

AN EXPLORATORY STUDY OF PERSONALITY MEASURES

IN RELATION TO TRADE - TRAINING SUCCESS

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INTRODUCTION

Traditionally, tests of skills and abilities have been applied to job applicants for the purpose of screening, selection, classification and placement.

These have generally been performance tests in which the testee produces his maximum output within the test situation. The results of these tests are then used to answer such questions as - does the testee have the necessary skills or potential to meet the job demands? Or, to which job would he be best suited with his particular complement of skills?

Occasionally test batteries are extended to include generalized personality assessments e.g. the sentence completion test, or, a biographical inventory. Prediction is made from these to assess the likelihood of the testee adjusting satisfactorily to the job.

On the whole, the role of the personality in terms of its relation to on-the-job performance or achievement has been given little attention. A survey of the literature gives rise to the impression that academic achievement in relation to personality variables has been given much more attention by researchers than job-performance in relation to personality variables.

In this study an attempt is made to explore possible relationships between job-performance and personality variables. It is felt that more is to be gained at this stage with an exploratory study covering a reasonable range of personality variables than from a more intensive study investigating fewer

variables. This holistic approach may produce certain promising areas of interrelationship which can be followed up, and also allows scope for interpretation of personality profiles.

This leads to the hypotheses in this study. The nul hypothesis is chosen, viz., that scores on personality measures do not relate to success of response to trade-training. Being an exploratory study, the level of significance chosen as criterion of relationship is set at .05.

Within the context of this study the term personality is used in its broadest sense, as an inclusive concept embodying, inter alia, the dimensions included in this study. No attempt was made to adhere to any particular discipline in choosing personality measures. It was felt that this would have been too restrictive.

"Trade-training success" may be defined as the degree of success with which a pupil responds to training in a particular trade. In this study it will also be referred to as "achievement". The pupil's trade-training success or achievement serves as the criterion in this study. Although there is without doubt some interdependence, achievement should not be equated with on-the-job performance. This was made quite clear by Brown et al (1952) who, in conducting a literature survey to establish the relationship between response to training and on-the-job performance, found that "it is clear that one cannot be at all secure in using a test that has been validated against training criteria as a basis for forecasting job proficiency, or in using a test validated against job proficiency criteria as a basis

for forecasting success in training". (p.372).

This study was conducted on a group of 100 institutionalized delinquents.

Tests, selected in such a way that they together gave a wide coverage of personality dimensions, were applied to the pupils in groups of 10 to 30 as they became available for testing according to the school programme.

At the same time trade instructors were given a schedule containing instructions for rating, the characteristics on which pupils were to be rated, scale-point definitions and verbal explanations where required. Subsequently weights were obtained for these characteristics and the distributions were normalized.

Results were analyzed by computing correlations between test scores and the criterion and by a graphical presentation of the results for qualitative interpretation.

The study is presented as follows: Firstly, a basis is provided in the form of a literature survey (Chapter 1). After this the tests and method are discussed (Chapters 2 and 3), the results analyzed (Chapter 4) and discussed (Chapter 5).

CHAPTER I
LITERATURE SURVEY

A number of researchers have touched on the question of personality, adjustment, interest, etc., as related to training success or on-the-job performance. These studies have been mainly atomistic in their approach insofar as they mainly investigate one or two dimensions. Differences in the samples preclude extrapolation so that one cannot sum the significant findings to obtain a personality picture of the successful trainee.

Roe (1956) provides a good starting-point when, in discussing individual differences and jobs, she states "It is a matter of common-sense observation that a very disturbed person will find it difficult to function occupationally as well as socially." (p.81).

Other authors have stressed the importance of relating personality variables to occupations or occupational success. Poggenpoel (1933) states pertinently that two individuals with the same aptitudes and with equal general intelligence can perform very differently as a result of their different temperamental bases; the one will work calmly, the other excitedly; or the one will be steady while the other will be erratic; and that individuals differ in temperament is equally as apparent as that they differ in respect of general intelligence and special abilities or aptitudes.

Murray (1953) stressed the importance of acknowledging human needs in vocational adjustment (p.303), advocating that the vocational counselor

fulfill the role of therapist. Needs to which the counsellor should be aware are the needs for initiative, for accomplishment, for autonomy, etc.. These needs should then be related to the work situation. By implication, her postulate encourages a more personality-orientated approach to employment counselling.

Henry and Moore (1950) state specifically that personality tests should be used in selection. "Both one's working relationships and intellectual productivity stem from personal qualities which operate in many other life situations to guide, direct or inhibit over long periods of time. The delineation of these individual characteristics is useful as a basis for considering problems of general placement, promotability and long-range potentialities." (p.6). Themselves employing the Thematic Apperception Test and Individual Rorschach Test as measuring instruments, they further define those personal characteristics most pertinent to the work-milieu as ambition, emotional stability, conformity to social and professional standards and initiative.

Campbell et al (1960) wanted to develop a performance evaluation procedure for use with clerical employees, and to validate selection measures. In this they assessed the interview, personality tests and performance tests as predictors of performance as evaluated after each testee's probationary period. They state "Product-moment correlations between sub-criterion and predictor measures showed higher apparent validities for personality test scores than for interview ratings and performance test scores".

Studies have been carried out empirically assessing the incidence of personality dimensions allied to certain occupational fields. Roe (1956), applying the Allport-Vernon Study of Values, investigated the frequency of occurrence of certain interests, viz. aesthetic, economic, etc., interests in occupations in the "upper strata", i.e. those occupations enjoying high social prestige and entailing a long period of training, e.g. bankers, accountants and lawyers. Groupings of scores significantly different from the average could be made around occupations. In other words, occupations were characterized by specific patterns of interests or values being maintained by the persons in these occupations, to a statistically significant extent.

In the same vein, two researchers, Maiser and Kuder (1949) applied the Kuder Preference Record (a measure of attitudes, or interests) to 577 male subjects in various occupational groups and also to a control group of 450 unselected males. Five types of preferences were distinguished viz. (1) taking the lead in situations, (2) dealing with practical problems rather than imaginary or glamorous ones, (3) thinking and speculating, (4) relations free from conflict, and (5) activities involving authority and power. They found that carpenters scored significantly below the mean on (1) and (3). From this they concluded that the carpenters in the study preferred the follower rather than the leadership role and were averse to abstract thinking and speculation. Factory workers scored significantly below the mean on (5), thereby implying a preference to submit to others rather than wield authority and power.

Calitz (1958) attempted to determine the incidence of personality traits in the following professions - architecture, law, medicine, accountancy, teaching and ecclesiastical. She sent questionnaires listing 14 qualities such as self-control, leadership, honesty, etc., each quality defined on a scale e.g. as "very important", "desirable", etc., to persons representing these professions. Of those sent off, 2979 completed questionnaires were returned. Analysis of the data showed that in all professions "honesty" and "the ability to work hard" were considered "very important" and "initiative" was considered "important".

Sarton (1960) similarly found clinically-orientated personality measurements viz., scales of paranoid tendencies, psychopathic tendencies and a faking scale (derived from the lie-scale of the MMPI) to produce significant differences among occupational groups. His sample consisted of 452 men and women from a variety of occupations.

More directly in line with the theme of this study, is an intensive study conducted by Heron (1952). He formulated his aim as (p.385) "... by means mainly of objective psychological tests to study the relationships which may be shown to exist between various aspects of the personalities of a group of male factory workers, and the extent to which they appear to be meeting the demands of the job situation."

His sample consisted of 80 men in a production department who engaged in pouring molten lead into hand-operated moulds. Twenty-two tests were applied, measuring "such aspects of personality as general mental ability, emotional stability, temperament and

dexterity." (p.285). The results were factor-analysed, using Burt's method with a matrix of product-moment correlations. As criteria for job adjustment he used an index of productivity and ratings on job adjustment by six supervisors independently. Significant relationships between factors obtained in the factor analysis with the criterion, were the following: Emotional Instability (many worries, much static ataxia, many annoyances, many interests) correlated with "poor job adjustment" to the extent of $+ .45$ ($p .001$). Speed of Approach (finger dexterity, quick approach to time test, manual dexterity, speed on track tracer) correlated with productivity to the extent of $+ .25$ ($p .05$) and with "good job adjustment" to the extent of $+ .28$ ($p .01$).

A combination of factors III (reversed) and IV gave a correlation with "good job adjustment" of $+ .53$.

Two factors, "General Mental Ability" and "Hysterical Tendency" (or neurotic extraversion), did not show a significant relationship with the criterion.

At this stage it should be pointed out that the majority of the relationships between the variables and criterion do not in themselves demonstrate a cause-effect relationship. If emotional instability is related to "poor job adjustment" it does not necessarily follow that the applicant who obtains a good score on emotional stability will be adjusted on the job. It is equally likely that poor adjustment to the job results in emotional instability, or magnifies a latent susceptibility to emotional

instability. All that has been established is that the two are concomitant to the degree indicated by the attained correlation value.

Baldwin (1960) conducted a study to investigate the hypothesis that some aspects of job performance are better measured by cognitive variables, while others are better measured by personality variables. The sample consisted of 127 recent college graduates employed by a large industrial organization. His criterion consisted of supervisor ratings. On the basis of a centroid factor analysis he identified a number of factors including general intelligence, general adjustment, masculine versus feminine interests, social aggressiveness, visual relationships, reflective thinking, religious interest, written language aptitude, sociability, economic motivation, level of activity, verbal ability, technical proficiency and interpersonal relations. He found that highly active subjects with high economic interests tended to be the more industrious workers, that subjects showing positive interpersonal adjustment were likely to have a greater ability to work with others, and that subjects with a religious interest were more likely to remain on the job.

Taking academic achievement as an index of performance, it may be illuminating to discuss some studies relevant to this field.

Whereas performance on the job may be found to relate to personality variables, this does not necessarily hold true in the same way for response to trade-training. In trade-training we are dealing essentially with learning, rather than a maintained level of performance within a job-level of more or

less static complexity. Insofar as we are dealing with training, or learning, studies of personality characteristics associated with academic learning are equally relevant to the topic of this study as is the relationship of personality variables with on-the-job performance.

Haun (1965) attempted to discover relationships between personality test scores and academic proficiency. He applied the Minnesota Multiphasic Personality Inventory (MMPI), Maudsley Extraversion and College Board tests to a group of 240 second-year students. He found an inverse relationship between academic proficiency and indications of pathology on the personality tests. The multiple correlation for predicting grade point average from those tests showing highest relationships with the criterion, viz., masculinity - femininity, psychopathic deviation (MMPI), extraversion (Maudsley) and verbal scores, was .721.

Griffin and Flaherty (1964) and Swisdak and Flaherty (1964) applied the California Psychological Inventory to a group of 170 female students. In the first mentioned study the subjects were first-year students whose CPI scores were correlated with grade point averages. Over all scales correlations ranged from .03 to .26. In the second study a follow-up study over 5 years was made, comparing drop-outs with successes. Significant mean differences (at 1% level) were found on the Sociability and Achievement versus Conformance scales.

Other studies have concerned themselves with adjustment or aspects of adjustment, as determinants of academic success. Cash (1962) found neurotic

tendency and self-sufficiency to relate to achievement in theological studies. Jamuar (1961) found that home, emotional and social adjustment, and introversion were conducive to academic success.

Regarding the two last-named studies, it is interesting to note that Furneaux (1962) found slight neuroticism and introversion to be favourable for academic success with a group of first-year engineering students.

Taylor (1964) reviewed the literature of the years 1933 to 1963 to establish whether there were any relationships between academic achievement and personality variables. The following emerged as significantly related: academic anxiety, self-values, authority relations, independence-dependence conflict, activity patterns and goal orientation. He found the following to be related to achievement: (a) the degree to which a student is able to handle his anxiety, (b) the value a student places on his own worth, (c) the ability to conform to authority demands, (d) student acceptance by peers, (e) less conflict over dependence-independence, (f) activities centered around academic interests, and finally, (g) realism of his goals.

Furneaux (1962) sorted a group of 91 first-year engineering students into four groups, viz., a neurotic and a stable group, and again introverted and extraverted groups. Each student was therefore classified on two scales, viz., neurotic - stable and introverted - extraverted. Furneaux qualifies the former by saying, "...neurotic does not denote neurotic illness, but simply relates to the above-average score in a test." (p.40). The fourfold

grouping was related to success and failure on the engineering course, as reflected in examination results. The obtained results are tabled below:

Diagnosis	Failure Rate (Percentage)
Neurotic Introverts	21 %
Stable Introverts	26 %
Neurotic Extraverts	26 %
Stable Extraverts	61 %

The introverts fared better overall than the extraverts, and neurotics better than stable persons. Furneaux ascribes the better performance of the neurotic persons to a higher drive-level.

As stated above, neurotics are not necessarily clinically classifiable as neurotic but merely obtained an above-average neurotic score. It is not clear what the performance would be of those on the more extreme end of the stable-neurotic continuum. A curvilinear relationship may exist between stability-neuroticism on the one hand and performance on the other. This would explain the apparent clash between Furneaux' results and those obtained by Celliers.

Celliers (1963) applied the Multiple Choice Rorschach Test to a group of 167 first-year B.A. students who underachieved, i.e. had a high intelligence but low achievement. He developed his own scoring system based on an item analysis and weighting of items. Using this scoring system he obtained a correlation value of .77 between Rorschach scores and examination results, in the

case of females ($n = 93$) and .73 for male students ($n = 74$).

Brill et al (1956) assessed the occupational adjustment of discharged World War II soldiers, and compared it with their "diagnoses of personality" made on entry to the Armed Forces. Their findings are summarized below:

Pre-service Personality	Occupationally mal-adjusted (percentage)
Normal	9.8 %
Neurotic Traits	23.5 %
Suggestive Neurosis	14.9 %
Overt Neurosis	34.0 %
Personality Disorder	41.8 %

There appears to be a continuum of occupational maladjustment directly proportionate to the severity of neurotic disorder. This is indicated by the fact that from latent ("suggestive") neurosis to overt neurosis the incidence has doubled. As the number of cases studied is not stated it is difficult to determine how much significance should be attached to these results. At any rate, the results conflict with those of Furneaux, whose "neurotic" may be presumed to be on par at least with Brill's "suggestive neurotic". In terms of Furneaux' findings, one would expect a higher incidence of maladjustment among the "normals". It may be argued that the reasons must be sought in the different fields, viz., "academic" versus "occupational". However, Brill's results do agree with those obtained by

Celliers, who applied his tests to university students.

Piotrowski (1943) made use of the Group Rorschach * in vocational and academic selection. He compared scores obtained on the Group Rorschach by 78 mechanical workers with supervisors' proficiency ratings. Eighty-eight per cent of workers were correctly sorted as "good" or "poor" workers on the basis of their adjustment scores.

Also using the Group Rorschach, Herz (1943) rated 108 students from "excellent" to "poor" on the basis of their adjustment scores. Three years later he studied their academic achievement records. Of the group, 14 had been rated "poor" - 93% of these had severe academic difficulties. Of the remaining 94 well-adjusted students, 14% had experienced comparable academic difficulties.

Enough evidence is available to suggest, as in the case of measures of personality dimensions, interest and abilities, that a persistent relationship exists between adjustment and success on the job, or in an educational institution.

Intelligence has also, like other personality variables described previously, been related to jobs, and a measurement of intelligence in one or other form (general adaptability, mental speed, mental ability, mental alertness, etc.) is traditionally included in a battery of selection tests.

If job-success is viewed as "mastery over a job",

* The Group Rorschach elicits spontaneous responses. It should not be confused with the Multiple Choice Rorschach Test in which the testee selects from a given set of responses.

and one considers that a tendency exists for an individual to gravitate toward that job which is on par with his intelligence, one would expect a small and clearly delineated range of intelligence for each job-level. In practice, classification of jobs in terms of the intellectual abilities of persons holding those jobs has not been productive. This is pointed out by Super (1957), who asserts that wide ranges of intelligence are found over different job levels, and that these ranges largely overlap. There is a meaningful difference, however, in the means of intelligence test scores in the different classifications of work (Proctor, 1937). In a follow-up study on a formerly environmentally homogenous group of school-children he found the following mean intelligence quotients within different job categories:

Job category	Mean I.Q.
Professional	115
Managerial	108
Clinical	104
Skilled	99
Semi-skilled	97

From the professional to the semi-skilled jobs there is a progressive decrease in job-complexity, therefore one may conclude that a positive relationship exists between mean intelligence levels and job-complexity levels.

Within a particular occupation, however, Super (1957) has not found significant evidence of a

relationship between intelligence and work efficiency. This appears to be especially true for the executive, scientific and professional occupations. Nevertheless, this relationship has been found to exist in the machine book-keeping occupation (Hay, 1943). That persons will, through natural screening, move into jobs broadly in keeping with their intelligence levels, and that intelligence will then play a secondary role has been suggested by Super (1957) who states. "If the individual has mastered the content of his field, other factors may affect success more than intelligence." (p.205). There is additional support for this in studies of scientists by Roe (Roe, 1951a, 1951b), for she failed to find any significant differences in the intellectual levels of eminent and less eminent scientists, concluding that the difference seems to be in motivational factors.

Super appears to discard the concept that intelligence is the major determinant for job-success. Like Roe, he suggests that motivation is the key to differences in job-success.

A number of isolated studies have thus shown that relationships exist between personality, adjustment, intelligence, etc., variables on the one hand and achievement on the other, consisting of success of response to educational training, or on the job itself. There is also evidence that personality, etc., characteristics, may ally themselves with certain occupational groupings.

Essentially, the principal message of the literature is that achievement cannot be divorced from personality factors.

Cronbach (1960) distinguishes between maximum performance of the testee in the test situation, and his habitual performance. The habitual performance may be expected to correlate more highly with personality variables, it concerns the individual's overall and long-term approach to the demands of the job or training situation. Whereas the gifted person may apply himself whole-heartedly to answering test items, and derive a high score, the way he applies his talents to a job in the long run involves more than a measure of those talents per se, it involves the total, functioning personality.

It is felt that there is at this stage a need for a broad exploratory study, from which predictive measures may be derived and followed up as to their reliability and validity for occupational groupings other than the sample tested. This exploratory study envisaged here would attempt to supply such a broad overview.

CHAPTER II

THE TESTS AND OTHER MEASURES

The tests used in this study have been chosen with a view to covering a wide range of personality dimensions, including intelligence. Other measures, e.g., educational level, home language medium, etc., have also been included. Though not falling within the definition of the term "personality", they may provide useful results for the final interpretation.

The test dimensions are:

Intelligence, measured on the New South African Group Test. Measures on this test are* (1) Non-Verbal (Performance) Intelligence, (2) Verbal Intelligence and a compound score, (3) Total Intelligence.

Personality dimensions of a more or less basic nature include scores on the Gordon Personal Profile viz., (4) Ascendancy, (5) Responsibility, (6) Emotional Stability, and (7) Sociability; and on the Gordon Personal Inventory, viz., (8) Cautiousness, (9) Originality, (10) Personal Relations and (11) Vigour.

The High School Personality Questionnaire (HSPQ) by Cattell was used to assess 14 basic personality factors, viz., (12) "Critical, reserved, cool" (Schizothymia) versus "warm, soft-hearted, participating" (Cyclothymia); (13) "Dull, less intelligent" (Low general mental capacity) versus "More intelligent, bright" (High general mental capacity);

* Dimensions are progressively numbered in order to facilitate dealing with them.

(14) "Emotionally immature and unstable" (Ego weakness) versus "Emotionally mature, stable, realistic" (Ego strength); (15) "Deliberate, stodgy, placid" (Phlegmatic temperament) versus "Unrestrained, nervous" (Excitability); (16) "Obedient, mild, dependent" (Submissiveness) versus "Assertive, aggressive, rebellious" (Dominance); (17) "Sober, silent, serious" (Desurgent) versus "Happy-go-lucky, enthusiastic" (Surgent); (18) "Casual, quitting, undependable" (Super-ego weakness) versus "Conscientious, persevering" (Super-ego strength); (19) "Timid, threat-sensitive, shy" (Threctia) versus "Venturesome, thick-skinned" (Parmia); (20) "Practical, tough-minded" (Harria) versus "Tender-minded, sensitive, protected" (Premsia); (21) "Vigorous, goes readily with group" (Zoppia) versus "Individualistic, obstructive, reflective" (Coesthenia); (22) "Secure, resilient, confident" (Confidence adequacy) versus "Discouraged, worrying, self-reproaching" (Guilt-proneness); (23) "Group follower, values social approval" (Group dependency) versus "Makes own decisions, resourceful" (Self-sufficiency); (24) "Careless, ignores standards, lax" (Weak self-sentiment) versus "Self-controlled, self-respecting" (Strong self-sentiment); (25) "Relaxed, composed" (Low ergic tension) versus "Tense, driven, irritable" (High ergic tension).

Thurstone's Gottschaldt Figures Test (26) was used to measure flexibility of closure.

Besides basic personality dimensions, adjustment-orientated measures were obtained. This was done with the California Test of Personality (CTP) and the Multiple Choice Rorschach. The CTP measures

(27) Personal adjustment, (28) Self-reliance, (29) Sense of personal worth, (30) Sense of personal freedom, (31) Belongingness, (32) Freedom from withdrawal, (33) Freedom from nervous symptoms, (34) Social adjustment, (35) Social standards, (36) Social skills, (37) Freedom from anti-social tendencies, (38) Family relations, (39) School relations, (40) Community relations and (41) Total adjustment.

The Multiple Choice Rorschach (42) purports to measure the degree to which the individual has adjusted to life.

Interests were assessed by the C.V. Interest Questionnaire (43) of the Provincial Administration of the Cape of Good Hope (Department of Administration). The test supplies ipsative scores of the subject's preference for a certain type of activity, e.g. working with figures, covering twelve areas of interest.

It was felt that the degree of satisfaction a pupil felt may be a deciding factor for his performance on the job. To obtain a rough measure of satisfaction, the pupil was asked whether he would choose the same trade or another one if given the choice. This was recorded as (44) "same" (S) or "different" (D).

Finally, it was decided to include the dimensions - experience in the trade (45), age (46), level of education (47) and the subjects' home language (48) as experimental variables.

2.1. The New South African Group Test was designed to measure those dimensions of mental ability, viz., verbal intelligence, non-verbal intelligence and

total intelligence (a combination of the former two).

The test was developed by the National Bureau for Educational and Social Research for the purpose of establishing the general intellectual level of testees as well as measuring differential abilities. It was designed primarily for screening and classification in schools.

On the basis of a factor analysis of the responses to a large number of items in a sample of 3,000 school children, six subtests were formed. These are:

Figure Analogies, Classification of Word Pairs, Number Series, Verbal Reasoning, Pattern Completion, Word Analogies.

Description:

The test is designed for three age groups, viz., Junior (8 to 11 years), Intermediate (10 to 14 years) and Senior (13 to 18 years). Three alternate forms are available for both language groups. The non-verbal and verbal parts are each made up of three subtests.

The N.B.E.S.R. is a performance test of the paper-and-pencil type and can be administered individually or to a group.

To apply the test, pre-test pattern is given, subjects are supplied with a test booklet, pencil, etc.. Biographical data (name, age, etc.) is entered.

Answers are of the multiple choice type (one out of 5), recorded on a standard I.B.N. answer sheet.

Each new subsection is preceded by examples. An example of a non-verbal item is shown on the next page. Fixed test-times are observed.

Q. Which pair is the odd one out?

A	B	C	D	E
Mirror	Table	Shilling	Blanket	Water
glass	Wood	Silver	Wool	Ground

Answer Sheet. A B C D E

☐ ☐ ☐ ☐ ☐

Reliability:

The reliability of the N.S.A.G.T. was calculated according to the Kuder-Richardson and Horst formulae.

Reliability coefficients obtained on the Senior Series (used in this study) were as follows:

	KR21	Horst
Total Test	.92	.96
Non-verbal Section	.84	.90
Verbal Section	.88	.94

N = 5952

Validity:

To establish validity, N.S.A.G.T. scores were correlated with scores obtained on the original South African Group Test. This test is similarly designed but less thoroughly standardized. The correlation value obtained between the two tests was .7 (Annexure to Test Manual, Nov. 1956 - Bureau for Educational and Social Research).

Discussion:

In discussing the N.S.A.G.T., Roberts (1959) pointed out that the tables transforming raw scores into I.Q.'s were unrefined. He stated: "It is a

good test and well-planned, but the present tables associated with it are inappropriate and involve risks." As an example he quoted the difference in scores obtained by the English-speaking pupils as compared to the Afrikaans-speaking pupils, with the former scoring higher.

The test designers, however, pointed out in their Annexure to the Test Manual (1956) that tests are not comparable. This may hold true for the translated verbal section, but in the case of the non-verbal section only the language-medium of instructions differ, items are identical. This ultimately points to the norm calculation or sampling as faulty. If norm development of both English and Afrikaans-speaking norm tables separately arrived at a mean I.Q. of 100, no such differences should exist, even though there may be true non-verbal ability differences between the two language groups.

A second criticism concerns the inadequate validity studies. A correlation value of .7 between the original South African Group Test and N.S.A.G.T. is quoted. No mention is made of the sample size. Nevertheless, given a sample size of, say 100 plus, the figure is satisfactory. A reason given as to why this figure is not higher, is that the original South African Group Test was inadequate.

Standardization procedures are adequate and are based on large samples.

2.2. Gordon Personal Profile (1963 Revision).

Originally developed in 1953, this test by L.V. Gordon was revised in 1963. The revised form is used in this study.

On the basis of factorial personality studies, Gordon chose six dimensions. Items were allocated to each dimension, applied to American College students and the results again factor-analyzed. The four dimensions at present used in the test emerged. Finally, items were grouped into tetrads (each pair representing a different dimension) and the final form item-analyzed on academic, clinical and industrial populations, and validated.

The dimensions measured are: Ascendancy, Responsibility, Emotional Stability and Sociability.

Description:

The Gordon Personal Profile is a self-report inventory, containing eighteen sets of tetrads (a group of four items). It requires approximately 15 minutes to complete. It can be administered individually or to a group.

The respondent is asked to mark one item in each tetrad as being most like himself and one as being least like himself, by marking appropriate columns. An example is shown below:

	M	L
has an excellent appetite	☒	☐
gets sick very often	☐	☒
follows a well-balanced diet	☐	☐
doesn't get enough exercise	☐	☐

Biographical data is entered, e.g. name, date, age, etc..

Norms have been calculated for different groups, and are presented as percentile scores. The normative groups are College Students (males and females), High School Students (males and females), etc..

Scoring is done by counting marked items through

a scoring key. No item is scored more than once.

Reliability:

Reliability was assessed by Gordon (1963) on each dimension. He reports the following values:

Sample	N	Reliability Measure	Factors			
			A	R	E	S
College Students	140	Split-half (corrected by S-E)	.88	.85	.88	.84
College 1st.-years	200	Kuder-Richardson, Case III	.74	.80	.79	.85
College Students	84	Test-Retest (over 1 week)	.84	.85	.84	.87
High Sch. Students	88	Test-Retest (over 3 months)	.80	.84	.87	.86
High Sch. Students	235	Split-half (Spearman-Brown)	.75	.70	.70	.77
High Sch. Students	159	Split-half (Spearman-Brown)	.70	.68	.78	.83

The mean of these reliability values, irrespective of N, are:

Ascendancy	.79
Responsibility	.79
Emotional Stability	.81
Sociability	.84

Validity:

Gordon determined validity by various methods. His results are tabled on the next page.

Definition of the Scales:

Gordon (1963) describes the test dimensions as follows (Manual, 1963, p.3):

Ascendancy (A)

Those individuals who are verbally ascendant, who adopt an active role in the group, who are self-assured and assertive in relationships with others, and who tend to make independent decisions, score

Results of validity determinations (see previous page):

Sample	N	A	R	E	S	Correlations with ...
Male Students	118	.50 ^a	.57 ^a	.61 ^a	.49 ^a	Peer ratings
Female Students	118	.47 ^a	.47 ^a	.73 ^a	.61 ^a	
Patients in Therapy	27	.54 ^a	.36 ^b	.58 ^a	.53 ^b	Counsellor ratings
Navy Personnel	160	.58 ^a	-	.46 ^a	.65 ^a	G-Z Temperament Survey

a - significant at .01 level.

b - significant at .05 level.

Ascendancy (A) continued: ... high on this scale.

Those who play a passive role in the group, who listen rather than talk, who lack self-confidence, who let others take the lead, and who tend to be overly dependent on others for advice, normally make low scores.

Responsibility (R)

Individuals who are able to stick to any job assigned them, who are persevering and determined, and who can be relied on, score high on this scale. Individuals who are unable to stick to tasks that do not interest them, and who tend to be flighty and irresponsible, usually make low scores.

Emotional Stability (E)

High scores on this scale are generally made by individuals who are well-balanced, emotionally stable, and relatively free from anxieties and nervous tension. Low scores are associated with excessive anxiety,

hypersensitivity, nervousness and low frustration tolerance. Generally, a low score reflects poor emotional balance.

Sociability (S)

High scores are made by individuals who like to be with and work with people, and who are gregarious and sociable. Low scores reflect a lack of gregariousness, a general restriction in social contacts, and, in the extreme, an actual avoidance of social relationships.

Discussion:

The Gordon Personal Profile has been carefully designed on strict psychometric standards.

It must, however, be recognized that the obtained scores are basically ipsative and not normative. A clear cut profile is obtained concerning the relative "strengths" of dimensions within the individual. In using the scores normatively, as in considering a group's scores on, say, the Ascendancy dimension, a certain amount of error is involved. For example, the testee who would be rated high on all four dimensions obtains the same position as one rated low on all four dimensions - the total score is the same.

In practice, ipsative scores are used normatively and satisfactory results are often obtained, as for example in Gordon's validity studies.

Fricke (1959) feels that adequate validity on this test has not been proven, pointing out that Gordon's samples were generally small and that his validation studies were not described in sufficient detail.

On the whole, it was felt that use of the test in the field has given rise to encouraging results

(see also "Literature Survey") and that this justifies including the test in this study.

2.3. Gordon Personal Inventory.

The Gordon Personal Inventory, a companion test to the Gordon Personal Profile, was developed in 1956 by L.V. Gordon.

It was similarly developed on the basis of a literature review on factorial studies of perception. Gordon (1956) writes: "Four factors, important in the life of a normal individual and not already included in the Personal Profile, were tentatively selected for the present measure." (p.8).

Two hundred and ten items were chosen under the selected factors, applied to College students, and the results factor-analyzed. Items were finally grouped into tetrads, each tetrad containing two items of (equally) high preference value, and two of (equally) low preference value.

Each item was correlated with the total trait score and the inventory was revised accordingly.

The four dimensions measured in this test are: Cautiousness, Original Thinking, Personal Relations, Vigour. Total score (sum of the four measures).

Description:

The Gordon Personal Inventory is a self-report inventory containing twenty sets of four items. It requires approximately 15 - 20 minutes to complete. It can be administered individually or to a group.

The respondent is asked to mark one item in each tetrad as being most like himself, and one as being least like himself, under appropriate columns. An example is shown on the next page:

prefers to get up early in the morning
 doesn't care for popular music
 has an excellent command of English
 obtains a poorly balanced diet

Biographical information is entered, viz., name, age, date, etc.

Two sets of norms are available, high school norms and college norms for both males and females. Raw scores are converted into percentile scores.

Scoring proceeds by applying a scoring key, counting the number of "positive" responses and "negative" responses. The latter score is subtracted from the former to derive the score for the trait. A total score is derived by summing the trait scores.

Reliability:

Reliability studies were carried out by Gordon (1956). Results are tabled below:

			Scales				
Sample	N	Reliability Test	C	O	P	V	Tot.
College Students	168	Split-half (corrected by S-B) *	.83	.83	.83	.80	.88
H.-Sch. Students	103	Split-half (corrected by S-B)	.83	.79	.80	.77	.89
College Students	124	Kuder-Richardson Case III	.83	.79	.83	.84	.88

* S-B = Spearman-Brown formula.

The means of the reliabilities, irrespective of N, are:

Cautiousness	.83
Original Thinking	.80
Personal Relations	.82
Vigour	.80
Total Score	.88

Validity:

Gordon did not conduct any validity studies.

Definition of the Scales:

Gordon defines the scales (Manual, p.4-6) as follows:

Cautiousness (C)

Individuals who are highly cautious, who consider matters very carefully before making decisions, and do not like to take chances or run risks, score high on this scale. Those who are impulsive, who act on the spur of the moment, make hurried or snap decisions, enjoy taking chances, and seek excitement, score low on this scale.

Original Thinking (O)

Those who tend to be original in their thinking, like to work with ideas, enjoy difficult problems and are reflective, score high on this scale. Individuals who do not care for intellectual or creative activity, and who lack both an inquiring mind and a general inclination for original thinking, score low.

Personal Relations (P)

High scores are made by those individuals who have great faith and trust in people, and are tolerant, patient and understanding. Low scores reflect a lack of trust or confidence in people, a tendency to be critical of others and to become annoyed or irritated by what they do.

Vigour (V)

High scores on this scale characterize individuals who are vigorous and energetic, who like to work and move rapidly, and who are able to accomplish more than the average person. Low scores are associated with low vitality or energy level, a preference

for setting a slow pace and a tendency to tire easily, to fall below average in terms of sheer output.

Discussion:

The test becomes highly vulnerable to criticism as a result of the lack of validation studies.

Fricke (1959) mentions this as a criticism of the test, as does Siegel (1957) who points out that the test should only be used experimentally for this reason.

Some construct validity can be inferred from the factor-analytic study. As an example of construct validity of the way of eliciting response, Gordon (1956) points out that the forced-choice presentation has shown itself to be more effective in eliciting meaningful information than the "Yes - No" type of response.

Of this test, Cronbach (1960) writes: "Evidence regarding significance of scores is extremely encouraging." (p.496).

Reliability is quite satisfactory, especially in terms of self-report inventory reliabilities.

Although validity studies are required, the similarity of this test to the Gordon Personal Profile in the manner of construction and the adequate validity values achieved by the latter, full justification was felt for including this test experimentally in this study.

2.4. The High School Personality Questionnaire (HSPQ).

The HSPQ was developed by Cattell and Beloff of the Institute for Personality and Ability Testing, in 1958.

They set out with the intention of developing

reliable and valid measures of basic personality dimensions.

Through a factor-analytic approach they isolated fourteen dimensions and grouped the relevant items under each factor. They attempted to reduce the face-validity of items and to balance the number of "Yes" and "No" responses which contribute to a positive score.

Alternate forms A and B were constructed in such a way that they could be combined into a single test for greater reliability.

The combined form of the HSPQ test was used in this study.

The fourteen factors in the test are the following:

- A Schizothymia - Cyclothymia
- B Low-High General Mental Capacity
- C Ego-Weakness - Ego-Strength
- D Phlegmatic - Excitable Temperament
- E Submissiveness - Dominance
- F Desurgency - Surgency
- G Superego Weakness - Superego Strength
- H Threctia - Parmia
- I Harria - Premsia
- J Zeppia - Coesthenia
- O Confidence Adequacy - Guilt Proneness
- Q₂ Group Dependency - Self-sufficiency
- Q₃ Weak - Strong Self-sentiment
- Q₄ Low - High Ergic Tension

Description of the Test

The test consists of 142 items in each form, each item consisting of two (sometimes three) alternatives, of which the subject must choose one, example on the next page:

Would you rather

Drive a car?

Climb a mountain?

The first two are buffer items and are not scored.

The test may be applied to pupils from 12 to 18 years. Above this age a similar test for adults, the 16 PF, is applied.

The test may be applied to a group. It takes approximately 40 to 50 minutes per form. The authors advise combining forms, which then takes 80 - 100 minutes, to obtain a more reliable score.

Scoring is done with a scoring key. This takes approximately 2 - 3 minutes.

Reliability:

Cattell (1962) calculated the stability, homogeneity and equivalence coefficients for the HSPQ.

The results are tabled below. Only full-length test coefficients are given, as the full-length test was used in this study.

Rel.	N	A	B	C	D	E	F	G	H	I	J	O	Q ₂	Q ₃	Q ₄
St.	112	.74	.75	.77	.78	.72	.68	.71	.80	.79	.69	.72	.70	.73	.78
Ho.	199	.36	.57	.39	.40	.51	.44	.57	.55	.60	.32	.58	.40	.53	.56
Equ.	296	.47	.65	.69	.44	.53	.54	.59	.67	.54	.41	.64	.44	.40	.61

The stability coefficient (St.), consists of test-retest reliability over a two week interval; the homogeneity coefficient (Ho.) is a split-half coefficient, and the equivalence coefficient (Equ.) is the agreement between each half (forms A and B) on each factor.

Validity:

Cattell computed validities as factor scale

validities by multiple correlation from factor-item correlations (FIC); as the square root of the equivalence coefficient (Eq.V); and as what he calls the circumstantial or indirect validity (IV) "...the extent to which the scale, in its correlation with other factor scales, agrees with the correlation existing between the pure factor and the other factor in the whole realm of important peer factors." (Manual, p.7).

The coefficients obtained by Cattell are tabled below:

Val.	N	A	B	C	D	E	F	G	H	I	J	O	Q ₂	Q ₃	Q ₄
FIC	-	.79	.82	.85	.78	.79	.81	.80	.84	.82	.73	.88	.76	.73	.85
Eq.V	296	.70	.81	.83	.68	.74	.75	.78	.83	.75	.66	.81	.68	.65	.79
IV	-	.66	-	.75	.81	.89	.79	.79	.81	.69	.48	.76	.50	.79	.83

Definitions of the Scales:

The dimensions in the HSPQ may be described as follows:

A. Schizothymia (A-) versus Cyclothymia (A+):

The A+ person has superior social adjustment, enjoys social recognition and likes to work with people rather than things. He is generally more tolerant, more generous in interpersonal relationships and less disturbed by criticism (Cattell, 1960).

The A- person is more uncompromising and earnest, he likes working alone and with things rather than people. He prefers intellectual interaction to social companionship. He is more penetrating in his evaluation of people and things and more inventive than the A+ person.

B. Low General Mental Capacity (B-) versus High General Mental Capacity (B+):

This dimension, while measuring general intelligence, also has concomitant personality attributes at high and low levels.

A low score, according to Cattell, is associated with lower morale, a willingness to give up easily, boorishness and a lack of interest in intellectual matters. A high score, on the other hand, is found with conscientiousness, perseverance, intellectual and cultured interests, greater school interests, leadership, lack of delinquency and popularity with peers.

C. Emotional Instability (Ego Weakness, C-) versus Ego Strength (C+):

Ego strength is commonly regarded as a factor expressing the degree of achievement of dynamic integration and emotional control, i.e. the success of emotional learning.

The C- individual tends to be easily annoyed, is more often dissatisfied with family and school and is discouraged by his inability to restrain himself or meet good behaviour standards. He shows more than average generalized neurotic responses in the form of sleep and digestive disturbances, irrational fears, etc.

The person with C- may fail in his adjustment if subjected to regimentation and stress.

D. Phlegmatic (D-) versus Excitable Temperament (D+):

The D- person may be described as placid, self-sufficient, deliberate, self-effacing, constant and showing a lack of restlessness.

The D+ person, on the other hand, is restless,

distractible, hurt or angry if not given important positions or retrained, etc. He is also often impulsive in his behaviour.

E. Submissiveness (E-) versus Dominance or Ascendancy (E+):

The E- person is mild, submissive, dependent, kindly, soft-hearted, expressive, conventional and easily upset.

The E+ person tends to be assertive, aggressive, competitive, self-assured, independent-minded, unconventional, rebellious and attention-getting.

Both extremes are problems for adjustment, a very high score being part of the delinquency pattern in teen-agers and may involve disobedience and, perhaps, anti-social behaviour. A very low score is also "pathological" in that it occurs in the profiles of institutionalized neurotics.

F. Desurgency (F-) versus Surgency (F+):

Low F signifies a person who is serious, introspective, depressed, chastened, brooding, incommunicative, slow, deliberate and sticks to inner values. The F- person tends to be secretive and to daydream. They have generally been brought up with severe, sobering standards. Although occupationally successful in life, they rarely show leadership.

The F+ person tends to be enthusiastic, happy-go-lucky, talkative, cheerful, frank, expressive, quick and alert. They usually have less exacting aspirations than F- persons.

G. Super-ego Weakness (G-) versus Super-ego Strength (G+):

The G- person has a lack of acceptance of group moral standards. He tends to be casual, undependable,

quitting, frivolous, demanding, impatient, delinquent and to disregard his obligations towards people. A low score is a feature of delinquency and is associated with lying, stealing, destruction of property, etc.

The high scorer is persevering, determined, responsible, emotionally mature, consistently ordered and conscientious. He is persevering, cautious and confident about his own moral standards. He is more likely to achieve well, to show leadership and to be a leader at school and in later life.

H. Threctia (H-) versus Parmia (H+):

The H- person is withdrawn, timid, shy, threat-sensitive and tends to remain aloof and self-contained. He also tends to be restrained, embittered, conscientious, to have restricted interests and quick to see dangers in his environment. He tends to keep to himself, to be fearful of new situations, etc..

The H+ person is adventurous, "thick-skinned", active, sociable, responsive, friendly, etc.. He tends to be impulsive. High H+ persons also tend to be more interaction- than task-orientated.

I. Harria (I-) versus Premsia (I+):

The I- person is tough and realistic to the point of cynicism. He is self-reliant, practical and self-sufficient. This largely represents a masculine, practical and realistic dimension, with males scoring predominantly in the I- direction as compared to females.

The I+ person is aesthetically sensitive, demanding, impatient, attention- and sympathy-seeking, gentle, indulgent and artistically fastidious. He is also theatrical, imaginative and tends to hypochondria. He shows a definite dislike of "crude"

people and occupations. As may be expected, females tend to score in the I+ direction.

The specific terms used to name this dimension are derived from the description, thus, harmia i.e. hardness and realism, and premsia i.e. protected emotional sensitivity (Cattell, 1957).

J. Zeppia (J-) versus Coesthenia (J+):

According to Cattell (1961) this factor seems to be a common influence underlying psychaesthetic, obsessive-compulsive and neurasthenic behaviour.

The J- person likes to go with the group, likes attention, is vigorous and accepts common standards.

The J+ person prefers to do things on his own, is physically and intellectually fastidious, thinks over his mistakes and how to avoid them, has views differing from the group and prefers to keep in the background.

O. Adequacy (O-) versus Guilt Proneness (O+):

The O- person is confident, self-secure, cheerful, resilient, tough, placid, vigorous, etc. He is not prone to fears and acts out.

The O+ individual is timid, insecure, anxious, depressed, sensitive, has phobic symptoms, broods, etc. He is over-fatigued by exciting situations and inadequate in meeting the daily demands of life. He prefers a quiet seclusion to contact with people or noise. These people are usually rated hinderers (Cattell, 1953) and are unpopular with peers.

Clinically, high O+ scores frequently appear in a variety of forms of neuroses, psychoses and character disorders.

Q Factors:

According to Cattell (1961) the factors A to O

have been demonstrated to exist simultaneously as patterns in behaviour ratings made by observers and patterns in questionnaire responses. The three remaining factors, Q_2 , Q_3 , Q_4 , have not yet been sufficiently aligned with definite behaviour factors. Nevertheless, he states that they have been shown to have validity in predicting behaviour criteria.

Q_2 Group Dependency (Q_2^-) versus Self-Sufficiency (Q_2^+):

This factor appears to reflect a person's internal values or attitudes. The Q_2^+ person is resolute and accustomed to making his own decisions, while at the Q_2^- pole the person goes with the group, places high value on social approval, and is conventional and fashionable. The Q_2^+ person frequently makes remarks aimed at solutions rather than questions - "and tends to be rejected!" (Cattell, 1958). He is more seclusive, has older friends and mature interests and generally achieves higher than the Q_2^- individual.

Q_3 Weak Self-sentiment (Q_3^-) versus Strong Self-sentiment (Q_3^+):

The Q_3^- pole signifies poor self-sentiment formation, i.e. uncontrolled emotionally, excitability, a rejection of cultural demands, etc.

The Q_3^+ person is self-controlled, striving to accept approved ethical and occupational standards, considerate, foresighted, conscientious, etc. He thus has an adequate self-concept (Cattell, 1957). Lack of development of an adequate self-concept, i.e. high Q_3^- , is also a leading concomitant of anxiety (Cattell, 1961).

In terms of group dynamics, high Q_3^+ scores pick out leaders, especially effective rather than popular

leaders (Cattell, 1960).

Due to its role in many situations of control, it has been called the "gyroscopic factor" by Stice (Cattell, 1960), producing steadiness and purpose in personality. Consistent with this, a Q_3 - score has been found to be associated with delinquency.

Q_4 Low Ergic Tension (Q_4 -) versus High Ergic Tension (Q_4 +):

The Q_4 - person is relaxed and composed.

The Q_4 + person is tense, excitable, frustrated, irritable and frequently worried.

Clinically, Q_4 shares with O the capacity to differentiate neurotics from normals and is one of the three highest factors in general anxiety. It is also high in character disorders, physical disability and psychosis.

x Discussion:

Cattell may be said to represent the modern school of structural psychology. His aim is to elicit dimensions which, when summed, give a picture of the total personality.

In the way he describes his factors there seems to be a fair amount of overlap, certain adjectives descriptive of behaviour occurring in more than one factor. The factors are not mutually exclusive and are, therefore, not "pure" factors but rather descriptive traits.

To be most meaningful, scores on the HSPQ should rather be viewed in relation to each other i.e. the profile they form on the test as a whole. This would, however, be impractical within the context of the present study.

Judging subjectively, reliability values appear

adequate but not particularly high, even for self-report inventories. Little information is given on the group on which he standardized the test.

Cattell has not yet conducted satisfactory validity studies. Factor purity or circumstantial validity are not satisfactory. Nevertheless, the test is presently being used in the field with apparent success, e.g. Pierson et al (1963) verified Cattell's "delinquency profile", projects quoted in I.P.A.T. Information Exchange Memoranda, citing use of the HSPQ in educational, social, clinical, etc., fields.

In view of the above, it must be pointed out that the test's use in this study is purely exploratory and experimental.

2.5. Gottschaldt Figures.

The Concealed Figures Test, developed by Thurstone and Jeffrey, is an adaptation of the Gottschaldt Figures.

It purports to measure flexibility of closure, viz., the identification of a figure amid distracting and confusing details. Cronbach (1960) refers to it as "... a strange geometric pattern and requires the subject to find it in a larger, complex field." (p.547).

Description of the Test:

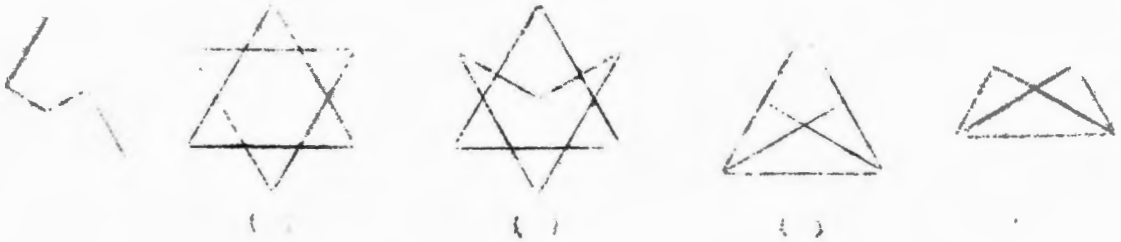
The Concealed Figures Test consists of 49 items, each containing a stimulus figure of a specific size and orientation. The testee must decide whether or not each complex figure contains the stimulus figure, and place a mark below the appropriate figure accordingly. An item is shown on the next page.

A fore-exercise and a test proper are given. The time-limit for the latter is 10 minutes. Items are of increasing difficulty. The test can be applied

to a group.

The final score is arrived at by subtracting the number of incorrectly marked items from the number of correctly marked items.

An item from the Concealed Figures Test, referred to on the previous page, is shown below.



Reliability:

Pemberton (1951) reports a split-half reliability coefficient of .94.

Validity:

Thurstone and Jeffrey (test manual, undated) refer the question of test validity to studies involving occupational success and the original Gottschaldt Figures Test.

Thurstone (1944) found the test scores to discriminate between administrative personnel with high salaries and those with low salaries, both in the same age group. In the same study he also compared public administration in terms of ratings of professional promise and success. The Gottschaldt Figures "proved the most discriminating test" (Manual, p.5) in this respect.

Pemberton (1951) correlated scores on the Concealed Figures Test with those on a Designs Test (which had a factor loading of .38 on flexibility of closure) and obtained a correlation value of .54.

Definition of the Scale:

Flexibility of closure is described by Thurstone and Jeffrey as concerning the ability to keep in mind a configuration in a distracting field, i.e. to facilitate the retention of a figure in a distracting field as well as the ability to manipulate two configurations simultaneously, or in succession. He expects this factor to be associated with deductive thinking.

In a factor-analytic study, attempting amongst other things to see whether flexibility of closure factors generalize to other areas of personality, Pemberton (1951) enlarged the above definition to "freedom from Gestaltbindung" (p.141).

She describes high-scorers on the Concealed Figures Test as socially retiring, interested in theoretical and scientific problems, and independent of rigid systems and routine. Anastasi (1961) includes independence of the opinions of others, and analytical-mindedness as symptomatic of the high-scorer.

Discussion:

The Concealed Figures Test holds much promise for research as it has been identified as a reasonably "pure" dimension factor-analytically (Bechthold, 1947), and intuitively as a basic dimension by researchers.

Tyler (Buros, 1965) adds that its best use (in its present form) would be in research.

Validity is very hard to prove for a dimension of this nature. Few, if any, equivalent measures are in existence, and it is not a process which can be correlated with any clear-cut overt form of behaviour as can, for example, personal relations.

As such it is included here purely experimentally.

2.6. The California Test of Personality (1953 Revision). This test was developed by Thorpe et al in 1953, of the California Test Bureau.

Originally constructed in 1942, the test was reviewed in 1953 to incorporate refinements, re-evaluate validity, etc.

The authors write of this test: "Factor analysis and multiple correlation studies indicate that all components are making a net contribution to the test. Thus far, no attempt has been made to use factor classifications. Instead, the familiar concepts and terminology of psychology have been retained and the test organized in terms of components based on logical analysis, experience, the judgements of those who participated in making the test and statistical analysis." (Manual, p.9).

Description of the Test:

The California Test is a self-report inventory, consisting of 180 items which cover 12 areas of adjustment, including 3 total scores, viz., personal adjustment, social adjustment and the sum of these two, total adjustment.

The test can be administered to a group. It takes approximately 45 minutes to complete. Responses are recorded by marking off "yes", or "no".

Pre-test patten is given and biographical data is entered, e.g. name, age, date, etc.

A sample item is shown below:

Do you keep on working even if the job is hard?

YES NO

Reliability:

The two forms used at each level were matched for item equivalence as to difficulty level, discriminative power and internal consistency. Reliability data, computed by the Kuder-Richardson formula is, therefore, expected to hold true for both forms. The values obtained with the intermediate level (used in this study) are tabled below:

Components	Form A or B		Form A + B	
	r	S.E	r	S.E
<u>1 Personal Adjustment</u>	.93	3.57	.96	5.40
A Self-reliance	.70	1.64	.82	2.54
B Sense of Personal Worth	.75	1.50	.86	2.24
C Sense of Personal Freedom	.92	0.99	.96	1.40
D Feeling of Belonging	.97	0.65	.98	1.06
E Freedom from Withdrawing Tendencies	.83	1.34	.91	1.96
F Nervous Symptoms	.82	1.27	.90	1.90
<u>2 Social Adjustment</u>	.94	3.43	.97	4.84
A Social Standards	.94	0.67	.97	0.96
B Social Skills	.75	1.50	.86	2.24
C Freedom from Anti-social Tendencies	.86	1.22	.92	1.84
D Family Relations	.92	0.99	.96	1.40
E School Relations	.86	1.31	.92	1.98
F Community Relations	.87	1.08	.93	1.58
<u>3 Total Adjustment</u>	.96	5.10	.98	7.22

N = 1136

Validity:

Thorpe et al (1953) write: "An instrument is valid if it accomplishes the purpose or purposes for which it is designed. If, therefore, an instrument

has several purposes, it may have several validities." (Manual, p.7).

He defines these purposes as: (i) providing a sampling of different types of thinking, feeling and acting patterns regarding the nature of the personality determinents and their relationships to each other in an individual, (ii) providing information about individuals which is useful in understanding their problems and improving their adjustment, (iii) serving as a research tool for obtaining other types of information.

Without quantifying, the authors assign the test validity accruing from the test construction, stating that inventories answered by testees themselves are among the most diagnostically differentiating, and are "particularly useful with problem boys and girls." (Thorpe, 1948). They state further that it is more self-revelatory than the interview.

This hypothesis was tested by Jackson (1946) who compared five methods of personality evaluation, viz. three rating scales (experience, teacher and parent rating), the interview and the California Test under discussion here. The C.T.P. yielded superior weights in six out of the seven Personal Adjustment categories; in four out of the seven Social Adjustment categories; and, in the Total Adjustment score.

Taylor and Combs (1952) assessed the validity of the California Test more directly. Testing the hypothesis that well-adjusted people can accept more self-damaging statements or criticisms than the poorly adjusted, they had 168 sixth-grade children check off items on a check-list which contained self-damaging statements. The group was tested by

the C.T.P., and groups of 50 best-adjusted and 50 poorest-adjusted chosen on the basis of their scores. The better-adjusted checked off a significantly larger number of self-damaging statements than the poorer-adjusted.

Definition of Scales:

Thorpe et al (1953) define the scales as follows (Manual, p.3):

1 Personal Adjustment:

A. Self-reliance:

An individual may be said to be self-reliant when his overt actions indicate that he can do things independently of others, depend on himself in various situations, and direct his own activities. The self-reliant person is also characteristically stable emotionally, and responsible in his behaviour.

B. Sense of Personal Worth:

An individual possesses a sense of being worthy when he feels he is well regarded by others, when he feels that others have faith in his future success, or when he believes that he has average or better than average ability. To feel worthy means to feel capable and reasonably attractive.

C. Sense of Personal Freedom:

An individual enjoys a sense of freedom when he is permitted to have a reasonable share in the determination of his conduct and in setting the general policies that shall govern his life. Desirable freedom includes permission to choose one's own friends and to have at least a little spending money.

D. Feeling of Belonging:

An individual feels that he belongs when he enjoys the love of his family, the well-wishes of

good friends, and a cordial relationship with people in general. Such a person will as a rule get along well with his teachers or employers and usually feels proud of his school or place of business.

E. Withdrawing Tendencies:

The individual who is said to withdraw is the one who substitutes joys of a phantasy world for actual success in real life. Such a person is characteristically sensitive, lonely and given to self-concern. Normal adjustment is characterized by reasonable freedom from these tendencies.

F. Nervous Symptoms:

The individual who is classified as having nervous symptoms is the one who suffers from one or a variety of physical symptoms such as loss of appetite, frequent eyestrain, inability to sleep, or a tendency to be chronically tired. People of this kind may be exhibiting physical expressions of emotional conflicts.

2 Social Adjustment:

A. Social Standards:

The individual who recognizes desirable social standards is the one who has come to understand the rights of others and who appreciates the necessity of subordinating certain desires to the needs of the group. Such an individual understands what is being regarded as right or wrong.

B. Social Skills:

An individual may be said to be socially skillful, or effective, when he shows a liking for people, when he inconveniences himself to be of assistance to them, and when he is diplomatic in his dealings with both friends and strangers. The socially skillful person subordinates his or her egoistic tendencies in favour

of interest in the problems and activities of his associates.

C. Anti-Social Tendencies:

An individual would normally be regarded as anti-social when he is given to bullying, frequent quarrelling, disobedience and to destroying property. The anti-social person is the one who endeavours to get his satisfaction in ways that are damaging and unfair to others. Normal adjustment is characterized by reasonable freedom from these tendencies.

D. Family Relations:

The individual who exhibits desirable family relationships is the one who feels that he is loved and well-treated at home, and who has a sense of security and self-respect in connection with the various members of his family. Superior family relations also include parental control that is neither too strict nor too lenient.

E. School Relations:

The student who is satisfactorily adjusted to his school is the one who feels that his teachers like him, who enjoys being with other students, and who finds the school work adapted to his level of interest and maturity. Good school relations involve the feeling on the part of the student that he counts for something in the life of the institution.

F. Community Relations:

The individual who may be said to be making good adjustments in his community is the one who mingles happily with his neighbours, who takes pride in the community improvements, and who is tolerant in dealing with both strangers and foreigners. Satisfactory community relations include the disposition to be

respectful of laws and of regulations pertaining to the general welfare.

Discussion:

The strongest criticism that could be levelled against the California Test of Personality is that the validity is assumed and not experimentally established. The rationale seems to be: "The items request that information from the testee which the tester requires, therefore, it is valid." Face or content validity are, however, not sufficient indices, for example, of the "purity" of the factors being measured.

Sims (Buros, 1959) does point out that the test has proved itself valuable in the field, saying, "In spite of limitations, however, the additional evidence on validity reported or referred to not only answers some of the earlier criticisms but convinces the receiver that as a measure of self-concept in the, as of now, vaguely defined area called adjustment, this test is as valid as most instruments." He feels, therefore, that validity has been indirectly, and empirically, proved.

Sims mentions two other points of criticism, viz. that subscores are not sufficiently reliable for diagnosis and that error variance on subscores covers a relatively wide percentile range. The second criticism is that there are a disproportionately large number of "NO" answers, 60% to 70% as compared to an ideal of 50%. As a result, if items are answered on the basis of chance, the respondent would give a severely maladjusted profile.

Reliability figures are very satisfactory for a self-report inventory.

This test, which is in constant use at the

Constantia School, has proved its usefulness as a diagnostic tool in working with delinquents. One of its prime advantages in this respect lies in the presentation of a profile allowing comparison between self-adjustment and social adjustment scores - a useful indicator of psychopathy and predictor for receptivity to therapy.

It is felt that its proven utility, and the adequate coverage of areas and types of adjustment, justify its inclusion in this study.

2.7. The Multiple Choice Rorschach Test.

Harrower-Erickson and Steiner first published their version of the Rorschach Test in multiple-choice response form in 1945.

Previously Terman (1936) had developed and used a similar test in which the testee was presented with four alternative answers to each in a small series of standard inkblots. The test was intended to determine dominant interests with reference to masculine and feminine traits.

Harrower-Erickson et al designed the Multiple Choice Rorschach along similar lines. For each Rorschach plate they chose ten responses. These represented responses typically and frequently occurring in protocols. In order to make plate-scores comparable, the responses chosen were indicative of a certain degree of maladjustment and represented a specific formal scoring category.

This procedure provided the basis for weighting items. Each was assigned a weight from one to ten, according to the level of adjustment and formal scoring category it represented. An item typically

found in normal protocols was given a weight of one, e.g., "Two king's heads with crowns." The response given by the severely maladjusted, e.g., "Nothing at all" is given the maximum weight of ten. This was done for each set of ten responses.

In later research (before the final form of the test was published), responses were divided into two groups viz. good responses carrying weights of one to five, and poor responses carrying weights of six to ten. The percentage of good responses was compared with the percentage of poor responses in screening.

Second-choice responses were elicited in an attempt to enhance the effectiveness of the test. A space was provided for spontaneous responses if the subject felt that none of the items fitted. This was scored in the usual way.

Numerical weightings were summed to provide a total mean weight. Alternatively, the number of good versus poor responses could be scored.

Subsequently the authors expanded the items to thirty per plate. These were presented to the testee in three groups of ten each. Three first-choice responses were obtained for each plate in this way.

Description of the Test:

The Multiple Choice Rorschach Test involves the ten standard Rorschach plates, or slides of these plates. The testee is presented with thirty descriptive items (three groups of ten items) from which he chooses three items, and may be required to choose three second-choice items (or alternatives). Additionally, he may give one spontaneous response for each card. The subject is instructed to choose "the best description of the blot or any part of the blot." (Harrower-

Erickson, et al, p.153).

The test can be given to a group by projecting slides of the cards before them. The test takes approximately 30 to 40 minutes to administer.

Scoring may be done by an untrained person (except where spontaneous responses have to be scored). This is done by summing the weights and calculating the mean weight, or by calculating the number of "good" and "poor" responses.

In this study the former method of scoring was used and no spontaneous responses were elicited.

Reliability:

An assessment of reliability was obtained by Due et al (1945). In a study comparing raters' judgements of adjustment on the basis of Multiple Choice Rorschach scores with clinical diagnoses, they assessed the degree to which raters agreed, in other words, the reliability of the interpretation.

They state "When pairs of raters are compared with each other, they show 'complete agreement' in more than half the cases as to the correspondence between the clinical and Multiple Choice evaluations, i.e., both raters made judgements of complete, essential, or partial agreement or disagreement." (p.209). Raters' personality assessments and clinical diagnosis had been compared and grouped into four categories viz. complete agreement, essential agreement, partial agreement, and disagreement.

The agreement of raters as to correspondence between clinical and Multiple Choice evaluations is tabled on the next page:

Degree of Agreement
Between RatersPercentage of Cases
for Raters

	A + B	A + C	B + C
Same category, e.g. Complete agreement/ Complete agreement	52	55	55
Agreement within 1 step, e.g. Complete agreement/ Essential agreement	46	39	36
Agreement within 2 steps, e.g. Complete agreement/ Partial agreement	3	7	9
Agreement within 3 steps, e.g. Complete agreement/ Disagreement	1	1	0

An average of 1% of cases occurred where raters disagreed completely on the correspondence between clinical and Multiple Choice evaluations, and an average of 54% of cases occurred where there was complete agreement on the similarity of categories.

Similar results were obtained with raters' reliability of interpretation of the degree of agreement between three categories as indices of maladjustment, rather than the particular diagnosis. These categories were (i) very little or no maladjustment, (ii) mild to moderate maladjustment and (iii) severe maladjustment.

Indices of agreement between clinical and Multiple Choice evaluations were obtained and are tabled on the next page:

Degree of Agreement Percentage of cases
for Raters

	A	B	C	A + B + C
Complete	33	33	48	38
Essential	35	27	25	30
Partial	21	28	18	22
Disagreement	11	11	8	10

Validity:

The test was administered to a group of 731 patients at the neuro-psychiatric service of a Naval hospital and to a control group of 369 non-patients who were living under comparable conditions.

A comparison of the two sets of scores showed that the non-patients obtained a statistically significant lower average total score than the patients, and gave significantly fewer negative responses than the patients (2.96 versus 3.93).

The protocols from a group of 200 patients of whom 94% were suffering from a neuro-psychiatric difficulty were analyzed "blind" in order to evaluate the validity of this test for differential diagnosis. The agreement with a clinical evaluation was considered complete or essential in 70% of cases and non-existent in 10% of cases. Ratings of both test-scores and clinical evaluation of adjustment gave rise to disagreement in 5% of cases and complete agreement in 70% of the cases.

Celliers (1963) used the Multiple Choice Rorschach, with his own weighting and scoring system (based on item-analysis) to determine the relationship between adjustment and academic proficiency in first-year

B.A. students. With Harrower-Erickson's scoring technique, the percentage of poor responses and academic achievement correlated to the extent of $-.24$. In contrast to the findings by Furneaux, the better adjusted student achieved higher.

Celliers, using his own scoring technique, obtained correlation values of $.77$ (female $n = 93$) and $.73$ (males $n = 74$).

Discussion:

The inherent administrative advantages of this test are plain. The test can be administered to a group, requires a fraction of the time needed for the individual Rorschach Test (± 35 minutes), whilst it is still claimed to provide a differential (but less intensive) diagnosis, it can be scored by an untrained person, etc..

As such the test may be expected to be a useful screening device, as intended by the authors who state: "In the last analysis, however, in any programme of screening out of the unfit, we are much less interested in knowing in detail why the individual is unfit provided we can spot him." (p.152).

The reliability studies carried out by Due et al (1945) require further investigation. What has been assessed is not test reliability but rater reliability. The authors do not make it clear whether the raters also evaluated the Multiple Choice Test scores. In fact they create the impression that this was not done, but that the raters only judged the extent of agreement.

"These judgements of agreement between the clinical and Multiple Choice evaluations and between degree of adjustment as evidenced clinically and by the test,

were made by three raters independently." (p.209). Test reliability has, therefore, not been adequately established.

McCall (Buros, p.285) writes as follows on the reliability of this test: "The Harrower-Erickson and similar forms of the group Rorschach have shown reasonably good reliability but very little validity either as research or screening instruments." (p.285).

Smith and George (1954) carried out a critical analysis of the Multiple Choice Rorschach by comparison with the individual Rorschach. Both tests were administered to fifty-five students, in each case by the same examiner. They correlated the two for the determinants studied, viz., M, FM, F, Fc, FC and CF, and concluded that the results "are neither high enough nor general enough to warrant any conclusion except that the two tests are not measuring the same thing."

They applied the test to a group of non-psychology first-year students who were given two series, with instructions on the second series to give the best possible scores. There was significant change on three determinants (M, FM, and FC) in the favourable direction. From this they concluded the test is subject to deliberate alteration. This experiment, however, does not really prove much except that the students did not fake on the first series, administered in accordance with instructions. All subjective test measurements are subject to faking, even performance tests which can be faked to produce a below-potential performance. A standard test for reliability would have been more meaningful.

The third experiment by Smith et al (1954)

showed that, in responding, testees did not always utilize blot areas anticipated in the original scoring key.

A less-than-satisfactory proof of reliability and validity must be accepted. Nevertheless, it is felt that there is sufficient justification for the inclusion, in this study, of the Multiple Choice Rorschach Test as a measure of general adjustment.

2.8. C.V. Interest Questionnaire.

This test was developed by the Cape Provincial Administration for use with scholars.

It was specifically designed to measure fields of interests which coincide with broad occupational groupings.

Description of the Test:

The test is a questionnaire covering twelve scales, or fields of interest. It may be applied to a group.

The test has been designed for use with pupils in Standard VI up to and including Standard X.

The scales are:

- i. SO, i.e. a preference for working with people as individuals or as fellows, this also involves a preference for social activities.
- ii. OP, i.e. a preference for contact with people in groups, or audiences, thus, also a liking for public appearances.
- iii. B, i.e. a preference for trade and, therefore, for that type of work done by buyers and salesmen.
- iv. SY, i.e. a preference for figures and arithmetic.
- v. SK, i.e. a preference for writing.
- vi. L, i.e. a preference for reading and study of

literature.

- vii. K, i.e. a preference for the study of art, i.e. interest in the appreciation rather than the practice of art.
- viii. H, i.e. a preference for manual work not involving work with machinery, in other words, manual work which involves the use of hand-tools.
- ix. M, i.e. preference for work with machinery and mechanical devices such as radios, electrical apparatus, etc.
- x. W, i.e. preference for scientific laboratory work, for practical work in the laboratory rather than an interest in a theoretical study of the sciences.
- xi. D, i.e. a preference for work with animals.
- xii. P, i.e. a preference for work with plants and thus for botanical or gardening work.

The test is scored by means of a scoring key for each scale. All scales have an equal number of items.

Reliability:

The reliability coefficients for the twelve scales of this questionnaire were calculated according to the Kuder-Richardson formula. The following values were obtained:

SO	.79	SK	.84	M	.96
OP	.77	L	.87	W	.86
B	.78	K	.80	D	.90
SY	.89	H	.83	P	.87

The sample in this reliability study consisted of a random selection of 250 Standard VII and

Standard IX pupils from a total test group of 1250 pupils drawn from 50 schools in the Cape Province.

Validity:

In an attempt to establish validity, test scores were correlated with ratings of pupils' interest by their teachers. The following values were obtained:

SC	.44	SK	.26	M	.55
OP	.36	L	.39	W	.50
B	.63	K	.16	D	.26
SY	.82	H	.25	P	.19

The sample consisted of 88 pupils drawn from 24 Cape Secondary and High schools.

Validity was also assessed in the following way: 125 pupils' test scores whose interests could be categorized into the C.V. scales on the basis of a case study were compared to a control group of 250 randomly drawn pupils' scores. In each scale the validity was tested by comparing the difference between the means of the experimental and control groups to give a critical ratio. Values obtained, and the number of subjects in the experimental group on that scale, are given below:

SO	3.86 (16)	SK	4.31 (6)	M	15.01 (21)
OP	6.27 (15)	L	3.14 (4)	W	2.86 (12)
B	5.70 (9)	K	2.03 (6)	D	4.99 (8)
SY	5.55 (8)	H	0.63 (14)	P	5.65 (6)

A group of students and professional workers whose fields of study coincided with the scale ' definitions were compared to a control group of

forty professional workers. Differences between scores of the criterion groups and control group were evaluated by means of a critical ratio. Results are shown below:

Criterion Group	Applicable Scale	Critical Ratios Criterion/ Control Group	n
Architectural Students	K	7.05	45
	H	2.76	
Commerce Students	E	7.15	40
	SY	4.66	
Agricultural Students	D	4.88	28
	P	3.44	
Seminary Students	OP	6.11	37
	SO	3.93	
Science Students	W	4.74	50
Electrical Engineers	M	3.70	28
	SY	4.97	
Librarians	L	3.76	16
Social Welfare Workers	SO	8.56	7

Finally, intercorrelations between scales were computed. From this it was concluded that three broad areas of interest are measured, viz., social interest (SO, OP and B), theoretical interest (SY, SK and L) and practical interest (H, M, D, P and W).

CHAPTER IIIMETHOD3.1. The Sample.

The sample consists of 100 male pupils at a Cape reformatory.

The age distribution of the pupils is tabled below:

Table I:

Age	n
15.0 - 16.9	9
17.0 - 18.9	43
19.0 - 20.9	38
21.0 - 22.9	6
23.0 - 24.9	4

Mean age = 19.2 years

Pupils receive both academic and vocational training. Academic training is from Standard VI to Standard X level.

The distribution of pupils over standards is given below:

Table II:

Standard	n
6	7
7	40
8	30
9	9
10	6

Vocational training is given to each pupil for

approximately fifteen hours per week. It consists of theoretical work in which pupils in a specific trade learn the basic techniques and principles of that trade, and of practical lessons where skills are acquired and trade knowledge is practically applied.

The trades from which the pupils in the sample were culled are: carpentry, brick-laying, plumbing, fitting and turning, painting and basic training. Basic training is not a specialized trade but provides a grounding in all other trades. Pupils entering the reformatory at Standard VI level are automatically placed in this category so that an idea can be formed where their interests and abilities lie for future placement.

A pupil may, if he stays long enough, obtain the NTC III qualification.

The distribution of pupils over trades is given below:

Table III:

Trade	n
Carpentry	19
Brick-laying	21
Plumbing	15
Fitting and Turning	15
Painting	23
Basic Training	7

The numbers allotted to a trade depend on the teaching, equipment, etc. facilities.

New pupils are assigned to trades as vacancies occur. Vacancies occur when pupils leave the reformatory. On the average, pupils stay at the

reformatory for two years - the duration for which they are formally committed and the average length of stay for pupils transferred from a School of Industries. This period may be extended for up to five years in the interests of the pupil, for example, if he does not have a satisfactory home to go to when discharged.

The way in which pupils are assigned to trades supports the assumption used in the criterion that, with respect to the dimensions measured, the distribution over trades is a random one.

The only exception to the rule of assigning pupils to trades as vacancies occur involves those with an education of below Standard VI who are automatically committed to basic trade training. The mean age of this group (seven pupils) is 19.1 years, close to the total group mean of 19.2 years. A proportion of the basic training group is scholastically retarded, whether due to environmental or innate shortcomings. However, the effect of these on the study as a whole is minimal.

A second and more important consideration is the concordance of interest and trade assignment. In other words, may a pupil's interest in a trade, or lack of it, not be the sole determinant of his success in that trade? It was decided to test this hypothesis by asking pupils whether, if given the choice, they would choose the same trade or a different one. Results will be given and discussed later.

The sample is a selected one with respect to the individuals themselves and the context within which they function, viz., in a corrective institution with its concomitant mores, values, etc.. A

pupil is committed to the reformatory or transferred from a School of Industries.

Committal is carried out by a magistrate in a Juvenile Court. The most common crimes perpetrated by these pupils are car theft, assault, house-breaking, etc.. Pupils are usually transferred for inability to conform, destructive behaviour, chronic lying, stealing, etc..

The sample in this study is, therefore, characterized by varying degrees of sociopathic behaviour.

Within itself the group is more homogeneous. Firstly, the diagnosis of adolescent sociopath is common to all. Secondly, the subjects' backgrounds are markedly similar, consisting generally of familial inadequacy in the form of divorced, separated or quarrelsome parents, inconsistent and overly harsh or laissez-faire discipline; one or both parents rejecting him; and, over indulgence in alcohol or promiscuity by the parents. Delinquents often begin their apprenticeship to crime in street-gangs. In advanced stages of sociopathy they smoke dagga and inhale intoxicating fumes, e.g. benzine or paint-thinners.

Some studies that have been carried out aimed at assessing personality differences between delinquents and non-delinquents. Peterson et al (1955) carried out a factor-analytic study on responses to two questionnaires on personality factors made by delinquents and non-delinquents. They isolated three factors, viz. psychopathic personality traits, emotional maladjustment and familial dissension.

Schneider (1950) found delinquents lacking in social insight to such an extent that "... they

need a certain amount of protection, where this is possible, from circumstances that may endanger them." (p.78).

Haines (1959) conducted a study on groups of delinquent and non-delinquent children to assess their self-centredness by giving verbal stimuli invoking socialized or self-oriented responses (Action-Agent Test of Merrill-Palmer Scale of Mental Tests). He found no statistically significant differences between the two groups, however.

In an unpublished study in 1964, the author compared the MMPI profiles of 42 institutionalized delinquents with "normal" profiles. Delinquents scored significantly high on the Pd scale, and higher than average, although not significantly so, on the Sc and Pa scales.

Manne et al (1962) applied an intelligence test comprised of performance intelligence and verbal intelligence measures to a group of 193 institutionalized delinquents. In all cases sociopathy had been diagnosed in interviews by psychologists and psychiatrists. They obtained the following results:

I.Q. Measure	Mean	Standard Deviation
Total	90.52	18.95
Verbal	86.84	17.73
Performance	96.20	18.75

The difference between mean I.Q.s was significant at the .1% level. In 22% of cases the direction of the difference was reversed. Most of these cases fell in the lower part of the I.Q. range and were

classified as mental defectives.

Quay (1964) factor-analyzed case history data in an attempt to establish personality dimensions of 115 institutionalized delinquents. The data was processed into ratings of behaviour traits on 29 items. Intercorrelations among trait ratings produced 4 factors, viz. Socialized-Subcultural, Unsocialized-Psychopathic, Disturbed-Neurotic and Inadequate-Immature. These traits were distinctive of delinquents.

Pierson and Kelly (1963) conducted an interesting personality assessment of the delinquent. They applied Cattell's High School Personality Questionnaire to 850 male delinquents. Scoring was aimed at second-order factors, anxiety and extraversion, and an idiosyncrasy score was derived (this was based on the sample mean deviation from the total mean deviation). Measurements were intercorrelated and factored. They found low anxiety, high extraversion and high idiosyncrasy to be typical of delinquents. This tends to support Eysenck's views in certain respects. Eysenck (1964, 1965) puts forward the view that unstable extraverts tend to become criminals. He also postulates a strong heredity factor: "... three-quarters by heredity and one-quarter by environment." (p.31)

Whereas Pierson et al and Eysenck agree on the extraversion factor, the latter postulates neuroticism and the former, low anxiety. The compatibility of these concepts is in doubt. For example, Karen Horney sees anxiety as the underlying mechanism of neurosis (Hall and Lindzey, 1957, p.132).

Quoting these studies is mainly intended to demonstrate that the delinquent shows personality

deviations compared to non-delinquent adolescents in the equivalent age range.

For the purpose of this study the major contribution of a description of the delinquent personality is to show that obtained results cannot be generalized to non-delinquents without verification of results on a non-delinquent group.

3.2. Testing Procedure:

Certain tests were applied as a formal procedure to each new entry at the reformatory. These are the California Test of Personality, Cattell's HSPQ, the N.S.A.G.T. and the C.V. Interest Questionnaire. Scores from these tests were utilized directly. In all cases raw scores were used, except in the case of the N.S.A.G.T. where raw scores had been converted to I.Q.'s.

The Gordon Personal Profile, Gordon Personal Inventory, Multiple Choice Rorschach Test and Gottschaldt Figures were applied to the pupils in groups of approximately ten to fifteen pupils. This allowed the tester adequate vigilance in testing.

All tests were applied according to standard test instructions.

Testing occurred over a two-week period, and in this time instructors carried out the ratings of pupils in their trade.

Certain information used in the study was culled from their records, viz. age, length of training period, etc..

3.3. The Criterion:

In order to assess the relationships between

personality measures and proficiency in the trade, it was necessary to obtain an index of performance in the trade.

Basically, this index was obtained from ratings by supervisors. These ratings were made by instructors using scales and scale definitions given to them.

In view of the fact that it was felt that not all scales could be given the same priority ratings, instructors were also asked to assign weights to the scales on the rating form. The weights thus obtained were applied to the rating scales and results were summed to provide a composite score indicative of the pupil's success of response to trade-training.

3.3.1 Rating the Pupil:

A rating form comprised of ten dimensions was chosen. These dimensions, or characteristics, were the following: (See also Add. I).

- (i) Ability to Learn
- (ii) Dependability
- (iii) Quantity of Work
- (iv) Quality of Work
- (v) Initiative
- (vi) Attitude towards Job
- (vii) Co-operation with Superiors
- (viii) Safety Habits
- (ix) Progress
- (x) Marks obtained in the Class (Theory and Practical).

Each characteristic was rated on a continuous scale on which five points were defined. An example is given on the next page.

Example:

<u>Characteristic:</u>	<u>Exceptional</u>	<u>Above Average</u>	<u>Average</u>	<u>Below Average</u>	<u>Unsatisfactory</u>
<u>Dependability:</u>	Always on the job - Conscientious	Hard Worker - Does his best	Shirks Some-times. Average	Requires watching Distractable	No sense of Responsibility
	* [+2]	* [+1]	* [0]	* [-1]	* [-2]

Together with the rating form, the instructor was given directions on how to rate in an accompanying letter, followed by a personal interview to ensure full understanding of the procedure. In this, common errors of halo-effect, central tendency, etc., were explained (Add. II). In this context it must be borne in mind that the instructors were experienced raters, having regularly handed in progress reports on pupils. These progress reports included items on such behavioural aspects as initiative, responsibility, etc..

The basis for comparison used by the raters was the standard within their own group of pupils. Each instructor was asked to rate only his own pupils, as these were the only pupils with whom he was sufficiently familiar to give the ratings any validity. This meant that the ratings by an instructor differentiated between the members of that group, e.g. Painter trainee group, only.

3.3.2 Obtaining Weights:

All raters were asked to assign a weight to each characteristic. The most important of the ten characteristics was to be given a weight of 1.0. All other characteristics were weighted accordingly, e.g.

if "Initiative" was considered exactly half as important as that characteristic assigned the highest weight, then it was given a weight of .5.

The individual weightings were summed to give the weight finally used for each characteristic.

To obtain a composite score for each pupil, the sum of ratings (multiplied by their respective weights) was taken.

The composite score represented the final score of success of response to trade-training.

Table IV: The final weights were as follows:

Characteristic	Weight
Ability to Learn	1.0
Dependability	.8
Quantity of Work	.5
Quality of Work	.8
Initiative	.6
Attitude towards Job	1.0
Co-operation with Superiors	.6
Safety Habits	.3
Progress	.8

The instructor was guided in his rating on Class Marks. In each trade group, class marks of all trainees were obtained and fitted to a normal distribution so that each point on the scale (of Class Marks) encompassed a range, e.g. the "Exceptional" point in the Painting trade produced a class mark range of 78% - 99%. The pupils' annual class mark was then compared to the given ranges and rated accordingly.

Previously it was mentioned that ratings by the instructors were made only on their own trade

groups as they were familiar with the trainees in their groups.

To obtain an overall proficiency assessment, the results of the groups were superimposed. To make this possible two assumptions have to be made, viz. that the true mean and variance of trade success is identical for all groups.

To have a significant difference in trainee quality between groups, with respect to the qualities measured in this study, implies a bias (e.g. placement programme) in the allocation of pupils to trades. New entries are assigned to trades according to where a vacancy exists, vacancies occurring as pupils complete their periods of detention. As far as assignment to trades is concerned, then, in terms of psychological qualities the distribution is a random one. This may be expected to, *ceteris paribus*, hold true for the mean and variance of trainee potential for trade success.

If the distributions of ratings for each group are similar, then each pupil's score will fall into the correct position, within small error limits, on the hierarchy of trade-success.

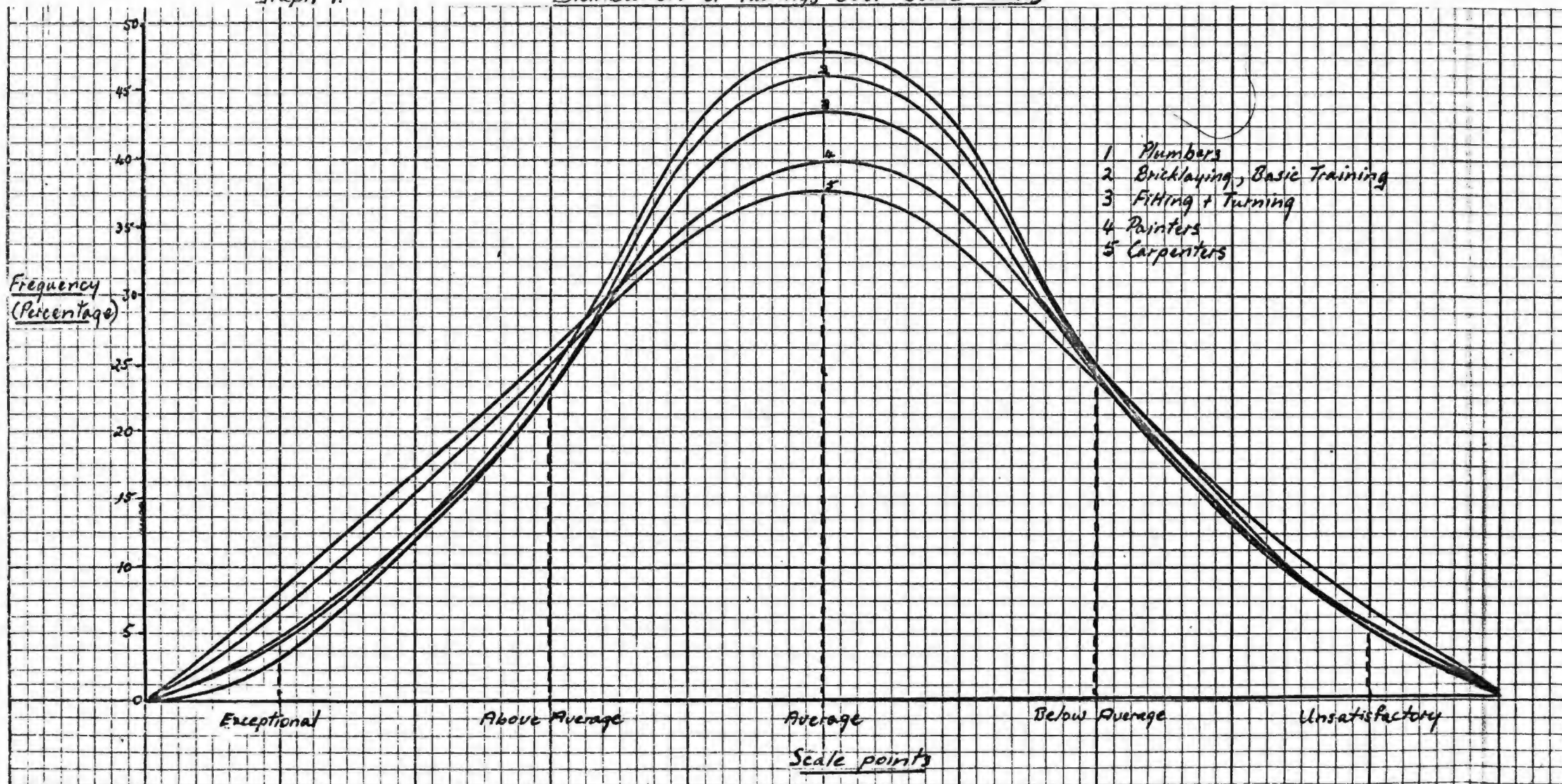
The distributions of ratings (over all scales) are shown in the accompanying graph.

Percentages are given rather than actual frequencies so that graphs may be visually compared.

In one trade, viz. Bricklaying, the distribution was skewed to the left. This was interpreted as an overly lenient rating of the group as a whole. This was explained to the instructor who re-rated the whole group. The second set of ratings is reflected in the graph.

Graph 1.

Distribution of Ratings over Scale Points



The distributions are seen to approximate the normal distribution, and they are considered sufficiently similar in shape to warrant their being superimposed.

The rating on each characteristic has been multiplied by its weight. For example, the characteristic "Dependability" was given a weight of .8 by the judges, the weighted ratings then become:

Exceptional	Above Average	Average	Below Average	Unsatisfactory
_____	*_____*	*_____*	*_____*	*_____*
2(x .8) or = 1.6	1(x .8) or = .8	0 or	-1(x .8) or = - .8	-2(x .8) = -1.6

The highest total score a trainee could receive (i.e. ratings on "exceptional" on all characteristics) would be +14.8, and the lowest -14.8.

To simplify calculations the largest negative value is added (as a positive value) to each trainee's total rating to transform all ratings into positive values, the lowest equalling zero.

CHAPTER IVRESULTS

The criterion scores were compared with scores on test dimensions and with age, language, etc., variables.

The relationships between criterion and other variables are assessed statistically and are also presented graphically later in this chapter.

4.1. Means and standard deviations:

The means and standard deviations obtained on the sample are tabled below:

Table V: n = 100

Means and standard deviations of test scores

Test	Dimension	Mean	S.D.
N.S.A.G.T.	Non-verbal intelligence	93.2	14.5
"-	Verbal intelligence	86.9	12.7
"-	Total intelligence	89.2	12.8
Gordon Personal Profile	Ascendancy	18.4	4.7
	Responsibility	20.5	5.4
"-	Emotional Stability	19.1	5.2
"-	Sociability	18.7	5.8
Gordon Personal Inventory	Cautiousness	14.8	5.3
	Originality	9.65	4.4
"-	Personal Relations	13.5	5.2
"-	Vigour	13.8	5.2
HSPQ	(low score) (high score) Schizothymia - Cyclothymia	9.7	2.8
"-	Low - High General Mental Capacity	11.9	3.1
"-	Ego Weakness - Ego Strength	9.6	3.4
"-	Phlegmatic - Excitable Temperament	8.0	3.3

Table V continued:

Table V continued: n = 100

Means and standard deviations of test scores

Test	Dimension	Mean	S.D.
HSPQ	(low score) (high score) Submissiveness - Dominance	9.6	2.8
"	Desurgency - Surgency	7.7	3.0
"	Superego Weakness - Strength	12.0	3.6
"	Threctia - Parmia	9.7	3.5
"	Harria - Premsia	10.0	2.9
"	Zeppia - Coesthenia	11.6	2.7
"	Confident - Guilt Prone	10.4	3.1
"	Group dependent - Self-sufficient	11.7	2.6
"	Weak - Strong Self-sentiment	10.5	2.8
"	Low - High Ergic Tension	8.5	3.4
Gottschaldt Figures	Flexibility of Closure	41.5	20.7
California Test of Personality	Personal Adjustment	8.5	4.6
	Self-reliance	9.3	4.5
"	Sense of Personal Worth	8.5	3.4
"	Sense of Personal Freedom	9.8	3.3
"	Feeling of Belonging	9.0	2.1
"	Freedom from Withdrawal Tendencies	6.3	3.3
"	Freedom from Nervous Symptoms	9.1	3.2
"	Social Adjustment	9.9	2.3
"	Social Standards	11.8	2.9
"	Social Skills	9.8	3.1
"	Freedom from asocial Tendencies	9.1	3.2
"	Family Relations	10.6	3.7
"	School Relations	8.7	2.8
"	Community Relations	10.3	3.5
"	Total Adjustment	9.3	2.7
M.C. Rorschach	General Adjustment	4.5	1.2

4.2. Correlations:

The Pearson product-moment raw score formula was used to compute the relationships between personality variables and achievement. The relationships between interests, language, age, etc., and achievement were calculated by t-tests, etc..

In view of the fact that the nul-hypothesis was used, a two-tailed test of significance was used. With $n = 100$, the value of r must equal or exceed plus or minus .195 for $p < .05$. If $r \leq .254$, then $p < .01$. (In table, $p < .05 = x$; $p < .01 = xx$).

Table VI:

Correlation values, personality variables and achievement.

Test	Dimension	r
N.S.A.G.T.	Non-verbal intelligence	.22 x
"	Verbal intelligence	.10
"	Total intelligence	.18
Gordon Personal Profile	Ascendancy	.001
	Responsibility	.18
"	Emotional Stability	.09
"	Sociability	.03
Gordon Personal Inventory	Cautiousness	.18
	Originality	.10
"	Personal Relations	-.03
"	Vigour	.28 xx
HSPQ	(low score) (high score) Schizothymia - Cyclothymia	.16
"	Low - High General Mental Capacity	.23 x
"	Ego Weakness - Ego Strength	.15
"	Phlegmatic - Excitable Temperament	-.16

Table VI continued:

Table VI continued:

Correlation values, personality variables and achievement.

Test	Dimension	r
HSPQ	(low score) (high score) Submissiveness - Dominance	-.19
"	Desurgency - Surgency	-.10
"	Superego Weakness - Strength	.08
"	Threctia - Parmia	-.01
"	Harria - Premsia	.003
"	Zeppia - Coesthenia	.08
"	Confident - Guilt Prone	-.01
"	Group Dependent - Self-Sufficient	.24 x
"	Weak - Strong Self-Sentiment	.17
"	Low - High Ergic Tension	-.03
Gottschaldt Figures	Flexibility of Closure	.11
California Test of Personality	Personal Adjustment	.07
"	Self-reliance	.01
"	Sense of Personal Worth	.03
"	Sense of Personal Freedom	.06
"	Feeling of Belonging	.09
"	Freedom from Withdrawal Tendencies	.12
"	Freedom from Nervous Symptoms	.20 x
"	Social Adjustment	.28 xx
"	Social Standards	.07
"	Social Skills	.09
"	Freedom from asocial Tendencies	.12
"	Family Relations	.09
"	School Relations	.27 xx
"	Community Relations	-.03
"	Total Adjustment	.09

Table VI continued:

Table VI continued:

Correlation values, personality variables and achievement.

Test	Dimension	r
M.C. Rorschach	* General Adjustment	+.11

* This is really a test of maladjustment, therefore, a low score accompanies good adjustment.

4.3. The C.V. Interest Questionnaire:

To score this test a pupil's raw score on each scale is converted into a percentile.

The question here is whether interests are related to achievement. To answer this, each pupil's major interest (i.e. on which he obtained the highest percentile relative to his other scores) was noted.

The frequencies with which main areas of interests appear in the study as a whole are tabled below.

Table VII:

Primary interests - frequency of appearance

<u>Dimension</u>	<u>Frequency of Appearance</u>
M	40
K	14
H	14
SY	9
D	9
SK	4
W	3
B	3
SO	2
P	1
L	1
OP	0

For analysis purposes it was decided that all main interests appearing fewer than four times would be discarded. This left M, K, H, SY and D.

The degree of association between the appearance of an interest and the criterion scores was calculated using the point biserial coefficient (rpb).

$$rpb = \sqrt{\frac{\sum yb^2}{\sum yt^2}}$$

As before, a two-tailed test of significance was used. The results are shown below.

Table VIII:

Interests and achievement - correlation values

Dimension	rpb
M	.18 *
K	.01
H	-.35 xx
SY	.10
D	.23 x

xx Significant at 1% level

x Significant at 5% level

The dimension H, i.e. a preference for manual labour in contrast to a preference for work with machines, was negatively related to achievement, significant at the 1% level. Although only fourteen pupils chose this dimension as their main interest, these were mainly low-achievers.

At the 5% level, the dimension D, i.e. a preference for work with animals, was significantly and positively related to the criterion. D was

only chosen nine times as the main interest, eight of these choices made by pupils above the median on achievement.

4.4 Vocational Preference:

In order to obtain a rough measure of job satisfaction pupils were asked to decide whether they would, if given the opportunity, chose the same trade or a different one.

This can of course never be used as a predictor of job success. It was included here to determine whether or not the trainees' preferences may have influenced the criterion; a dissatisfied trainee will not respond as well to training as a satisfied one. On the other hand it is quite possible that a trainee who cannot meet the standards set by the instructor will experience a wish to withdraw as evidenced by his wanting to "try" another trade.

To test whether high-scorers and low-scorers differ with respect to the same or different choice of trades, the top-scoring 50 (in terms of the criterion scores) and lowest-scoring 50 were compared.

The question here is whether "S" (same) and "D" (different choice) responses are each randomly distributed over the criterion range or not.

A 2 x 2 table is shown below:

<u>Vocational Preference</u>			
	Same	Different	
	A	B	
High-scorers	40	10	50
	C	D	
Low-scorers	37	13	50
	77	23	Totals

Using the formula (Siegel, 1956, p.107):

$$\chi^2 = \frac{N \left[\frac{(AD - BC)^2}{N} \right]}{(A + B)(C + D)(A + C)(B + D)} \quad (df = 1)$$

obtained values are:

$$\frac{100 (100)^2}{50 \times 50 \times 77 \times 23}$$

$$\chi^2 = .226$$

With $\chi^2 = .226$ the nul hypothesis cannot be rejected at $p < .05$.

There is no significant difference in the frequency with which top-scorers chose the same trade as compared to low-scorers, nor in the frequency with which each of the two groups chose different trades.

This means a possible source of unreliability in the criterion due to performance differences reflecting differences in job satisfaction (as measured by choice of the same or of a different trade) can be ruled out.

4.5. Training Period:

The training period, or length of experience in the particular trade, was included as a variable to be measured. Here again, the mean length of training periods (in months) of the highest scoring 25 pupils - in terms of success of response to trade-training - and 25 lowest scoring pupils were compared, using

the t-test for means, viz.:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{\frac{\sum x_1^2}{n_1} + \frac{\sum x_2^2}{n_2}}{n_1 + n_2 - 2}}}$$

The following values were obtained:

$$\begin{array}{ll} \bar{x}_1 &= 12.96 & \bar{x}_2 &= 13.60 \\ \sum x_1^2 &= 1712 & \sum x_2^2 &= 1328 \\ n_1 &= 25 & n_2 &= 25 \end{array}$$

Substituting these values in the above formula gives:

$$t = -.64$$

For $df = n_1 + n_2 - 2$, this value is not significant at the 5% level.

The length of training which a pupil had in his trade at the time of testing did, therefore, not affect his measured proficiency.

This point deserves further clarification. There is no doubt at all that pupils with a longer training period behind them produce better, or more advanced, work than untrained pupils. Helping pupils to acquire the necessary skills and knowledge is the whole purpose of training. Had a significant difference between the high-scorers and low-scorers been found, it would have been highly coincidental that those who have been in training longer also fare best in terms of the defined characteristics constituting the criterion; or it would have meant that

the instructors were assessing the pupil's degree of knowledge and of acquisition of skills as a function of the length of training rather than each pupil's response to trade-training independent of his experience in the trade. The lack of difference, therefore, provides reassurance that the criterion is not a function of the length of training.

Length of training is of course not a personality variable. The reason it is included in the study is solely to ensure that it did not determine pupils' positions in the criterion.

4.6. Age Differences:

To establish whether pupil's age is a significant factor in discriminating between high-scorers and low-scorers, mean ages of the highest-scoring 25 pupils and lowest-scoring 25 pupils were compared by means of the t-test for means.

The following values were obtained:

$$\begin{array}{ll} \bar{x}_1 & = 19.56 & \bar{x}_2 & = 18.80 \\ \sum x_1^2 & = 46.2 & \sum x_2^2 & = 68.0 \\ n_1 & = 25 & n_2 & = 25 \end{array}$$

Substituting these values in the formula for the t-test for means, gives:

$$t = 1.74$$

For $df = n_1 + n_2 - 2$, the value of t is not significant at the .05 level.

In the present sample, age is, therefore, not a

contributory factor to success of response to trade training. The mean ages of the highest-scoring 25 and the mean ages of the lowest-scoring 25 pupils did not differ significantly.

4.7. Educational Qualifications:

Educational qualifications are generally closely allied with age. In the Reformatory, however, the mean intelligence is below average (in this sample the mean I.Q. is 89, as measured by the New South African Group Test, and pupils entering the school have often had little previous education. They are then placed in standards commensurate with their general development (i.e. age, language, sophistication, etc.).

For this reason, deviant socio-economic and cultural backgrounds, scholastic aptitude and intelligence interrelate in a unique fashion in the Reformatory situation, so that the high age and educational qualification relationship generally found is not equally close in the Reformatory.

The dimension of educational qualification is, therefore, a complex one which results from variables of intelligence, motivation, scholastic aptitudes, pre-institutional acquaintance with education (as a function of home life, socio-economic environment, etc.) and others.

To establish whether any relationship exists between educational qualifications and the criterion, two groups of 25 pupils, viz. the highest and lowest scoring in terms of the criterion, were again compared with respect to the means of these two groups, using the t-test.

The following values were obtained:

$$\begin{array}{ll} \bar{x}_1 &= 7.08 & \bar{x}_2 &= 6.28 \\ s^2_{x_1} &= 29.84 & s^2_{x_2} &= 13.04 \\ n_1 &= 25 & n_2 &= 25 \end{array}$$

The value of t is 2.96. With df of n_1+n_2-2 , this is significant at the .01 level.

To establish whether the variances are sufficiently similar to justify the use of the given formula, the F test is applied.

$$F = \frac{s^2_1}{s^2_2} = 2.29$$

Although variances differ significantly at the .05 level, they do not do so at the .01 level.

Even so, the t -formula corrected for variance still allows the nul hypothesis to be rejected at the 5% level of significance.

There is a significant difference between the means of educational standard of the high-scorers and low-scorers, with the difference in the expected direction, i.e. high-scorers having the higher educational qualifications. As pointed out previously, the underlying factors in scholastic achievement are intelligence, motivation, cultural background, etc..

4.8. Language Medium:

One of the questions to be answered in terms of the hypothesis formulation concerns the distribution of

the language variable. The question is, does the one language group (English or Afrikaans-speaking) fare better than the other?

To test this, the group was split into two sub-groups viz. the 50 highest and 50 lowest scorers in terms of the criterion - success of response to trade-training.

Examination of the 2 x 2 table below shows that a larger number of Afrikaans-speaking students appear in the "poor" group, and the larger proportion of English-speaking students in the "good" group.

The question arises as to whether this is a chance variation or not. To test this, the χ^2 test was used.

The 2 x 2 contingency table is shown below:

		<u>Home Language</u>		
		Afrikaans	English	
High-scorers	A	30	20	50
Low-scorers	C	36	14	50
		66	34	Totals

$$\chi^2 = \frac{100 \left((420 - 720) - \frac{100}{2} \right)^2}{50 \times 50 \times 66 \times 34}$$

$$= 1.114$$

With a value of $\chi^2 = 1.114$, the nul hypothesis cannot be rejected at $p < .05$.

There is thus no significant difference between English and Afrikaans-speaking pupils, in terms of

their success of response to trade-training.

The differences observed within the contingency table are ascribed to chance variation.

4.9. Graphic Presentation:

The comparison of any personality variable or other variable (e.g. age, education, etc.) with the criterion scores, by means of a correlation coefficient, tests the association between the two as linearly related variables. It is, however, not out of the question that the relationship between the two may be curvilinear. It may, for instance, be possible that those of very low intelligence and those of very high intelligence, within the sample, may have a poor response to trade training. The pupils scoring around the mean may fare best as they may experience optimal balance between abilities and job-demands while the low-scorers may have difficulty in meeting them, and the high-scorers may find the work undemanding and tedious.

To answer questions of this nature it was decided to construct scattergrams representing response to trade training on the Y axis and the personality variable in question on the X axis. The tally in each block was entered*. All the tallies across a row of blocks were summed, the mean obtained and plotted. This was done for every horizontal row. The means were then joined. The shape of the resulting curve shows the position of the mean of personality scores within each interval on the criterion

* The score denoting the endpoint of an interval is tallied in the preceding interval, e.g. $\overline{2} \quad \overline{5} \quad \overline{10}$ represents 2 - 5, 6 - 10, 11

scores. An L-shaped curve, for example, will indicate that the poor achievers tended to score higher on the personality variables than those of average or high achievement.

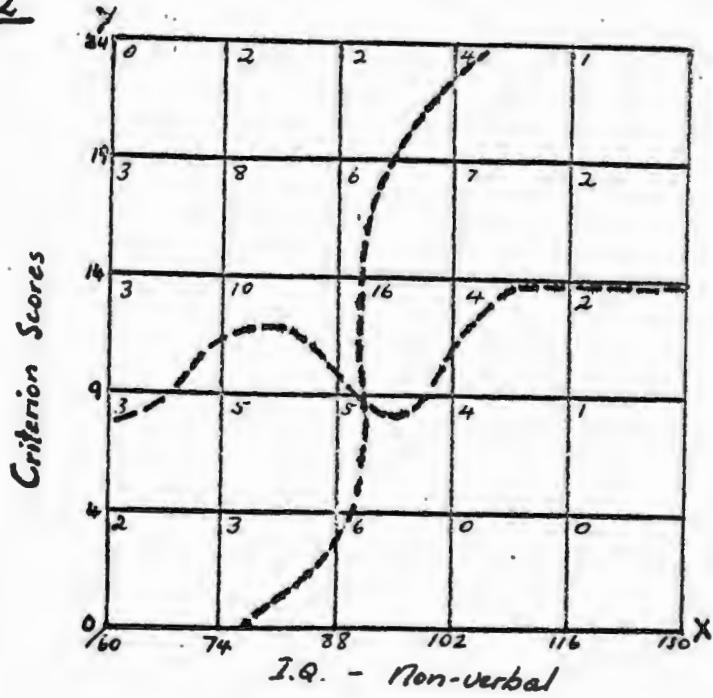
Rows are also summed vertically, means plotted and joined. This shows the achievement score tendency with a constant increase in the personality variable in question. Assuming the personality variable is level of adjustment, the curve would indicate the mean achievement on trade training of the poorly-adjusted, the average-level adjusted, etc., in an even progression of intervals.

The higher the correlation value, the closer the curves coincide diagonally across the graph (left bottom to top right for a positive correlation; left top to bottom right for a negative correlation).

The graphs are provided on the following pages.

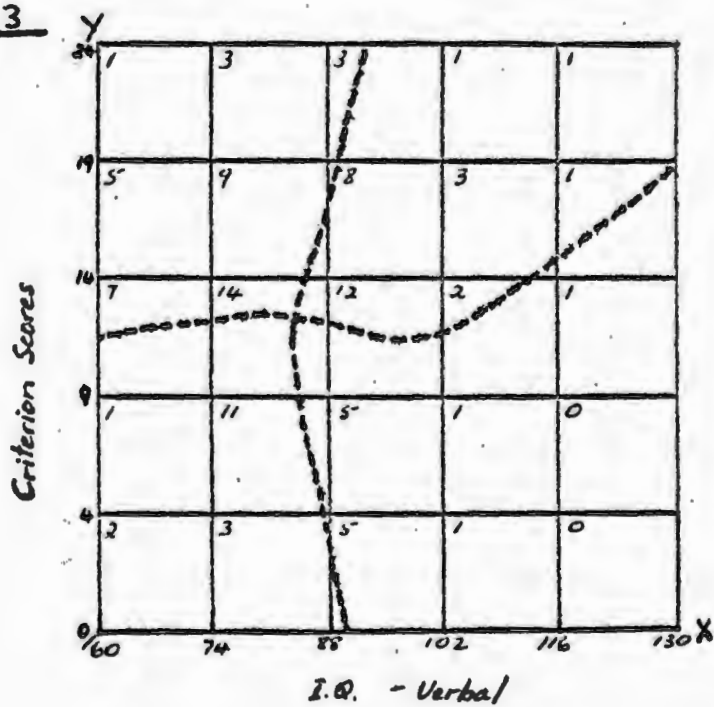
Criterion / I.Q. - Non-verbal (NSAGT)

Graph 2

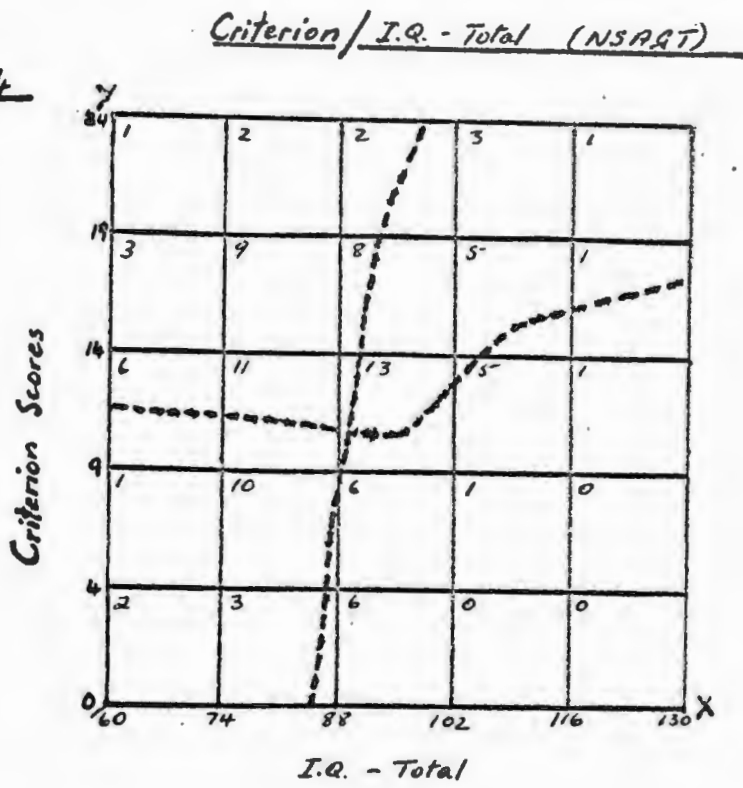


Criterion / IQ - Verbal (NSAGT)

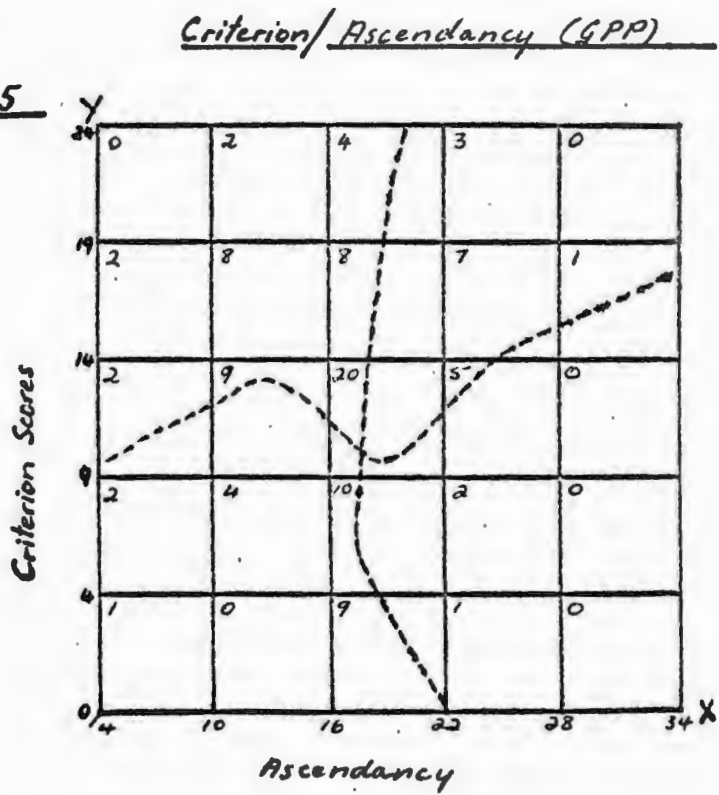
Graph 3



Graph 4

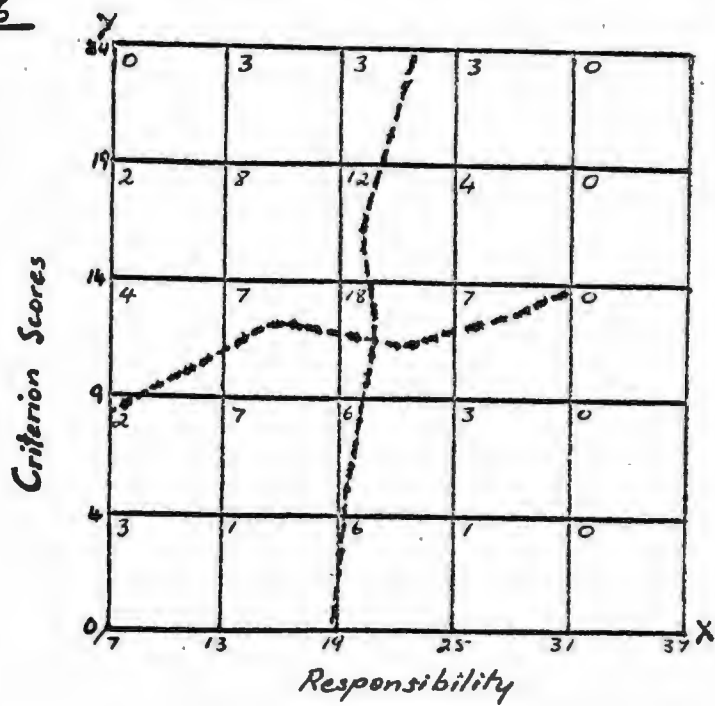


Graph 5



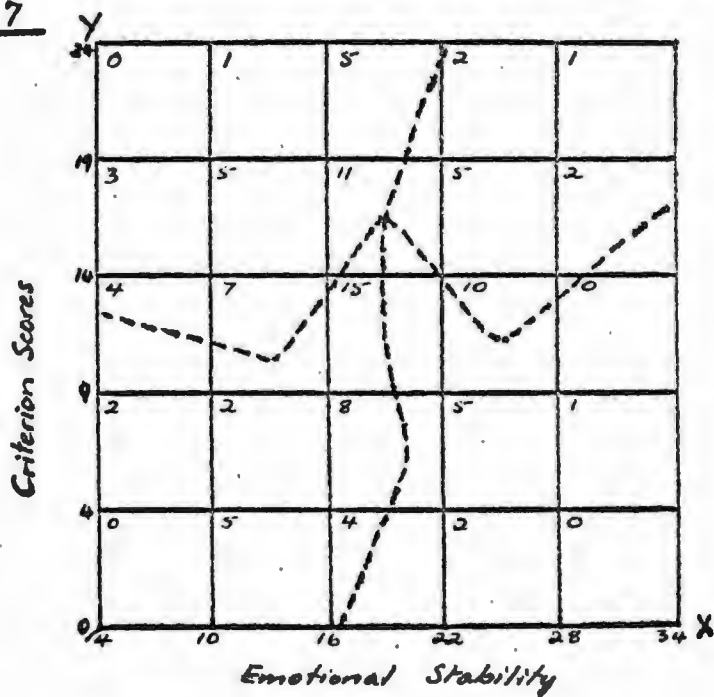
Criterion/Responsibility (GPP)

Graph 6

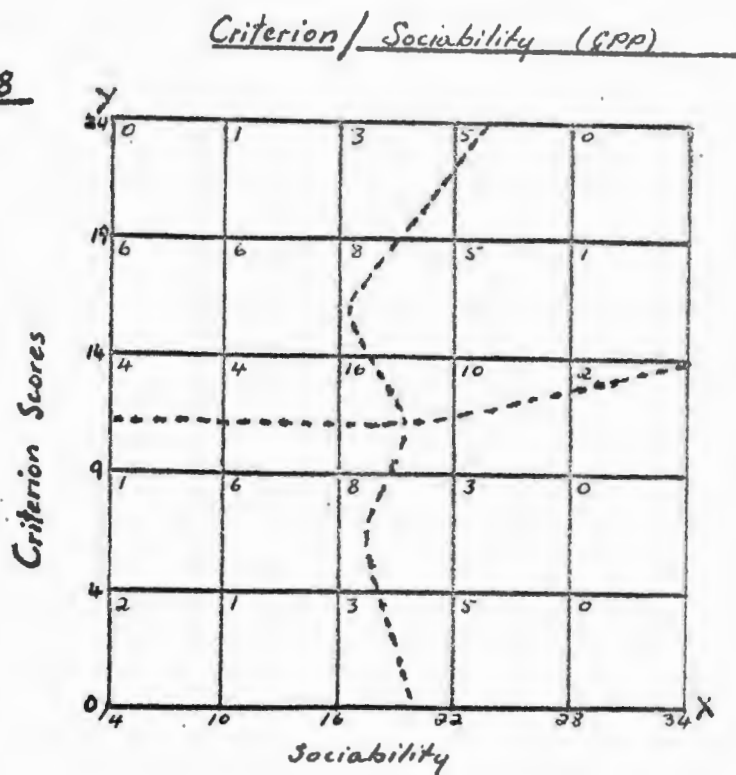


Criterion/Emotional Stability (GPP)

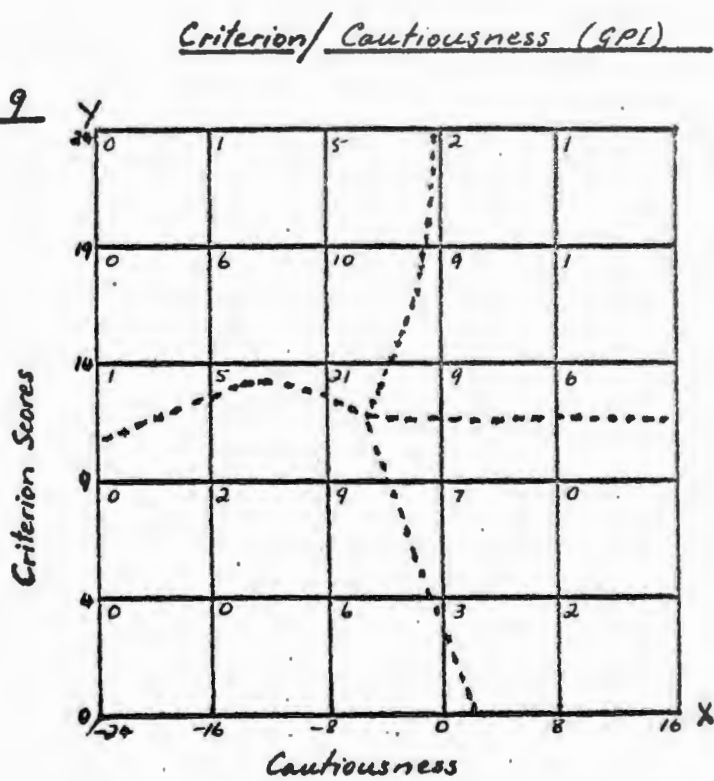
Graph 7



Graph 8

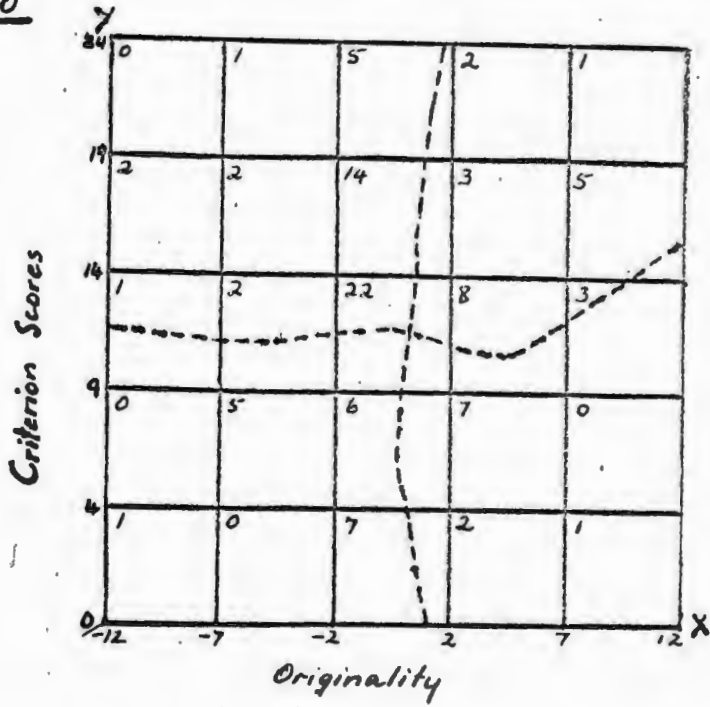


Graph 9



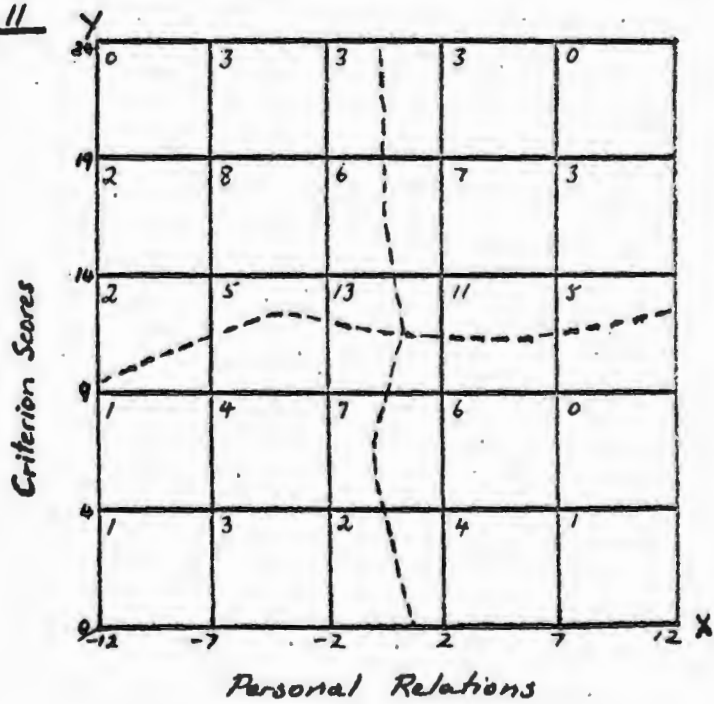
Criterion/Originality (GPI)

Graph 10



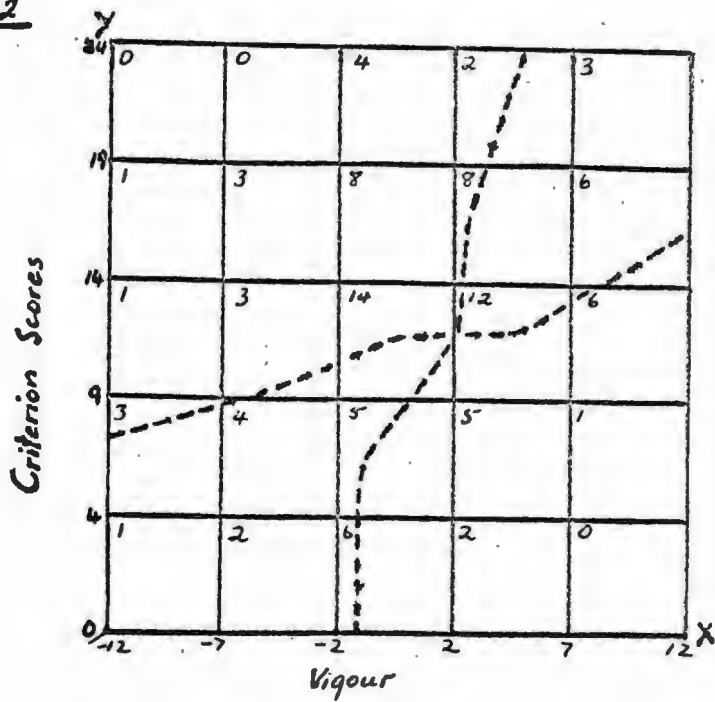
Criterion/Personal Relations (GPI)

Graph 11



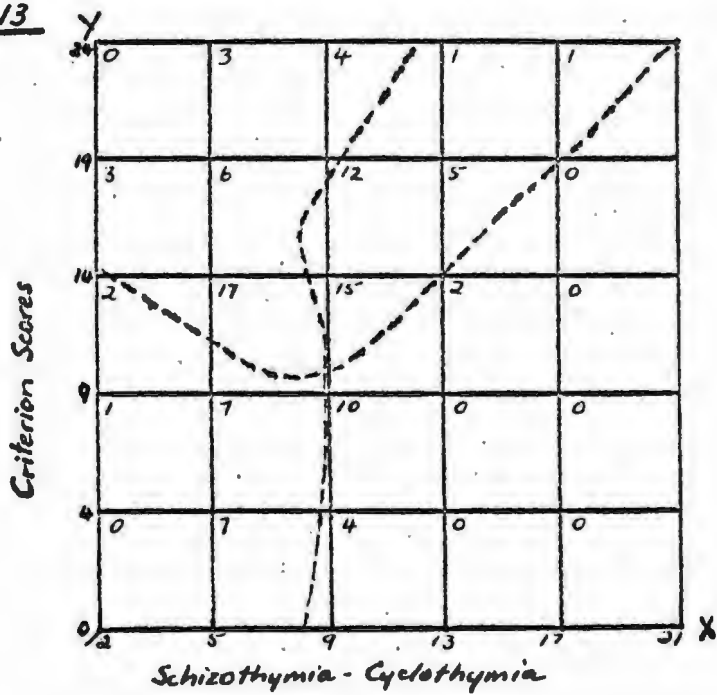
Criterion / Vigour (SPI)

Graph 12

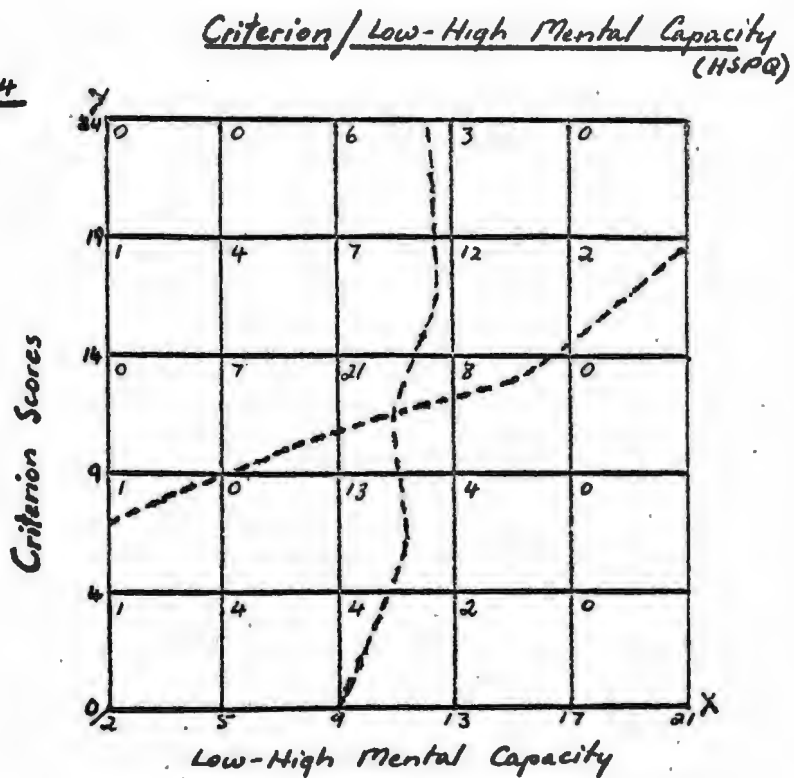


Criterion / Schizothymia - Cyclothymia (HSPQ)

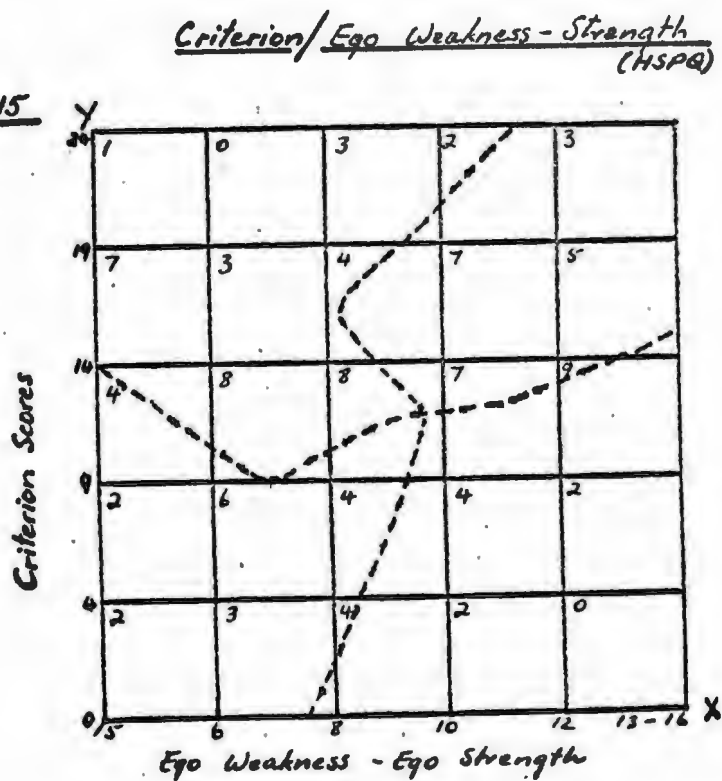
Graph 13



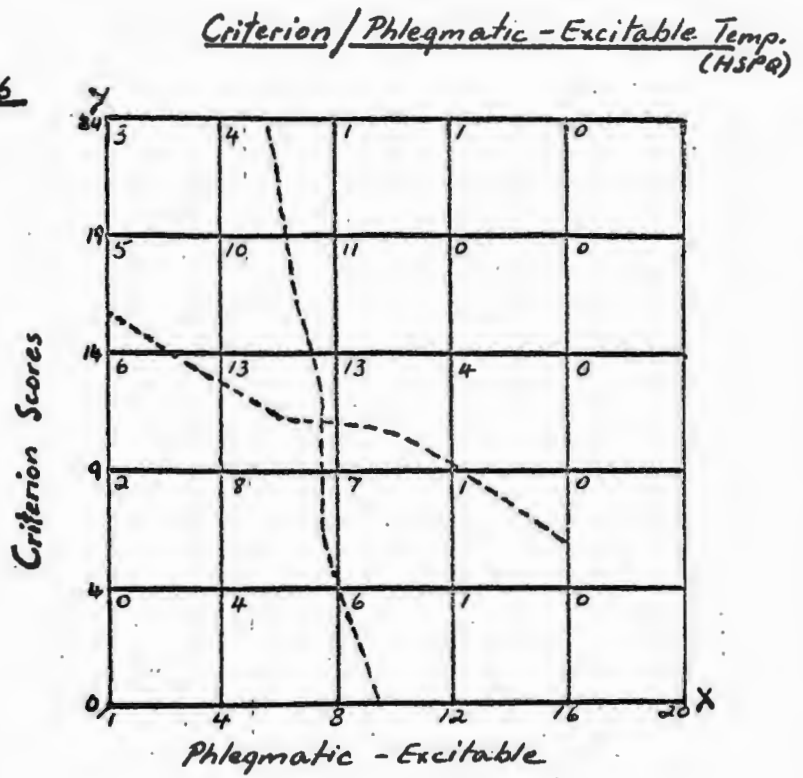
Graph 14



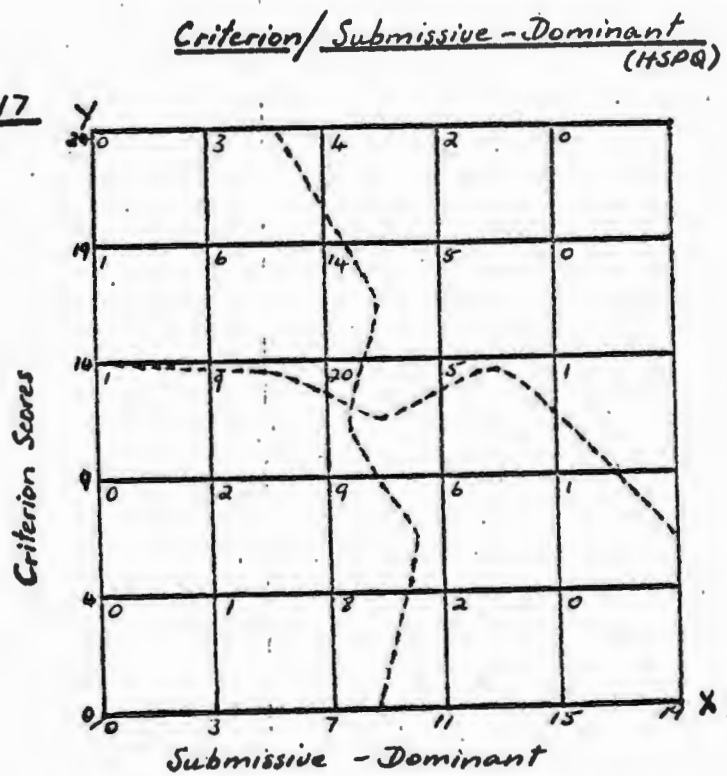
Graph 15



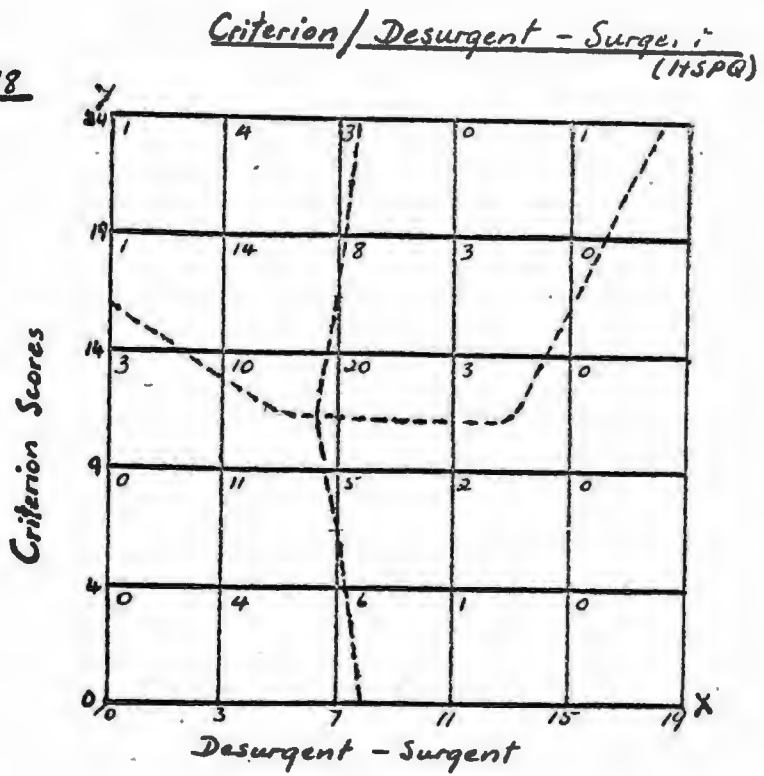
Graph 16



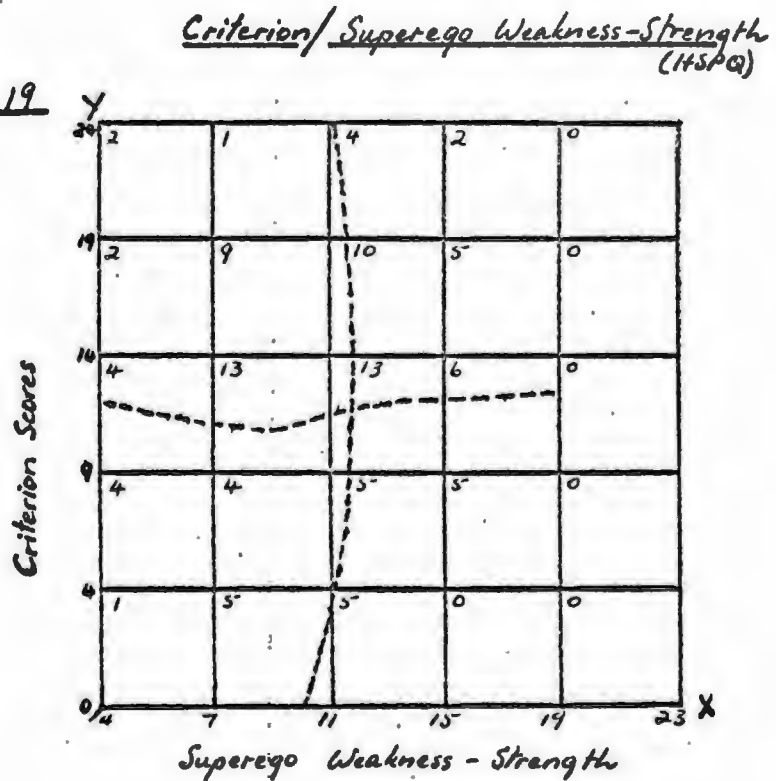
Graph 17



Graph 18

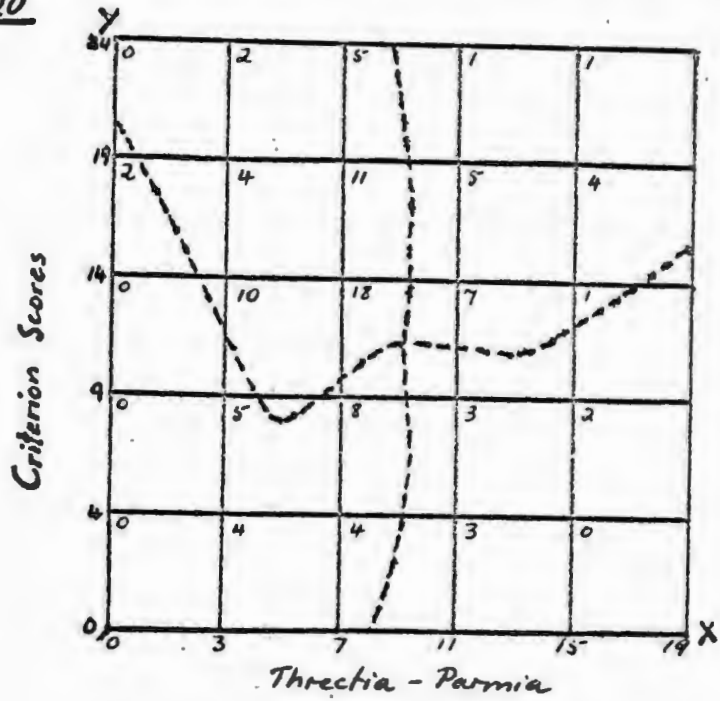


Graph 19



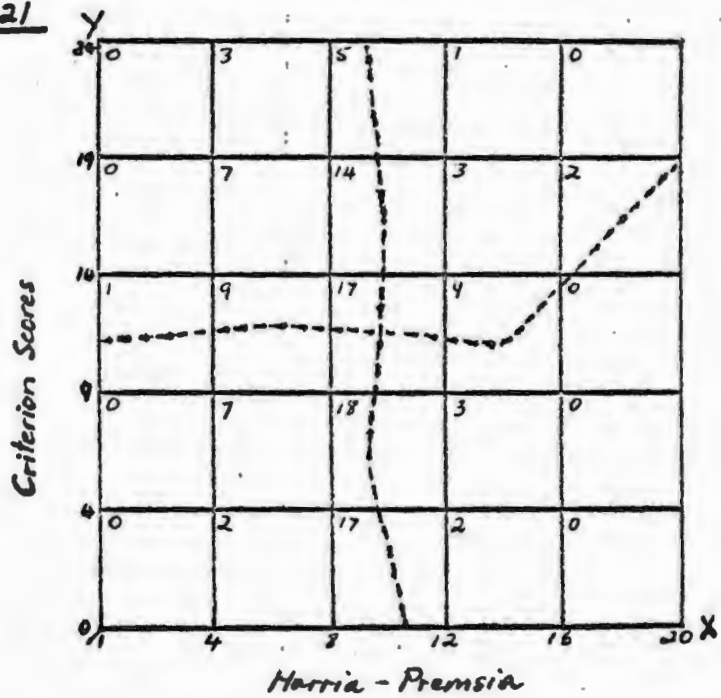
Graph 20

Criterion/Threctia - Parmia (HSPA)



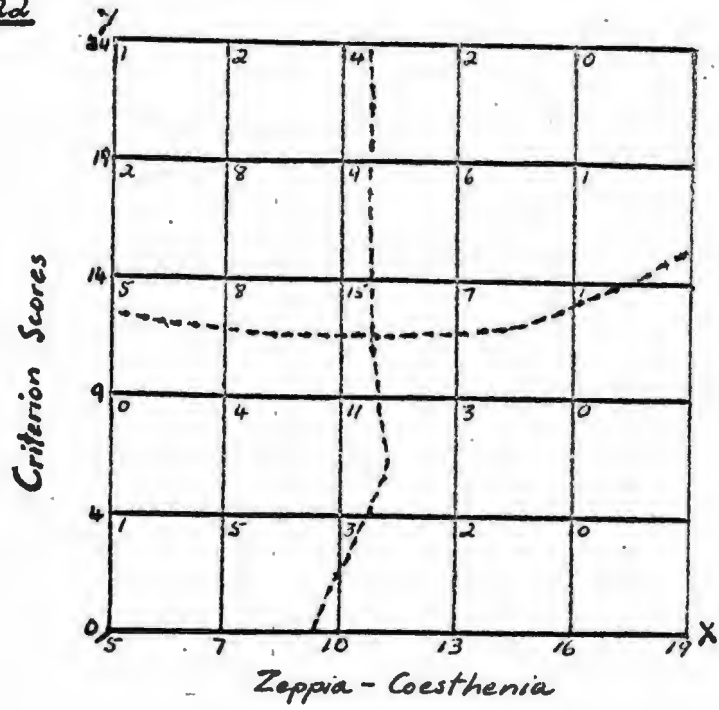
Graph 21

Criterion/Harria - Premsia (HSPA)



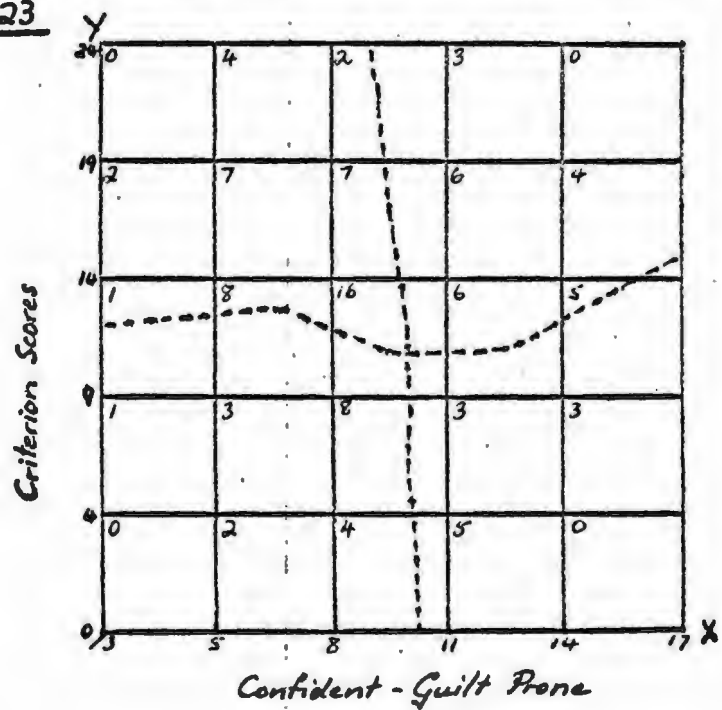
Criterion / Zeppia - Coesthenia (HSPQ)

Graph 22

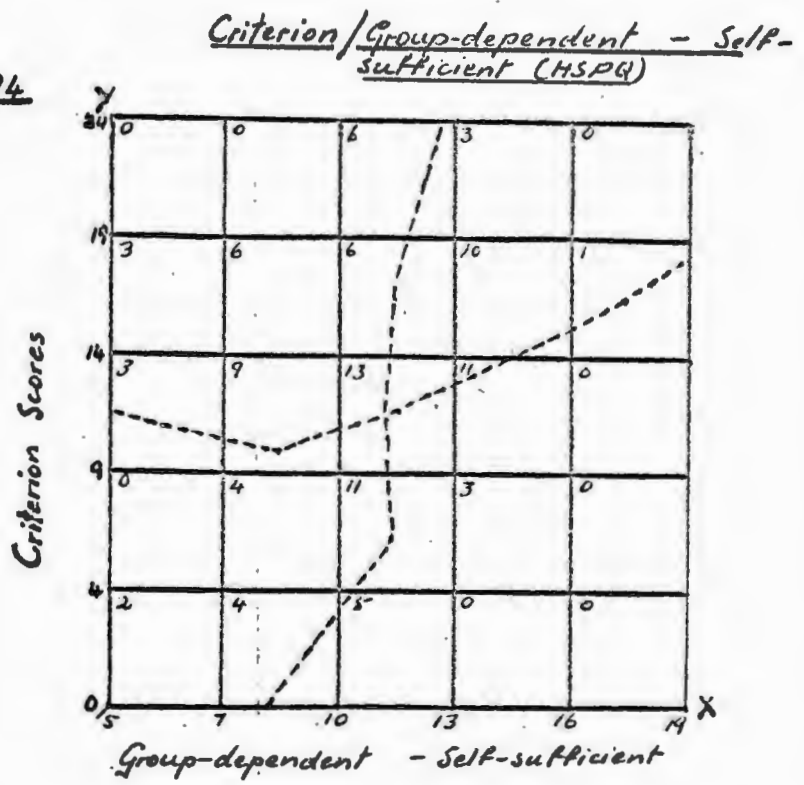


Criterion / Confident - Guilt Prone (HSPQ)

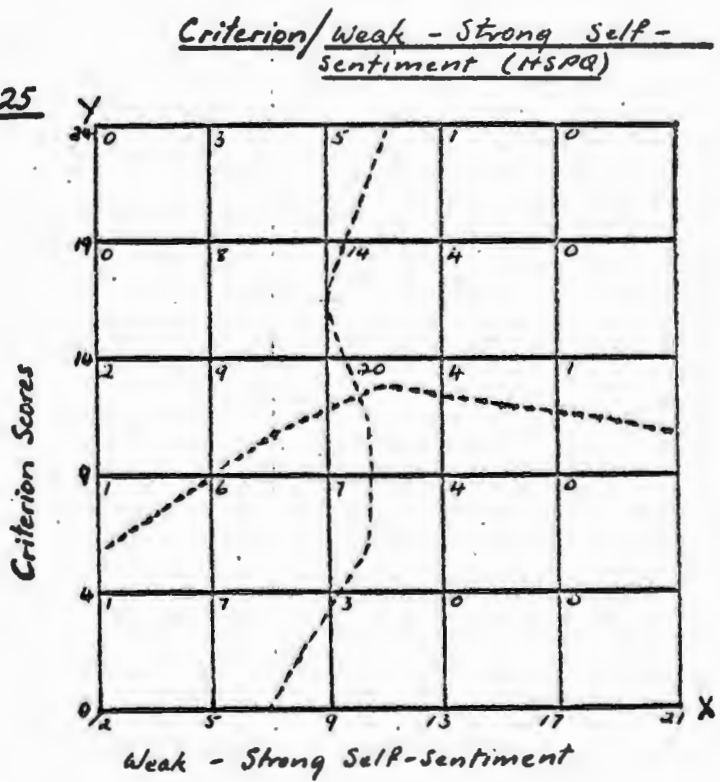
Graph 23



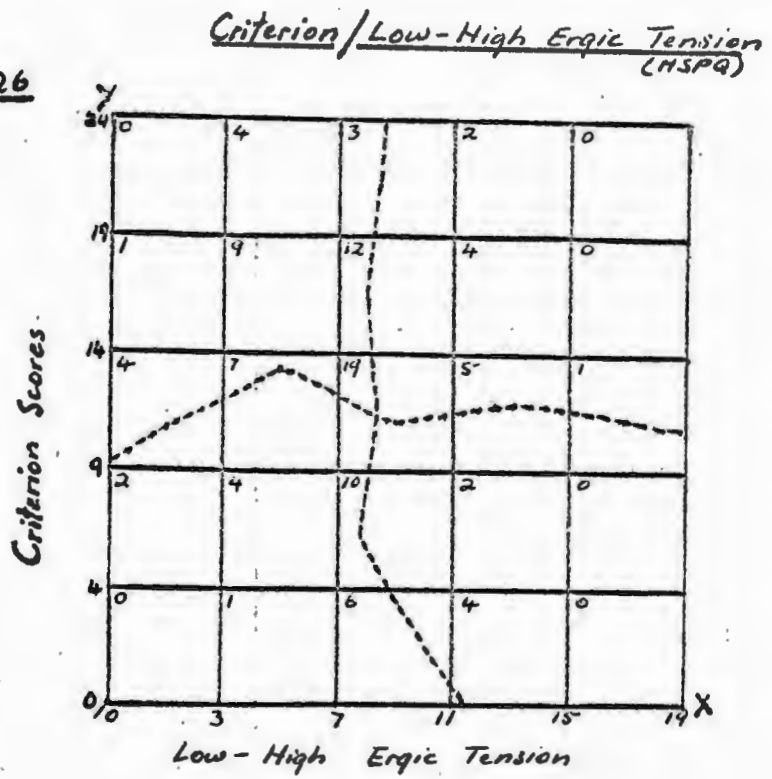
Graph 24



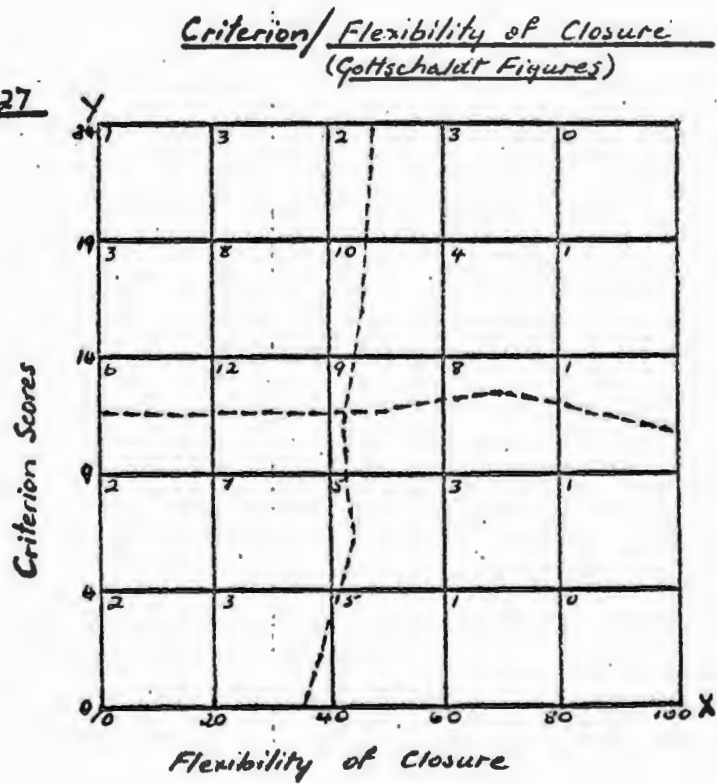
Graph 25



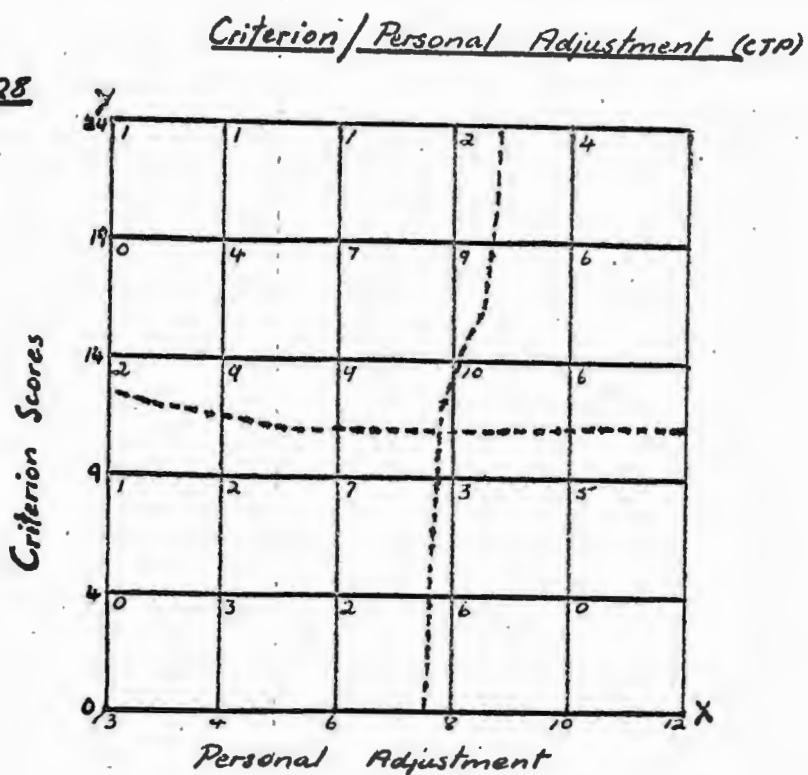
Graph 26



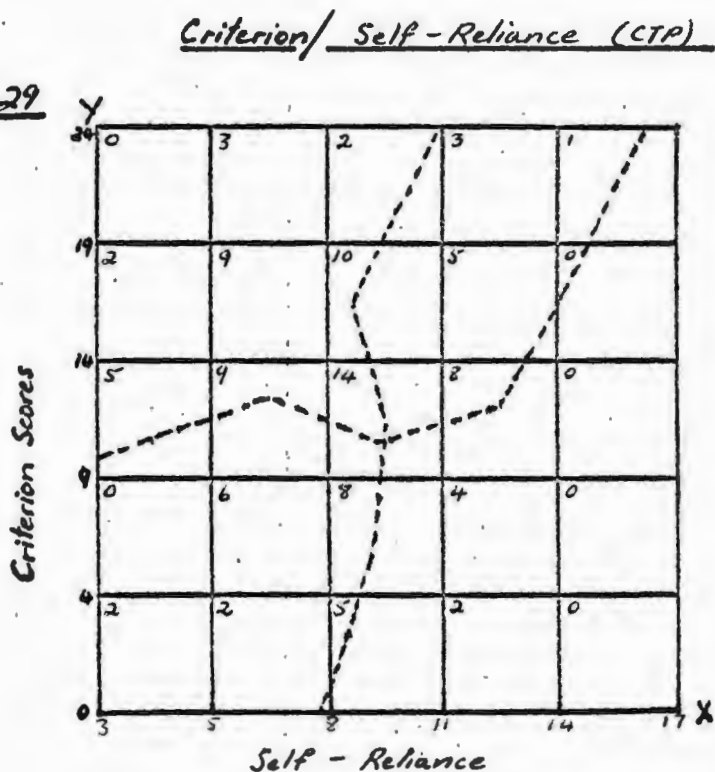
Graph 27



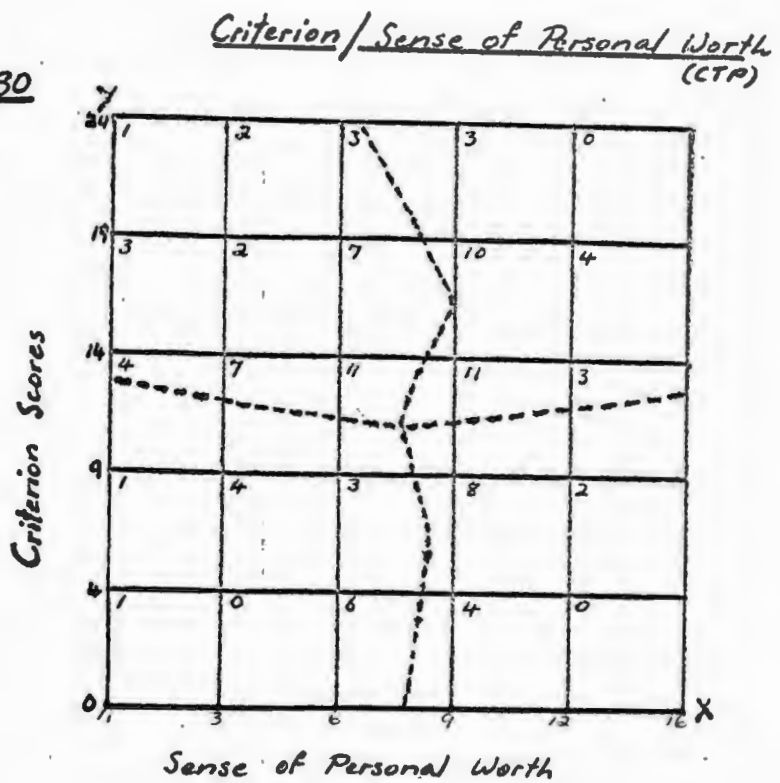
Graph 28



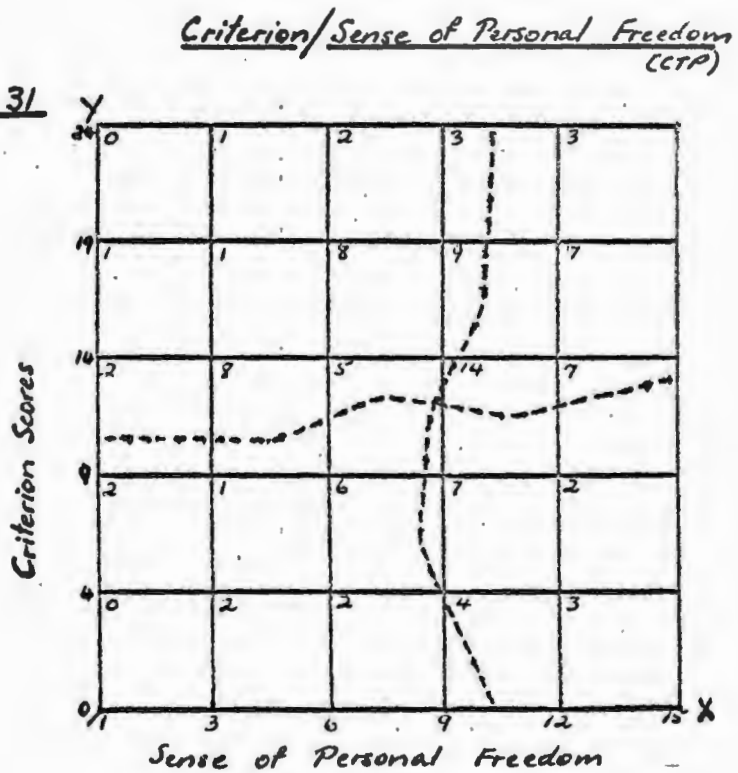
Graph 29



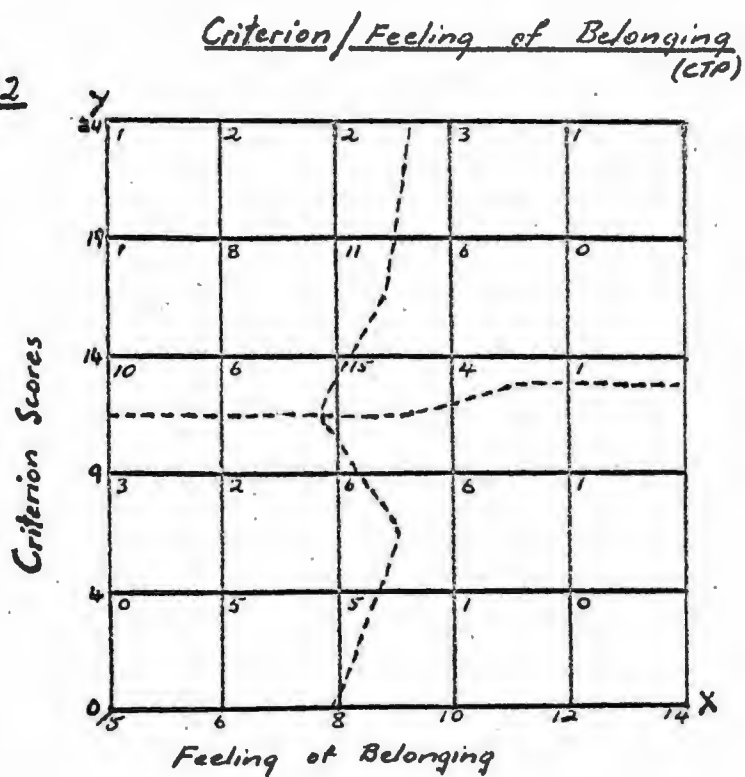
Graph 30



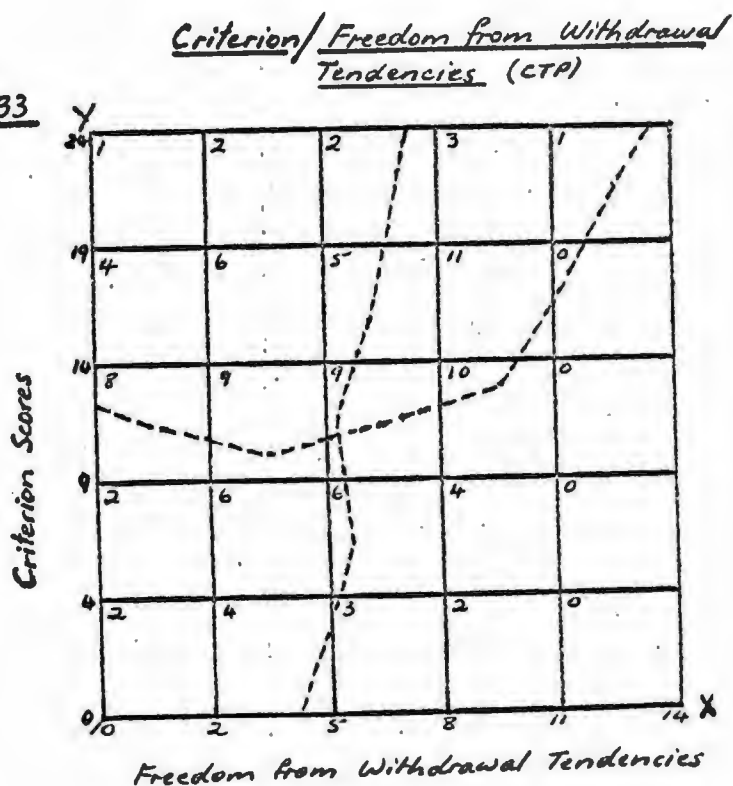
Graph 31



Graph 32

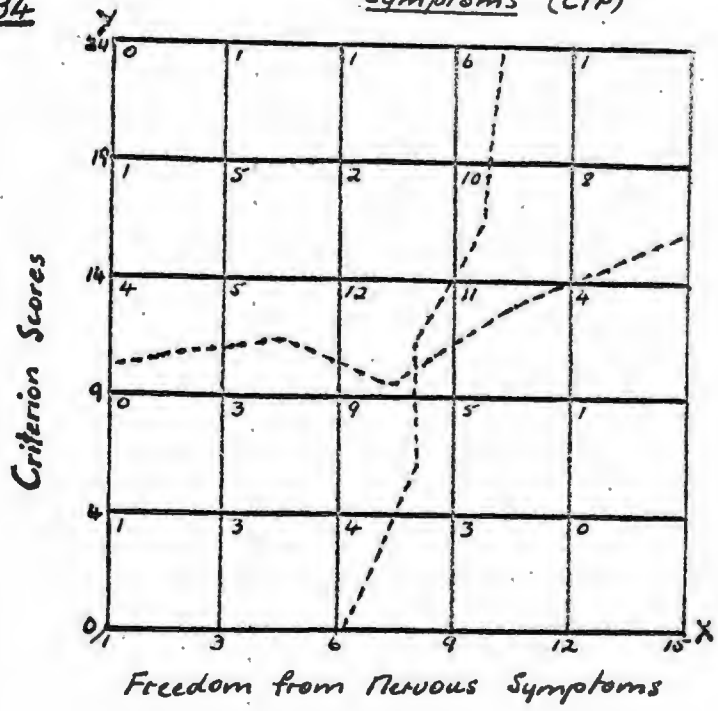


Graph 33



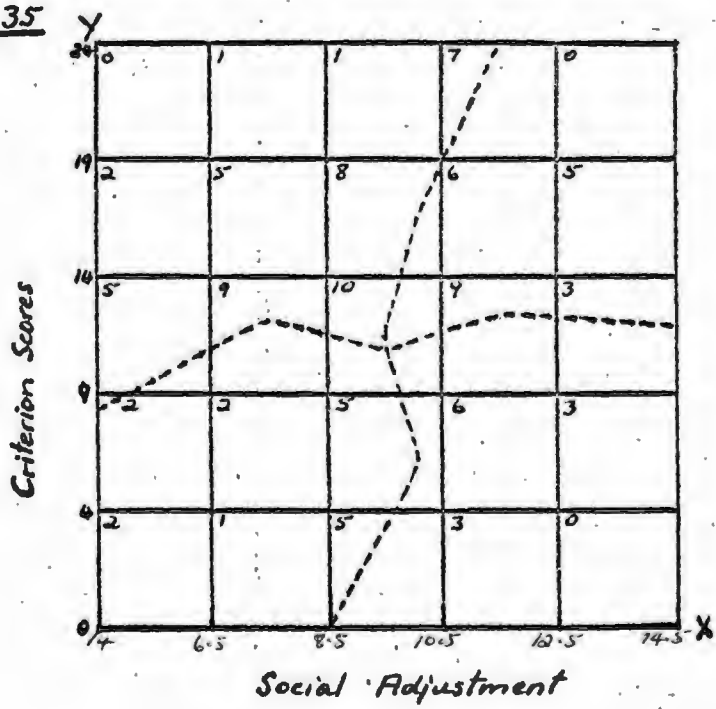
Graph 34

Criterion / Freedom from Nervous Symptoms (CTP)



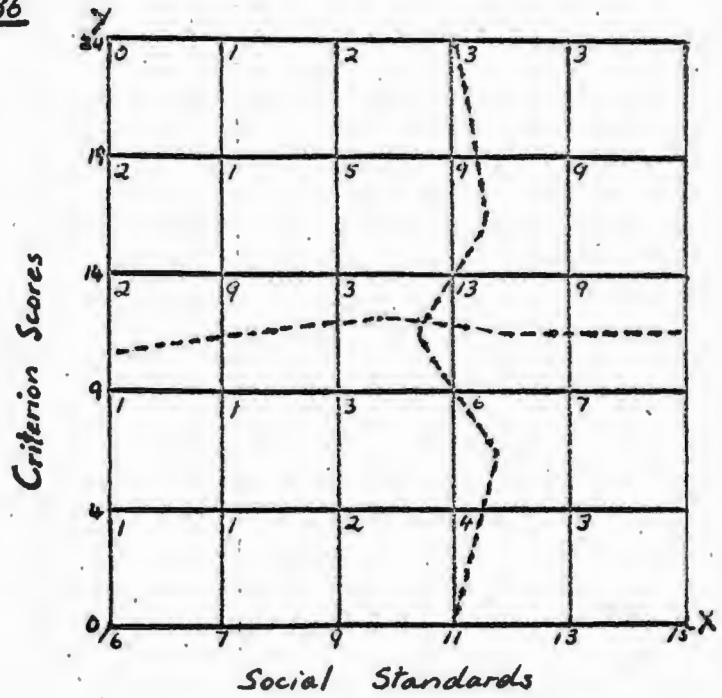
Graph 35

Criterion / Social Adjustment (CTP)



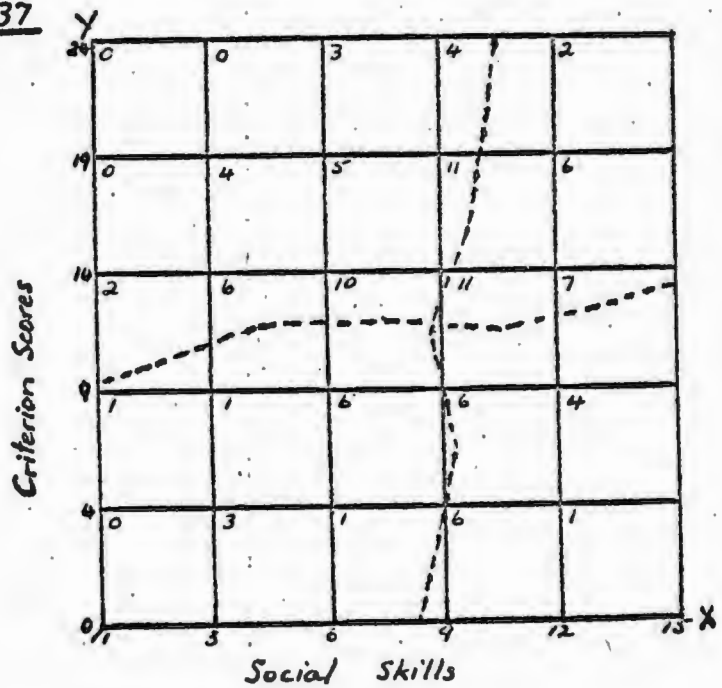
Criterion/ Social Standards (CTP)

Graph 36

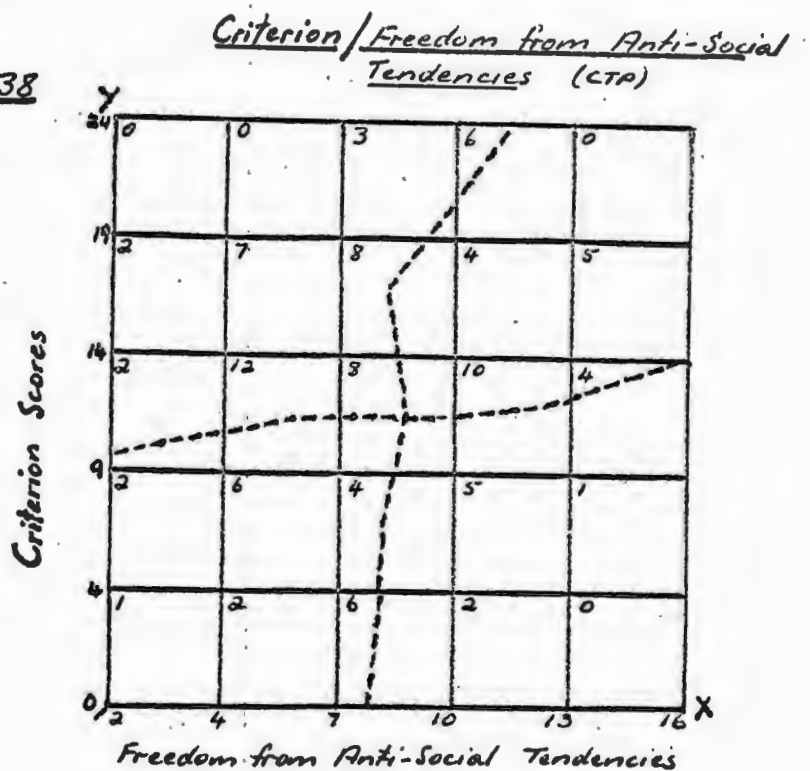


Criterion/ Social Skills (CTP)

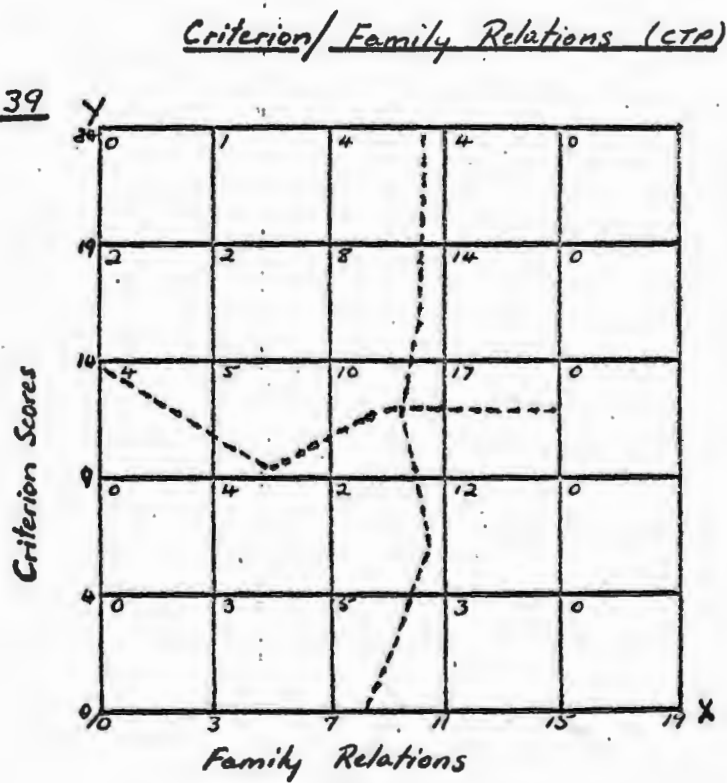
Graph 37



Graph 38

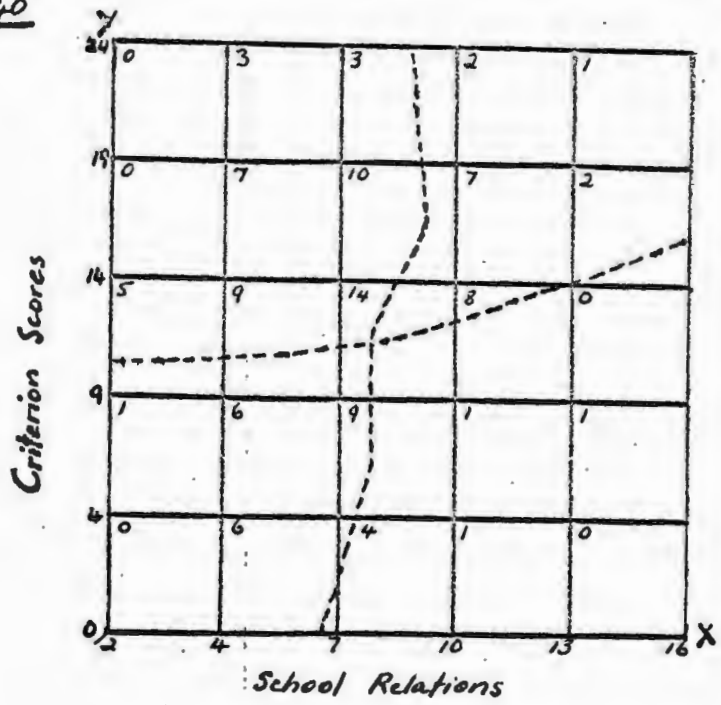


Graph 39



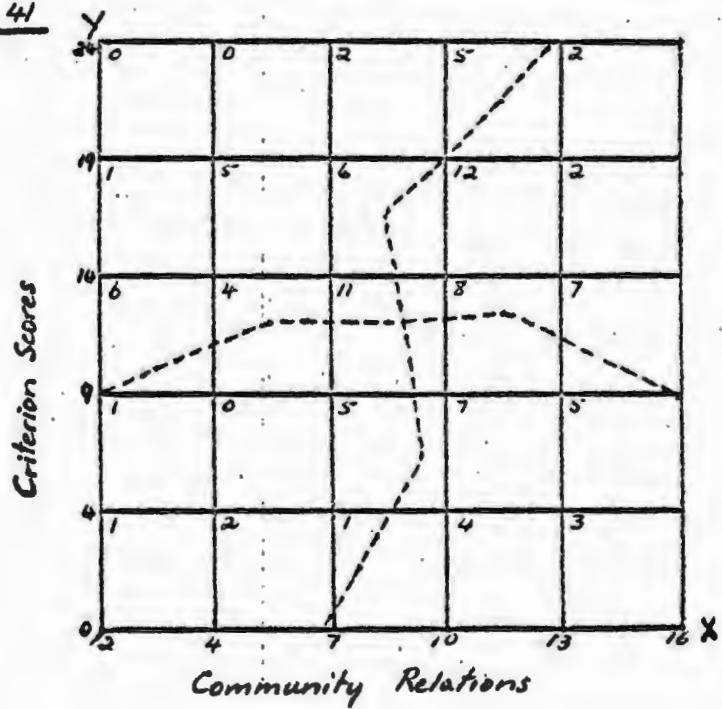
Criterion/ School Relations (CTP)

Graph 40

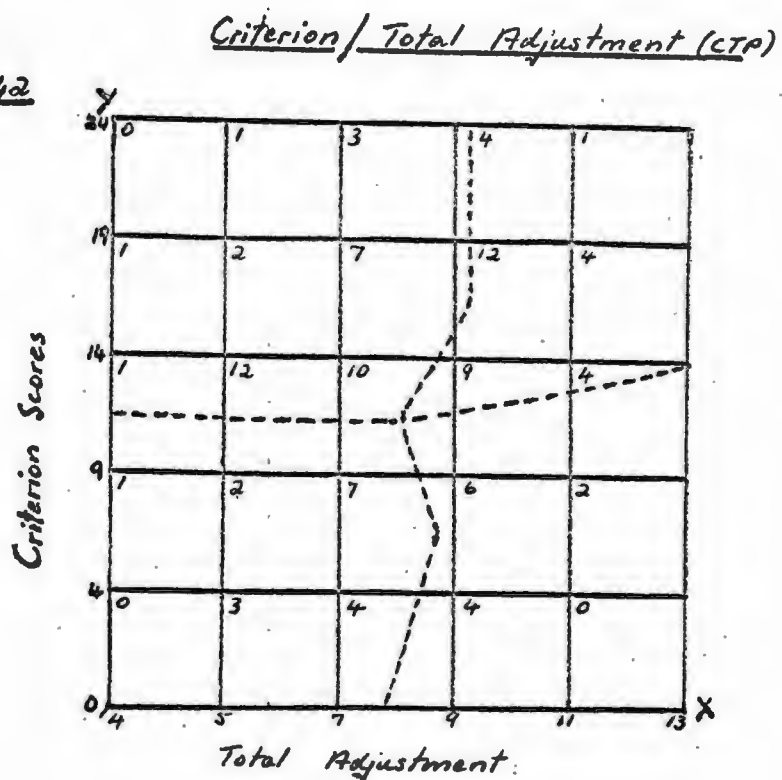


Criterion/ Community Relations (CTP)

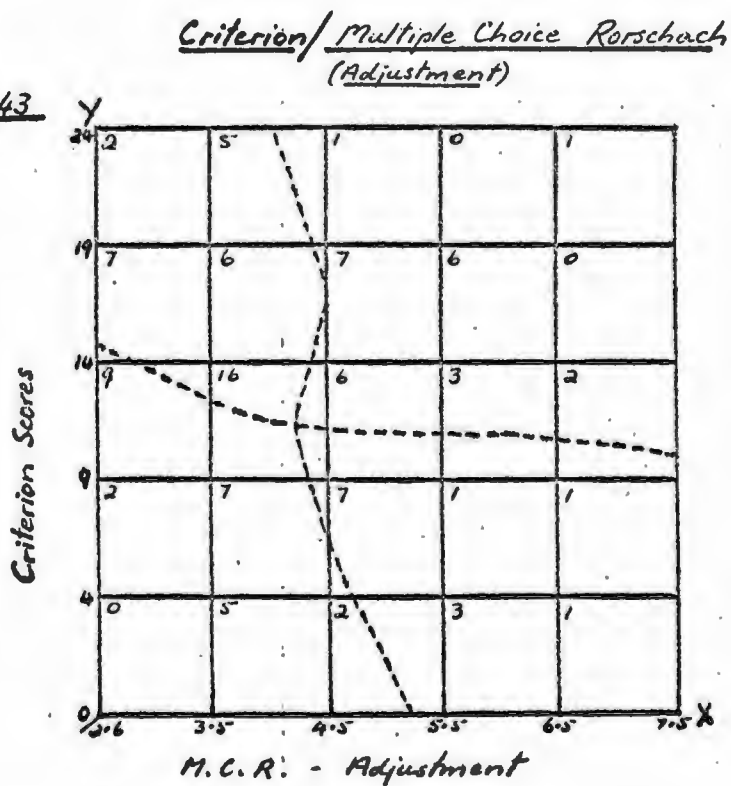
Graph 41



Graph 42



Graph 43



CHAPTER VDISCUSSION AND CONCLUSIONS

Test dimensions which related significantly to ratings of success of response to trade-training, using a two-tailed test of significance, were the following:

- | | | |
|-----|---|-----------------|
| 1) | Non-verbal Intelligence | $r = .28$ |
| 2) | Freedom from Nervous Symptoms | $r = .20$ |
| 3) | Social Adjustment | $r = .28$ |
| 4) | School Relations | $r = .27$ |
| 5) | Mental Capacity | $r = .23$ |
| 6) | Self-sufficiency | $r = .24$ |
| 7) | Vigour | $r = .28$ |
| 8) | Interest in Animals | $r_{pb} = .23$ |
| 9) | Interest in Manual Work | $r_{pb} = -.35$ |
| 10) | Educational Achievement (t-test, $p < .01$). | |

5.1. Intelligence and Achievement:

Of the intelligence measures on the N.S.A.G.T., non-verbal intelligence gave the highest correlation with achievement ($r = +.22$). Verbal intelligence also correlated with achievement to a lesser extent ($r = +.10$).

This finding is supported by the correlation value of $+.23$ between achievement and scores on Cattell's General Mental Capacity dimension. He found that a high score on this dimension tends to associate with high scores on certain personality characteristics, viz. school adjustment, conscientiousness, perseverance, intellectual and cultural interests, etc..

It is notable that both intelligence tests show

an association with achievement although these measures have been constructed in entirely different ways, i.e. the N.S.A.G.T. is an achievement test in which the subject is posed with problems which he solves as quickly and accurately as possible, whereas the HSPQ is a self-report inventory where the subject chooses among alternative answers.

A correlation between achievement and the N.S.A.G.T. is the more "plausible" of the two. It has a certain face validity in that the items (figure analogies, number series and pattern completion) more closely approximate the demands in the work. The HSPQ test items, on the other hand, measure intelligence more broadly. This leads to the conclusion that it is intelligence in toto, rather than specific abilities, e.g. the ability to find the culling rule in a number series, which is related to achievement in this sample.

The intelligence/achievement relationship seems to hold true mainly in the lower job echelons. Investigators (e.g. Super, 1957) have not found this relationship to hold in high level (e.g. professional) jobs. In the lower level jobs which are less complex, more routine, in which tasks are prescribed, etc., the relationship appears to establish itself. Hay (1943), for example, found intelligence to be a predictor of success in machine book-keeping.

Examination of the graphs representing N.S.A.G.T. scores and achievement (Graphs 2, 3 and 4) indicate that the achievement/intelligence association is strongest in the upper $\pm$ 30% of I.Q. scores. To a lesser extent this also holds true for the HSPQ measure of intelligence (see Graph 14). Subjects

with an I.Q. of approximately 102 or less are more randomly scattered in terms of achievement.

As far as this particular sample and criterion are concerned, these findings tend to discredit the view that intelligence is a basic requirement and that personality factors take over to determine achievement once this requirement has been met. Low-intelligence subjects, as may be seen on the graphs, also include high achievers. In other words, a low intelligence (I.Q. 60 to 74) does not exclude the possibility of high achievement within these particular jobs, and the variance in achievement within this I.Q. range must be accounted for by other factors.

5.2. Adjustment and Personality Correlates:

Concepts of adjustment and personality vary widely. In the sense they are used here, adjustment is the degree of harmony in the individual's interaction with his environment and the degree of cost this involves to himself - in terms of his own happiness and progress - and to his environment. Personality is seen as the basic facets of the person, his mode of reacting to the environment.

The concepts of personality and adjustment are inseparable. Adjustment, however, is evaluative. The individual's adjustment is satisfactory or not with regard to certain areas, it involves cause-effect relationships, and it demands a holistic evaluation. Personality variables can be seen as the basic tools with which the individual adjusts. It does not involve a cause-effect relationship

and lends itself to measurement of "pure" factors.*

Nevertheless, due to the overlap and interdependence of personality variables with modes of adjustment, the two fields will be dealt with in conjunction.

Differentiating personality/adjustment measures in the sample were found to be:

- 1) Freedom from nervous symptoms (r = .20)
- 2) Social adjustment (r = .28)
- 3) School relations (r = .27)
- 4) Self-sufficiency (r = .24)
- 5) Vigour (r = .28)

"Freedom from Nervous Symptoms" is an aspect of personal adjustment on the California Test of Personality. The high scorer is free from emotional conflicts expressed in physical symptoms, e.g. insomnia, frequent eyestrain, chronic fatigue, etc.. In this study it correlated with achievement to the extent of + .20.

This dimension in more clinical terms is called neurasthenia. In discussing the neurasthenic, Thorpe and Katz (1948) made the illuminating statement: "The neurasthenic syndrome in nearly all

* Some may argue that this definition of personality more adequately suits the term "temperament."

"Tabula Rasa" adherents will contest the idea that the basic personality is not the result (effects) of environmental stimuli (causes). It is, however, not the purpose of this study to defend a particular viewpoint. The major aim is to obtain adequate coverage by means of tests of an inclusive concept of personality.

cases incapacitates the patient for any type of labor." (p.363).

One of the most frequently appearing symptoms is that of chronic fatigue and listlessness. This symptom directly affects the subject's work capacity, or drive level. As such it is immediately brought to the attention of the instructor, also, in this case, the rater.

Examination of the distribution of scores (Graph 34) indicates that, as was the case with the distributions of intelligence and achievement, a closer relationship exists between the upper ranges of the two variables than the lower ranges. This means that the bulk of the covariance is derived from subjects scoring high on both criterion and this particular personality dimension.

As neurasthenia is a distinct neurosis, studies of neuroticism and achievement are relevant. Celliers (1963), Brill et al (1956), Baldwin (1960), Haun (1965), Piotrowski (1943), Herz (1943),* Babcock (1940) and others have all found neuroticism or maladjustment to be associated with low achievement.

Babcock undertook a study in which 313 subjects, ranging in age from 18 to 36 years, were administered the Babcock-Levy Examination, a test of learning performance, considered a measure of mental efficiency. He correlated these scores of mental efficiency with scores on the Bernreuter Personality Inventory. He found that the less efficient learners tended to score high on neuroticism,

* These studies have been described in greater detail in the introductory chapter.

introversion and self-consciousness and low on dominance.

Similarly, Stagner (1933) found that low scores on the Bernreuter Personality Inventory Neurotic Scale were associated with good academic achievement, in a group of first-year university students.

On the other hand, Furneaux (1962) and Cash (1962) found neurotic tendency to be positive indicators for achievement, the former conducting his study on engineering students and the latter on theology students.

On the whole, it appears that neuroticism constitutes a contra-indication for achievement, a viewpoint supported in this study regarding nervous symptoms, or neurasthenia.

It was mentioned above that the common chronic fatigue symptoms of neurasthenics may underlie low achievement. Conversely, a high drive level would associate positively with high achievement. This view gains support with the significant relationship between "Vigour" on the Gordon Personal Inventory and achievement ($r = +.28$, significant at 1% level).

High scores on this dimension are defined as characterizing individuals who are vigorous and energetic, who like to work and move rapidly, and who can accomplish more than the average person. Low scores, on the other hand, are associated with low vitality or energy level, a preference for setting a slow pace, and a tendency to tire easily, to fall below average in their output.

Baldwin (1960) similarly found that highly active subjects tended to be industrious workers,

especially those with high economic interests. The relationship between drive-level and achievement is straightforward. As Calitz (1958) found, the "ability to work hard" was given the highest rating as a desirable quality by a group of professional people.

Degree of "Self-sufficiency" as measured by Cattell's HSPQ was also found to be significantly related to the criterion ($r = + .24$). This factor has not been clearly established in external behaviour ratings, "showing itself more in internal attitudes than in behaviour" (Cattell, 1962). It is one of the major factors in introversion. A high score characterizes the person who is resolute and accustomed to making his own decisions alone, who is significantly more dissatisfied with group integration than is the low-scorer. He is seclusive, has older friends and mature interests and generally achieves higher. He makes remarks which are more frequently answers than questions, and is rejected.

This description tallies closely with that given by Bass (1960) of the task-orientated person. The task-orientated person is concerned with completing a job, and less so with group interaction or his personal prestige (i.e. group-orientation and self-orientation). There are, however, indications that where task-orientation or goal-orientation coupled with self-sufficiency are desirable for achievement (Cash, 1962, also found the latter dimension to relate positively to achievement), this may not reach the stage where it outpaces social interaction and conformity. For example, sociability (Swisdak and Flaherty, 1964), inter-

personal relations (Baldwin, 1960) the ability to conform to authority demands and acceptance by peers (Taylor, 1964) have all been found to relate positively to achievement. In this study, Personal Relations and Sociability (Gordon Tests) did not relate positively to achievement.

In accordance with other research findings, Social Adjustment was characteristic of high-achievers ($r = + .28$). This means that although self-sufficiency, self-reliance, resourcefulness, etc., are important, good social adjustment is also a condition for high achievement. This is supported by Jamuar (1961) who found, inter alia, that home, emotional and social adjustment are conducive to high academic achievement.

"Social Adjustment", on the California Test of Personality, is a composite score derived from scores on the following subsections - Social Standards, Social Skills, Anti-Social Tendencies, Family, School and Community Relations. Each of these six sections contributes one-sixth to the variance of Social Adjustment. Except for School Relations, which correlated $+ .20$ with achievement, the others only correlated to the extent of $- .03$ to $+ .12$. The Social Adjustment score, therefore, is more than the sum of its sections and may be seen as a unique dimension in this study. Definition of Social Adjustment must be made with reference to its part scores. The socially adjusted person has high social standards and skills, enjoys good school, family and community relations, and is free from anti-social tendencies. It is interesting that the latter dimension correlated with achievement to the extent

of + .12. This finding supports those of Sarton (1960) and Haun (1965) who found psychopathy as measured on the MMPI - a scale which more truly measures anti-social tendencies - to be a contra-indicator regarding high achievement.

A high-scorer on "School Relations" feels accepted and liked by teachers and other students, finds the school work adapted to his level of interest and maturity and involves the feeling on his part that he counts for something in the life of the school. In other words, he feels accepted, affiliated and a sense of worth.

Examination of the graphs of social adjustment, school relations and self-sufficiency (Graphs 35, 40 and 24) will show that the same tendency exists as was found in intelligence scores with achievement, viz. that there is a closer tie between high-achievers and high-scorers on the personality dimension than between low-achievers and low-scorers.

A possible reason for this is that the low-achievers, realizing their lack of job-status, carried over a resulting defensiveness into the self-report inventories, perhaps deliberately but also possibly because of a lack of insight.

Another possibility is that the high-achievers, being more intelligent than the low-achievers, more easily faked the tests in the positive direction.

Finally, it could be that a closer association between adjustment or personality and achievement really exists in the higher achievers.

5.3. Interest and Achievement:

High achievers more frequently have a preference for

work with animals and a stronger aversion to manual labour than do low-achievers.

No explanation can be offered for the high-achiever's interest in work with animals.

As regards the aversion to manual labour - this is most probably due to motivation and potential for higher-level work. Aspirations may be realistic or over-optimistic. They are less frequently below the person's capabilities. Whereas manual labour is more closely geared to the achievement potential of low-achievers, it is below that of the high-achievers who will set their goals higher. The preference, or choice of type of activity, will be more in line with these goals.

5.4. Educational Qualifications:

The 25 highest and 25 lowest achievers were compared with respect to mean educational qualification. A difference, significant at the .05 level, was found to exist. High-achievers had the higher educational qualification.

The standard in which a pupil is placed when he enters the Reformatory depends on his level of development (his previous qualifications prior to admission). Socio-economic and family background play a role insofar as they determine his academic experience, e.g., the degree to which studying was encouraged in the home. Motivation and scholastic ability largely determine whether he will absorb the material and whether he will pass or fail his examinations, etc..

Whereas the non-delinquent attends school from the age of six and progresses to Standard VIII or

Standard X, at the rate of a standard a year, this is not quite the case with the delinquents studied here. Low intelligence limits a number to the lower standards, pre-institutional life, e.g. truancy and such other factors as mentioned (e.g. socio-economic level) vary. As a result, subjects' ages largely overlap between standards. Age itself, however, was not found to be related to achievement.

The difference found could be ascribed to any or all of the other factors mentioned above.

5.5 Discussion of the Graphs:

Examination of the graphs does not show any marked curvilinear relationships.

In all cases, means within an interval are calculated on a range of scores which is sufficiently wide to suggest that any mild curvilinearity is the result of chance fluctuations.

A clearcut trend apparent from the graphs is that the correlations between scores is closer in the upper ranges of achievement and the personality dimension than in the lower ranges. This is especially so on the measures of Total Intelligence (Graph 4), Ascendancy (Graph 5), Schizothymia - Cyclothymia (Graph 13), Social Adjustment (Graph 55), Freedom from Anti-social Tendencies (Graph 38) and Total Adjustment (CTP, Graph 42). In other distributions the high achievement/high personality dimension score and low achievement/low personality dimension score appear equally related.

The one exception is Cattell's Weak - Strong Self-Sentiment where the converse seems to hold - the low achievement/low personality dimension score

association is the stronger.

There is no clearcut reason for this trend. Some possibilities have been mentioned previously, viz. that low-achievers may be defensive on the tests because of their low achievement and may, therefore, be more inclined to fake the tests; or it could be that the high-achievers who have been shown to be more intelligent, may more intelligently fake the tests; or, finally, it may be that these tendencies of high achievement/high personality dimension score associations really exist and that they have been accurately measured.

Further research would be required to explore these possibilities.

5.6. Follow-up Research:

The present study is exploratory and employs a select sample trained in a homogeneous and restricted range of jobs. A logical follow-up of this study would involve the cross-validation on other groups of the significant dimensions.

The criterion could also be extended to on-the-job performance as sufficient evidence exists to show that this may require different characteristics to training success for high achievement.

CHAPTER VIA. SUMMARY

A group of variables was measured in an exploratory attempt to find personality traits which correlate significantly with ratings of success of response to trade training. The sample consisted of 100 institutionalized delinquents.

The dimensions consist of 3 intelligence measures, 39 personality and adjustment measures, 12 areas of interest, language medium, age, educational qualifications and period of training, etc..

Data has been presented as correlation values between the criterion and intelligence, personality and adjustment variables. Areas of interest chosen with sufficient frequency were evaluated by means of the point-biserial correlation coefficient. The 25 highest-achievers and 25 lowest-achievers were compared with respect to age, training period and educational qualifications by testing the significance of differences in the means. The chi-square test was used to establish whether either of the two language groups achieved higher than the other and to establish whether high scorers would choose another trade less often than low-scorers.

It was pointed out that the testee group is select; socially, by virtue of the fact that it consists of institutionalized delinquents; and, occupationally, as a restricted range of job complexity is involved, viz. plumbing, fitting and turning, painting, bricklaying, etc..

In terms of this study it was found that the high achiever:

- i) has a higher mental capacity (Cattell's HSPQ) and non-verbal intelligence,
- ii) is free of nervous symptoms of a psychaesthetic nature,
- iii) is socially well-adjusted,
- iv) enjoys sound school relations, e.g. with his peers,
- v) tends to be self-sufficient,
- vi) is vigorous and energetic,
- vii) demonstrates an interest for working with animals and has no interest in manual work with elementary tools,
- viii) achieves superior academic qualifications.

As this is an exploratory study and has been carried out on a select sample, the findings are presented for further verification. This would involve a cross-validation study of these significant dimensions on other samples and the extension of the achievement criterion from response to trade-training to, for instance, on-the-job proficiency in a variety of jobs.

B. OPSOMMING

'n Groep veranderlikes is gemeet in 'n poging om persoonlikheidstrekke te vind wat betekenisvol met ambagsopleiding korreleer. Die monster bestaan uit 100 jeugmisdadigers in 'n inrigting.

Die dimensies bestaan uit 3 intelligensiemetings, 39 persoonlikheids- en aanpassingsmetings, 12 belangstellingsgebiede, huistaal, ouderdom, opvoedkundige kwalifikasies, opleidingstydperk, ens..

Korrelasies is uitgewerk tussen die kriterium en intelligensie, persoonlikheids- en aanpassingsmetings. Belangstellingsgebiede wat met genoegsame frekwensie vir analisedoeleindes voorgekom het, is evalueer deur die toepassing van die punt-biseriële korrelasie-formule. Vyf-en-twintig hoogste-presteerders en 25 laagste-presteerders is ten opsigte van gemiddeldes vergelyk aangaande ouderdom, opleidingstydperk en akademiese kwalifikasies deur middel van die t-toets. 'n Chi-kwadraat toets is toegepas om te bepaal of daar enige prestasieverskille is tussen die twee taalgroepe, en ook of die hoë-presteerders hulle ambagte minder verwerp as die lae-presteerders.

Daar is op gewys dat die toetsgroep selekteerd is; sosiaal, insoverre dit uit geselekteerde jeugmisdadigers in 'n inrigting bestaan; en beroepsgewys, aangesien 'n beperkte omvang in werkskompleksiteit ingesluit is nl. loodgieters, pas-en-draai werk, verfwerk, messel, ens..

In terme van hierdie studie is gevind dat die hoë-presteerder:

- i) 'n hoër verstandelike vermoë (Cattell se HSPQ) sowel as nie-verbale intelligensie besit,
- ii) vry is van „senuweeagtigheids“-simptome van 'n psigasteniese aard,
- iii) sosiaal aangepas is,
- iv) gesonde skoolverhoudinge het, bv. met sy mede-leerlinge,
- v) self-onderhoudend is,
- vi) lewenskragtig en energiek is,
- vii) belangstelling toon in werk met diere asook 'n gebrek aan belangstelling in handwerk met basiese gereedskap,
- viii) hoëre akademiese kwalifikasies bereik.

Aangesien dit 'n loods-studie is en op 'n geselekteerde monster uitgevoer is, behoort die bevindinge deur middel van verdere navorsing geverifieer te word. Dit sou 'n kruis-validasie studie inhou van hierdie betekenisvolle dimensies, nie net op ander monsters nie, maar ook met ander kriteria as basis, bv. prestasie in die werk self, ens..

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APPENDIX

ADDENDUM 1. TRAINEE APPRAISAL FORM

Name: _____

Trade: _____

Rater: _____

<u>Characteristic</u>	<u>Exceptional</u>	<u>Above Average</u>	<u>Average</u>	<u>Below Average</u>	<u>Unsatisfactory</u>
1. Ability to learn	Has know-how. Catches on quickly.	Learns quickly. Needs no help.	Can think for himself. Average.	Needs instruction on every point.	Slow learner. Much supervision.
2. Dependability	Always on the job. Conscientious.	Hard worker. Does his best.	Shirks sometimes. Average.	Requires watching . Distractable.	No sense of respons- ibility.
3. Quantity of work	Very fast and productive.	Good volume	Average volume	Could produce more.	Very slow.
4. Quality of work	Rarely has errors.	Few errors	Average number of errors.	Work needs inspection.	Careless. Sloppy.
5. Initiative	Suggests and tries new ideas.	Usually keeps busy.	Works as told. Average.	Sometimes interested.	No desire to improve.
6. Attitude towards job.	Aims at doing fine job.	Appreciates help and criticism.	Does as expected. Average.	Just another job.	Indifferent. Dislikes criticism.
7. Co-operation with superiors.	Especially co-operative.	Always willing.	Does as told. Average.	Lacks co-opera- tiveness.	Morose and negative.
8. Safety habits.	Never takes chances.	Observes basic rules.	Reasonable care. Average.	Needs some protection.	Careless and reckless.
9. Progress	Improved beyond expectation.	Good progress.	As can be expected. Average.	Not up to standard.	Very little, if any.
10.* Class Marks					

* Class Marks is computed as:- Theory + Practical Mark

ADDENDUM II

Job-Trainee Appraisal

Dear Sir,

For my thesis I am trying to find out if there is any connection between success in response to trade-training and the pupils' personality make-up.

Ratings of the pupils on various measures (see the attached form [Add. I]), will provide the criterion of achievement. It will also have the advantage that it will provide a record of their progress at the Psychological Clinic.

The thesis results may provide us with the necessary information to place new pupils in the trades to which they are best suited.

Rating Method:

There are nine characteristics on which each pupil is rated from "exceptional" to "unsatisfactory." Each point of a scale is shortly defined, e.g. "no sense of responsibility." Place a cross (x) in the appropriate spot.

Rate only those pupils in your trainee group, and only those who have been there one month or longer.

Finally, please give the pupil's average class-marks at the end of the last scale, i.e. both theory marks and practical marks. As pupils have been in the trades for different periods, the score should consist of the average of all his test and examination marks, notwithstanding his period of attendance.

Points to remember in rating are:

(i) Halo-effect: To be valid the rating must be as objective as possible. Ensure that one characteristic, e.g. a sound attitude towards superiors, does not push up the other ratings unless these are earned; or vice-versa.

(ii) Central Tendency: Sometimes ratings wrongly cluster around the average when in actual fact the trainee's position should be more extreme, either positively or negatively. The point is just that differences should be reflected in the ratings.

(iii) Basis for Comparison: When rating one should compare a pupil with the average standard of the present group. The standards of past groups should not be used as a criterion.

Thank you for your co-operation.

A.H. Deppe

ADDENDUM III

Psychological Clinic,
Constantia School.

Dear Sir,

We are at present engaged in conducting a study on the relationship between personality factors and response to trade-training.

All trade instructors are being asked to appraise their pupils on the characteristics enumerated below.

We do feel, however, that these characteristics are not equally important and should therefore not carry equal weight.

We would appreciate your assistance in weighting these items, as follows:

Choose the characteristic you consider the most important and assign it a weight of one. Then assign a weight to each of the others according to its comparative importance.

For example, assume you have decided that initiative is most important you would give it a weight of one. You may then decide that safety habits are half as important and you assign it a weight of .5.

<u>Characteristic</u>	<u>Weight</u>
Ability to Learn	
Dependability	
Quantity of Work	
Quality of Work	
Initiative	
Attitude towards Job	
Co-operation with Instructors	
Safety Habits	
Progress (in learning the trade)	
Marks obtained in class (theory and practical)	

A.H. Deppe

Note.(i) Please contact me if you do not have a full understanding of what is required.

(ii) Please send the completed form to the psychological clinic.

ADDENDUM IVActual scores obtained on this sample.*

Tests	1	2	3	4	5	6	7
Subj.							
1	107	100	103	12	23	21	12
2	95	78	84	24	15	21	22
3	120	119	121	19	19	20	24
4	107	78	91	17	21	15	23
5	98	103	98	26	29	27	26
6	85	65	71	22	27	26	25
7	116	93	104	18	29	29	22
8	85	76	79	16	20	22	18
9	109	105	106	24	19	20	23
10	95	85	88	10	18	6	10
11	91	96	95	13	22	18	11
12	106	90	96	12	21	19	10
13	105	91	98	17	24	20	18
14	97	106	102	21	17	19	21
15	80	74	75	18	15	11	23
16	83	77	79	23	23	21	25
17	115	97	105	13	20	21	10
18	106	101	106	11	16	15	8
19	73	78	75	13	23	9	15
20	88	93	90	22	26	33	23
21	83	83	83	16	18	11	15
22	120	99	109	5	16	13	4
23	112	107	111	32	17	27	30
24	82	75	77	15	12	8	13
25	72	71	71	20	22	17	19
26	103	83	91	19	29	22	20
27	90	73	80	19	18	17	16
28	102	91	96	23	24	21	24
29	129	118	121	26	21	27	15
30	85	80	83	24	22	29	21
31	102	86	91	20	23	16	17
32	84	81	81	15	9	17	9
33	73	73	71	24	26	26	20
34	79	67	74	23	24	24	21
35	113	94	102	24	31	24	24
36	68	74	69	20	26	27	15
37	108	108	108	10	22	21	5
38	75	71	71	12	15	10	21
39	94	97	95	23	25	28	30
40	80	76	76	20	22	16	24
41	122	95	107	14	22	17	18
42	89	91	90	18	25	24	25
43	79	87	83	23	24	20	23
44	92	89	89	16	23	21	10
45	101	91	96	20	21	17	18
46	98	91	95	22	13	20	23
47	85	88	87	14	28	23	9
48	96	90	93	21	27	18	22
49	102	72	86	20	25	24	25
50	96	86	91	21	26	28	23

* The first three are converted (I.Q.) scores. The remainder are raw scores.

The order of tests is given on the last page.

ADDENDUM IV continued:

Tests	1	2	3	4	5	6	7
Subj.							
51	115	113	114	20	12	8	22
52	95	95	95	22	20	19	23
53	103	96	98	23	18	2	29
54	79	91	84	12	11	11	14
55	84	84	83	19	29	27	23
56	91	86	88	23	17	21	19
57	85	80	83	18	12	10	22
58	125	117	123	17	24	19	14
59	85	92	88	15	21	12	16
60	70	70	70	18	22	14	20
61	110	81	96	20	27	26	25
62	82	66	71	17	24	19	22
63	93	82	86	9	16	15	8
64	80	62	70	19	17	15	19
65	93	88	90	16	27	20	19
66	98	82	89	20	17	19	18
67	92	80	85	21	25	24	20
68	95	86	90	16	20	15	17
69	63	61	61	16	16	17	19
70	93	77	84	21	23	18	22
71	105	115	110	27	22	27	28
72	106	86	95	18	7	17	16
73	94	96	95	14	29	24	25
74	92	81	85	23	29	30	18
75	86	80	83	15	30	20	19
76	65	67	64	18	22	21	18
77	93	80	85	17	25	24	16
78	64	95	81	20	24	23	24
79	70	81	76	18	15	10	11
80	119	112	116	22	15	24	21
81	77	78	75	11	17	16	13
82	84	84	81	20	19	21	20
83	87	84	85	14	14	17	15
84	104	84	93	19	22	19	23
85	105	100	102	7	14	14	5
86	110	97	101	9	11	10	18
87	78	78	78	21	15	20	16
88	89	79	82	23	22	19	19
89	96	91	93	20	20	24	22
90	100	100	100	22	20	16	21
91	91	103	94	22	22	23	15
92	73	66	68	18	12	16	18
93	83	82	83	21	22	21	24
94	100	91	96	20	21	16	25
95	100	94	97	21	27	20	24
96	86	91	90	17	22	19	8
97	67	67	65	20	9	14	23
98	107	91	96	8	7	15	8
99	81	81	79	23	20	22	17
100	93	83	86	18	19	14	23

ADDENDUM IV continued:

Tests	8	9	10	11	12	13	14
Subj.							
1	6	1	- 7	4	7	13	10
2	1	4	3	8	12	12	11
3	- 3	- 3	1	1	19	16	15
4	7	2	0	11	11	16	9
5	7	2	1	2	11	14	12
6	10	4	5	11	9	11	13
7	0	9	- 3	4	11	12	9
8	0	12	4	2	14	13	13
9	-13	2	- 7	0	7	14	6
10	- 1	- 3	- 6	- 2	7	11	4
11	6	- 2	- 4	10	10	14	9
12	10	5	- 5	0	11	14	6
13	11	1	7	9	8	4	7
14	- 2	0	- 2	- 4	10	11	4
15	3	2	- 7	8	14	14	7
16	2	6	6	0	9	9	12
17	8	1	- 4	3	4	16	6
18	- 2	- 8	- 9	- 7	15	19	11
19	2	2	- 6	- 4	3	12	5
20	- 2	0	0	0	11	14	13
21	5	2	5	8	16	14	7
22	- 3	- 5	- 1	1	7	12	11
23	-10	-13	- 2	7	14	17	14
24	- 2	- 1	4	7	12	9	12
25	- 6	- 2	- 6	0	9	9	10
26	0	4	4	4	13	14	11
27	4	1	2	3	11	13	13
28	7	8	7	10	5	14	5
29	14	8	11	4	10	12	14
30	10	9	7	4	10	14	7
31	- 1	1	- 8	2	12	7	10
32	- 5	- 8	- 7	-10	6	16	5
33	10	2	10	8	12	11	10
34	2	2	2	2	10	14	11
35	7	13	10	4	14	19	11
36	3	- 8	- 2	1	6	10	9
37	3	2	9	6	8	16	11
38	- 1	3	0	- 2	4	10	10
39	1	9	2	4	7	14	7
40	6	12	- 1	- 1	7	15	8
41	- 5	2	4	- 1	12	10	15
42	2	2	- 5	7	10	11	7
43	3	0	5	4	12	11	7
44	5	3	5	5	5	9	7
45	2	3	2	3	8	11	12
46	11	1	0	- 4	11	10	10
47	17	3	9	7	6	11	6
48	3	- 1	- 2	4	10	10	9
49	13	2	9	8	13	17	16
50	10	2	6	8	9	13	13

ADDENDUM IV continued:

Tests	8	9	10	11	12	13	14
Subj.							
51	1	2	3	-10	14	15	6
52	- 1	4	2	- 1	10	10	11
53	0	- 2	-12	- 2	9	17	9
54	1	- 7	- 3	- 3	9	9	10
55	8	- 1	8	13	13	11	11
56	1	4	7	8	8	12	16
57	- 3	0	- 2	- 1	11	10	11
58	- 7	4	4	11	14	13	17
59	- 2	4	3	1	6	12	6
60	4	5	- 1	2	10	7	14
61	4	13	4	1	10	12	10
62	- 3	1	- 5	- 7	11	11	9
63	- 6	- 3	- 8	- 1	4	10	4
64	1	1	5	7	9	15	16
65	0	1	4	3	8	6	12
66	2	2	- 3	0	11	9	8
67	8	6	8	2	7	11	8
68	- 5	3	- 2	4	6	7	8
69	- 1	1	1	1	11	7	12
70	1	- 2	- 3	8	7	10	15
71	0	0	0	4	11	16	14
72	- 4	- 3	- 1	- 8	9	11	10
73	0	2	- 3	- 3	8	13	8
74	3	4	0	6	12	12	8
75	3	- 3	4	2	13	10	11
76	- 1	0	- 1	- 6	11	11	8
77	1	7	0	6	12	13	11
78	4	5	5	8	9	12	14
79	1	- 7	-11	3	7	13	7
80	- 3	6	3	0	5	16	4
81	1	- 2	- 2	1	12	12	9
82	- 1	- 5	0	0	12	10	10
83	7	6	- 4	- 5	8	12	9
84	3	0	3	- 2	12	11	11
85	- 5	- 2	- 6	- 9	8	14	5
86	- 4	- 6	- 4	-12	10	17	7
87	- 2	3	5	- 4	12	5	12
88	1	6	0	5	10	12	13
89	8	2	4	6	9	16	8
90	- 2	3	6	- 1	10	11	9
91	- 1	8	8	2	11	8	9
92	2	- 2	5	1	8	6	10
93	1	0	- 3	0	9	15	8
94	3	- 2	2	1	7	6	6
95	3	- 2	4	- 3	10	12	8
96	5	5	4	4	12	10	9
97	-12	- 8	-15	- 3	6	4	11
98	- 8	1	- 5	-14	9	17	5
99	3	2	1	4	8	8	8
100	- 3	2	- 3	2	6	13	11

ADDENDUM IV continued:

Tests	15	16	17	18	19	20	21
Subj.							
1	8	12	6	8	9	10	13
2	4	7	6	14	10	9	11
3	7	10	16	5	15	6	6
4	10	9	9	12	9	8	9
5	3	11	6	17	7	8	13
6	5	7	5	15	8	15	14
7	4	12	11	13	10	9	10
8	6	6	9	16	16	9	13
9	15	11	10	8	5	9	14
10	9	12	6	14	3	14	13
11	4	12	5	18	11	9	12
12	7	9	6	14	9	9	15
13	10	10	12	11	9	7	11
14	12	11	6	13	10	9	13
15	10	9	6	12	9	17	16
16	10	10	9	9	10	10	9
17	7	9	4	8	5	13	15
18	5	4	5	16	13	9	12
19	9	10	6	7	4	17	18
20	9	9	11	15	14	11	13
21	8	9	9	14	7	12	9
22	8	5	1	9	5	10	16
23	9	13	15	12	16	5	9
24	8	10	9	10	9	10	7
25	11	12	5	9	8	8	8
26	10	8	9	14	13	6	7
27	1	5	13	18	16	12	13
28	9	8	5	6	2	7	13
29	1	9	6	17	16	11	10
30	7	7	11	11	18	11	10
31	6	12	7	13	11	12	9
32	6	7	8	11	9	7	16
33	6	9	10	13	12	16	12
34	2	9	6	10	11	7	10
35	4	6	5	17	10	10	15
36	11	8	6	14	5	9	16
37	3	5	4	18	5	9	15
38	14	10	8	9	4	10	13
39	10	12	11	4	8	11	10
40	7	9	2	14	7	11	13
41	4	8	10	6	12	5	10
42	10	11	8	19	11	10	10
43	9	8	8	11	11	9	13
44	10	11	7	12	5	13	14
45	14	10	6	12	11	15	7
46	12	12	9	10	12	12	14
47	10	10	2	12	6	9	14
48	7	11	6	7	6	10	12
49	4	6	4	15	12	12	14
50	3	3	8	15	11	9	11

ADDENDUM IV continued:

Tests	15	16	17	18	19	20	21
Subj.							
51	9	11	11	11	11	5	11
52	6	5	4	18	8	11	11
53	12	7	10	15	6	8	8
54	7	11	13	8	10	8	6
55	7	9	11	12	13	10	11
56	2	6	6	15	13	14	13
57	12	14	9	11	9	4	9
58	3	6	7	19	18	11	13
59	8	16	4	6	7	10	13
60	12	6	12	10	8	14	8
61	7	13	10	11	8	15	15
62	15	12	11	9	9	14	7
63	15	9	8	14	8	14	19
64	10	15	9	9	11	8	7
65	6	8	12	10	10	8	10
66	10	10	8	14	10	8	12
67	5	9	3	12	10	14	15
68	8	7	9	9	7	10	10
69	5	10	10	16	13	15	12
70	6	11	8	10	10	8	5
71	5	7	8	16	12	6	12
72	5	7	8	17	15	7	12
73	3	11	4	14	11	8	11
74	10	12	7	13	10	11	10
75	6	10	7	11	13	14	12
76	8	8	7	13	5	12	12
77	8	10	6	13	11	14	12
78	10	8	5	16	9	9	11
79	9	12	5	7	6	14	12
80	12	15	6	10	5	6	14
81	7	16	9	7	11	7	12
82	6	10	6	16	10	12	12
83	12	13	12	7	7	11	10
84	5	6	9	18	16	9	10
85	10	15	7	7	4	5	9
86	14	10	11	9	9	9	16
87	2	10	12	14	18	10	14
88	6	10	5	19	12	8	13
89	11	12	10	8	8	8	11
90	7	10	11	15	10	9	11
91	10	10	9	13	7	15	13
92	10	10	4	14	6	10	14
93	12	9	9	10	4	9	14
94	13	10	12	11	13	8	9
95	6	11	8	12	14	14	13
96	8	11	6	12	7	11	11
97	11	14	8	7	11	11	9
98	5	6	7	8	9	6	9
99	12	9	7	11	12	10	11
100	11	13	8	9	10	9	8

ADDENDUM IV continued:

Tests	22	23	24	25	26	27	28
Subj.							
1	12	13	12	11	68	3	7
2	14	16	14	4	28	6.5	7
3	6	11	7	4	64	11	10
4	10	11	8	14	34	11	12
5	8	14	12	7	48	11.5	9
6	9	15	12	10	34	11	13
7	8	13	9	8	74	8	9
8	6	12	12	5	10	10	12
9	12	11	10	14	54	9	6
10	13	14	11	11	66	7	11
11	11	14	17	6	42	6	11
12	15	13	13	8	44	10	8
13	6	15	8	5	60	8	10
14	12	9	10	13	36	6.5	8
15	15	7	8	13	-12	7	5
16	10	14	11	9	40	10	10
17	13	11	9	13	44	7.5	8
18	9	9	14	6	30	11	12
19	14	10	12	15	44	5	5
20	6	11	7	8	46	10.5	9
21	10	14	12	8	14	8.5	8
22	16	13	9	9	28	11	13
23	8	12	11	4	67	11	11
24	9	12	7	11	84	9	7
25	11	8	11	8	10	9	6
26	8	10	9	9	35	11	9
27	8	14	11	5	24	12	12
28	15	14	12	11	46	5	6
29	4	15	14	2	48	10	10
30	5	10	12	4	32	10	12
31	9	15	12	7	26	8	11
32	14	7	12	10	78	8	6
33	14	6	11	6	22	10	11
34	9	17	6	7	38	12	12
35	6	16	14	5	84	10	8
36	13	14	13	9	34	8	3
37	13	14	13	7	76	4	9
38	11	13	11	9	28	10	9
39	14	9	5	10	54	8	8
40	10	9	12	8	62	5	9
41	9	15	10	9	72	11	12
42	9	11	10	11	46	10	12
43	12	13	9	9	24	10	13
44	15	10	9	13	62	6	5
45	11	10	14	11	-14	8	9
46	9	14	8	9	22	10	10
47	17	12	11	11	24	7.5	8
48	15	12	7	12	63	7	6
49	8	12	11	4	34	6	7
50	10	11	13	10	70	11	10

ADDENDUM IV continued:

Tests	22	23	24	25	26	27	28
Subj.							
51	10	13	12	11	45	8	6
52	10	16	14	10	34	7.5	9
53	17	15	11	10	58	11.5	12
54	10	6	5	10	44	9	11
55	11	10	11	6	15	10	13
56	7	16	15	4	38	11	12
57	10	9	9	12	24	4	8
58	4	12	19	1	8	11	14
59	13	7	6	12	75	6	4
60	7	6	7	8	12	9	4
61	7	12	11	9	66	9	10
62	11	10	7	12	30	6	8
63	16	14	8	18	3	5.5	10
64	10	10	7	9	84	9.5	4
65	12	14	14	0	48	8	11
66	10	12	17	10	54	7.5	9
67	8	14	11	7	32	5	11
68	10	12	10	6	46	6	9
69	6	10	13	3	30	10	9
70	6	12	10	12	18	6	6
71	6	14	12	4	52	11	12
72	6	9	14	5	66	8	10
73	13	12	15	9	84	8	10
74	12	12	11	11	30	10	9
75	9	10	14	9	42	8	11
76	9	8	13	9	42	8	7
77	8	14	12	5	22	7	11
78	10	12	12	10	18	11	12
79	15	13	9	11	22	9	11
80	11	13	9	9	52	11	11
81	8	11	6	5	42	9	9
82	12	12	14	8	38	12	14
83	11	9	9	13	23	6	8
84	3	13	12	3	58	12	12
85	17	11	12	11	26	4	7
86	10	12	7	13	65	7	7
87	10	12	14	4	16	11	12
88	9	15	17	2	66	7	6
89	16	14	9	10	34	6	6
90	13	8	6	13	44	10	12
91	14	9	9	10	26	7	11
92	10	12	4	12	34	6	7
93	13	8	9	12	54	6.5	4
94	11	10	7	9	58	8	9
95	9	10	8	9	32	9.5	13
96	12	11	10	11	42	10	11
97	8	7	9	6	64	9	6
98	13	11	7	8	44	10	10
99	8	7	12	12	8	8	10
100	9	11	11	8	8	6.5	5

ADDENDUM IV continued:

Tests	29	30	31	32	33	34	35
Subj.							
1	5	4	7	2	4	7	12
2	3	10	7	3	10	11	15
3	13	12	11	14	11	11	10
4	9	13	14	9	13	12	15
5	12	13	11	11	12	12	13
6	11	11	11	10	11	12	14
7	7	9	10	7	9	11	13
8	9	13	9	8	11	11.5	10
9	5	9	6	5	12	9.5	7
10	3	8	8	4	6	10	15
11	16	1	9	2	13	9	14
12	10	11	10	10	12	13	14
13	7	8	11	7	8	9	11
14	10	10	6	1	9	8	13
15	9	8	9	10	3	7	0
16	13	12	11	5	10	10	14
17	4	12	7	4	10	10	14
18	13	10	11	9	13	14	15
19	3	5	9	0	6	8.5	12
20	11	13	10	10	11	12	13
21	12	8	9	8	6	13	16
22	9	15	10	7	10	8	12
23	11	11	12	11	13	9	5
24	13	11	11	4	11	12	13
25	6	8	10	10	15	11	11
26	11	15	11	10	11	13.5	15
27	13	11	10	11	14	11	10
28	2	7	8	2	5	4.5	8
29	9	9	10	9	14	11.5	13
30	11	13	7	7	12	12.5	14
31	8	9	8	3	12	10	10
32	9	14	7	5	6	8	12
33	10	11	7	10	13	10.5	11
34	12	15	7	11	13	13	14
35	9	13	11	8	11	9.5	13
36	10	10	5	10	10	6.5	1
37	4	4	6	2	9	8	15
38	8	12	5	5	3	8	14
39	4	13	10	9	9	7	8
40	4	5	9	4	7	8	11
41	10	11	10	10	14	12	13
42	9	11	10	9	11	12	15
43	14	11	8	8	6	11	9
44	2	12	9	2	4	6	12
45	11	11	13	3	3	10.5	13
46	10	9	10	11	11	10	12
47	4	13	6	1	10	8	15
48	9	10	8	4	6	10	11
49	7	5	7	4	8	7	9
50	13	13	10	10	12	12.5	12

ADDENDUM IV continued:

Tests	29	30	31	32	33	34	35
Subj.							
51	8	13	8	6	8	8	13
52	7	11	12	4	3	11	15
53	12	15	9	10	10	12.5	14
54	10	11	10	5	7	10	8
55	13	8	10	6	9	12	12
56	8	11	12	7	15	14	15
57	3	2	9	2	1	6.5	9
58	11	11	12	6	15	14	15
59	4	7	9	4	7	6	9
60	8	7	4	11	10	9	9
61	10	11	8	7	7	12	14
62	3	10	8	2	8	7	6
63	5	5	6	3	4	9.5	13
64	10	14	12	7	10	10.5	9
65	8	6	6	7	11	7.5	8
66	7	6	9	7	7	9	13
67	4	6	6	0	4	9	11
68	2	9	6	1	9	6	12
69	6	14	10	11	12	12.5	12
70	8	6	6	1	10	9.5	12
71	12	11	9	10	13	13	13
72	10	8	10	4	9	11	14
73	5	11	9	5	11	10	15
74	11	11	11	8	8	11	13
75	8	7	6	7	12	4	10
76	11	8	10	6	5	11	12
77	4	6	9	4	9	12	14
78	10	11	13	6	12	13	14
79	10	13	12	5	4	10	12
80	13	14	10	11	7	11	12
81	10	11	11	4	9	9	10
82	15	2	11	11	11	13	15
83	4	3	8	6	6	7	6
84	12	12	12	10	14	14.5	15
85	2	3	4	0	9	4	11
86	7	9	7	2	9	9	10
87	11	11	10	9	11	10	12
88	8	9	11	3	7	11	14
89	4	8	6	7	7	7	8
90	11	11	10	7	9	11	15
91	3	11	7	2	5	6	12
92	8	6	9	3	5	7.5	13
93	7	13	8	1	6	9	15
94	8	12	10	5	3	12	14
95	10	13	7	5	9	12.5	13
96	11	11	9	7	11	9	12
97	11	13	9	10	6	9.5	10
98	9	9	11	10	11	10	9
99	9	8	7	5	11	9	11
100	8	4	7	8	8	6.5	6

ADDENDUM IV continued:

Tests	36	37	38	39	40	41	42
Subj.							
1	8	11	9	6	9	7	4.3
2	12	11	11	7	10	9	3.3
3	14	10	7	11	14	11	8.7
4	8	13	14	10	12	11.5	3.7
5	8	12	14	15	11	12	3.8
6	13	12	12	12	11	12	3.0
7	11	11	9	8	13	9.5	4.3
8	11	9	14	10	15	10.5	5.0
9	10	8	8	6	13	9.5	4.4
10	13	5	11	7	11	9	3.3
11	9	9	0	11	11	8	4.3
12	14	14	15	13	14	12	4.0
13	11	6	15	9	6	9	6.2
14	6	8	6	9	8	8	3.4
15	8	4	11	6	7	6	5.1
16	12	7	13	8	9	10	5.2
17	4	8	12	9	11	9	2.9
18	13	15	12	14	15	12.5	6.0
19	7	6	10	6	10	6	4.2
20	11	12	14	14	10	11.5	5.0
21	11	12	15	11	12	10.5	3.3
22	9	8	8	6	6	10	3.9
23	12	5	4	9	11	10	4.9
24	11	11	14	9	12	11	4.6
25	14	7	15	7	11	10	6.2
26	12	15	14	12	13	12	3.5
27	13	10	15	12	7	11	3.2
28	5	1	2	9	2	4.5	3.7
29	11	12	10	5	13	11	3.1
30	12	15	12	13	13	11.5	5.6
31	13	10	13	7	9	9	4.9
32	5	6	11	6	10	8	4.4
33	11	10	11	9	13	10.5	4.7
34	12	14	14	13	13	12.5	5.6
35	8	10	11	9	6	10	5.8
36	3	15	10	5	5	7	4.3
37	10	6	3	8	9	7	3.8
38	11	9	9	8	12	9	3.6
39	4	5	2	10	3	7	4.6
40	8	8	2	10	10	6	3.2
41	12	11	14	11	13	11.5	3.9
42	14	9	12	10	12	11	3.4
43	8	14	12	8	12	10	3.5
44	5	3	13	4	6	6	3.4
45	14	10	11	8	9	9.5	6.4
46	11	10	9	10	10	10	3.4
47	5	11	7	4	6	7.5	3.9
48	7	5	12	8	13	8.5	3.2
49	7	7	14	6	3	6	5.8
50	12	10	14	13	14	11.5	2.9

ADDENDUM IV continued:

Tests	36	37	38	39	40	41	42
Subj.							
51	9	6	10	7	4	8	3.6
52	10	13	13	9	5	9	3.7
53	14	11	11	13	11	12	3.8
54	7	7	14	7	12	9.5	3.3
55	13	9	10	13	14	11	5.4
56	14	14	15	14	15	12.5	5.8
57	5	4	4	8	9	5	4.0
58	14	12	15	13	15	13	4.6
59	5	5	7	3	8	6	3.9
60	10	9	10	6	10	8	4.4
61	11	14	12	9	15	10.5	3.2
62	7	6	8	7	4	6	3.9
63	7	11	13	4	9	7.5	5.2
64	12	7	14	10	13	10	5.1
65	3	12	6	7	8	8	3.6
66	11	6	8	7	8	8	4.2
67	9	11	13	7	3	7	8.2
68	6	5	3	4	4	6	4.4
69	9	13	15	12	15	11	5.1
70	11	7	7	10	10	8	4.6
71	13	11	14	11	15	12	4.2
72	7	11	13	5	10	20	8.4
73	6	9	13	9	11	9	4.1
74	12	6	13	9	13	10	3.1
75	15	11	11	6	13	9.5	4.8
76	13	10	10	11	9	9.5	4.6
77	12	11	13	11	11	10	4.1
78	9	13	15	11	13	11.5	4.7
79	11	5	13	8	13	9.5	4.3
80	9	10	12	9	14	11	5.1
81	12	2	13	6	10	9	4.3
82	13	12	15	13	14	13	4.9
83	8	6	6	7	8	6.5	6.2
84	14	14	15	15	15	14	3.3
85	2	3	4	2	1	4	5.2
86	8	7	6	9	14	8	4.3
87	11	7	13	6	11	10.5	5.1
88	12	9	10	10	10	9	3.8
89	9	7	4	6	8	6.5	3.7
90	10	10	11	10	14	11	5.3
91	4	4	6	6	6	6	6.4
92	6	6	8	7	5	7	6.1
93	10	8	4	5	11	8	4.4
94	13	13	13	6	14	10	4.6
95	12	13	14	13	13	11	3.6
96	9	7	13	8	10	9	3.9
97	10	10	8	6	14	9	5.8
98	11	9	11	9	11	10	3.7
99	10	8	8	5	12	8	3.9
100	5	10	6	8	4	7.5	6.8

ADDENDUM IV continued:

Tests	43	44	45	46	47	48	49
Subj.							
1	M	S	9	19.3	8	A	11.6
2	M	D	8	19.4	7	A	10.3
3	K	S	19	20.2	9	E	10.0
4	M	S	36	20.9	7	A	9.5
5	M	S	7	17.5	7	A	8.2
6	K	S	11	19.5	7	E	7.3
7	M	S	4	18.8	8	E	7.2
8	M	S	8	18.8	7	E	7.0
9	S	D	4	19.0	9	E	7.0
10	D	S	10	19.2	7	A	6.8
11	Sy	S	2	17.9	7	A	6.6
12	D	S	18	20.2	7	E	6.5
13	M	S	7	18.6	6	A	6.3
14	Sy	D	22	19.8	8	A	6.0
15	K	S	22	24.0	7	A	6.0
16	M	S	7	17.5	6	E	5.7
17	D	S	11	18.7	7	A	5.3
18	Sy	D	20	19.5	8	E	5.3
19	D	S	13	20.0	6	A	5.2
20	M	S	6	17.9	6	E	5.0
21	Sy	S	5	16.5	6	E	4.8
22	M	S	11	19.2	7	A	4.8
23	W	D	24	21.5	8	E	4.8
24	D	D	28	21.0	7	A	4.5
25	M	S	12	20.5	6	A	4.3
26	D	S	9	19.5	6	E	4.3
27	K	S	11	18.7	6	A	4.2
28	W	S	12	18.5	7	E	3.7
29	K	D	4	23.6	9	A	3.7
30	D	S	8	20.4	5	E	3.5
31	K	S	20	18.9	6	A	3.3
32	M	S	11	17.7	6	E	3.3
33	M	S	22	20.4	6	A	3.0
34	M	S	15	20.3	6	E	2.5
35	W	S	48	19.5	9	E	2.3
36	K	S	39	23.9	7	A	2.2
37	D	S	18	8.8	7	A	2.2
38	M	S	7	18.6	6	A	1.8
39	SK	S	10	19.8	7	E	1.8
40	B	S	5	19.7	7	E	1.8
41	M	D	10	17.1	7	A	1.7
42	M	S	10	18.6	7	A	1.5
43	M	S	19	20.8	7	A	1.5
44	H	D	22	20.0	7	A	1.2
45	M	S	4	18.7	6	A	1.0
46	Sy	S	7	19.2	6	A	0.8
47	H	D	2	18.7	5	A	0.8
48	H	S	1	16.5	5	A	0.8
49	M	S	32	19.8	7	E	0.7
50	M	S	18	18.6	7	A	0.7

ADDENDUM IV continued:

Tests	43	44	45	46	47	48	49
Subj.							
51	B	S	2	16.5	8	A	0.7
52	M	D	6	16.2	6	E	0.5
53	M	D	4	17.8	7	E	0.5
54	M	S	3	18.8	6	A	- 0.2
55	S	S	29	18.9	6	A	- 0.3
56	M	S	8	19.4	6	A	- 0.3
57	M	S	17	19.9	6	A	- 0.5
58	K	S	31	18.8	9	A	- 0.5
59	M	S	10	18.5	7	A	- 0.5
60	M	D	15	18.6	6	A	- 0.5
61	Sy	S	22	17.5	7	E	- 0.7
62	M	D	12	20.7	6	E	- 0.8
63	Sy	S	8	19.4	7	A	- 0.8
64	K	S	16	17 $\frac{1}{2}$ 3	5	E	- 0.8
65	H	S	14	16.8	6	A	- 1.2
66	K	S	14	18.3	7	A	- 1.2
67	M	S	16	18.2	7	A	- 1.5
68	M	S	10	19.1	7	A	- 1.7
69	H	S	40	18.1	5	A	- 2.0
70	M	S	2	21.2	8	E	- 2.3
71	D	S	19	19.4	8	A	- 2.3
72	M	D	14	19.0	6	A	- 2.5
73	M	S	29	21.9	7	A	- 2.8
74	M	S	9	18.7	7	E	- 3.0
75	B	S	23	19.6	6	A	- 3.8
76	P	S	19	20.3	5	E	- 4.2
77	M	D	27	19.4	7	A	- 4.7
78	H	S	24	17.6	6	A	- 4.8
79	H	D	12	18.7	6	A	- 5.2
80	M	S	15	21.2	8	A	- 5.3
81	H	S	4	19.9	6	E	- 5.5
82	H	S	4	16.6	6	A	- 5.5
83	H	S	26	17.0	7	A	- 5.7
84	K	D	6	18.2	5	A	- 5.8
85	H	S	7	17.7	8	E	- 5.8
86	Sy	D	26	21.6	7	E	- 6.0
87	M	D	12	20.2	6	A	- 6.2
88	M	D	9	18.7	6	A	- 6.5
89	K	S	13	17.5	7	A	- 6.5
90	L	S	7	18.7	6	A	- 7.5
91	SK	D	11	16.3	6	A	- 8.0
92	So	S	13	16.8	6	E	- 8.3
93	Sy	S	18	19.5	6	A	- 9.3
94	E	S	13	18.4	6	A	- 9.3
95	K	S	14	17.2	6	A	-10.2
96	E	S	16	18.4	7	E	-10.3
97	E	S	4	19.8	6	A	-10.5
98	M	D	3	17.4	6	E	-11.3
99	So	S	13	18.6	6	A	-11.5
100	K	S	24	23.3	6	A	-12.0

KEY TO ADDENDUM IVTest

1	N.S.A.G.T.	Non-Verbal Intelligence
2	"	Verbal Intelligence
3	"	Total intelligence
4	G.P.P.	Ascendancy
5	"	Responsibility
6	"	Emotional Stability
7	"	Sociability
8	G.P.I.	Cautiousness
9	"	Originality
10	"	Personal Relations
11	"	Vigour
12	HSPQ	Schizothymia - Cyclothymia
13	"	General Mental Capacity
14	"	Ego Weakness - Ego Strength
15	"	Phlegmatic - Excitable Temperament
16	"	Submissiveness - Dominance
17	"	Desurgency - Surgency
18	"	Superego Weakness - Strength
19	"	Threctia - Parmia
20	"	Harria - Premsia
21	"	Zeppia - Coesthenia
22	"	Confident - Guilt Prone
23	"	Group dependent - Self-sufficient
24	"	Weak - Strong Selfsentiment
25	"	Low - High Ergic Tension
26	Gottschaldt	Figures (Flexibility of Closure)
27	C.T.P.	Personal Adjustment
28	"	Self-reliance
29	"	Sense of Personal Worth
30	"	Sense of Personal Freedom
31	"	Feeling of Belonging
32	"	Freedom from Withdrawal Tendencies
33	"	Freedom from Nervous Symptoms
34	"	Social Adjustment
35	"	Social Standards
36	"	Social Skills
37	"	Freedom from Asocial Tendencies
38	"	Family Relations
39	"	School Relations
40	"	Community Relations
41	"	Total Adjustment
42	Multiple Choice Rorschach	
43	C.V. Interest Questionnaire	
44	Vocational Preference	
45	Training Period	
46	Age	
47	Educational Qualifications	
48	Home Language	
49	Criterion Ratings	