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Correlations between the Johnson temperament analysis and the Minnesota multiphasic personality inventory based upon 100 male counselees

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CORRELATIONS BETWEEN THE JOHNSON TEMPERAMENT

ANALYSIS AND THE MINNESOTA MULTIPHASIC

PERSONALITY INVENTORY BASED UPON 100 MALE

COUNSELEES

A Thesis

Presented to

The Faculty of the Department of Psychology

Municipal University of Omaha

In partial fulfillment of the Requirements for the Degree

Master of Arts

by

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HISTORY AND BACKGROUND

The field of personality is one of the most popular, challenging, important, and confused in present-day psychological studies.

During psychology's infancy, the study of personality was neglected by the psychologists and left to the uncontrolled clinical methods of the psychiatrists and psychoanalysts. Finally, study in this field has been undertaken by psychologists possessing scientific method, but too often lacking the orientation to persons as such, which characterizes the clinically trained psychiatrists. It should, therefore, be no surprise to find chaotic conditions ruling the study of the psychology of personality.

The attempts to reduce this chaos to order which marked the origin and development of the theories of personality extant at this time could hardly be considered germane to this study; treatments of the subject which were current during the development of the tests used in this study can be found in the psychological writings of Allport[1], Brown[3], and Shaffer[20].

Some psychologists show a preference for considering the personality as a whole, thinking of it as a global unit, complex in nature but unanalyzable, which viewpoint is often arrived at in the Gestaltist's protest against the unduly atomistic approach of some Behaviorists. To the scientifically oriented mind this viewpoint may appear mystical, vague, and of little value in practice.

Personality has also been defined in terms of the reactions aroused in others, as social stimulus value. This approach is rather limited in its empiricism, as it leaves the individual's personality in other persons whose reactions are not completely uniform. A third, and widely used definition, treats personality as a pattern of traits or ways of reacting to external stimuli. Personality thus becomes both analyzable and unitary; the operationalism of this approach appeals to the scientific mind. In terms of this definition, the organismic or global viewpoint makes a definite contribution, for one can regard the individual as a more or less organized and integrated unit, and the process of emotional development as one in which an attempt is made to organize a variety of reaction patterns or modes of behavior into an integrated, smoothly working whole. The person in whom a degree of integration appropriate to the social demands has taken place may be considered to be an emotionally adjusted person, while one in whom integration is insufficient to meet the demands made upon him by society, or in whom the integration has partly broken down because of demands with which he was unable to cope, is an emotionally maladjusted or disturbed person.

Allport defines personality as: [1]

> "The dynamic organization within the individual
> of those psychophysical systems that determine
> his unique adjustments to his environment."

From this, we see that certain essentials are present. First, "dynamic organization". This implies activity rather than passivity in the organization. Constantly evolving and changing according to the situational requirements. The process of disorganization is also implied here, especially in those personalities which we refer to as "abnormal".

"Psychophysical systems" - the term system refers to traits or groups of traits in a latent or an active condition. Psychophysical serves as a reminder that personality comprises both mental and neural activities.

"Adjustments to his environment" - again this indicates an active process. Personality is a mode of survival. Adjustment is not merely passive adaptation, but also includes spontaneous, creative activity directed toward the environment.

The basic characteristics of personality appear to be determined early in the life of the individual and to persist in a relatively stable form throughout that individual's existence. The mode of expression may change from time to time, but the underlying characteristics remain the same. The persistence or stability of traits is well illustrated in the article Personality under Social Catastrophe by Allport, Bruner, and Jandorf which summarizes an analysis of ninety life histories of persons who experienced various degrees of persecution and suffering in Germany after the Nazi rise to power in 1933. The authors state as one of their summary conclusions:[2]

> "Even catastrophic social change does not succeed
> in effecting radical transformations in person-
> ality. Before and after disaster, individuals are
> to a large extent the same. In spite of intensifi-
> cation of political attitudes (toward extreme
> opposition) and in spite of growing awareness and
> criticism of standards of judgment and evaluation,
> the basic structure of personality persists - and,
> with it, established goal striving, fundamental
> philosophy of life, skills, and expressive behavior.
> When there was change it did not seem to violate
> the basic integrations of the personality, but
> rather to select and reinforce traits already
> present."
>
> (2,19f)

Roback defines personality as follows: [18]

> "Personality is the integrated organization of
> all the cognitive, affective, conative, and
> physical characteristics of an individual as
> it manifests itself in focal distinctness and
> carrying a special meaning to others."

Again we see the stressing of the factors of integration and
organization. It is the organization and the integration of the
various factors which will determine the effect on others, and it is
this effect on others which enables us to characterize the significance
of a personality.

Any attempt at assessment or measurement of personality must,
therefore, take into consideration the social aspect or manifestation
of the various components or traits, for it is by the effect on others
that we actually assess a personality. Some of these components are
of great importance, and others appear to have relatively little effect.
For example, abstract intelligence seems to have little significance,
but insight, which is the type of intelligence which can perceive
relations between oneself and others in a proper perspective, is of
greatest significance. In every one of the departments from which
personality draws its ingredients, it is that item which affects others
that counts most heavily.

Measurement of personality is primarily concerned with the
evaluation or assessment of those traits which appear to carry the
greatest weight in making up the total or whole personality. We turn
again to Roback for the definition of a trait: [19]

> "A distinctive mode of behavior, of a more or less
> permanent nature, arising from the individual's
> native endowments as modified by his experience."

The measurement of personality has evolved into various methods
of measuring or evaluating these modes of behavior which we call traits.

As a method of evaluating traits the questionnaire has become an accepted instrument. Whether it is frankly a series of questions about attitudes and behavior as exemplified by the Bernreuter Personality Inventory, or whether it is made up of a series of statements of behavior or feeling as is used in the Minnesota Multiphasic Personality Inventory, the instrument remains fundamentally a questionnaire. Such instruments, of course, are reliable and valid only to the extent that the criteria upon which they are based can be relied upon. Several methods of construction have been used in the past, but those instruments which have gained the greatest recognition appear to be those which have been established by the use of external criterion groups.

STATEMENT OF THE PROBLEM

In the course of the work done by the Bureau of Adult Testing and Counseling at the University of Omaha, it was noticed that there seemed to be a tendency for certain patterns to show up concurrently on several different personality inventories. For example, cases which had high scores on certain areas of the Johnson Temperament Analysis would also show significantly high scores on one or more scales of the Minnesota Multiphasic Personality Inventory. As a result of these observations it was felt that the two tests might have several areas of overlap. Therefore, this investigation was undertaken to determine if there was any relationship between the traits evaluated by the two tests, and if so, to what degree such a relationship existed.

The problem as finally set up was to correlate each trait defined by the Johnson Temperament Analysis with each trait defined by the Minnesota Multiphasic Personality Inventory. A search of the literature showed that, while several similar investigations had been made, there had not been a comparison made between these particular tests at the time this problem was undertaken.

The number of studies that have been done with the Minnesota Multiphasic Personality Inventory has tended to establish this instrument as a reliable clinical test, and the author felt that this study would be of use in determining whether the Johnson Temperament Analysis was capable of being used in clinical situations in the same manner as the MMPI.

LITERATURE

Few investigations of the relationships between the various personality tests have been done up to this time. While a great deal of work has been done with personality inventories, and especially with the Minnesota Multiphasic Personality Inventory, few people have undertaken to make comparisons between the various inventories.

Loth[10] investigated the correlations between the Guilford-Martin Inventory of Factors STDGR and the Minnesota Multiphasic Personality Inventory at the college level in 1945. Her findings were that there was little or no correlation between the two inventories. In fact, the various scales of the STDGR correlated among themselves to a much higher degree than with any scale of the MMPI.

Wesley[22] conducted a similar investigation using the Guilford-Martin Personality Inventory I in the same year. The results of this study were very similar to those of Loth, and the conclusion was that neither of the Guilford-Martin Inventories had any definite relationship to the MMPI.

DESCRIPTION OF THE EXPERIMENT

A. The Instruments

Both the Johnson Temperament Analysis and the Minnesota Multiphasic Personality Inventory were established by means of the method of external criterion groups. That is, the power of each item to differentiate between groups that have been empirically chosen is checked. Those items which demonstrate discriminating power reaching a given (statistical) level may then be incorporated into the final scale.

The principal advantage of the method of external criterion groups is found in the accruement of meaning to the scale. Upon examination by this method, even those items which appear to have no logical relationships with the trait in question may be shown to discriminate well between the criterion groups. The collecting of items found to differentiate between the several criterion groups whose characteristics are known, yields a scale which derives its meaning from the chief characteristic of each group so differentiated. As a means of solving practical problems this method has gained wide acceptance in many fields of psychological measurement. The principal handicap of the method in the field of personality measurement lies in the labor and difficulty involved in finding satisfactory criterion groups.

The first extensive use of external criterion groups as a means of scale validation was that of Binet. When other variables of possible influence on intelligence, such as age, were empirically controlled, it was found that the omnibus test which he developed was capable of distinguishing differences in intelligence existing among children with

a high degree of accuracy. The method was also successfully applied to the Army trade test program developed during World War I. Strong[21], in developing his Vocational Interest Blanks, made extensive use of external criterion groups in his validation research.

The majority of the psychological measuring devices which have been validated by this method have been found to be capable of doing the thing for which they were designed. The Minnesota Multiphasic Personality Inventory has gained wide acceptance primarily because it has demonstrated its utility in performing the task for which it was designed.

The MMPI* has been well described in the literature. It differs from previous personality inventories in deliberately attempting to include as many items as possible which will give clinically pertinent information "without regard to the particular phase of personality upon which the item may bear"[14]. For the selection of the items, a large number of items were gathered from a variety of sources: psychiatric examination forms; textbooks of psychiatry, neurology, and medicine; previous personality and social attitude schedules; and clinical experience[6]. The questions are not formulated as interrogative sentences; the majority consist of positive sentences in the first person singular, the remainder consist of negative statements. The statements are printed on separate cards which the subject places in whichever of the three categories he feels most adequately describes his behavior. The categories of response are "True", "False", and "Cannot Say". Of the 550 statements, 366 are scored for the present scales of the inventory.[5]

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* Hereafter refers to the Minnesota Multiphasic Personality Inventory.

The group or booklet form of the MMPI uses the same statements printed in a book. The response is made on a machine-scored answer sheet by marking either the "True" or "False" column in response to the particular statement. "Cannot Say" items are left blank on the answer sheet. Studies by Weiner[23] and Cottle[4] of the equivalency of the two forms are in general agreement that the forms can be interchanged with no appreciable difference in the obtained results. If anything, the book or group form may be slightly superior since there are fewer items placed in the "Cannot Say" category by subjects who take the group form.

Careful and extensive validation of the items in each scale has produced a number of scales with a high degree of validity. The nine scales of the MMPI which were available at the time of testing which measured clinical syndromes were as follows*:[9]

The Hypochondriasis Scale (Hs)[12]

The Hs scale is a measure of amount of abnormal concern about bodily functions. Persons with high Hs scores are unduly worried over their health. They frequently complain of pains and disorders which are difficult to identify and for which no clear organic basis can be found. It is characteristic of the hypochondriac that he is immature in his approach to adult problems, tending to fail to respond with adequate insight.

Hypochondriacal complaints differ from hysterical complaints of bodily malfunction in that the hypochondriac is often more vague in describing his complaints and in that he does not show such clear

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* Four additional scales furnish a check on the validity of the measures obtained.

evidence of having got out of an unacceptable situation by virtue of his symptoms as does the hysteric. The hypochondriac more frequently has a long history of exaggeration of physical complaints and of seeking sympathy.

With psychological treatment a high score may often be improved, but the basic personality is unlikely to change radically. Common organic sickness does not raise a person's score appreciably, for the scale detects a difference between the organically sick person and the hypochondriac.

<p style="text-align:center">******</p>

The Depression Scale (D)[7]

The D scale measures the depth of the clinically recognized symptom or symptom complex, depression. The depression may be the chief disability of the subject or it may accompany, or be the result of, other personality problems. A high D score indicates poor morale of the emotional type with a feeling of uselessness and inability to assume a normal optimism with regard to the future. Often such persons insist that their attitude is the only realistic one, since death is inevitable and time passes. Though this may be true, the average person is - possibly erroneously - not so deeply concerned with the grim realities of life. A high score further suggests a characteristic personality background in that the person who reacts to stress with depression is characterized by lack of self-confidence, tendency to worry, narrowness of interests, and introversion. This scale, together with the Hs and Hy scales, will identify the greater proportion of those persons not under medical care who are commonly called neurotic, as well as individuals so abnormal as to need psychiatric attention.

The Hysteria Scale (Hy)[14]

The Hy scale measures the degree to which the subject is like patients who have developed conversion-type hysteria symptoms. Such symptoms may be general systemic complaints or more specific complaints such as paralyses, contractures, gastric or intestinal complaints, or cardiac symptoms. Subjects with high Hy scores are also especially liable to episodic attacks of weakness, fainting, or even epileptiform convulsions. The hysterical cases are more immature psychologically than any other group. Although their symptoms can often be "miraculously" alleviated by some conversion of faith or by appropriate therapy, there is always the likelihood that the problem will reappear if the stress continues or recurs.

******

The Psychopathic Deviate Scale (Pd)[14]

The Pd scale measures the similarity of the subject to a group of persons whose main difficulty lies in their absence of deep emotional response, their inability to profit from experience and their disregard of social mores. Although sometimes dangerous to themselves or others, these persons are commonly likeable and intelligent. Except by the use of an objective instrument of this sort, their trend toward the abnormal is frequently not detected until they are in serious trouble. They may often go on behaving like perfectly normal people for several years between one outbreak and another. Their most frequent digressions from the social mores are lying, stealing, alcohol and drug addiction, and sexual immorality. They may have short periods of true psychopathic excitement or depression following the discovery of a series of their asocial or antisocial deeds. They differ from some criminal types in their inability

to profit from experience and in that they seem to commit asocial acts with little thought of possible gain to themselves or of avoiding discovery.

<center>******</center>

The Interest Scale (Mf)[9]

This scale measures the tendency toward masculinity or femininity of interest pattern; separate scales are provided for the two sexes. In either case a high score indicates a deviation of the basic interest pattern in the direction of the opposite sex. Every item finally chosen for this scale indicated a trend in the direction of femininity on the part of male sexual inverts. Males with very high Mf scores have frequently been found to be either overt or repressed sexual inverts. However, homosexual abnormality must not be assumed on the basis of a high score without confirmatory evidence. Among females high scores cannot yet be safely assumed to have similar clinical significance, and the interpretation must be limited to measurement of the general trait.

<center>******</center>

The Paranoia Scale (Pa)[9]

The Pa scale was derived by contrasting normal persons with a group of clinic patients who were characterized by suspiciousness, over-sensitivity, and delusions of persecution, with or without expansive egotism. However, there are a very few paranoid persons who have successfully avoided betraying themselves in the items of this scale.

Persons with an excess amount of paranoid suspiciousness are common and in many situations are not especially handicapped. It is difficult and dangerous to institutionalize or otherwise protect society from the borderline paranoiac because he appears so normal when he is on guard

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and he is so quick to become litigious or otherwise to take action
vengefully against anyone who attempts to control him.

######

The Psychasthenia Scale (Pt)[13]

The Pt scale measures the similarity of the subject to psychiatric
patients who are troubled by phobias or compulsive behavior. The
compulsive behavior may be either explicit, as expressed by excessive
hand washing, vacillation, or other ineffectual activity, or implicit,
as in the inability to escape useless thinking or obsessive ideas. The
phobias include all types of unreasonable fear of things or situations
as well as overreaction to more reasonable stimuli. Many persons show
phobias or compulsive behavior without being greatly incapacitated. Such
minor phobias as fear of snakes or spiders and such compulsions as being
forced to count objects seen in arrays or always to return and check a
locked door are rarely disabling. Frequently a psychasthenic tendency
may be manifested in a mild depression, lack of confidence, or inability
to concentrate.

######

The Schizophrenia Scale (Sc)[9]

The Sc scale measures the similarity of the subject's responses to
those patients who are characterized by bizarre and unusual thoughts and
behavior. There is a splitting of the subjective life of the schizophrenic
person from reality so that the observer cannot follow rationally the
shifts in mood or behavior.

The Sc scale distinguishes about 60 per cent of observed cases
diagnosed as schizophrenia. It does not identify some paranoid types of
schizophrenia, which, however, usually score high on Pa, and certain other
cases which are characterized by relatively pure schizoid behavior. It is

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probable that one or two additional scales will be necessary to identify the latter cases, but this is not surprising in the light of the frequently expressed psychiatric opinion that schizophrenia is not a clinical entity but a group of rather heterogeneous conditions. Most profiles with a high Sc score will show several other high points, and further clinical sorting will need to be carried out by subjective study of the case.

######

The Hypomania Scale (Ma)[14]

The Ma scale measures the personality factor characteristic of persons with marked overproductivity of thought and action. The word hypomania refers to a lesser state of mania. Although the real manic patient is the lay person's prototype for the "insane", the hypomanic person seems just slightly off normal. Some of the scale items are mere accentuations of normal responses. A principal difficulty in the development of the scale was the differentiation of clinically hypomanic patients from normal persons who are merely ambitious, vigorous, and full of plans.

The hypomanic patient has usually gotten into trouble because of undertaking too many things. He is active and enthusiastic. Contrary to common expectations he may also be somewhat depressed at times. His activities may interfere with other people through his attempts to reform social practice, his enthusiastic stirring up of projects in which he then may lose interest, or his disregard of social conventions. In the latter connection he may get into trouble with the law. A fair percentage of patients diagnosed as psychopathic personality (see Pd) are better called hypomanic.

A high score on a scale has been found to predict positively the corresponding final clinical diagnosis or estimate in more than 60 per cent of new psychiatric admissions. This percentage is derived from differentiation among clinic cases, which is considerably more difficult than differentiation of abnormal from normal groups. Even in cases in which a high score is not followed by a corresponding diagnosis, the pressure of the trait to an abnormal degree in the symptomatic picture will nearly always be noted[9].

The Johnson Temperament Analysis

A person's temperament consists of his more fundamental character-istic behavior tendencies. It is true that behavior tendencies are somewhat determined by intelligence, knowledge, and the widely imposed folkways of the group. However, there are tendencies which are deeper and not as easily explainable. Thus, we say of a person that he is active, cordial, or sympathetic. Such traits are found in varying degrees in all social groups and all levels of intelligence.

The word "trait" is used here to indicate a constellation of behavior patterns and behavior tendencies sufficiently coherent to be measured and effectively used. Such traits can be combined into larger ones or split into finer distinctions. The choice from many that might have been used has been dictated largely by the relative need for them in the various applications of temperament testing[11].

The nine traits that are distinguished by the JTA* are defined as follows: [11]

Nervous-Composed

A person high on this scale operates under considerable nervous tension, is high strung, and sometimes may show nervous mannerisms.

* Hereafter refers to the Johnson Temperament Analysis.

Restlessness, fidgeting, tenseness, sleeplessness, tendency to worry, and faulty muscular control are typical symptoms. With nervousness high, any of the other traits are worsened, so that improvement in this trait often improves several of them.

######

Depressive - Gay-hearted

The person who scores high on this scale is given to swings of mood, is easily discouraged, may do considerable brooding. This trait correlates positively with nervousness and improvement of either usually helps the other. When present to a high degree it damages severely the wellbeing of the individual and lowers his effectiveness socially and in nearly all occupations. It may change in waves, alternating with a lesser degree, or less frequently with the active trait to be discussed next. This condition is called cycloid.

######

Active-Quiet

Active is the trait that is shown in the dynamic, lively, hustling, life-of-the-party, "peppy" persons well known to all. The person who scores high on this scale is one who undertakes new activities readily and with enthusiasm. This, however, is no guarantee that he necessarily carries them through to a successful conclusion. There is also in the high scores so strong a drive as to make temper manifestation a danger.

######

Cordial-Cold

Cordial is expressive warm-heartedness. It has usually been included with active under the name manic, but is here separately measured, because a score in each is needed in the best counseling. The person who scores

high on this scale is one who meets people readily, with enthusiasm, and is expressively warm-hearted. The person who scores low on this scale approaches others with reserve, and is cold in social situations rather than warm, especially on first contact.

<p style="text-align:center">******</p>

Sympathetic - "Hard-boiled"

The person who scores high on this trait is quick to sympathize with other people and to respond to their problems and feelings. When the standing is very high there is some danger that the person may be made a "sucker" or "easy mark". The person who stands low is inclined to be insensitive toward the feelings and problems of other people, and is inclined to be hard.

<p style="text-align:center">******</p>

Subjective-Objective

Subjective is the trait of being highly self-centered. It may go so far that the individual interprets many things as related to himself, although there may be no real relationship. Extremes of subjectiveness should be considered to be indicative of psychotic conditions. The person who stands high on the scale is a self-centered or selfish person who thinks of himself first and gives little regard to the welfare of other people. The person who stands low is one who operates logically in situations, and does not have his judgment clouded by prejudice and ideas of his own self-importance.

<p style="text-align:center">******</p>

Aggressive-Submissive

Aggressive is the trait which causes people to be pushful, ruthless, ambitious, conceited, persistent, and determined. It is

notably higher in men than in women. Aggressive, together with the traits critical and subjective, make the paranoid combination. The individual who scores high on this scale is a pushing individual who enjoys dominating other people, and pushes in order to get ahead of them or to "get the best of them." The individual who stands low, on the other hand, does not push himself readily, and who will hold back and assume the follower role rather than the leader role.

<center>######</center>

Critical-Appreciative

High scores in this trait are characteristic of those individuals who are carpingly critical of others, and take issue readily with ideas presented to them. The critical person is disagreeable, often egotistical, and usually disliked by others. He appears to criticize merely for the sake of criticizing. This frequently appears to be for the purpose of bolstering his own ego. Such persons are usually emotionally immature. The person who stands low on this scale, in contrast to the above, is one who tends to look for the better qualities in others and to point them up. He is appreciative of the good qualities of other people.

<center>######</center>

Self-mastery - Impulsive

Self-mastery is the tendency to make plans and carry them through relatively undeflected by impulse and caprice. It is nearly the opposite of impulsive and capricious. It involves a capacity to inhibit but also involves an ability to decide when and how much to inhibit and act accordingly. The individual who stands high on this scale is an individual of considerable maturity, who has good control of himself, and who is not easily rattled. However, the person whose standing is extremely high may

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be an individual who is overly restrained in his behavior, and who shows considerable restraint in meeting other people. Low standing would indicate lack of emotional maturity, lack of self-control, and a tendency to operate on caprice and impulse rather than by logical means.

******

In establishing the normative tables for this test, Johnson contrasted groups composed of premarital clients at the American Institute of Family Relations with groups of marital maladjustment clients at the Institute. This was done because the premarital groups were relatively well adjusted, while the maladjustment groups were heavily weighted with persons with personality faults ranging up to the psychotic.*

The use of the JTA at the Family Relations Institute has confirmed and supported the original trait findings, and comparisons with the MMPI have given additional confirmation.

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* This material is taken from correspondence between Dr. Roswell H. Johnson and the author of this study.

B. Procedure

The data for this study was taken from case files in the Bureau of Adult Testing and Counseling at the University of Omaha. It is regular practice to administer a battery of at least five personality tests to all clients at the Bureau. The battery includes the JTA and the MMPI as well as several other personality inventories.

The cases used in this study were selected by inspection of case records during the past two years, as well as those of cases handled during the period of gathering the data. Each case was identified only by number, in order to avoid any possibility of identifying a particular person with the study. Fifty cases were selected in this manner.

Twenty-five additional cases were selected from among the persons referred by the Veterans Administration for testing in connection with the Vocational Advisement program conducted by them.

Another twenty-five cases were taken from the records of persons referred by various employers who use the services of the Bureau for the selection of employees.

The raw scores of these 100 cases were then tabulated and statistical procedures necessary for the investigation carried out. These procedures will be described in the section devoted to results of the experiment.

C. The Sample

As previously stated one hundred males were used in this investigation.
Fifty of them were counselees of the Bureau who had come for various forms
of vocational and personal counseling. Twenty-five were veterans who were
referred by the Vocational Advisement section of the Veteran's Administration.
Twenty-five were applicants for various business and industrial positions
who were referred for testing by prospective employers.

The criterion for selection for inclusion in this study was that at
least one trait of the MMPI show a T score above 70. This was done in
order to have a group that would deviate from the norm sufficiently to
add emphasis to the extremes. It was also felt that this would serve
to emphasize whatever correlations might exist between the two tests.

The sample was exclusively male and ranged in age from 17 to 54
years. Males were chosen because the JTA has separate norms for males
and females, and the MMPI also has one scale with separate norms for the
two sexes. It was felt that the elimination of sex differences would
simplify the problem somewhat.

RESULTS AND DISCUSSION
A. Comparison of Groups

An inspection of Table I, which is a comparison of the group used by Johnson in establishing the norms for the JTA with the group used in this experiment, indicates that there is an essential similarity between the two groups. There are two significant points of difference. On the C or Active trait, the experimental group would appear to be more active than the original group. On the F or Subjective trait, the experimental group indicates a considerably higher degree of subjectivity than does the original group. Other than this, the results of this comparison would appear to indicate that the experimental group, in terms of adjustment or maladjustment, closely approached the original standardizing group. On the basis of this comparison, it would not appear unreasonable to assume that where a significant degree of correlation appears between traits of the two tests used, those traits are measuring similar personality characteristics.

Tables II, III, and IV show the range of scores in the three sub-groups that constituted the experimental group. Table V shows the range of scores for the entire experimental group. A comparison of these tables and of Charts I, II, III, and IV is an indication of the relative homogeneity of the experimental group.

The comparison of the two groups in Table I was made by means of the following statistical formula: [15]

$$t = \frac{M_1 - M_2}{\sqrt{\sigma m_1{}^2 + \sigma m_2{}^2}} \quad \text{and} \quad \sigma_m = \frac{s}{\sqrt{N-1}}$$

M   is the mean of the group

m   is the standard error of the mean

N   is the number of cases in the group

s   is the standard deviation of the group

σ_m is the standard error of the mean

Table I

Comparison of the original group used in standardizing
the Johnson Temperament Analysis with the group used
in this experiment.

	Original Group			Experimental Group		
Trait	Mean	s		Mean	s	t
A	71.17	9.0		71.41	9.6	.184
B	69.72	10.2		69.01	11.17	.467
C	73.33	7.1		75.56	8.25	2.045*
D	89.59	13.16		90.65	13.59	.561
E	86.16	5.35		86.86	6.12	.854
F	71.99	8.46		76.26	9.64	3.310**
G	75.49	6.07		76.95	6.63	1.60
H	70.05	11.79		73.48	12.79	1.76
I	90.85	9.35		89.03	13.74	1.09

* Significant at the .05 level of confidence

** Significant at the .01 level of confidence

Table II

Means and extremes of scores made by 25 male industrial
applicants on the Johnson Temperament Analysis

Trait	High	Low	Mean
A	90	57	67
B	91	55	62
C	90	68	75
D	112	66	94
E	96	80	88
F	92	62	73
G	92	65	77
H	87	56	66
I	110	77	97

Table IIa

Means and extremes of above group on the Minnesota
Multiphasic Personality Inventory

Trait	High	Low	Mean
Hs	17	5	12
D	22	10	17
Hy	23	9	19
Pd	30	18	22
Mf	31	18	24
Pa	18	3	10
Pt	40	18	25
Sc	55	19	27
Ma	33	13	22

Table III

Means and extremes of scores made by 25 veterans on
the Johnson Temperament Analysis

Trait	High	Low	Mean
A	101	56	71
B	95	55	67
O	91	59	78
D	109	66	93
E	100	72	89
F	96	61	74
G	96	68	78
H	102	54	69
I	107	62	94

Table IIIa

Means and extremes of above group on the Minnesota
Multiphasic Personality Inventory

Trait	High	Low	Mean
Hs	29	6	13
D	29	12	20
Hy	32	14	21
Pd	30	17	24
Mf	32	17	25
Pa	14	5	8
Pt	34	21	27
Sc	39	17	26
Ma	30	12	21

Table IV

Means and extremes of scores made by 50 male counselees
on the Johnson Temperament Analysis

Trait	High	Low	Mean
A	102	57	74
B	100	55	74
C	90	61	75
D	111	56	88
E	96	73	85
F	100	63	79
G	92	65	77
H	107	56	80
I	110	58	83

Table IVa

Means and extremes of above group on the Minnesota
Multiphasic Personality Inventory

Trait	High	Low	Mean
Hs	29	6	14
D	34	10	21
Hy	34	12	21
Pd	38	16	25
Mf	36	10	26
Pa	20	4	10
Pt	45	13	30
Se	45	14	29
Ma	32	11	21

Table V

Means and extremes of scores made by composite group of
100 male counselees on the Johnson Temperament Analysis.

Trait	High	Low	Mean
A	102	57	71
B	100	55	69
C	91	59	76
D	112	56	91
E	100	72	87
F	100	61	76
G	96	65	77
H	107	54	73
I	110	58	89

Table Va

Means and extremes of above group on the Minnesota
Multiphasic Personality Inventory

Trait	High	Low	Mean
Hs	29	5	13
D	34	10	20
Hy	34	9	21
Pd	38	16	24
Mf	36	10	25
Pa	20	3	9
Pt	45	13	28
Sc	55	14	28
Ma	33	11	21

B. Correlations

The technique used in computing the correlations between the different scales was the Pearson product moment correlation coefficient. This is defined by[15]

$$r = \frac{Sxy}{N\, s_x\, s_y}$$

in which x and y represent deviation measures from the respective means of the two variables. The S indicates the sum, the s's in the denominator are the standard deviations of the two distributions, and N is the number of individuals measured. The numerator term Sxy, implies that the product of each individual's x and y is determined, and that all such products are summed algebraically.

In the actual determination of r, a scatter diagram was first prepared for each pair of variables in which the values of raw scores for the trait of the MMPI under investigation were laid out along the X axis in appropriate intervals, and the values for the Johnson trait on the Y axis. The actual formula used was as follows:

$$r = \frac{N \Sigma d_x d_y - \Sigma d_x\, \Sigma d_y}{\sqrt{N\Sigma d_x^2 - (\Sigma d_x)^2}\quad \sqrt{N\Sigma d_y^2 - (\Sigma d_y)^2}}$$

In this formula d_x is defined as an individual's score deviation, in step intervals, from an arbitrary origin on the X scale, and d_y is defined similarly for the Y scale. N is the number of cases. indicates summation.

In the case of the MMPI raw scores, the K factor[16, 17] was included in the score for the scale wherever it was required by the standard method of scoring[9].

Turning now to Table VI which gives the correlations among the various traits of the two inventories, we find that there are indications of similarity in a number of places.

Taking first an over-all view of this table, it would appear that the JTA is able to indicate those persons who are psychotically inclined to a greater degree than it can indicate the neurotically inclined person.

At the start of this investigation, there were several assumptions made on the basis of descriptions of the traits in the test manuals which led this investigator to expect to find the following correlations. It was expected that there would be a significant correlation between the two scales which measure depression. The paranoid syndrome described by Johnson[11] indicated that the three scales, F, G, and H, should show relatively high correlation with the Pa scale. Other expected correlations were: Active (C) with Ma to a fairly high degree; Sc and Subjective (F); Pd negatively with I (Self-mastery); Hs with Nervous (A); Hy with both Nervous (A) and Depressed (B); Negative correlations were expected between Sc and Cordial (D) and Sympathetic (E); it was also expected that Pd would correlate positively with Aggressive (G) and negatively with Self-mastery (I).

Some of these expectations were borne out, but others were definitely refuted.

Of the three scales that were expected to correlate with the Pa scale, only one was found to show any significant degree of correlation. The Critical scale showed a correlation of .20 positive. This is not high enough to be considered significant, although it does support the original expectation to some degree. Unexpected correlations with the

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* From personal correspondence between Dr. Johnson and the author.

Pa scale were found with the Nervous and Depressive scales. These were .22 and .31 respectively. Again, these cannot be considered highly significant, although the latter one does exceed the .01 level of confidence by a considerable degree. For the purpose of individual prediction, however, these correlations are too low to allow any precise predictions to be made.

When we consider the expected correlation between the Active scale and the Ma scale, we find that the expectations were fully borne out. The correlation here, .69, was the highest found among any of the scales. In this case, there is some justification for saying that the Active scale does tap at least a major part of the symptom syndrome of hypomania.

The two scales which purportedly measure depression, Depressive and D, were found to be positively correlated, but to a much lower degree than had been expected. It would appear, in this case, that they measure related, but not identical, symptom complexes.

Taking the MMPI scales in the order in which they appear on the profile sheet, the Hs scale was found to have positive correlations which were significant at the 5% level of confidence with only the Depressive scale of the JTA. The D scale of the MMPI showed significant correlations in the positive direction with the Nervous, Depressive, Subjective, and Critical scales of the JTA. Negative correlations appeared with the Active and Cordial scales. Depression, as measured by the MMPI, appears to form a part of several of the JTA scales.

The Hy scale showed no significant correlations, although two were just below the significant level.

The Pd scale gave two significant correlations, both negative, with the Sympathetic, and the Self-mastery scales. Perhaps psychopathic

deviates are neither cordial nor sympathetic. The expected positive correlation with Aggressive turned out to be a low negative.

The Mf interest scale appears to be positively correlated with Critical, and negatively related to Self-mastery, to a significant degree. This scale was not expected to have any significant correlations since it is designed to investigate only interest patterns in relation to the sex of the person taking the test.

The Pa scale has already been discussed. The next two scales were the ones that showed the greatest number of relationships of the entire group. The Pt scale gave very strong positive correlations with Nervous, Depressed, Subjective, and Critical, and equally significant negative correlations with Active and Sympathetic. On the face of it, this would appear to give us a neat parcel of traits which could be classified under the term psychasthenia. However, when we look at the Sc scale, we find that the same correlations appear, but slightly less in degree, with the addition of a strong negative relationship with Self-mastery. The question now arises, does this particular constellation of traits constitute psychasthenia or schizophrenia? Unfortunately, this investigation did not furnish any data which would enable us to answer this question. All that can be deduced from this series of relationships is that the JTA can be of use in unearthing psychotic syndromes.

The Ma scale further confuses the matter by giving us strong positive correlations with the Nervous, Depressed, Active, Aggressive and Critical scales, and a significant negative correlation with the Sympathetic scale. However, there are enough differences here that we are not in danger of confusing this group with the two preceding groups.

Actually, there are sufficient significant correlations present to warrant the conclusion that the JTA has a fairly large field of usefulness in the investigation of personality disorders.

From a study of the correlation coefficients obtained in this experiment, the following conclusions appear to have at least a minimal degree of justification.

Hypochondriasis and Hysteria as defined by the MMPI, do not appear to be differentiated by the JTA.

Psychasthenia and Schizophrenia appear to be the syndromes most closely approached by the traits of the JTA.

The Hypomanic will probably show high scores on scales A and B, very high on scale C, low in scale E, high again on G and H, and may or may not show a low score on scale I.*

In general, the correlations are higher between the so-called psychotic scales of the MMPI and the JTA than they are between the neurotic scales of the MMPI and the JTA.

While the JTA does, of itself, aid greatly in the discovery of neurotic trends in individuals, when used as a supplement to the MMPI, its greatest usefulness is in lending confirmation and support to the indications given by the so-called psychotic scales rather than those of the neurotic scales.

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* For identification of the scales, refer to sample JTA profile in appendix.

Table VI

Correlations between the Johnson Temperament Analysis and the Minnesota Multiphasic Personality Inventory as found among 100 male counselees.

Johnson Temperament Analysis	Minnesota Multiphasic Personality Inventory								
	Hs	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma
A Nervous	.15	.25*	-.08	.03	.12	.22*	.49**	.48**	.21*
B Depressed	.19*	.26*	.03	.06	.05	.31**	.65**	.60**	.30**
C Active	-.09	-.35**	.11	-.01	.11	-.06	-.32**	-.20*	.69**
D Cordial	-.04	-.23*	.08	-.24*	.06	-.15	-.37**	-.35**	-.01
E Sympathetic	.12	.09	.18	.19*	.13	-.05	-.11	-.18	-.27**
F Subjective	-.18	.22*	-.18	.17	.07	.15	.30**	.36**	.16
G Aggressive	.08	-.15	.12	-.03	.15	.10	-.08	.009	.26**
H Critical	.002	.19*	-.10	-.10	.27**	.20*	.37**	.39**	.44**
I Self-mastery	-.04	-.14	.13	-.24*	-.21*	-.12	-.11	-.28**	-.17

* Indicates that this r is significant at the .05 level of confidence.

** Indicates that this r is significant at the .01 level of confidence.

SUMMARY

One hundred cases were selected from the case files of the Bureau of Adult Testing and Counseling at the University of Omaha, using the requirement of a T score of 70 or above on at least one scale of the MMPI. These cases were distributed as follows: 25 industrial applicants, 25 veteran counselees, and 50 vocational counselees.

Correlations between raw scores on the various traits of the JTA and raw scores on the traits of the MMPI were determined using the Pearson product moment correlation coefficient.

Sufficient significant correlations were found to lead to the conclusion that the JTA traits are rather closely related to the last three scales of the MMPI. These scales are described as being primarily concerned with the characteristics of psychoses rather than with neuroses.

These relationships would appear to justify the use of the JTA in supplementing the MMPI where the presence of psychoses is suspected.

SUGGESTIONS FOR FUTURE RESEARCH

A similar investigation using diagnosed groups of psychotic patients should show much stronger relationships. If groups of 100 or more diagnosed schizophrenics, hypomanics, and psychasthenics could be used, the results might give somewhat more clearly defined indications.

Multiple correlations, using several scales of the JTA with one or more scales of the MMPI could possibly unearth more significant relationships.

An investigation of relationships between patterns characteristic of certain syndromes could be of considerable use in establishing diagnostic profile patterns.

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CHART I

Means and extremes of scores made by 25 male industrial applicants on
The Johnson Temperament Analysis

CHART II

Means and extremes of scores made by 25 male veterans on
The Johnson Temperament Analysis

CHART Ia

Means and extremes of scores made by 25 male industrial applicants on the Minnesota Multiphasic Personality Inventory
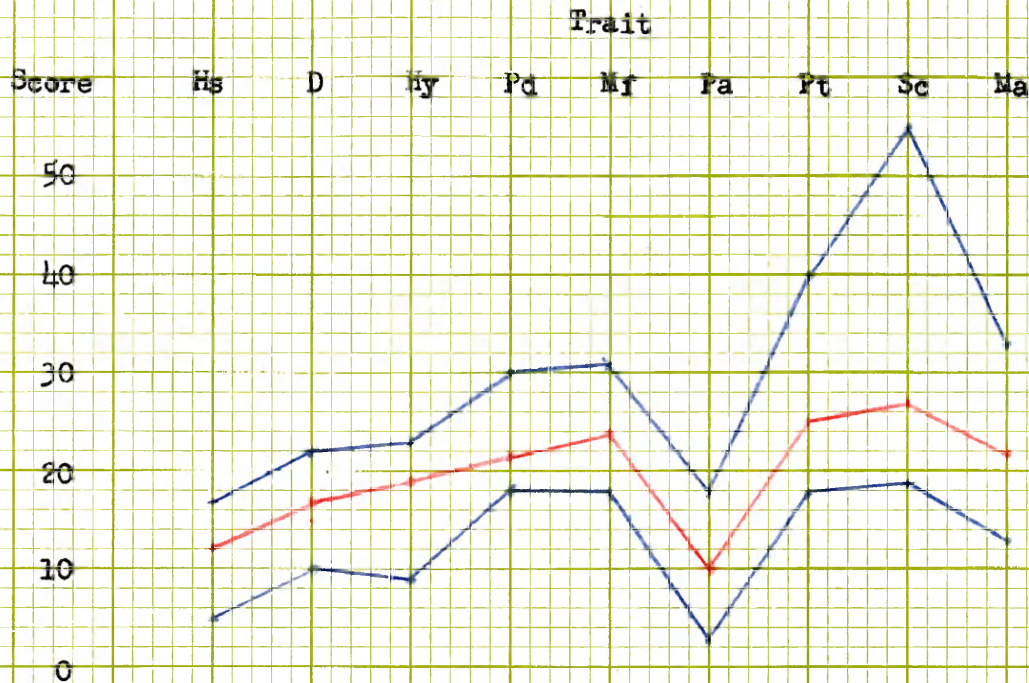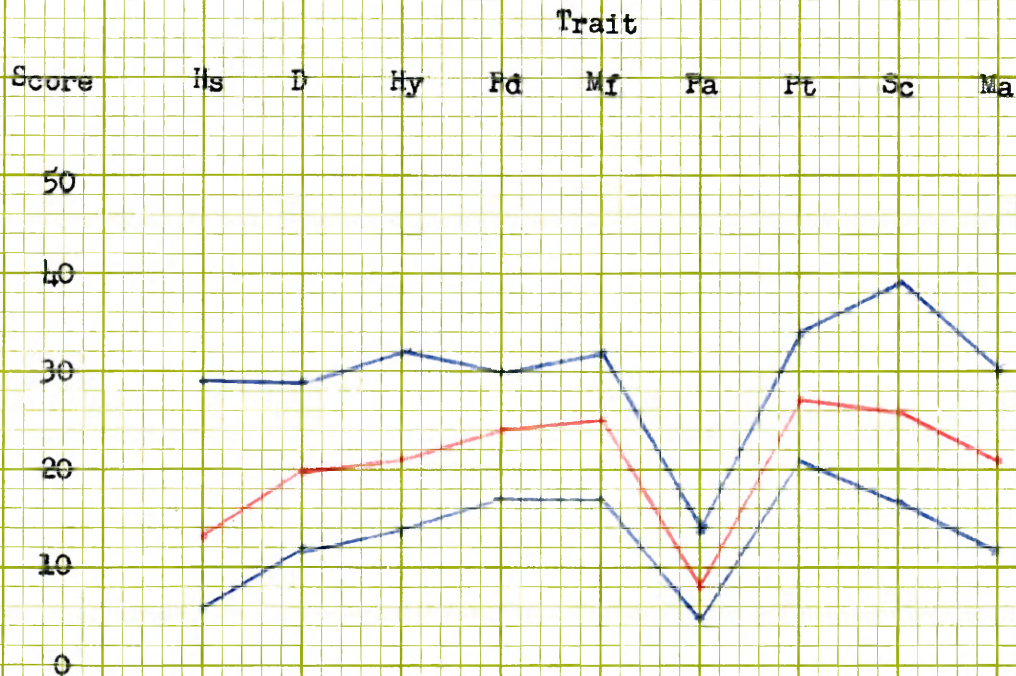
Trait

Score   Hs   D   Hy   Pd   Mf   Pa   Pt   Sc   Ma

CHART IIa

Means and extremes of scores made by 25 male veterans on the Minnesota Multiphasic Personality Inventory

Trait

Score   Hs   D   Hy   Pd   Mf   Pa   Pt   Sc   Ma

Chart III

Means and extremes of scores made by 50 male counselees
on the Johnson Temperament Analysis

Trait

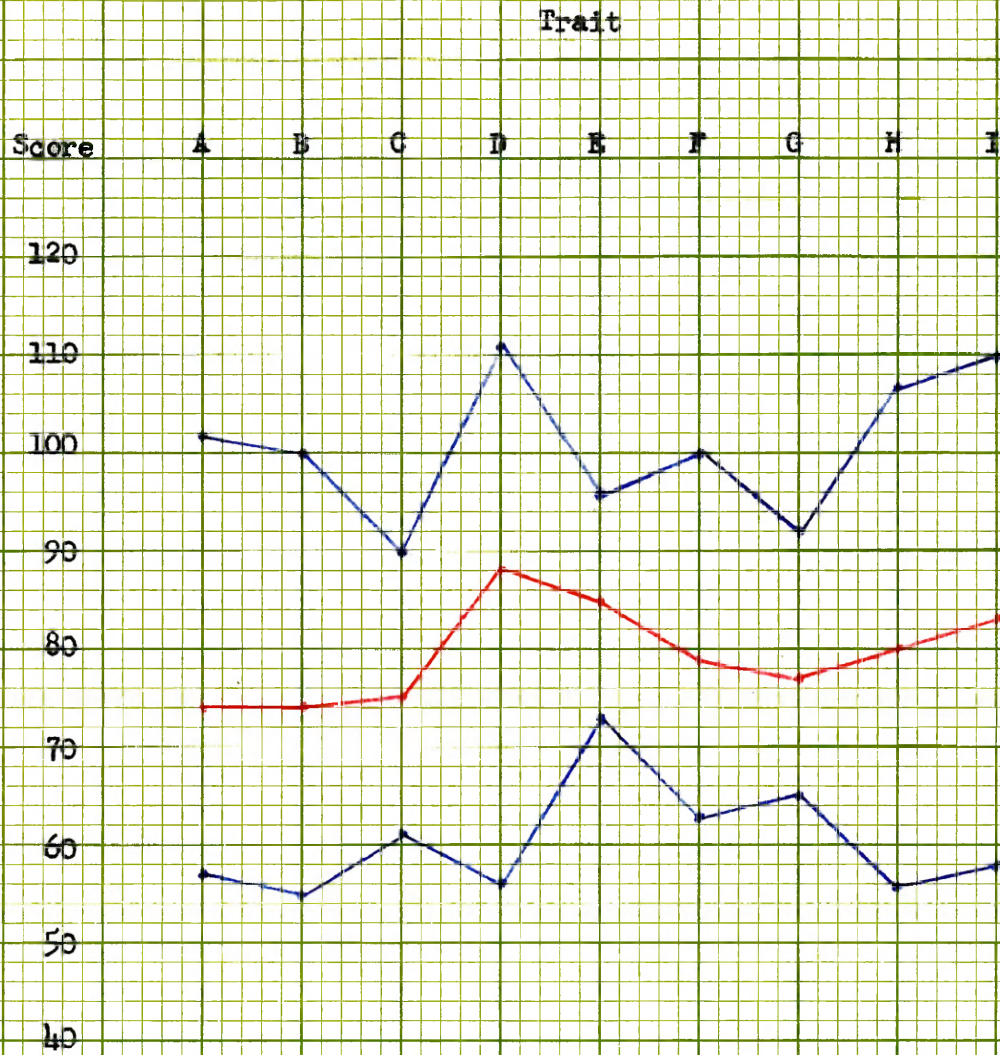| Score	A	B	C	D	E	F	G	H	I

CHART IV

Means and extremes of scores made by composite group of 100
males on the Johnson Temperament Analysis

Trait

Score	A	B	C	D	E	F	G	H	I

Means and extremes of scores made by 50 male counselees on
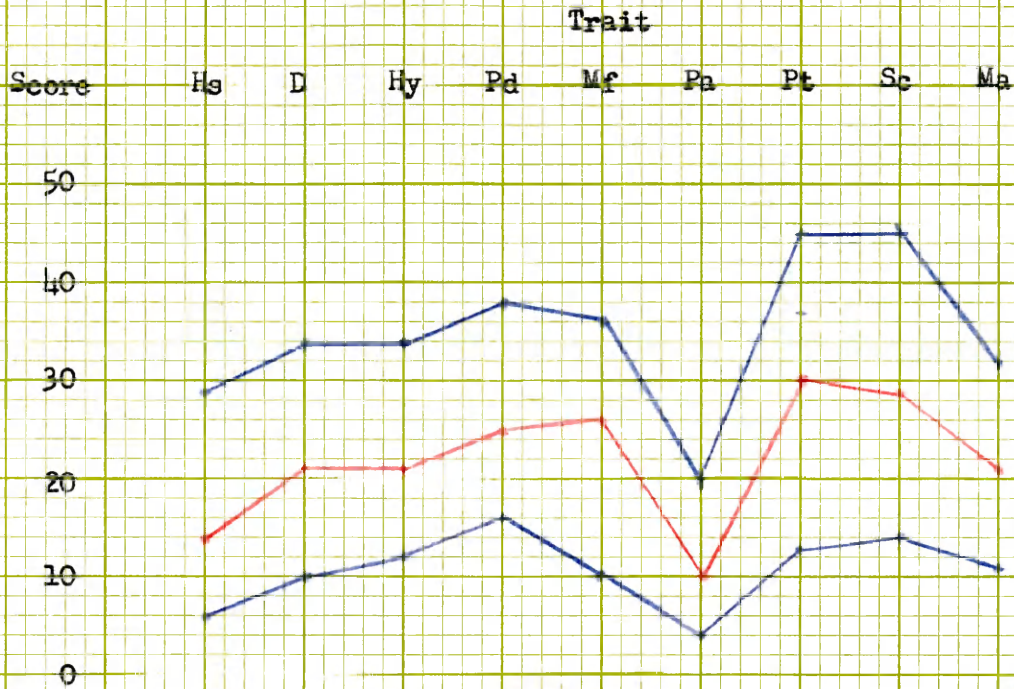the Minnesota Multiphasic Personality Inventory

Trait

Means and extremes of scores made by composite group of 100
males on the Minnesota Multiphasic Personality Inventory

Trait