as a rule in Grades XI and XII and the accelerated groups in general.

The results from 721 junior high school pupils from the Ann Arbor, Michigan schools do not establish any relationship between the number of siblings, or membership in social organizations.

When the results were analysed for 721 junior high school pupils to determine the influence of popularity with the classmates and number of offices held in organized groups, a relationship was established. The mean introvert-extrovert scores of boys and girls named ten or more times as the most popular in their home room were definitely more extroverted than the group as a whole. For both boys and girls, there was also a definite trend towards extroversion with an increase in the number of offices to which the pupil had been

elected. The mean scores of those pupils who had been elected to no offices are slightly higher or more introverted than the average for the group as a whole.

While this investigation has contributed something towards the measurement of introversion-extroversion traits in high school pupils and established a limited number of relationships, it should accomplish much more in pointing the way for further experimentation.

APPENDIX ONE

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APPENDIX TWO

Experimental Forms of the Psychological Interview Test
Used for Self and Associate Ratings of 107
Representative Junior and Senior
High School Pupils

A PSYCHOLOGICAL INTERVIEW
Form A

Name.....Date.....
School grade.....Age.....Date of birth.....
Girl.....Boy.....Name of School.....

DIRECTIONS: On the following pages are a number of questions with three answers listed. None of these questions have wrong answers, as they are only different ways of doing or thinking about things. You are to read the questions and mark the answer you like best by placing a check mark in front of it. Be sure to check only one answer to each item. Read all three parts to each question before checking one. Just tell the way you feel and remember that your school-mates or teachers will not know what you write. There is no time limit to this interview, but work as rapidly as you can.

1. Where would you rather go for your summer vacation?
 1. to a lively resort where there are lots of people, cottages, and amusements?
 2. to a nice quiet lake or resort in the woods?
 3. sometimes enjoy a quiet place and sometimes a more lively one?
2. How many good friends have you?
 1. two or three?
 2. quite a few?
 3. a great many?
3. When you are in a dangerous position or when things depend on you, do you
 1. use your head though it is hard not to get excited?
 2. get excited so easily that you hardly know what you are doing?
 3. keep cool so that it is hard for you to get excited?
4. When someone has said something unkind about you which you have overheard or been told about, do you
 1. pay no attention and forget it?
 2. let it bother you a little?
 3. feel unhappy about it?
5. The friends that you have made, have you found that they
 1. are not as good friends as at first?
 2. are just as good friends as you at first thought they would be?
 3. sometimes one, sometimes the other?
6. Whenever you are at a party or event where others are present, do you
 1. like to take part when you think others want you to?
 2. enter into all activities and think of things to do?
 3. like to take it easy and let others talk most of the time and start things?
7. In your dress and personal appearance, do you
 1. want to look as well as your friends?
 2. prefer to be comfortably dressed whether you look very well or not?
 3. take particular care so that you always look your best?
8. Suppose some of your friends change the subject of conversation or seem to be talking in low tones when you join them, do you
 1. think they are saying mean or "catty" things about you?
 2. hardly notice it so that it makes no difference in what you think of them?
 3. feel that it is their business that they are talking about?
9. Whenever things are not going right, do you
 1. feel sure that they will come out all right?
 2. sometimes worry about what might happen?
 3. try to make the best of things?
10. In doing work of any kind, do you prefer to work
 1. with others?
 2. either alone or with others?
 3. alone?

11. Suppose your school is giving the largest school party of the year. You are a member of a committee in charge of the affair. Would you
 1. like to do those things which you are sure the other members want you to do?
 2. rather have the others on the committee run it?
 3. greatly enjoy directing activities of the party?

12. When you are given some work to do, do you prefer to
 1. plan just enough to get a good start?
 2. plan it out carefully before you begin?
 3. plan as you go?

13. Suppose you have just been introduced to someone whom you never saw or heard of before. Would you
 1. place trust in him until he proves otherwise?
 2. be rather careful about associating with him until you know him better?
 3. assume that he is probably all right?

14. When it comes to your feelings toward your best friends or parents, do you
 1. feel deeply, but show it very little?
 2. find some difficulty in expressing your feelings?
 3. find it easy to express feelings whether deep or not?

15. Suppose one of your crowd wants to borrow a dollar from you. Would you
 1. hesitate making the loan no matter who wanted it?
 2. make the loan to some but not to others?
 3. make the loan if he promised to pay you back?

16. Try to picture the way you generally work. Do you
 1. work steadily at one thing until completed?
 2. work steadily at those tasks you like best, but not at those which you do not like?
 3. do better work when you go from one thing to another as your feelings change?

17. When written work is given in your English classes, do you
 1. sometimes like to write about things you are interested in and sometimes like to write about other things?
 2. prefer to write about other things rather than what you have done?
 3. get enjoyment from writing about your interests, things you have done, and how you feel?

18. When several people look at you or laugh at you, do you
 1. blush and feel unhappy?
 2. rather enjoy the attention and turn the joke if you can?
 3. not mind it?

19. When looking at what your friends do or listening to what they say, do you
 1. many times see something funny about what they do or say?
 2. sometimes take them seriously and sometimes see the funny side?
 3. take them seriously?

20. Whenever things go wrong, do you
 1. feel that it is your fault, but that you will have better luck next time?
 2. feel that luck is against you?
 3. forget it and go ahead with what you are trying to do?

21. When talking about what others do or say, do you
 1. see a great many faults in them?
 2. see hardly any faults?
 3. on a few occasions see faults in them?
22. Suppose someone in your school that you don't know personally has been caught cheating on an examination. The teacher wants to find out what the students think ought to be done about it. Would you prefer to do this in
 1. speech?
 2. writing?
 3. either writing or speech?
23. In making friends with girls, if you are a boy, and boys, if you are a girl, do you
 1. think little about such friendships?
 2. like both equally well?
 3. greatly enjoy such friendships?
24. When it comes to running errands, returning something you have borrowed, or remembering to do things at the right time, do you
 1. forget some things?
 2. most always remember?
 3. very often forget?
25. Suppose a new "talkie" is being shown at one of your best theatres. The "star" of the play is one whom you never cared much about, but everyone seems to be going. Would you
 1. go because most of your crowd are going?
 2. stay away because you do not care for the "star" of the play?
 3. go because you think you might like it?
26. When you have your own way about picking tasks to be done, do you choose those
 1. which make it possible for you to be alone?
 2. which make it possible to work with others?
 3. in which you are most interested whether or not you have to work alone or with others?
27. In the way things are run at school, in our cities, or in foreign countries, do you feel
 1. that some things are good and some are bad and it is better to be on the side of the good?
 2. there is much wrong that ought to be changed and it would be fine to be a great reformer and make things better?
 3. that the thing to do is to take the world as it is and learn to get on in it?
28. In making up your mind what to do, do you
 1. think how others will take it?
 2. try to think of both sides of the question?
 3. think of the effect it will have on you?
29. In choosing boy friends, if you are a boy, and girl friends, if you are a girl, do you
 1. prefer those who like the same things you do?
 2. like those just as well whose interests are somewhat different?
 3. have no special preference?

30. At school assemblies or other places where your class-mates are assembled, do you
1. find it easier to say what you want to in discussion or debate?
 2. like to talk before a crowd?
 3. prefer not to talk before them?
31. When talking to others about something which they or their friends have done, do you usually
1. say what you think is the truth?
 2. say just what you think, but in as nice a way as possible?
 3. try to be careful not to hurt any one's feelings?
32. If Commander Byrd should ask you to accompany him on one of his Arctic or Antarctic trips, would you
1. accept gladly and look forward to a great experience?
 2. thank him kindly, but decline, telling him that you would prefer to read about it after he returned?
 3. accept, not because you really wanted to go, but because you felt it was a great opportunity?
33. Have you ever kept a diary?
1. never kept any?
 2. a short "line a day" recording of what happens?
 3. quite a long one telling how you feel about things that happen?
34. When it comes to new ways of doing or making things, do you
1. once in a while think of a new way of doing or making something?
 2. very often think of new things or ways of doing things?
 3. very seldom think of new ways to make or do anything?
35. Whenever you lose a game or play poorly, do you
1. try not to let it bother you and have a good time anyway?
 2. enjoy the sport almost as much as if you had won?
 3. become disgusted with yourself?
36. Many times people are called upon to share their things with others. Do you
1. prefer not to do this?
 2. do this sometimes?
 3. most always do this?
37. Suppose your school is putting on a drive to raise money to buy some new pictures. You have been asked to help in this campaign. Will you
1. prefer to help in some other way?
 2. greatly enjoy selling things?
 3. neither like it or dislike it very much?
38. Think of several of your friends. Did you
1. make them your friends rather easily?
 2. know them a long time before you could really call them friends?
 3. call them friends before you knew them very long?

39. Whenever you think of starting something that takes nerve, do you
1. go ahead and take a chance for the fun there is in it?
 2. generally decide it would be wiser not to do it?
 3. think it over and do it if you decide it won't get you into trouble?
40. When it comes to telling your worries and troubles, do you
1. like to talk about them if you can find some one who seems to be interested?
 2. tell some of your worries and troubles perhaps to your best friends or parents?
 3. most always keep things to yourself?
41. Think of some of the things you enjoy because of the "thrill". Do you
1. make some use of them besides enjoying them?
 2. like them just for the fun there is in it?
 3. like them because the experience will be useful sometime?
42. When someone questions what you believe to be true, do you
1. stand by your beliefs?
 2. sometimes argue for them?
 3. let them believe what they want to?
43. At times when you are "out of humor", "peevish", or angry, can you say that
1. you do not know what makes you feel so?
 2. you know who it is or what happened that got you "sore"?
 3. the cause is only partly understood?
44. Suppose a story is being passed around the school about one of your friends. The truth of the story is not clear. Would you
1. keep it in mind should the chance come to find out whether it is true or a lie?
 2. pay serious attention to it and try to find out if it is true and who started it?
 3. forget it or pay no attention to it?
45. Whenever your teachers give orders or try to get you to stop whispering, study harder, etc., do you
1. do what they tell you to do most of the time and try not to let it bother you?
 2. do what they say as a matter of course?
 3. feel that you do not want to do what they ask you to do?
46. When it comes to a problem in your daily life at home or in school, do you
1. usually ask your teacher or friends to help you?
 2. sometimes ask others to help you?
 3. work it out by yourself?
47. In writing letters to your friends, do you
1. rewrite many of them?
 2. rewrite only a few?
 3. never rewrite them?

- 48. Suppose a group of students at your school have decided that a "school paper" should be established. They have called a meeting to see what can be done about it. Would you
 - 1. go to the meeting and help promote the idea of establishing a school paper?
 - 2. prefer to wait, and, if the paper is established, try-out for some position on the staff?
 - 3. go to the meeting to see what it is all about?

- 49. Which answer best describes the work you like best-
 - 1. work which is not too "fussy"?
 - 2. work requiring a great deal of care and patience?
 - 3. at times one, at times the other?

- 50. When your school has a "pep" meeting before a big game, do you think they
 - 1. are not especially interesting or valuable?
 - 2. are good fun and help win the game?
 - 3. help "pep" up the crowd?

- 51. When you are going to do something you want to do very much, do you express your feelings thru
 - 1. happy thoughts but keep quiet?
 - 2. happy thoughts and wanting to tell people about it?
 - 3. actions like jumping up and down or yelling - you feel so good?

- 52. In general, how do you feel towards your work and towards other people?
 - 1. cheerful and happy at all times?
 - 2. sometimes very cheerful and sometimes unhappy?
 - 3. quite unhappy and dissatisfied?

- 53. If your teachers should give you the morning off to do whatever you liked best, would you
 - 1. enjoy most reading or thinking over things and making plans in your mind for the future?
 - 2. like best to play games out-of-doors or in the gym?
 - 3. sometimes do what is under (1) and sometimes what is under (2)?

- 54. Suppose you have stopped work on a school problem of your own because you were having a hard time finding the answer. What do you think would help most to get you started again?
 - 1. your teacher and classmates thinking that you can finish?
 - 2. a great deal of praise for what you have done, by the teachers or your friends?
 - 3. your teacher and classmates thinking that you cannot finish?

- 55. Everyone spends some time each day thinking things over. Do you
 - 1. like to dream sometimes and do things sometimes?
 - 2. think it is more fun to do things than dream about them?
 - 3. find joy in picturing in your mind scenes and events most of which could never really happen to you?

- 56. On the playground, in the gym., or in any of your school work, in general, how do you really compare with others in your crowd?
 - 1. somewhat better?
 - 2. about the same?
 - 3. not as good?

- 57. In making up your mind on ordinary questions, do you
 - 1. decide very quickly?
 - 2. take lots of time?
 - 3. decide rather quickly?

- 58. What about your "pet" ideas? Do you
 - 1. make use of some and forget others?
 - 2. tell others about them?
 - 3. put them to some use?

- 59. Suppose the students in your class have secured evidence which shows that one of their class-mates has cheated on several occasions. You have looked the evidence over and find a clear case against him. Would you
 - 1. make an effort to have him given another chance?
 - 2. insist that, since he has proved to be dishonest, he should be punished?
 - 3. let the others decide what to do about it?

- 60. At times when you feel that someone can do some stunt better than you can, do you
 - 1. not care whether others can do it better or not?
 - 2. sometimes admit that you cannot do it as well?
 - 3. try to make them believe that you can do it just as well?

PSYCHOLOGICAL INTERVIEW
Form G

My name is.....Date.....

I am describing.....

DIRECTIONS: On the following pages are a number of questions with three answers listed. None of these questions have wrong answers, as they are only different ways of doing or thinking about things. You are to read the questions and mark the answer WHICH YOU THINK BEST DESCRIBES YOUR FRIEND WHOSE NAME APPEARS ABOVE. Be sure to check ONLY ONE answer to each item. Read all three parts to each question before checking one. Just tell what you think and REMEMBER THAT YOUR CLASS-MATES WILL NOT KNOW WHAT YOU WRITE. If you have no ideas for some of the items, you may skip them. BUT, WHEN YOU HAVE ANY IDEAS ABOUT WHAT SHE WOULD BE MOST LIKELY TO DO OR HOW SHE WOULD FEEL, BE SURE TO MARK THE ONE WHICH YOU THINK APPLIES IN HER CASE. Work as rapidly as you can.

1. Where do you think she would rather go for her summer vacation?
 1. to a lively resort where there are lots of people, cottages, and amusements?
 2. to a nice quiet lake or resort in the woods?
 3. sometimes enjoy a quiet place and sometimes a more lively one?

2. How many good friends has she?
 1. two or three?
 2. quite a few?
 3. a great many?

3. When she is in a dangerous position or when things depend on her, does she
 1. use her head though it hard for her not to get excited?
 2. get excited so easily that she hardly knows what she is doing?
 3. keep cool so that it is hard for her to get excited?

4. Whenever someone has said something unkind about her which she has overheard or been told about, does she
 1. pay no attention and forget it?
 2. let it bother her a little?
 3. feel unhappy about it?

5. The friends she has made, do you think she has found that they
 1. are not as good friends as at first?
 2. are just as good friends as she at first thought they would be?
 3. sometimes one, sometimes the other?

6. Whenever she is at a party or event where others are present, does she
 1. like to take part when she thinks others want her to?
 2. enter into all activities and think of things to do?
 3. like to take it easy and let others talk most of the time and start things?

7. In her dress and personal appearance, does she
 1. want to look as well as her friends?
 2. prefer to be comfortably dressed whether she looks very well or not?
 3. take particular care so that she looks her best?

8. Suppose some of her friends should change the subject of conversation or seem to be talking in low tones when she joined them, do you believe she would
 1. think they were saying mean or "catty" things about her?
 2. hardly notice it so that it made no difference in what she thought of them?
 3. feel that it was their business that they were talking about?
9. Whenever things are not going right, does she
 1. feel sure that they will come out all right?
 2. sometimes worry about what might happen?
 3. try to make the best of things?
10. In doing work of any kind, does she prefer to work
 1. with others?
 2. either alone or with others?
 3. alone?
11. Suppose your school is giving the largest school party of the year. She is a member of a committee in charge of the affair. Would she
 1. like to do those things which she is sure the other members want her to do?
 2. rather have the others on the committee run it?
 3. greatly enjoy directing activities of the party?
12. When she is given some work to do, does she prefer to
 1. plan just enough to get a good start?
 2. plan it out carefully before she begins?
 3. plan as she goes
13. Suppose she has just been introduced to someone whom she never saw or heard of before. Would she
 1. place trust in the person until he proves to be otherwise?
 2. be rather careful about associating with him until she knows him better?
 3. assume that the person is probably all right?
14. When it comes to her feelings towards her best friends or parents, does she
 1. feel deeply, but show it very little?
 2. find some difficulty in expressing her feelings?
 3. find it easy to express her feelings whether deep or not?
15. Suppose one of her crowd wants to borrow a dollar from her. Would she
 1. hesitate making the loan no matter who wanted it?
 2. make the loan to some, but not to others?
 3. make the loan if the person promised to pay her back?
16. Try to picture the way she generally works. Does she
 1. work steadily at one thing until completed?
 2. work steadily at those tasks she likes best, but not at those which she does not like?
 3. do better work when she goes from one thing to another as her feelings change?

17. When written work is given in your English classes, does she
 1. sometimes like to write about things she is interested in and sometimes like to write about other things?
 2. prefer to write about other things rather than what she has done?
 3. get enjoyment from writing about her interests, things she has done, and how she feels?

18. When several people look at her or laugh at her, does she
 1. blush and feel unhappy?
 2. rather enjoy the attention and turn the joke if she can?
 3. not mind it?

19. When looking at what her friends do or listening to what they say, does she
 1. many times see something funny about what they do or say?
 2. sometimes take them seriously and sometimes see the funny side?
 3. take them seriously?

20. Whenever things go wrong, does she
 1. feel that it is her fault, but that she will have better luck next
 2. feel that luck is against her?
 3. forget it and go ahead with what she is trying to do?

21. When talking about what others do or say, does she
 1. see a great many faults in them?
 2. see hardly any faults?
 3. on a few occasions see faults in them?

22. Suppose someone in your school that she does not know personally has been caught cheating on an examination. The teacher wants to find out what the students think ought to be done about it. Do you think she would prefer to do this in
 1. speech?
 2. writing?
 3. either writing or speech?

23. In making friends with boys, does she
 1. think little of such friendships?
 2. like both boys and girls equally well?
 3. greatly enjoy such friendships?

24. When it comes to running errands, returning something she has borrowed, or remembering to do things at the right time, does she
 1. forget some things?
 2. most always remember?
 3. very often forget?

25. Suppose a new "talkie" is being shown at one of the best theatres. The "star" of the play is one whom she never cared much about, but everyone seems to be going. Do you think she would
 1. go because most of her crowd are going?
 2. stay away because she does not care for the "star" of the play?
 3. go because she thinks she might like it?

26. When she has her way about picking tasks to be done, does she choose those
 1. which make it possible for her to be alone?
 2. which make it possible for her to work with others?
 3. in which she is most interested whether or not she has to work alone or with others?

27. In the way things are run at school, in our cities, or in foreign countries, do you think she feels that
1. some things are good and some are bad and it is better to be on the side of the good?
 2. there is much wrong that ought to be changed and it would be fine to be a great reformer and make things better?
 3. the thing to do is to take the world as it is and learn to get on in it?
28. In making up her mind what to do, does she
1. think how others will take it?
 2. try to think of both sides of the question?
 3. think of the effect it will have on her?
29. In choosing girl friends, does she
1. prefer those who like the same things she does?
 2. like those just as well whose interests are somewhat different?
 3. have no special preference?
30. At school assemblies or other places where her class-mates are assembled, does she
1. find it easier to say what she wants to in discussion or debate?
 2. like to talk before a crowd?
 3. prefer not to talk before them?
31. When talking to others about something which they or their friends have done, does she usually
1. say what she thinks is the truth?
 2. say just what she thinks, but in as nice a way as possible?
 3. try to be careful not to hurt any one's feelings?
32. If Commander Byrd should ask her to accompany him on one of his Artic or Antarctic trips, do you think she would
1. accept gladly and look forward to a great experience?
 2. thank him kindly, but decline, telling him that she would prefer to read about it after he returned?
 3. accept, not because she really wanted to go, but because she felt it was a great opportunity?
33. Has she ever kept a diary?
1. never kept any?
 2. a short "line a day" recording of what happens?
 3. quite a long one telling how she feels about things that happen?
34. When it comes to new ways of doing or making things, does she
1. once in a while think of a new way of doing or making things?
 2. very often think of new things or ways of doing things?
 3. very seldom think of new ways to make or do anything?
35. Whenever she loses a game or plays poorly, does she
1. try not to let it bother her and have a good time anyway?
 2. enjoy the sport almost as much as if she had won?
 3. become disgusted with herself?
36. Many times people are called upon to share their things with others. Does she
1. prefer not to do this?
 2. do this sometimes?

37. Suppose your school is putting on a drive to raise money to buy some new pictures. She has been asked to help in this campaign. Do you think she would
 1. prefer to help in some other way?
 2. greatly enjoy selling things?
 3. neither like it or dislike it very much?
38. Think of several of her friends. Did she
 1. make them her friends rather easily?
 2. know them a long time before she could really call them friends?
 3. call them friends before she knew them very long?
39. Whenever she thinks of starting something that takes nerve, does she
 1. go ahead and take a chance for the fun there is in it?
 2. generally decide it would be wiser not to do it?
 3. think it over and do it if she decides it won't get her into trouble?
40. When it comes to telling her worries and troubles, does she
 1. like to talk about them if she can find some one who seems to be interested?
 2. tell some of her worries and troubles perhaps to her best friends or parents?
 3. most always keep things to herself?
41. Think of some of the things she enjoys because of the "thrill". Does she
 1. make use of them besides enjoying them?
 2. like them just for the fun there is in it?
 3. like them because the experience will be useful sometime?
42. When someone questions what she believes to be true, does she
 1. stand by her beliefs?
 2. sometimes argue for them?
 3. let them believe what they want to?
43. At times when she is "out of humor", "peevish", or angry, do you think that she
 1. does not know what makes her feel so?
 2. knows who it is or what happened that got her "sore"?
 3. only partly understands the cause?
44. Suppose a story is being passed around the school about one of her friends. The truth of the story is not clear. Would she
 1. keep it in mind should the chance come to find out whether it is true or a lie?
 2. pay serious attention to it and try to find out if it is true and who started it?
 3. forget it or pay no attention to it?
45. Whenever her teachers give orders or try to get her to stop whispering, study harder, etc., does she
 1. do what they tell her to do most of the time and try not to let it bother her?
 2. do what they say as a matter of course?
 3. feel that she does not want to do what they ask her to do?
46. When it comes to a problem in her daily life at home or in school, does she
 1. usually ask her teachers or friends to help her?
 2. sometimes ask others to help her?
 3. work it out by herself?

47. In writing letters to her friends, does she
1. rewrite many of them?
 2. rewrite only a few?
 3. never rewrite them?
48. Suppose a group of students at your school have decided that a "school paper" should be established. They have called a meeting to see what can be done about it. Do you think she would
1. go to the meeting and help promote the idea of establishing a school paper?
 2. prefer to wait, and, if the paper is established, try-out for some position on the staff?
 3. go to the meeting to see what is all about?
49. Which answer best describes the work she likes best -
1. work which is not too "fussy"?
 2. work requiring a great deal of care and patience?
 3. at times one, at times the other?
50. When your school has a "pep" meeting before a big game, do you believe she thinks they
1. are not especially interesting or valuable?
 2. are good fun and help win the game?
 3. help "pep" up the crowd?
51. When she is going to do something she wants to do very much, does she express her feelings thru
1. happy thoughts but keeps quiet?
 2. happy thoughts and wanting to tell people about it?
 3. actions like jumping up and down or yelling - she feels so good?
52. In general, how does she feel towards her work and towards other people?
1. cheerful and happy at all times?
 2. sometimes very cheerful and sometimes unhappy?
 3. quite unhappy and dissatisfied?
53. If her teachers should give her the morning off to do whatever she liked best, do you think she would
1. enjoy most reading or thinking over things and making plans in her mind for the future?
 2. like best to play games out-of-doors or in the gym?
 3. sometimes do what is under (1) and sometimes what is under (2)?
54. Suppose she has stopped work on a school problem of her own because she was having a hard time finding the answer. What do you think would help most to get her started again?
1. her teachers and class-mates thinking that she can finish?
 2. a great deal of praise for what she has done by the teachers or her friends?
 3. her teachers and class-mates thinking that she cannot finish?
55. Every spends some time each day thinking things over. Does she
1. like to dream sometimes and do things sometimes?
 2. think it is more fun to do things than dream about them?
 3. find joy in picturing in her mind scenes and events most of which could never really happen to her?

56. On the playground, in the gym., or in any of her school work, in general, does she think she is
1. somewhat better than the rest of her crowd?
 2. about the same?
 3. not as good?
57. In making up her mind on ordinary questions, does she
1. decide very quickly?
 2. take lots of time?
 3. decide rather quickly?
58. What about her "pet" ideas? Does she
1. make use of some and forget others?
 2. just tell others about them?
 3. put them to some use?
59. Suppose the students in your class have secured evidence which shows that one of their class-mates has cheated on several occasions. She has looked the evidence over and finds a clear case against this student. Would she, in your opinion,
1. make an effort to have the student given another chance?
 2. insist that, since this student has proved to be dishonest, he should be punished?
 3. let the others decide what to do about it?
60. At times when she feels that someone can do some stunt better than she can, does she
1. not care whether others can do it better or not?
 2. sometimes admit that she cannot do it as well?
 3. try to make others believe that she can do it just as well?

PSYCHOLOGICAL INTERVIEW

Form B

My name is.....Date.....

I am describing.....

DIRECTIONS: On the following pages are a number of questions with three answers listed. None of these questions have wrong answers, as they are only different ways of doing or thinking about things. You are to read the questions and mark the answer WHICH YOU THINK BEST DESCRIBES YOUR FRIEND whose name appears above. Be sure to check ONLY ONE answer to each item. Read all three parts to each question before checking one. Just tell what you think and REMEMBER THAT YOUR CLASS-MATES WILL NOT KNOW WHAT YOU WRITE. If you have no ideas for some of the items, you may skip them. BUT, WHEN YOU HAVE ANY IDEAS ABOUT WHAT HE WOULD BE MOST LIKELY TO DO OR HOW HE WOULD FEEL, BE SURE TO MARK THE ONE WHICH YOU THINK APPLIES IN HIS CASE. Work as rapidly as you can.

1. Where do you think he would rather go for his summer vacation?
 1. to a lively resort where there are lots of people, cottages, and amusements?
 2. to a nice quiet lake or resort in the woods?
 3. sometimes enjoy a quiet place and sometimes a more lively one?

2. How many good friends has he?
 1. two or three?
 2. quite a few?
 3. a great many?

3. When he is in a dangerous position or when things depend on him, does he
 1. use his head though it is hard for him not to get excited?
 2. get excited so easily that he hardly knows what he is doing?
 3. keep cool so that is hard for him to get excited?

4. When someone has said something unkind about him which he has overheard or been told about, does he
 1. pay no attention to it?
 2. let it bother him a little?
 3. feel unhappy about it?

5. The friends that he has made, do you think he has found that they
 1. are not as good friends as at first?
 2. are just as good friends as he at first thought they would be?
 3. sometimes one, sometimes the other?

6. Whenever he is at a party or event where others are present, does he
 1. like to take part when he thinks others want him to?
 2. enter into all activities and think of things to do?
 3. like to take it easy and let others talk most of the time and start things?

7. In his dress and personal appearance, does he
 1. want to look as well as his friends?
 2. prefer to be comfortably dressed whether he looks very well or not?
 3. take particular care so that he always looks his best?

8. Suppose some of his friends should change the subject of conversation or seem to be talking in low tones when he joined them, do you believe he would
 1. think they were saying mean or "catty" things about him?
 2. hardly notice it so that it made no difference in what he thought of them?
 3. feel that it was their business that they were talking about?
9. Whenever things are not going right, does he
 1. feel sure that they will come out all right?
 2. sometimes worry about what might happen?
 3. try to make the best of things?
10. In doing work of any kind, does he prefer to work
 1. with others?
 2. either alone or with others?
 3. alone?
11. Suppose your school is giving the largest school party of the year. He is a member of a committee in charge of the affair. Would he
 1. like to do those things which he is sure the other members want him to do?
 2. rather have the others on the committee run it?
 3. greatly enjoy directing activities of the party?
12. When he is given some work to do, does he prefer to
 1. plan just enough to get a good start?
 2. plan it out carefully before he begins?
 3. plan as he goes?
13. Suppose he has just been introduced to someone whom he never saw or heard of before. Would he
 1. place trust in the person until he proves to be otherwise?
 2. be rather careful about associating with him until he knows him better?
 3. assume that the person is probably all right?
14. When it comes to his feelings towards his best friends or parents, does he
 1. feel deeply, but show it very little?
 2. find some difficulty in expressing his feelings?
 3. find it easy to express his feelings whether deep or not?
15. Suppose one of his crowd wants to borrow a dollar from him. Would he
 1. hesitate making the loan no matter who wanted it?
 2. make the loan to some, but not to others?
 3. make the loan if the person promised to pay him back?
16. Try to picture the way he generally works. Does he
 1. work steadily at one thing until completed?
 2. work steadily at those tasks he likes best, but not at those which he does not like?
 3. do better work when he goes from one thing to another as his feelings change?

17. When written work is given in your English classes, does he
 1. sometimes like to write about things he is interested in and sometimes like to write about other things?
 2. prefer to write about things rather than what he has done?
 3. get enjoyment from writing about his interest, things he has done, and how he feels?

18. When several people look at him or laugh at him, does he
 1. blush and feel unhappy?
 2. rather enjoy the attention and turn the joke if he can?
 3. not mind it?

19. When looking at what his friends do or listening to what they say, does he
 1. many times see something funny about what they do or say?
 2. sometimes take them seriously and sometimes see the funny side?
 3. take them seriously?

20. Whenever things go wrong, does he
 1. feel that it is his fault, but that he will have better luck next time?
 2. feel that luck is against him?
 3. forget it and go ahead with what he is trying to do?

21. When talking about what others do or say, does he
 1. see a great many faults in them?
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22. Suppose someone in your school that he does not know personally has been caught cheating on an examination. The teacher wants to find out what the students think ought to be done about it. Do you think he would prefer to do this in
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 2. writing?
 3. either writing or speech?

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24. When it comes to running errands, returning something he has borrowed, or remembering to do things at the right time, does he
 1. forget some things?
 2. most always remember?
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25. Suppose a new "talkie" is being shown at one of the best theatres. The "star" of the play is one whom he never cared much about, but everyone seems to be going. Do you think he would
 1. go because most of his crowd are going?
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26. When he has his own way about picking tasks to be done, does he choose those
1. which make it possible for him to be alone?
 2. which make it possible for him to work with others?
 3. in which he is most interested whether or not he has to work alone or with others?
27. In the way things are run at school, in our cities, or in foreign countries, do you think he feels that
1. some things are good and some are bad and it is better to be on the side of the good?
 2. there is much wrong that ought to be changed and it would be fine to be a great reformer and make things better?
 3. the thing to do is to take the world as it is and learn to get on in it?
28. In making up his mind what to do, does he
1. think how others will take it?
 2. try to think of both sides of the question?
 3. think of the effect it will have on him?
29. In choosing boy friends, does he
1. prefer those who like the same things he does?
 2. like those just as well whose interests are somewhat different?
 3. have no special preference?
30. At school assemblies or other places where his class-mates are assembled, does he
1. find it easier to say what he wants to in discussion or debate?
 2. like to talk before a crowd?
 3. prefer not to talk before them?
31. When talking to others about something which they or their friends have done, does he usually
1. say what he thinks is the truth?
 2. say just what he thinks, but in as nice a way as possible?
 3. try to be careful not hurt any one's feelings?
32. If Commander Byrd should ask him to accompany him on one of his Artic or Antarctic trips, do you think he would
1. accept gladly and look forward to a great experience?
 2. thank him kindly, but decline, telling him that he would prefer to read about it after he returned?
 3. accept, not because he really wanted to go, but because he felt it was a great opportunity?
33. Has he ever kept a diary?
1. never kept any?
 2. a short "line a day" recording of what happens?
 3. quite a long one telling how he feels about things that happen?
34. When it comes to new ways of doing or making things, does he
1. once in a while think of a new way of doing or making something?
 2. very often think of new things or ways of doing things?
 3. very seldom think of new ways to make or do anything?

35. Whenever he loses a game or plays poorly, does he
1. try not to let it bother him and have a good time anyway?
 2. enjoy the sport almost as much as if he had won?
 3. become disgusted with himself?
36. Many times people are called upon to share their things with others. Does he
1. prefer not to do this?
 2. do this sometimes?
 3. most always do this?
37. Suppose your school is putting on a drive to raise money to buy some pictures. He has been asked to help in this campaign. Do you think he would
1. prefer to help in some other way?
 2. greatly enjoy selling things?
 3. neither like it or dislike it very much?
38. Think of several of his friends. Did he
1. make them his friends rather easily?
 2. know them a long time before he could really call them friends?
 3. call them friends before he knew them very long?
39. Whenever he thinks of starting something that takes nerve, does he
1. go ahead and take a chance for the fun there is in it?
 2. generally decide it would be wiser not to do it?
 3. think it over and do it if he decides it won't get him into trouble?
40. When it comes to telling his worries and troubles, does he
1. like to talk about them if he can find some one who seems to be interested?
 2. tell some of his worries and troubles perhaps to his best friends or parents?
 3. most always keep things to himself?
41. Think of some of the things he enjoys because of the "thrill". Does he
1. make some use of them besides enjoying them?
 2. like them just for the fun there is in it?
 3. like them because the experience will be useful sometime?
42. When someone questions what he believes to be true, does he
1. stand by his beliefs?
 2. sometimes argue for them?
 3. let them believe what they want to?
43. At times when he is "out of humor", "peevish", or angry, do you think that he
1. does not know what makes him feel so?
 2. knows who it is or what happened that got him "sore"?
 3. only partly understands the cause?
44. Suppose a story is being passed around the school about one of his friends. The truth of the story is not clear. Would he
1. keep it in mind should the chance come to find out whether it is true or a lie?
 2. pay serious attention to it and try to find our if it is true and who started it?
 3. forget it or pay no attention to it?

45. Whenever his teachers give orders or try to get him to stop whispering, study harder, etc., does he
1. do what they tell him to do most of the time and try not to let it bother him?
 2. do what they say as a matter of course?
 3. feel that he does not want to do what they ask him to do?
46. When it comes to a problem in his daily life at home or in school, does he
1. usually ask his teacher or friends to help him?
 2. sometimes ask others to help him?
 3. work it out by himself?
47. In writing letters to his friends, does he
1. rewrite many of them?
 2. rewrite only a few?
 3. never rewrite them?
48. Suppose a group of students at your school have decided that a "school paper" should be established. They have called a meeting to see what can be done about it. Do you think he would
1. go to the meeting and help promote the idea of establishing a school paper?
 2. prefer to wait, and, if the paper is established, try-out for some position on the staff?
 3. go to the meeting to see what it is all about?
49. Which answer best describes the work he likes best -
1. work which is not too "fussy"?
 2. work requiring a great deal of care and patience?
 3. at times one, at times the other?
50. When your school has a "pep" meeting before a big game, do you believe he thinks they
1. are not especially interesting or valuable?
 2. are good fun and help win the game?
 3. help "pep" up the crowd?
51. When he is going to do something he wants to do very much, does he express his feelings thru
1. happy thoughts but keeps quiet?
 2. happy thoughts and wanting to tell people about it?
 3. actions like jumping up and down or yelling - he feels so good?
52. In general, how does he feel towards his work and towards other people?
1. cheerful and happy at all times?
 2. sometimes very cheerful and sometimes unhappy?
 3. quite unhappy and dissatisfied?
53. If his teachers should give him the morning off to do whatever he liked best, do you think he would
1. enjoy most reading or thinking over things and making plans in his mind for the future?
 2. like best to play games out-of-doors or in the gym?
 3. sometimes do what is under (1) and sometimes what is under (2)?

54. Suppose he has stopped work on a school problem of his own because he was having a hard time finding the answer. What do you think would help most to get him started again?
1. his teachers and class-mates thinking that he can finish?
 2. a great deal of praise for what he has done by the teachers or his friends?
 3. his teachers and classmates thinking that he cannot finish?
55. Everyone spends some time each day thinking things over. Does he
1. like to dream sometimes and do things sometimes?
 2. think it is more fun to do things than dream about them?
 3. find joy in picturing in his mind scenes and events most of which could never really happen to him?
56. On the playground, in the gym., or in any of his school work, in general, does he think he is
1. somewhat better than the rest of his crowd?
 2. about the same?
 3. not as good?
57. In making up his mind on ordinary questions, does he
1. decide very quickly?
 2. take lots of time?
 3. decide rather quickly?
58. What about his "pet" ideas? Does he
1. make use of some and forget others?
 2. just tell others about them?
 3. put them to some use?
59. Suppose the students in your class have secured evidence which shows that one of their class-mates has cheated on several occasions. He has looked the evidence over and finds a clear case against this student. Would he, in your opinion,
1. make an effort to have the student given another chance?
 2. insist that, since this student has proved to be dishonest, he should be punished?
 3. let the others decide what to do about it?
60. At times when he feels that someone can do some stunt better than he can, does he
1. not care whether others can do it better or not?
 2. sometimes admit that he cannot do it as well?
 3. try to make others believe that he can do it just as well?

APPENDIX THREE

**Teachers' Rating Scale Used By Thirty-One Teachers
In Rating 139 Junior High School Pupils**

Name of pupil.....

Please check one of the three phrases under each item which best describes in some way the pupil whose name appears above.

- Employment of leisure time.
 - exciting activities
 - reading or enjoying quiet surroundings
 - sometimes one, sometimes the other
- Number of acquaintances.
 - quite a few (5 to 20)
 - hardly any (1 to 5)
 - a great many (20 or more)
- Control during moments of stress.
 - control with some difficulty
 - good control
 - lack of control
- Sensitivity to environment.
 - feelings easily hurt
 - feelings not easily hurt
 - slightly sensitive
- Social activity.
 - enters into activities freely
 - keeps in the background
 - moderately active
- Suspicion concerning other's motives.
 - on some occasions
 - not suspicious
 - becomes suspicious easily
- Possible misfortune.
 - worries and leaves nothing to chance.
 - worries a little and takes some precaution
 - optimistic and carefree
- Preference in working with others.
 - has no preference
 - likes to work with others
 - prefers to work alone
- Qualities of leadership.
 - a good leader or director of activities
 - not good at directing activities
 - has some ability as a leader
- Degree of emotional expression.
 - emotions expressed with slight difficulty
 - expresses emotions easily
 - deeply emotional with little overt expression
- Self-consciousness.
 - enjoys attention of others
 - blushes easily and reveals self-consciousness
 - not noticeably self-conscious
- Degree of humor.
 - sees humor in situations rather slowly
 - sees quickly the humorous side to situations
 - sees little or no humor in situations
- Critical attitude concerning himself or herself and others.
 - seldom critical
 - sometimes critical
 - very often critical

4. Friendships with opposite sex.
 makes them sometimes avoids them when possible enjoys them very much
5. Following the lead of others.
 does things because "they are the thing to do" sometimes unconventional very often unconventional
6. Preference in tasks to be done.
 motivated wholly by interest picks those in which better work is done when working alone those involving others
7. Acquaintances with own sex.
 of various interests prefers those of same interests some varied and some of his or her own
8. Ease in oral expression.
 likes discussion before smaller groups best finds it easy to talk before others oral expression difficult and disliked
9. Attitude when losing a game or playing poorly.
 enjoys the game anyway becomes disgusted with himself or herself tries to have a good time
10. Degree of selfishness.
 sometimes selfish not at all selfish many times shows selfishness
11. Influence over others.
 has little influence some influence has considerable influence or persuasive power
12. Degree of initiative and nerve.
 moderate degree little or no nerve--generally backs out is always willing to try and takes many chances
13. Attitude towards discipline.
 takes orders willingly sometimes unwilling to do what is requested shows considerable unwillingness to cooperate
14. Time taken in decisions.
 rather quickly very quick in deciding rather slowly
15. General type of work preferred.
 work requiring some care and patience not too "fussy" painstaking and delicate work
16. Degree of cheerfulness.
 quite unhappy and dissatisfied most always happy sometimes unhappy and sometimes cheerful
17. Intellectual amusements vs. athletic games.
 prefers athletic games greatly enjoys reading sometimes one--sometimes the other
18. Effect of praise.
 somewhat effective not very effective strongly motivated by praise
19. Daydreams.
 very seldom very often once in a while
20. Attitude concerning own abilities.
 deprecates his or her believes himself or her

APPENDIX FOUR

Final Form of the Psychological Interview Test* With
Directions for Using With Junior and Senior
High School Pupils

*A diagnostic test measuring those tendencies commonly termed introverted, ambiverted, or extroverted, developed at the University of Michigan School of Education. Copyright 1930 by R. D. MacNitt, Ann Arbor, Michigan.

A PSYCHOLOGICAL INTERVIEW*

A PSYCHOLOGICAL INTERVIEW*

For Use in Junior and Senior High Schools

Form A

Name Date
(first name) (initial) (last name)

School grade..... Age..... Date of birth

Girl..... Boy..... Name of school.....

DIRECTIONS: On the following pages are a number of questions with three answers to each question. None of these questions have wrong answers, as they are only different ways of doing or thinking about things. You are to read the questions and mark the answer you LIKE BEST by placing a check mark in front of it. Be sure to check ONLY ONE answer to each item. Read all three parts to each question before checking one. Just tell the way you feel and REMEMBER THAT YOUR SCHOOL-MATES WILL NOT KNOW WHAT YOU WRITE. There is no time limit to this interview, but work as rapidly as you can.

1. Where would you rather go for your summer vacation?

- 1. to a lively resort where there are lots of people, cottages, and amusements?
- 2. to a nice quiet lake or resort in the woods?
- 3. sometimes enjoy a quiet place and sometimes a more lively one?

2. How many GOOD friends have you?

- 1. two or three?
- 2. quite a few?
- 3. a great many?

3. When you are in a dangerous position or when things depend on you, do you

- 1. use your head, though it is hard not to get excited?
- 2. get excited so easily that you hardly know what you are doing?
- 3. keep cool so that it is hard for you to get excited?

4. When someone has said something unkind about you which you have overheard or been told about, do you

- 1. pay no attention and forget it?
- 2. let it bother you a little?
- 3. feel unhappy about it?

5. Whenever you are at a party or event where others are present, do you

- 1. like to take part when you think others want you to?
- 2. enter into all activities and think of things to do?
- 3. like to take it easy and let others talk most of the time and start things?

* A diagnostic test measuring those tendencies commonly termed introverted, ambiverted, or extroverted, developed at the University of Michigan School of Education.

6. Suppose some of your friends change the subject of conversation or seem to be talking in low tones when you join them, do you

- 1. think they are saying mean or "catty" things about you?
- 2. hardly notice it so that it makes no difference in what you think of them?
- 3. feel that it is their business that they are talking about?

7. Whenever things are not going right, do you

- 1. feel sure that they will come out all right?
- 2. sometimes worry about what might happen?
- 3. try to make the best of things?

8. In doing work of any kind, do you prefer to work

- 1. with others?
- 2. either alone or with others?
- 3. alone?

9. Suppose your school is giving the largest school party of the year. You are a member of a committee in charge of the affair. Would you

- 1. like to do those things which you are sure the other members want you to do?
- 2. rather have the others on the committee run it?
- 3. greatly enjoy directing activities of the party?

10. Suppose one of your crowd wants to borrow a dollar from you. Would you

- 1. hesitate making the loan no matter who wanted it?
- 2. make the loan to some but not to others?
- 3. make the loan if he promised to pay you back?

11. When several people look at you or laugh at you, do you

- 1. blush and feel unhappy?
- 2. rather enjoy the attention and turn the joke if you can?
- 3. not mind it?

12. When looking at what your friends do or listening to what they say, do you

- 1. many times see something funny about what they do or say?
- 2. sometimes take them seriously and sometimes see the funny side?
- 3. take them seriously?

13. When talking about what others do or say, do you

- 1. see a great many faults in them?
- 2. see hardly any faults?
- 3. on a few occasions see faults in them?

14. In making friends with girls, if you are a boy, and boys, if you are a girl, do you

- 1. think little of such friendships?
- 2. like both equally well?
- 3. greatly enjoy such friendships?

15. Suppose a new "talkie" is being shown at one of your best theatres. The "star" of the play is one whom you never cared much about, but everyone seems to be going. Would you

- 1. go because most of your crowd are going?
- 2. stay away because you do not care for the "star" of the play?
- 3. go because you think you might like it?

16. When you have your own way about picking tasks to be done, do you choose those

- 1. which make it possible for you to be alone?
- 2. which make it possible to work with others?
- 3. in which you are most interested, whether or not you have to work alone or with others?

17. In choosing boy friends, if you are a boy, and girl friends, if you are a girl, do you

- 1. prefer those who like the same things you do?
- 2. like those just as well whose interests are somewhat different?
- 3. have no special preference?

18. At school assemblies or other places where your class-mates are assembled, do you

- 1. find it easier to say what you want to in discussion or debate?
- 2. like to talk before a crowd?
- 3. prefer not to talk before them?

19. Whenever you lose a game or play poorly, do you

- 1. try not to let it bother you and have a good time anyway?
- 2. enjoy the sport almost as much as if you had won?
- 3. become disgusted with yourself?

20. Many times people are called upon to share their things with others. Do you

- 1. prefer not to do this?
- 2. do this sometimes?
- 3. most always do this?

21. Suppose your school is putting on a drive to raise money to buy some new pictures. You have been asked to help in this campaign by selling things. Would you

- 1. prefer to help in some other way?
- 2. greatly enjoy selling things?
- 3. neither like it or dislike it very much?

22. Whenever you think of starting something that takes nerve, do you

- 1. go ahead and take a chance for the fun there is in it?
- 2. generally decide it would be wiser not to do it?
- 3. think it over and do it if you decide it won't get you into trouble?

23. When it comes to telling your worries and troubles, do you

- 1. like to talk about them if you can find someone who seems to be interested?
- 2. tell some of your worries and troubles perhaps to your best friends or parents?
- 3. most always keep things to yourself?

24. At times when you are "out of humor," "peevish" or angry, can you say that

- 1. you do not know what makes you feel so?
- 2. you know who it is or what happened that got you "sore"?
- 3. the cause is only partly understood?

25. Which answer best describes the work you like best—

- 1. work which is not too "fussy"?
- 2. work requiring a great deal of care and patience?
- 3. at times one, at times the other?

26. In general, how do you feel towards your work and towards other people?

- 1. cheerful and happy at all times?
- 2. sometimes very cheerful and sometimes unhappy?
- 3. quite unhappy and dissatisfied?

27. If your teachers should give you the morning off to do whatever you liked best, would you

- 1. enjoy most reading or thinking things over and making plans in your mind for the future?
- 2. like best to play games out-of-doors or in the gym.?
- 3. sometimes do what is under (1) and sometimes what is under (2)?

28. Suppose you have stopped work on a school problem of your own because you were having a hard time finding the answer. What do you think would help most to get you started again?

- 1. your teacher and classmates thinking that you CAN finish?
- 2. a great deal of praise for what you have done, by the teachers or your friends?
- 3. your teacher and classmates thinking that you CANNOT finish?

29. Everyone spends much time each day thinking things over. Do you

- 1. like to dream sometimes and do things sometimes?
- 2. think it is more fun to do things than dream about them?
- 3. find joy in picturing in your mind scenes and events most of which could never really happen to you?

30. On the playground, in the gym., or in any of your school work, in general, how do you really compare with others in your crowd?

- 1. somewhat better?
- 2. about the same?
- 3. not as good?

A PSYCHOLOGICAL INTERVIEW *

For Use in Junior and Senior High Schools
Form A

Directions for Administering

To administer the test, begin by saying, "As soon as you receive one of these test booklets, you may begin filling the blanks in the upper part of the first page, giving your name, grade, age, etc. After you have finished this, wait for further directions. Do not open the booklet."

After the pupils have received a test blank and filled in the blanks ask them to read the directions on the blank silently while you read them orally. When you are certain that all pupils understand what they are to do say, "Ready; begin."

The most difficult part of administering this test is to create a serious attitude in the pupils so that they will not hesitate to answer the questions in accordance with their true feelings.

Directions For Scoring

To score the test, compare each response with the scoring key and assign one of the three scores in accordance with the pupil's check mark. If a pupil should check the first answer in item one, he receives a score of 0 for that item; second answer, 6; and third, 4. The score for the test is the sum of the scores for each of the thirty items.

Interpretation of Results

Roughly speaking high scores indicate an introvert tendency; median scores, an ambivert tendency; and low scores, an extrovert tendency. The table on the next page may be used to interpret results. The boys' mean scores for ages eleven to eighteen were found to be approximately the same, so but one set of standards has been provided for them. Such was not the case with girls, so four sets of standards have been prepared by two year periods. A girl eleven or twelve years of age making a score of 120 exceeds 79% of the girls of her age, 76% of the girls thirteen and fourteen, 69% of the girls fifteen and sixteen, and 62% of the girls seventeen and eighteen. A boy making the same score exceeds 73% of the boys between the ages of eleven and eighteen. By this table, the degree of introversion (higher scores), extroversion (lower scores), or ambiversion (near mean scores) can be quickly determined.

*A diagnostic test measuring those tendencies commonly termed introverted, ambiverted, or extroverted, developed at the University of Michigan School of Education. Copyright 1930, by R. D. MacNitt, Ann Arbor, Michigan.

Page 2		Page 3		Page 4		Page 1	
Item No.	Score	Item No.	Score	Item No.	Score	Item No.	Score
6.	6 2 4	15.	2 8 4	24.	7 3 4		
7.	2 7 4	16.	7 2 4	25.	2 5 4		
8.	1 4 8	17.	6 3 4	26.	1 4 6		
9.	4 8 2	18.	5 2 7	27.	7 1 4		
10.	7 4 1	19.	3 2 6	28.	4 7 3	1.	0 6 4
11.	8 3 4	20.	6 4 2	29.	4 2 6	2.	6 4 2
12.	2 4 7	21.	7 2 4	30.	2 4 8	3.	4 5 3
13.	5 1 4	22.	1 7 4			4.	1 4 8
14.	7 4 3	23.	3 4 6			5.	4 1 7

Making Adjustments

On the basis of the test results, teachers may make many social and scholastic adjustments which will be of great value from a mental hygiene and vocational guidance standpoint. At the present time little information can be given the teacher as to how to make these adjustments. A great deal of experimental work needs to be done before definite adjustment trends can be established, but a pursual of literature concerning the concepts of introversion and extroversion will give the teacher a working basis for making these personality adjustments. The recent study* by the author of the Psychological Interview Test for Introversion and Extroversion may help in better understanding these problems.

Percentile Rank, Central Tendencies, Variability for Boys and Girls Ages 11 to 18

Score	Boys		Girls		Girls		Girls		Girls	
	11	13	11	12	13	14	15	16	17	18
	Freq.	P. R.	Freq.	P. R.	Freq.	P. R.	Freq.	P. R.	Freq.	P. R.
160									1	100
155	2	100							2	99
150	3	99					3	100	3	98
145	14	99			4	100	4	99	4	98
140	32	98	2	100	6	99	10	98	3	95
135	35	94	3	98	14	97	17	95	5	92
130	75	91	6	95	24	93	27	90	13	88
125	98	83	11	89	35	86	45	82	20	78
120	142	73	14	79	52	76	64	69	22	62
115	130	58	21	65	64	61	44	50	23	44
110	148	44	16	45	56	42	48	37	11	26
105	136	29	14	30	44	26	41	23	9	17
100	81	15	7	17	25	13	19	11	8	9
95	36	7	0	10	9	6	14	5	3	4
90	18	3			9	3	1	1		
85	9	1			1	1	3	1		
80	3	.4	1	1	2	1			1	1
75	1	.1								
N	963		104		345		340		125	
Median	116.90		116.19		117.07		120.00		121.75	
Mean	117.41		115.96		115.82		119.23		122.16	
S. D.	12.31		11.27		11.62		12.33		12.77	
P. E. mean	.28		.74		.41		.45		.77	

*Obtainable as are the Psychological Interview Tests by writing R. D. MacNitt, Ann Arbor, Michigan.

PSYCHOLOGICAL INTERVIEW TEST*

RECORD SHEET

School or institution.....City.....State.....

Teacher..... Examiner..... Date.....

Lowest score..... Median..... Mean..... Highest score.....

NAME	Sex	Grade	Age	Total Score	Percentile Rank	School Data	Remarks and Recommendations
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
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16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

*A diagnostic test measuring those tendencies commonly termed introverted, ambiverted, or extroverted, developed at the University of Michigan School of Education. Copyright 1980, by R. D. Mac Nitt, Ann Arbor, Mich.

APPENDIX FIVE

**A Table For Estimating the Probable Significance
Of Statistical Constants***

By

Raymond Pearl and John Rice Miner

*Papers from the Biological Laboratory of the Maine Agricultural Experiment Station, No. 63.

Such statements as these have no meaning

The use of biometric methods in biology and related applied sciences is becoming all the time more general. The increasing use of this technique is not, however, entirely free from doubtful features. Biometric methods and biometric conclusions per se are not infallible. To use them safely and profitably demands a clear understanding of this real meaning, so that a spacious air of profundity and infallibility may not be given to results which in reality lack these qualities. The present note is offered as a slight numerical aid to sanity and conservatism in statistical investigations.

One of the most important of the contributions of biometry is its insistence on the "probable error" as a test of the probable validity of conclusions. This is an entirely commendable tendency. But there has grown up a certain conventional way of interpreting probable errors, which is accepted by many workers, not all of whom are beginners, without any critical examination of the real basis of the conventional usage. It has been practically a universal custom amongst biometric workers to say that a difference (or a constant) which is smaller than twice its probable error is probably not significant, whereas a difference (or constant) which is three or more times its probable error is either "certainly" or at least "almost certainly" significant.

Now such statements as these drive whatever meaning

they may possibly have from the following simple mathematical considerations. Assuming* that the errors of random sampling are distributed strictly in accordance with the normal or Gaussian curve it is a simple matter to determine from any table of the probability integral the precise portion of the area of a normal curve lying outside any original abscissal limits, or in other words, the probability of the occurrence of a deviation as great as or greater than the assigned deviation. To say that a deviation as great or greater than three times the probable error is "certainly significant" means, strictly speaking, that the area of the normal curve beyond 3 P.E. on either side of the central ordinate is negligibly small. As a matter of fact this is not true, unless one chooses to regard 4.3 per cent, as a negligible fraction of a quantity. There are certainly many common affairs of life in which it would mean disaster to "neglect" a deviation of four per cent of the total quantity involved.

It seems likely that it may be useful to statistical workers to have at hand a small table which will set forth for a series of ratios between a statistical deviation and the

*In the present connection we are in no way concerned with the generality or degree of validity of this assumption. It has been extensively and adequately dealt with by Pearson and his students in many papers. In most cases this assumption is sufficiently accurate for practical purposes.

"probable error"* of the error distribution, first the probability that a deviation as great as or greater than the given one will occur, and second, the odds against the occurrence of such a deviation. Such a table is appended thereto. In calculating it we have used Sheppard's** tables of the probability integral, changing from arguments in terms of standard deviation to arguments in terms of probable error. The probabilities have been expressed on a percentage basis, on the ground that they will probably in this way make a more direct appeal to the average mind, since we are more accustomed to thinking in terms of parts per 100 than per any other number.

A single example will indicate how the table is to be used. Suppose one has determined the mean of each of two comparable series of measurements. These means differ by a certain amount. The difference is found to be, let us say, 3.2 times as large as the probable error of the difference. Is one mean significantly larger than the other? Or, put in another way, what is the probability that the difference arose purely as a result of random sampling (as a result solely of chance)? Under the argument 3.2 in the table we find the

*As many statistical writers have pointed out, the convention of using the "probable error" rather than the standard deviation of a distribution as a measure of its "scatter" is unfortunate. Yule (Introduction to the Theory of Statistics) has made recently a strong plea for the use of the "standard error." It however seems likely that the probable error is too strongly entrenched in the common usage now to be dislodged.

**Biometrika Vol. II, pp. 174-190.

probability of the occurrence of a deviation as great or greater than this to be 3.09. This means that in every 100 trials a deviation of this size or greater would be expected to occur, as result of chance alone, (the error of random sampling), 3.09 times. Or, from the next column, the odds against the occurrence of a difference as great or greater than this in proportion to its probable error, are 31.36 to 1, if chance alone were operative in the determination of the event. If one wants to call this "certainty" he has a perfect right to do so. The table merely defines quantitatively his particular conception of certainty.

It will be noted that after the ratio, deviation + P.E., passes 3.0 the odds against the deviation increase rapidly, reaching a magnitude at 8.0 which is, practically speaking, beyond any real power of conception. We have started the table at 1.0, because this is the point where the chances are even. A deviation as large as the probable error is as likely to occur as not, and vice versa.

TABLE I

Showing the Probability of Occurrence of Statistical
 Deviations of Different Magnitudes
 Relative to the Probable Error

Deviation <u>P.E.</u>	Probable Occurrence of a deviation as great as or greater than designated one in 100 trials	Odds against the occurrence of a de- viation as great as or greater than the designated one.
1.0	50.00	1.00 to 1
1.1	45.81	1.18 to 1
1.2	41.83	1.39 to 1
1.3	38.06	1.63 to 1
1.4	34.50	1.90 to 1
1.5	31.17	2.21 to 1
1.6	28.05	2.57 to 1
1.7	25.15	2.98 to 1
1.8	22.47	3.45 to 1
1.9	20.00	4.00 to 1
2.0	17.73	4.64 to 1
2.1	15.67	5.38 to 1
2.2	13.78	6.26 to 1
2.3	12.08	7.28 to 1
2.4	10.55	8.48 to 1
2.5	9.18	9.89 to 1
2.6	7.95	11.58 to 1
2.7	6.86	13.58 to 1
2.8	5.90	15.95 to 1
2.9	5.05	18.80 to 1
3.0	4.30	22.26 to 1
3.1	3.65	26.40 to 1
3.2	3.09	31.36 to 1
3.3	2.60	37.46 to 1
3.4	2.18	44.87 to 1
3.5	1.82	53.95 to 1
3.6	1.52	64.79 to 1
3.7	1.26	78.37 to 1
3.8	1.04	95.15 to 1
3.9	.853	116.23 to 1

TABLE I (Cont'd.)

Deviation

P.E.

4.0	.698	142.26 to 1
4.1	.569	174.75 to 1
4.2	.461	215.92 to 1
4.3	.373	267.10 to 1
4.4	.300	332.33 to 1
4.5	.240	415.67 to 1
4.6	.192	519.83 to 1
4.7	.152	656.89 to 1
4.8	.121	825.45 to 1
4.9	.095	1051.63 to 1
5.0	.074	1350.35 to 1
6.0	.0052	19230 to 1
7.0	.00023	434,782 to 1
8.0	.000000068	1,470,588,234 to 1