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# Psychometric correlates of deviant responding: a factor analysis

Ernest L. Robinson

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Psychometric Correlates of Deviant  
Responding: A Factor Analysis

by

Ernest L. Robinson

A thesis submitted in partial fulfillment  
of the requirements for the degree of Master of Arts  
in Psychology in the Graduate School of the University  
of Richmond

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## CHAPTER I

### THE PROBLEM

Recent years have seen increased recognition by those in the field of assessment of the importance of response sets, or as they have been termed, styles of responding (Jackson & Messick, 1958). For example, these authors point out that it is naive to assume that the content pull of a test item is the significant determinant of response. No longer should these response biases or styles be regarded simply as sources of error variance, for recent studies show that response styles, per se, can be regarded as reliable and valid indicators of personality characteristics (Berg, 1957, 1961).

Berg (1955) has stated that many studies which have attempted to measure personality traits directly from response sets have met with only partial success, since the direct relationship between personality/traits and response sets is only moderate. Berg proposed that those responses which deviate from the established pattern of bias should yield stronger relationships with personality variables. This proposal has been formulated into the Deviation Hypothesis: "Deviant response patterns tend to be general; hence those deviant behavior patterns which are significant for abnormality (atypicalness) and thus regarded as symptoms (earmarks or signs) are associated with other deviant re-

response patterns which are in noncritical areas of behavior and which are not regarded as symptoms of personality aberration (nor as symptoms, signs, earmarks)" (Berg, 1957, p. 159).

The Deviation Hypothesis has several important implications:

1. Deviant response patterns can be defined operationally. Berg (1955) refers to a deviant response as "one which differs from the modal response or from a criterion group response at or beyond the 5% level of significance" (p. 63).
2. Deviant responses are general; thus, those individuals who are deviant in a noncritical area of behavior (i.e. select personality test items or prefer certain abstract designs not selected by the criterion group) will be likely to be found deviant in a critical area of behavior (schizophrenia, mental deficiency, etc.). This does not imply that normal individuals will never select deviant responses, but it does suggest that those individuals who deviate in a critical area of behavior will also show a larger number of deviant responses in noncritical areas of behavior.

3. Though not stated by the Hypothesis, it should be apparent that item content is not of particular importance, for as long as deviant responses can be identified almost any stimulus content can be employed (Berg, 1959).
4. A theoretical explanation is offered by the Deviation Hypothesis to account for the findings of a great many studies which have attempted to predict behavior in one area from findings in another (Berg, 1961).

The research design employed most often thus far for testing the Deviation Hypothesis and its corollary, the unimportance of item content, has been the criterion group method. This design assumes that groups which differ on a priori grounds should be able to be identified by their characteristic styles of responding regardless of the item content employed (Berg, 1961).

The Perceptual Reaction Test (PRT) was developed by Berg, Hunt, and Barnes (1949) to elicit "set" and to demonstrate the unimportance of specific test content in personality measurement. This test consists of 60 abstract designs drawn with ruler and compass. For each of the designs, the subject picks one of four response options: Like Much, Like Slightly, Dislike Slightly, Dislike Much. Despite its brevity,

simplicity, and abstract nature of content, the PRT elicits deviant response sets which are associated with other behavioral manifestations. Through identification of deviant responses, variation from an established pattern of bias, scales have been developed which highly differentiate various clinical groups from normals and from each other (Berg, 1959, 1961).

Barnes (1955), in a specific test of the Deviation Hypothesis, administered the PRT to 1700 normal subjects and 546 persons suffering from various psychiatric disorders. Deviant responses were tabulated and significant comparisons cross-validated by a method suggested by Katzell (1951). On the basis of significant response options, Barnes was able to construct five major scales: (1) Delta (normals vs. NP patients); (2) Psi (normals vs. psychotics); (3) Sigma (normals vs. schizophrenics); (4) Chi (normals vs. character disorders); (5) Psi-Chi (psychotics vs. character disorders). It is interesting to note, for example, that 90.9% of schizophrenic males in one of Barnes' groups scored above the median of the score distribution for the normal subject criterion group on the Sigma scale. The development of the Psi-Chi scale points to the fact that it is possible to differentiate between two psychiatric groups with the PRT,

a seven-minute test. In Barnes' words, "It is concluded that response set on the PRT is related to personality factors, that it has a degree of reliability which compares well with other tests of personality factors, and that it can be used to assess personality disorder," (p.290).

Hesterly and Berg (1958) investigated the possibility that the PRT could be used as a measure of maturity. Two main hypotheses were tested: (1) That normal adults and young, normal children should reveal characteristic styles of responding on the PRT which would highly differentiate the two groups; (2) That since immaturity is a characteristic of schizophrenia, PRT response styles of young, normal children should be more similar to schizophrenic styles of responding than to those of normal adults. The PRT was administered to 300 Louisiana grade-school children, 100 children in each of three age groupings (7-0 to 8-11; 9-0 to 10-11; 11-0 to 12-11). Barnes' data on schizophrenics and normals were used, with each group scored by the Sigma key. These Sigma scores were used to compare the groups employing the non-parametric median test because of lack of homogeneity of variance. The scores of the young children differed significantly ( $p < .0001$ ) from the normal adult group. However no significant differences could be found when the Sigma scores of normal, young children were compared with the schizophrenic group. It was also found within the group

of young, normal children that as age increases, the Sigma scores decrease (i.e. become less indicative of schizophrenic scores).

Using the Hesterly and Berg study (1958) as a point of departure, Roitzsch and Berg (1959) reasoned that both older children and neurotic adults should differ from normal adults in deviant response patterns, but should not differ from each other. These investigators administered the PRT to 300 Louisiana school children, 100 in each of three age groupings (12-13, 14-15, and 16-17 yrs.) and to 45 neurotic adults. Data for the normal adults were obtained from Berg's files. The findings were quite consistent with expectations in that normal adults differed significantly in deviant response patterns for both the older children and adult neurotic groups. No statistically significant difference was found when deviant frequency of the older children was compared with that for the adult neurotic group. It was now necessary to ascertain if the neurotic group differed from a schizophrenic group. Schizophrenic response data from Barnes (1955) was compared with deviant response frequencies of the adult neurotic group. The Sigma scale was able to differentiate the two groups ( $p < .01$ ). The authors conclude that "... adult neurotics are immature in the sense that their PRT responses are like those of 12-17 yr. old children rather than like those of normal adults. The deviant response

pattern of neurotic adults does not resemble that of schizophrenics, for the two groups are readily distinguished from each other on the Sigma scale" (p.419).

It should be apparent that the process of aging reveals itself quite characteristically in deviant response patterns. Berg (1961) reports a study by Hesterly (1960) in which an attempt was made to construct a PRT maturity scale. Deviant response patterns, as based upon a sample of 2253 subjects, ages 6 to 83 years, were analyzed by Katzell's (1951) cross-validation method with deviant responses identified by the stringent .0025 significance level. It was found that to age 19, the number of deviant responses decreases steadily with increasing age, that from 20 to 60 years no systematic variation can be identified, deviant response frequency remaining fairly stable, and that after age 60 frequency of deviant responses increases with age. It is notable that when the three groups were compared with reference to deviant response patterns, the children and aged groups differed from the 20-60 yr. group, but were quite similar to each other.

Hawkins (1960) showed that an elderly group still active in business or professional pursuits did not exhibit the increase in deviant response frequency characteristics of Hesterly's (1960) group. Berg (1961) feels that

Hawkins' sample is somewhat atypical of the general elderly population, for Boozer (1961) using a more generalized elderly population sample was able to construct the aging scale, Alpha, which was found to be different from those scales developed by Barnes (1955).

House (1960) has been able to construct a PRT scale for emotionally disturbed children employing the criterion group method. The responses of 240 children under psychiatric treatment were compared with those for a group of 400 normal children matched for age (7-15 yrs.), sex, I.Q., and socioeconomic status. When the option choices were analyzed for the two groups (each sex separately) 94 to 112 options differentiated the disturbed children from the normal controls.

Cieutat (1960) compared PRT responses of 433 mental defectives with the responses of 850 normal controls in an effort to see if mental retardation would reveal itself in deviant response patterns. The Iota scale, an index of mental deficiency was constructed and based upon 187 deviant responses for males and 164 for females of 240 possible deviant responses. These numbers of deviant responses are quite large, especially when it is realized that fewer than three deviant responses would be expected by chance at the level of significance employed. It was also found that as I.Q. decreases, deviant response frequency increases. Cieutat then compared her mental



defective group with a schizophrenic group on the basis of deviant responses. Each group had its own deviant response pattern and was readily distinguished from the other.

A long standing physical disease can alter living habits and personality characteristics of its victims. Since physical disease can be diagnosed objectively, a study which compared PRT responses of the chronically physically ill with those of normal controls would fit quite well into the Deviation Hypothesis frame of reference. For example, Engen (1959) gave the PRT to 200 hospitalized patients and compared their option choices with the responses of normal controls. On the basis of deviant response identification (73 for males, 31 for females) a PRT scale for tuberculosis was constructed.

Berg (1961) was able to use PRT deviant responses to differentiate a group of 125 cardiac patients from a matched group of normal controls. The deviant response patterns of his cardiac group were different from those of schizophrenics, demonstrating that it would be possible to construct another scale similar to the Psi-Chi "diagnostic sharpener" scale of Barnes (1955). It is interesting to note that when the responses of cardiac females were scored on the PRT M-F scale, the trend was "significantly in the masculine direction." As Berg commented, "This later finding is intriguing since one is led to speculate

that females who exhibit M-F response patterns which are more characteristic of males than of females may possibly be more prone to heart disease" (Berg, 1961, p. 358).

The MMPI has been employed to test the Deviation Hypothesis. In his 1955 study Barnes had observed that the PRT alternative selected most often by his psychotic group was "Like Much", while normals would most often select the "Dislike Slightly" choice. Since the MMPI items answered in the infrequent direction are recorded (and thus being deviant responses) Barnes(1956 ) reasoned that the psychotic triad (Pa, Pt, So) should correlate highly with deviant or atypical "true" responses, while the neurotic triad (Hs, D, Hy) should correlate highly with deviant or atypical "false" responses. He obtained MMPI records of 40 male psychiatric patients and tabulated the total number of deviant responses, atypical "true" responses, and atypical "false" responses. These were correlated with the individual MMPI scales. As anticipated, atypical "true" responses correlated quite highly with the psychotic triad (Pa .52, Pt .84, and Sc .90), while atypical "false" answers showed a similar relationship with the neurotic triad (Hs .56, D .73, and Hy .59). These coefficients are much in excess of what would be expected from the number of common elements. Thus it would seem that psychotics have an "accept" (like, true)

response set and neurotics a "reject" (dislike, false) response set regardless of particular stimulus content (Berg 1959, 1961).

Adams and Berg (1961) used auditory stimuli to differentiate schizophrenic patients from normals in another test of the Deviation Hypothesis. The subjects indicated their degree of liking or disliking (PRT-type option choices) for 50 meaningless, recorded sounds. When option choices were analyzed, from 65 to 71 met the deviant response criterion. Thus auditory stimulus content of a meaningless nature can be employed to assess personality disorder.

Other tests of the Deviation Hypothesis have been carried out using adjective check lists and not employing the criterion group method of research. For example, Grigg and Thorpe (1960), administered the 300-item Gough Adjective Check List to freshmen at the University of Texas with the objective of constructing a scale composed of commonly and uncommonly selected adjectives (i.e. adjectives selected by 84% or more and those selected 16% or less). This revised list, consisting of 33 commonly selected and 39 uncommonly selected adjectives was administered the next year to entering freshmen. Later the deviant response scores (failing to select a common or checking an uncommon adjective) of those freshmen who sought personal counseling or psychiatric treatment were

compared with educational-vocational counselees and non-client controls. As predicted by the Deviation Hypothesis, the psychiatric-personal group had significantly higher deviation scores than the combined vocational-control group.

A recent study (Lucky and Grigg, 1964), investigated the relationship between deviant responses on content and contentless tasks and the repression-sensitization dimension, a continuum spanned by various degrees of perceptual defense. According to these authors "The terms 'repressor' and 'sensitizer' have described the tendency to respond to emotionally-toned stimuli by avoiding (or repressing), or by approaching (or sensitizing)." To measure this dimension Byrne (1961) has developed The Repression-Sensitization Scale, composed of MMPI scales and based upon earlier work of Altrocchi, Parsons, and Dickoff (1960). The Grigg-Thorpe Adjective Check List served as a content task, and an ESP set (Bass, 1956) was used as a contentless task. A Pearson  $r$  of .40 ( $p < .01$ ) was obtained when the Grigg-Thorp Adjective Check List deviation scores were correlated with the Byrne R-S Scale (high scores indicating sensitizers). The obtained correlation between the contentless task and the Byrne R-S Scale was .069. Lucky and Grigg draw two main conclusions with respect to these results: "(1) Deviant responses on a self-description test are related to defensiveness scores: sensitizers are more self-critical than repressors; (2) When a task does not in-

volve self-description, defensiveness scores do not appear to be related to deviant responding."

Two recent papers by Sechrest and Jackson (1961, 1962) have subjected the Deviation Hypothesis and its ramifications to a critical methodological and theoretical analysis. One study (1962) attempted to test Berg's assertion that deviant response tendencies are quite general in that they are expected to manifest themselves across many different classes of behavior. Several tests of personality and sociometric rating scales were given to two groups of college students. The personality measures were scored following the definition of "relative deviation" (1961) in which atypical responses in the one group under study are considered deviant. These data were analyzed by three approaches to generality of deviation: (1) a correlational approach, to test the possibility that deviation and deviant responses manifest themselves unidirectionally. Within this approach, it would be expected that a subject scoring high, for example, on one deviation measure would score high on another measure of deviant responding; (2) a bidirectional approach, to test if a subject would consistently score either deviantly high or deviantly low on measures of deviant responding; (3) the study of those persons who fell at either extreme on a deviation measure.

- With reference to the first approach, a general

factor of deviation could not be identified, the obtained intercorrelations being " ... inconsequential to be supportive ..." (1962, p. 397). Little support could be found that deviation manifests itself in a bidirectional manner. However, when individuals falling at the [extremes] of the deviation continuum were studied, "significant relationships are obtained with reputational unconventionality and atypicality ..." (p.400).

In discussing these and other findings with reference to the Deviation Hypothesis, Sechrest and Jackson (1961) conclude that deviant responses cannot be considered completely general, but that these tendencies are "sometimes associated." In addition, there are distinctly different kinds of deviant response measurement definitions, ( the authors cite six ) each one having its own implications with reference to measurement, interpretation, and theory.

The present study will seek to identify psychometric correlates of deviant responding and in so doing, appraise the extent to which generality of deviation manifests itself across a broad continuum of personality and interest measures. It should be pointed out that deviation generality and deviant response correlates will be investigated not employing the criterion group method; rather, the within group research framework will be utilized. To date, few studies have concerned themselves with measurement of

deviant tendencies within any particular group. It will also be possible to show to what extent personality and interest variables are associated with independent measures of deviant responding as well as the interrelationship between the independent deviation measures. Factors involved in deviant responding will be delineated and identified.

CHAPTER II  
THE METHOD

Subjects - In the present study 140 adult male prisoners housed in the Receiving Unit of the Virginia State Penitentiary served as subjects. Each inmate at the time of testing, was in the process of being evaluated for classification and assignment purposes. There was one criterion for selection of subjects: An Otis (Otis Quick-Scoring Mental Ability Test, Form BETA) I.Q. of 90 or better. A preliminary study had shown that those inmates who could attain a verbal I.Q. in the average range usually had sufficient reading ability (at least seventh grade-level speed and comprehension) to take the present battery of tests. Pertinent sample data for the 140 subjects used in the study are listed in Table I.

It should be pointed out that, according to the experience of the prison psychologists, those inmates of the Receiving Unit are characteristically quite cooperative in the testing situation. This observation was borne out by the writer who tested the present sample. In fact the Motivational Distortion scores on the Sixteen Personality Factor Questionnaire for this inmate group were significantly lower ( $t = - 4.56, p < .01$ ) than those of the 16 P.F. adult male (non-student) standardization sample.



TABLE I

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Description of the Sample

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	<u>Min.</u>	<u>Mean</u>	<u>Sigma</u>
Age	22.8	24.35	5.94
Education	10.0	9.76	2.17
Otis I.Q.	103.7	104.11	8.05
Beta I.Q.	110.4	108.83	9.17

---

Procedure - The subjects were called into the testing room in groups ranging from six to twelve and were asked to cooperate in a research project in psychological testing that was being conducted by the University of Richmond. That their participation was non-obligatory (under penitentiary policies) was made explicit; still, however, only one inmate refused to take the tests. Testing was done at times which would not interfere with recreational or other activities. Physical conditions were good.

Each subject was administered a battery of psychological tests selected to span and sample a wide range of personality and interest areas as well as other tests to elicit deviant response sets. It was necessary to limit the testing to one session of approximately 1 1/2 to 1 3/4 hours. Each test in the battery then had to yield maximum information in minimum time. The six tests, yielding a total of 26 scores (a few more can be derived), are described below and listed in order of administration.

1. The Perceptual Reaction Test (PRT) - To date, the PRT has been used most often in investigations of deviant responding and tests of the Deviation Hypothesis. As stated before, the PRT consists of 60 abstract designs drawn with ruler and compass. For each of the designs the subjects selects one of four response options: Like Much, Like Slightly, Dislike Slightly, Dislike Much.

Since the deviation scores will be obtained from using the Delta key developed by Barnes (1955), the

writer feels it expedient to explain the construction and rationale of this deviation index and its relevance for the present study.

Barnes (1955) used two contrasted groups: (1) A group of hospitalized neuropsychiatric patients (schizophrenics, brain damaged cases, neurotics, etc.) from various sections of the country; (2) A group of normal persons (those not hospitalized for any neuropsychiatric condition.) Even though group one was comprised of heterogeneous disorders, they all deviated in a critical area - hospitalization for a neuropsychiatric condition, being unable to manage their affairs independently. Barnes compared the responses of the two contrasted groups and developed keys as based upon deviant responses. Here is illustrated Sechrest and Jackson's (1962) concept of "absolute deviation" - When a normal group is compared with a group which on a priori grounds can be considered to be deviant, a key being developed therefrom.

Sechrest and Jackson (1962, 1963) used the Delta scale in assessing the generality of deviation within a normal population and correlated the obtained deviation scores with other deviation indices including PRT-derived, within-group deviation measure. The latter can be considered under the authors' concept of "relative deviation" - atypical responses (those departing from the

previously identified modal responses) in the one group under study being considered deviant. A correlation of .70 obtained between the Delta scores and within-group deviation scores led the investigators to conclude that those responses atypical or deviant in their normal group under study are quite characteristic of general psychiatric patients. This writer feels that the Sechrest and Jackson study offers sufficient justification for use of the Delta key, rather than developing another key as based upon deviant responses within the present inmate sample.

In the present study, the Delta scores will indicate the extent to which the inmate subjects resemble a neuropsychiatric population with regard to their responses on the PRT. Thus those subjects who score on the neuropsychiatric norms can be considered "deviant responders." The writer agrees with Berg (1961) who states that criminals or criminal behavior cannot be considered a "critical group or a valid category of behavior.

## 2. The Job Interest Test (JIT)

Since a search of the literature had revealed that there were no short and reliable occupational inventories suitable for groups with limited educational backgrounds, the JIT was constructed by the writer especially for the present study. The test is based upon Roe's (1956) classification of occupations according to interest factors and level of competence required. The JIT consists of 98

paired-comparisons and the subject is required to indicate the extent or strength of a person's interests in jobs from seven occupational fields: (1) Service to people; (2) Business Contact; (3) Organizational; (4) Technology; (5) Outdoor; (6) Scientific; and (7) Arts and Entertainment. Appendix I contains a detailed account of the construction and rationale of the JII.

3.. The Adjective Check List (ACL) -- Byrne (1961) and Lucky and Grigg (1964) have used the Grigg-Thorpe Adjective Check List in studies of deviant responding with college students. Initially it had been planned to use this same instrument for the present study, but upon examining these adjectives closely, the writer felt that several of the Grigg-Thorpe words were too difficult for comprehension within the prisoner sample, while other adjectives, popular among the college group, would not be so with the present sample. A list of 213 easily comprehensible adjectives was prepared by the writer from the Gough Adjective Check List (Gough, 1955). This list was standardized on a sample of 100 prisoners meeting the selection criterion as described above. The adjective check list used in the present study is similar in its rationale and construction to the Grigg-Thorpe Adjective Check List described above.

Specifically, it consists of 60 adjectives, 20 having been picked by 75% or more of the standardization sample, and 40 chosen by 25% or less.

A score is assigned for failing to check a popular adjective or for checking an unpopular adjective.

4. The Revised Repression-Sensitization Scale - -

This revised scale consists of the 127 items from the original R-S scale which survived a stringent internal-consistency item-analysis (Byrne, Barry, and Nelson, 1962). High scores are indicative of sensitizers, while low scores indicate repression. The R-S scales have been shown to correlate highly with measures of self-description and have been used in studies of deviant responding (Lucky and Grigg, 1964).

5. The Sixteen Personality Factor Questionnaire (16 P.F.) - -

The 16 P. F. is a carefully constructed, factor analytically based personality inventory which measures a number of independent personality dimensions. A recent review by Adcock (1958) points out the usefulness of the test in assessment of the broad personality continuum. Form C of the 16 P.F. (Cattell, 1956, and Cattell, Saunders and Stice, 1957), which was chosen for use in the present study, is a "Basic English" version and is intended for those groups with a limited educational background. The test provides maximum information in minimum time.

6. The Graves Design Judgment Test DJT - -

The DJT is essentially a test of preference for

abstract designs, although it has not been standardized solely as a measure of artistic judgment. To test the possibility that deviant responding is associated with design judgment, the Graves Design Judgment Test (Graves, 1948), which consists of designs in many ways similar to those of the PRT, will be included in the present testing battery. The Graves Test is composed of non-objective or abstract designs. For each item, one design was constructed to be in accord with the "basic principles of aesthetic order" and art structure, while the design with which it has been paired violates a major aesthetic principle. Validity of the test is based upon judgments of art teachers and upon a number of contrasted art, non-art group studies. In its final form, the test consists of 90 items, 8 containing a triad of designs, the rest having pairs of designs. The subject indicates his preference for the one design in each item organized according to aesthetic principles.

### CHAPTER III THE RESULTS

The first step in the data analysis involved inter-correlating the twenty-six measures described above to form a 26 x 26 matrix, presented in Table III. Because of the magnitude of statistical computation necessary, an IBM 1620 Computer was employed in the analysis. (A complete listing of the computer programs used in this study is found in Appendix VI). The means and standard deviations of the tests are presented in Table II.

Of note is the mean of the PRT Delta (-10.84); it is noticeably higher (indicating greater deviation) than the mean value reported by Barnes (1955) for his normal group (-16.07). The difference is significant,  $t = 4.75$ ,  $p < .01$ , showing that convicted criminals make a greater number of deviant responses than Barnes' non-criminal, normal subjects. That the present group makes significantly fewer deviant responses than Barnes' psychiatric group ( $M = +1.08$ ) is witnessed by a  $t$ -value of -5.27, significant beyond the .01 level also. Deviant responses for this study were obtained by Barnes' Delta key and show extent to which the criminals' response patterns are similar to response patterns of a general psychiatric group. In each instance, unless specifically stated otherwise, when PRT scores are mentioned, they were obtained from the Delta scoring key.



TABLE II

<u>Means and Standard Deviations of the Twenty-Six Measures</u>			
	<u>Test</u>	<u>Mean</u>	<u>Sigma</u>
1	PRT (Deviation Score)	-10.84	11.58
2	ACL (Deviation Score)	10.91	6.67
3	Byrne R-S	45.13	19.09
4	Graves AJD	44.11	13.06
5	16.P.F. A	6.16	2.36
6	C	7.66	2.36
7	E	5.28	2.54
8	F	7.42	2.60
9	G	6.45	2.30
10	H	5.65	2.27
11	I	4.16	2.26
12	L	6.10	2.08
13	M	5.93	2.25
14	N	5.48	2.21
15	O	4.36	2.04
16	Q <sub>1</sub>	5.42	2.45
17	Q <sub>2</sub>	7.75	2.01
18	Q <sub>3</sub>	6.67	2.42
19	Q <sub>4</sub>	5.17	2.31
20	JIT S <sub>v</sub>	11.28	5.22
21	BC	9.16	5.55
22	O	12.96	5.92
23	T	17.17	6.08

TABLE II (Con't.)

	<u>Test</u>	<u>Mean</u>	<u>Sigma</u>
24	Od	11.96	6.45
25	SC	10.81	5.66
26	A & E	13.63	5.78

---

The results of the Byrne R-S Scale from the present group (  $M = 45.13$ ,  $SD = 19.09$ ) are comparable with those found by Byrne with his college group ( $M = 42.25$ ,  $SD = 20.10$ ).

All findings germane to the Job Interest Test are presented and discussed at length in Appendix II. (See Appendix III for additional validity information).

In Table III is presented the intercorrelation matrix for the 26 variables, rounded to two decimal places, with decimal points omitted.

Of initial interest are the correlations between the PRT and the 25 other tests. An inspection of line one of Table III reveals negligible relationships between the PRT and each variable. The range of correlation coefficients is quite restricted,  $-.12$  to  $-.08$ . Since a coefficient of  $.17$  is required for significance at the  $.05$  level, the correlation of the greatest magnitude (PRT vs. Factor A,  $-.12$ ) is merely a chance correlation.

Noteworthy is the lack of relationship between the two indices of deviant responding, PRT vs. ACL ( $-.04$ ). If there were generality of deviant responses in "non-critical" areas, a positive relationship between the two scales would be expected. It is obvious that the obtained coefficient does not support the notion of generality of noncritical deviant responses, at least as based upon an unidirectional, correlational co-





efficient criterion.

The Adjective Check-List (ACL), the second deviation index, was significantly related to eleven other measures, eight at the .01 level, three at the .05 level. In accord with past studies (Byrne, 1961, 1962, and Lucky and Grigg, 1964) there was a moderate relationship between deviant responding on a task of self-description (ACL) and the repression - sensitization dimension (.44,  $p < .01$ ). Positively related with ACL scores were the following personality variables of the 16 P.F. : Factor L, Paranoid Tendency ( $r = .35$ ), Factor E, Dominance / Ascendance ( $r = .34$ ), Factor M, Bohemian Introversion / Absent-Minded ( $r = .31$ ), Factor N, Shrewdness ( $r = .24$ ), and Factor Q<sub>4</sub>, Tense / Excitable ( $r = .19$ ). Inversely related were Factor C, Dissatisfied Emotionality ( $r = -.36$ ), (For these negative relationships the minus pole of each personality factor is used for the sake of clarity of relationship.), Factor Q<sub>3</sub>, Poor Self-Sentiment Formation ( $r = -.34$ ), Factor G, Lack of Rigid Internal Standards ( $r = -.25$ ), Factor H, Shy / Timid ( $r = -.20$ ), and Factor G, Glum / Serious ( $r = -.18$ ). Generally then, deviant

responding on a task of self-description is associated with scores allegedly reflecting unfavorable personality characteristics. None of the interest scales of the Job Interest Test was significantly related with the ACL.

Associated with the Byrne R-S scale are a host of scores reflecting unfavorable traits. Related significantly to R-S are the five 16 P.F. second-order anxiety factors ( $Q_4 +$ ,  $O +$ ,  $L +$ ,  $G -$ , and  $Q_3 -$ ), four at the .01 level, and four of the five second-order introversion-extraversion factors ( $M +$ ,  $A -$ ,  $F -$ ,  $H -$ , not with  $Q_2 +$ ), three at the 1% level. The Byrne R-S and the ACL both show similar relationships (direction and slightly greater magnitude for R-S) with the personality variables of the 16 P.F. As in the case of ACL, the R-S Scale is not associated with the interest scales.

The Graves Design Judgment Test, while primarily an ability measure, bears significant and logically consistent relations to personality traits. Worthy of mention are the associations with the following: Factor M, Introversion (interested in art), and Factor N (sophisticated, polished).

Intercorrelations of the Job Interest Test are discussed in Appendix II.

The 26 x 26 intercorrelation matrix presented in Table III was subjected to a principal-axis factor analytic solution as based upon the work of Hotelling (Harman,

1960, and see Appendix VI). There were two a priori criteria set to determine when to stop factoring. First, since the following Varimax Rotation Program could accommodate but twelve factors and since maximum utilization of computer time was imperative, it was decided to extract a maximum of twelve factors, if criterion two was not reached first. Second, following Harman (1960), the decision was made that after 75% of the total variance was accounted for, any additional factor contributing less than 5% would not be retained, regardless of the number of factors then extracted. As it happened, it was necessary to extract the full twelve factors in order to reach 75% of the total variance. Table IV presents the sums of squares, cumulative percent of total variance accounted for by each succeeding factor, and percent of total variance accounted for by each factor.

As Table IV illustrates, a general factor was not identified from the data. After five factors had been extracted, no succeeding factor accounted for as much as 5% of the total variation. Table V presents the unrotated loadings for factors I-VI, while Table VI illustrates these for factors VII - XII.

The twelve factors identified by the factor analysis were rotated to simple structure employing the Varimax Rotation Program (see Appendix VI). Substantial loadings were found on each factor. Tables VII-X show a



TABLE IV

Sums of Squares, Cumulative Per Cent of Total Variance,  
and Per Cent of Total Variance Accounted for by Each

Factor

<u>Factors</u>	<u>SS</u>	<u>Cumulative %</u>	<u>Individual %</u>
Factor 1	3.745	14.40	14.40
Factor 2	3.198	26.70	12.30
Factor 3	2.126	34.87	8.17
Factor 4	1.824	41.89	7.02
Factor 5	1.456	47.49	5.60
Factor 6	1.246	52.28	4.79
Factor 7	1.236	57.04	4.76
Factor 8	1.129	61.38	4.34
Factor 9	1.003	65.24	3.86
Factor 10	.941	68.86	3.62
Factor 11	.826	72.03	3.17
Factor 12	.791	75.07	3.04

TABLE V

Unrotated Loadings For Factors I - VI						
Test	Factor I	II	III	IV	V	VI
PRT	-.04	-.08	-.07	.04	-.13	.20
ACL	.57	.38	-.23	.13	.06	-.10
Byrne R-S	.78	.04	.21	-.17	.05	.00
Graves	.08	.19	-.28	.40	.48	.32
16 PF: A	-.48	.39	.10	-.35	-.09	-.24
C	-.55	-.32	.06	.06	-.05	-.04
E	.20	.53	-.43	.08	-.20	.09
F	-.54	.19	-.23	.02	-.17	.32
G	-.23	-.36	.44	-.02	.49	.07
H	-.68	.15	-.26	.07	-.04	.07
I	-.04	.34	.18	-.38	.33	.02
L	.53	.30	-.15	.06	.02	.04
M	.29	.42	-.12	.17	.44	-.12
N	.06	.44	-.48	-.08	-.11	.24
O	.13	.11	.23	-.40	.08	.62
Q <sub>1</sub>	-.26	.21	-.10	.18	.57	-.02
Q <sub>2</sub>	.16	-.12	-.17	.30	-.09	-.46
Q <sub>3</sub>	-.62	-.14	-.18	-.06	.32	-.04
Q <sub>4</sub>	.58	.04	.41	-.22	.05	.03

TABLE V (Con't.)

Test	Factor I	II	III	IV	V	VI
JIT: Sv	-.19	.43	.49	.43	-.21	.06
BC	-.21	.70	.25	-.04	-.05	-.06
O	-.22	.53	.44	-.17	-.17	.04
T	.10	-.40	.11	.45	-.16	.46
Od	.19	-.36	.31	.42	-.05	.04
Sc	-.18	.37	.38	.35	.09	-.09
A & E	-.10	.49	.28	.48	.07	.01

TABLE VI

Unrotated Loadings For Factors VII - XII						
Test	VII	VIII	IX	X	XI	XII
PRT	.67	-.24	.47	-.08	.14	.26
ACL	-.08	-.02	.06	.08	.38	.02
Byrne R-S	-.12	-.16	.02	.08	.08	.02
Graves	.12	.14	.08	-.16	-.19	-.05
16 P.F:A	-.21	.04	.00	.13	.05	.22
C	-.10	-.17	.34	-.14	.01	-.33
E	.22	-.04	-.16	.06	.08	-.11
F	-.09	.12	.01	.43	-.03	-.07
G	.02	.01	.10	.33	.06	.18
H	-.14	-.11	-.06	.11	.04	-.30
I	.25	.44	.05	-.26	-.13	-.22
L	-.20	-.22	.38	-.02	-.36	-.01
M	-.05	-.21	-.02	.38	-.20	-.09
N	-.20	.17	-.08	-.15	-.11	.39
O	.25	.08	-.24	.18	.06	-.12
Q <sub>1</sub>	-.16	-.04	-.11	-.32	.43	.01
Q <sub>2</sub>	.52	.18	-.30	.17	.03	-.05
Q <sub>3</sub>	.12	-.16	-.04	.17	-.11	.34
Q <sub>4</sub>	-.06	-.05	.03	.15	.09	-.04
JIT:						
Sv	.02	.23	.07	.03	-.04	.09
BC	-.05	.08	.11	-.05	.18	.16
O	.08	-.33	-.19	-.21	-.13	-.05

TABLE VI(Con't.)

Test	VII	VIII	IX	X	XI	XII
T	-.18	-.22	-.23	-.06	.19	.04
Od	-.16	.40	-.08	-.05	-.20	.15
Sc	.15	-.42	-.31	-.10	-.20	.05
A & E	.02	.17	.30	.19	.16	-.14

TABLE VII

## ROTATED FACTOR LOADINGS FOR FACTORS I - III

Factor I		Factor II		Factor III	
Test	Loading	Test	Loading	Test	Loading
3	.80	26	.83	9	.84
10	-.75	20	.80	7	-.66
19	.69	21	.54	18	.46
8	-.68	8	.25	2	-.41
18	-.59	24	.24	14	-.38
2	.44	18	-.22	24	.31
6	-.43	25	.22	12	-.28
12	.37	22	.19	6	.14
5	-.30	5	.18	22	-.14
24	.22	2	.15	10	-.14
16	-.16	11	.10	17	-.12
15	.13	3	-.10	21	-.11
14	-.13	7	.09	5	.10
13	.13	4	.09	19	.08
4	-.12	13	.06	26	-.08
11	.08	10	.06	16	.07
7	-.06	9	.05	3	-.07
23	.06	19	.05	25	.07
25	-.05	16	.04	23	.05
20	-.04	15	-.03	20	.05
26	-.04	1	.03	4	-.05

TABLE VII (Con't.)

<u>Factor I</u>		<u>Factor II</u>		<u>Factor III</u>	
<u>Test</u>	<u>Loading</u>	<u>Test</u>	<u>Loading</u>	<u>Test</u>	<u>Loading</u>
17	.02	6	-.02	15	.03
21	-.01	12	.01	13	-.03
9	-.01	14	-.01	1	-.01
22	.00	23	.00	11	.01

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TABLE VIII

ROTATED FACTOR LOADINGS FOR FACTORS IV - VI					
Factor IV		Factor V		Factor VI	
Test	Loading	Test	Loading	Test	Loading
23	.82	4	.74	15	.87
11	-.78	5	-.58	11	.30
5	-.33	24	.36	8	.27
21	-.29	21	-.28	12	-.25
24	.26	12	.25	19	.23
22	-.17	23	.23	6	-.23
25	.11	22	-.23	7	.18
3	.09	11	.19	22	.17
13	-.08	13	.15	9	.16
2	.07	8	-.14	24	-.15
15	-.07	16	.14	23	.13
8	.07	10	-.12	3	.11
4	-.07	19	-.12	17	-.11
14	-.07	1	.09	18	-.07
16	-.05	18	-.08	16	-.07
18	-.05	14	.08	5	-.07
12	-.05	25	.07	25	-.05
9	.04	3	-.06	2	-.05
6	.03	17	.05	4	.04
7	-.02	26	.05	10	.04
10	.02	2	-.04	26	-.04
1	.01	20	.04	1	.03
26	-.01	7	.03	14	-.02



Table VIII Con't.

<u>Factor IV</u>		<u>Factor V</u>		<u>Factor VI</u>	
<u>Test</u>	<u>Loading</u>	<u>Test</u>	<u>Loading</u>	<u>Test</u>	<u>Loading</u>
20	.01	15	.02	21	-.02
19	.00	9	-.02	13	.00
17	.00	6	-.02	21	.00

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TABLE IX

## ROTATED FACTOR LOADINGS FOR FACTORS VII - IX

Factor VII		Factor VIII		Factor IX	
Test	Loading	Test	Loading	Test	Loading
17	.88	25	-.82	1	.93
12	-.36	22	-.77	24	-.30
6	-.26	20	-.30	18	.20
14	-.23	21	-.27	13	-.14
22	-.19	2	.22	10	-.12
5	-.18	8	.16	7	.11
7	.18	5	-.15	5	-.10
21	-.17	13	-.12	6	.09
24	.15	24	.12	11	-.08
8	-.14	18	-.10	16	-.08
10	-.13	16	-.09	19	-.08
25	.13	11	-.08	9	.06
15	-.12	14	.07	4	.06
3	-.09	10	-.06	12	.05
2	.09	15	-.06	15	.05
16	-.08	9	.06	26	.05
19	.08	17	.05	3	-.05
23	-.07	3	.04	21	.05
13	.07	7	-.04	17	.04
1	.05	26	-.04	8	-.04
18	.04	23	-.03	20	-.04
11	-.03	4	.03	2	.03
4	-.03	6	.02	23	-.03

Table IX Con't.

<u>Factor VII</u>		<u>Factor VIII</u>		<u>Factor IX</u>	
<u>Test</u>	<u>Loading</u>	<u>Test</u>	<u>Loading</u>	<u>Test</u>	<u>Loading</u>
20	.02	12	-.01	14	-.02
9	-.01	19	.01	25	-.01
26	.01	1	.00	22	.01

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TABLE X

## ROTATED FACTOR LOADINGS FOR FACTORS X - XII

Factor X		Factor XI		Factor XII	
Test	Loading	Test	Loading	Test	Loading
13	.81	16	.85	14	.72
12	.46	2	.31	6	-.57
2	.37	12	-.25	7	.23
24	-.32	21	.24	5	.23
7	.28	24	-.23	21	.22
4	.25	4	.22	10	-.19
3	.24	8	-.15	18	.17
23	-.21	10	.14	2	.17
6	-.20	11	.12	4	.15
26	.18	18	.12	9	-.14
25	.16	9	.10	26	-.13
8	.14	25	.09	8	.11
19	.14	19	-.09	12	.11
11	-.13	20	-.08	24	.08
18	-.12	17	-.08	20	.08
20	-.12	26	.08	19	-.08
10	.10	1	-.07	13	.08
1	-.08	13	.07	23	-.07
9	.08	5	.07	15	.06
22	-.06	15	-.06	1	-.04
17	.05	23	.05	17	-.03
16	.04	3	-.05	3	.02
14	.04	14	.05	16	.02

Table X Con't.

<u>Factor X</u>		<u>Factor XI</u>		<u>Factor XII</u>	
<u>Test</u>	<u>Loading</u>	<u>Test</u>	<u>Loading</u>	<u>Test</u>	<u>Loading</u>
21	.03	7	.04	22	-.02
15	-.02	22	-.02	25	-.01
5	.01	6	.00	11	-.01

---

rank order of the twenty-six variables on each of the twelve factors according to magnitude of rotated factor loadings.

In naming each factor, it was decided to use a loading of .20 as the lower cut-off point for considering a particular variable as of importance. (According to Fruchter, 1954, loadings of .20 or less are usually considered to be insignificant. In addition, the writer feels that the lower limit of .20 is necessary in view of the scarcity of moderate loadings (.3 to .5) on some factors. Fruchter considers loadings of .5 to .7 as high, and those above .7 as being very high.) As each factor is discussed, a table showing rotated loadings above .20 will be presented.

Tables XI - XII present important loadings for each of the twelve factors.

Generally, Factor I is loaded with a host of scores reflecting unfavorable personality traits. Present in this factor are four of the five second-order anxiety scales of the 16 P.F., namely  $Q_4+$ ,  $Q_3-$ , C-, and L+. Weighted heavily in the 16 P.F. anxiety factor is  $Q_4$  (high tension, excitable), a scale which loads highly (.69) with the present factor.  $Q_3-$  is involved in low self-concept integration, C-with emotional instability and low ego strength, while L+ is indicative of paranoid tendencies. So far then, Factor I is loaded with the second-order anxiety factor of the 16 P.F. to a high degree.

TABLE XI

## Factor I, Important Loadings

<u>Test</u>	<u>Name</u>	<u>Loading</u>
3	Byrne R-S Scale	.80
10	Factor H (16 P.F.)	- .75
19	Factor Q <sub>4</sub> (16 P.F.)	.69
8	Factor F (16 P.F.)	-.68
18	Factor Q <sub>3</sub> (16 P.F.)	-.59
2	Adjective Check List (Deviation Score)	.44
6	Factor C (16 P.F.)	-.43
12	Factor L (16 P.F.)	.37
5	Factor A (16 P.F.)	-.30
24	Outdoor (JIT)	.22

Noteworthy also are the loadings for H-, F-, and A-, which are the three factors of importance in the 16 P.F. second-order introversion - extroversion factor (here indicative of introversion). Two of these three scales have particularly high loadings: H =  $-.75$  and F =  $-.68$ . H- is concerned with shy, timid, and withdrawn behavior patterns and with dislike for personal contact occupations. Desurgency (serious, depressed, introspective) characterizes F-, while schizothymic traits (aloof, stiff) go along with A-. Clinically A- and H- are the "two main components in the schizophrenic pattern" (Cattell, 1957).

A self-descriptive measure of deviant responding, the Adjective Check-List loads moderately with the present factor. Deviant responding in this case is associated with self-report psychopathological symptoms.

Endorsement of outdoor jobs has a low loading, but here is worthy of mention since Od shows important loadings on eight of the twelve factors. This interest category is significantly correlated with schizothymic traits (A-) and withdrawal tendencies (H-), the schizophrenic components mentioned above. The individual items deal with jobs which to some extent are solitary in nature, while not in seclusion (e.g. groundskeeper, farmer, forest ranger). In keeping with these correlations



in the relationship of Od to Factor E- (16 P.F.), the submissive, non-competitive personality factor. (See Appendix II for a further discussion.)

The highest factor loading (.80) belongs to the Byrne Repression - Sensitization Scale, sensitization dimension. Sensitizers have relatively - lowered thresholds for emotionally-toned stimuli and characteristically exhibit approach or sensitizing behavior to threatening stimuli. The scale is consistently associated with measures of self-description. It is possible from these factor analytic results to suggest that the R-S scale is measuring something in common with self-report questionnaire psychopathological traits. Byrne (1962) has reported the R-S scale to be related to degree of self-ideal discrepancy. Cattell (1957) has shown that the two second-order factors of the 16 P.F., Anxiety vs. Integration and Introversion (general schizothymia) vs. Extroversion, can account for these discrepancies.

Factor I, then is heavily saturated with anxiety and introversion loadings, and can be viewed in terms of a deficit of general personality strength or as a proclivity toward psychopathology. The label "Emotional Instability" can be offered to name this factor.

Factor II, having loadings from five scales of the Job Interest Test, can be considered an interest factor.

TABLE XII

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Factor II, Important Loadings

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<u>Test</u>	<u>Name</u>	<u>Loading</u>
26	Arts & Entertainment (JIT)	.63
20	Service (JIT)	.60
21	Business Contact (JIT)	.54
8	Factor F (16 P.F.)	.25
24	Outdoor (JIT)	.24
18	Factor Q <sub>3</sub> (16 P.F.)	-.22
25	Science (JIT)	.22

---

The speculations raised in Appendix II with regard to the Sv, A & E, and BC intercorrelations can be discussed in a definitive manner.

Each of these three interest categories provides services which help to fulfill the needs of people. Within the Service category, the job bears a direct relationship to personal need satisfaction of others. Individuals in Business Contact occupations, to a large extent, sell products which provide for the needs and/or comforts of others. It can be suggested that the jobs fulfill a need to be needed and accepted by their holders. This speculation can be strengthened by the observation that those in the arts and entertainment area constantly strive to have their talents wanted, accepted, and appreciated by others. Service job-holders can, by virtue of their work, satisfy the need to be needed. Interest in service - oriented jobs can thereby be maintained. Sales personnel(Business Contact) to function proficiently need others. It is only natural that these workers would develop a desire to have their services needed and appreciated. Logically and factorially a common thread connecting the three job areas would be a need to be needed and accepted.

The contribution of Factor F, Surgency (enthusiastic, talkative) is congruent with the foregoing in that surgency

is conducive to social acceptance; however, the loadings for F, Od, Q<sub>3</sub>, and Sc are low and the writer feels that interpretation of factor II can be adequately supported using that discussed above. The factor can be named a "Need to be Needed."

Factor G of the 16. P.F., the character or super-ego strength scale, loads very heavily on Factor III. Other traits indicative of G + include regard for moral standards, responsibility, and persistence. Consistent with G + is the moderate loading for Q<sub>3</sub>, a scale denoting socially approved character responses, persistence, self-control, and, as with G, conscientiousness. Q<sub>3</sub> is the highest loaded factor in the Integration vs. General Anxiety second-order factor. Although showing a low loading, Factor L-, the relaxed security, accepting variable, is congruent with the foregoing. L + on the other hand is a component in second-order anxiety. Thus far the loadings indicate positive personality characteristics, socially approved behavior patterns, and relative freedom from anxiety.

It is not surprising that the deviant Adjective Check-List should have a negative loading on a factor denoting socially approved behavior. That the test is related to unfavorable traits was shown by its moderate

TABLE XIII

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Factor III, Important Loadings

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<u>Test</u>	<u>Name</u>	<u>Loading</u>
9	Factor G (16 P.F.)	.84
7	Factor E (16 P.F.)	-.66
18	Factor Q <sub>3</sub> (16 P.F.)	.46
2	Adjective Check-List (Deviation Score)	-.41
14	Factor N (16 P.F.)	-.38
24	Outdoor (JIT)	.31
12	Factor L (16 P.F.)	-.28

---

loading (  $+.44$  ) on Factor I, "Emotional Instability." The minus loading in this case represents a tendency to select self-descriptive adjectives which are "popular" in the standardization sample, and thereby to avoid words which were unpopular or self-depreciatory. Here the loading indicates social desirability of response, since the score is consistent with what is considered "popular" or desirable in the standardization group.

Somewhat incongruous is the high negative loading for factor E, the submissive-dependent measure. Since E - is usually present in neurotic profiles, its membership in the present factor is difficult to interpret. From Table III it can be seen that Factor G and E are correlated  $-.44$ , while the 16 P.F. manual reports negative, but low ( $-.05$  and  $-.13$ ) relationships between the scales. It would seem then that here E - could be contributing a dependent attitude toward social approval of character responses and a kindly, soft-hearted approach to interpersonal relations. (L- has also a "soft-hearted" trait description.)

Factor N- which is low in mental illness is a naïveté factor and here is probably contributing a trusting in accepted social values. Present to a low degree is Outdoor (JIT) ( $.31$ ), but it is difficult for the writer to see the association.

It is possible though that the individual who endorses primarily agricultural occupations is simple and unpretentious (N-) and lacks aggressiveness (E-). (See Appendix for discussion of personality factors related to Outdoor interests.)

Obviously, to apply a label to such a factor is difficult, since both positive and negative traits are represented. It can be seen that conventionality and socially approved character responses cut across the factor. Apparently, there is present a dependent attitude toward social approval of behavior; hence, the label "Rigid Social Acquiescence" to name Factor III.

Interpretation of Factor IV is rather clear-cut. A preference for technological jobs, having the highest loading, involves a liking for rough, rugged occupations in which physical strength is usually a necessary requisite. Roe (1956) has reported that within the technological group, masculinity ratings run high, and there is also present an indifference to personal interaction.

In accord is the very high loading for Factor I (eye) the tough, masculine, hard, practical, and realistic personality dimension of the 16 P.F. I individuals like rough occupations and do not show the "fastidious dislike of 'crude' people" (Cattell, 1957, p.15) which characterizes the I-sensitive and effeminate person.

Factor A- adds a lack of interest in social interaction, a preference for jobs involving working with material things, and a hard aggressive, and aloof manner in interpersonal relations.

TABLE XIV

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Factor IV, Important Loadings

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<u>Test</u>	<u>Name</u>	<u>Loading</u>
23	Technological (JIT)	.82
11	Factor I (16 P.F.)	-.78
5	Factor A (16 P.F.)	-.33
21	Business Contact (JIT)	-.29
24	Outdoor (JIT)	.26

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This factor may also be indicative of anti-social tendencies, an interpretation supported by the negative loading of the Business Contact scale, a people-orientated interest category. Having another low loading is Outdoor, an interest scale associated with lack of interest in personal relations.

Because of the close factor analytic relationship between the Technological category and Factor I<sup>-</sup>, and the occupational implications of Factor I, this factor seems to correspond to one named "Harria" by Cattell (1957).

Factor V is quite heterogeneous in composition, including an ability measure, four interest scales, and two personality factors. Highest loaded is the Graves Design Judgment Test, a measure of basic aesthetic principles via judgment of abstract designs.

Factor A - has a high loading, and here denotes a host of schizothymic adjectives: critical, obstructive, aloof, precise, suspicious, and cold.

Negative loadings for Business Contact and Organizational point to a dislike for working with people. Congruent with this and A - are the positive loadings for Outdoor and Technological. Suspicious, self-sufficient, hard, irritable, and tyrannical traits are contributed by Factor L.

TABLE XV

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**Factor V, Important Loadings**

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<u>Test</u>	<u>Name</u>	<u>Loading</u>
4	Design Judgment	.74
5	Factor A (16 P.F.)	-.58
24	Outdoor (JIT)	.36
21	Business Contact (JIT)	-.28
12	Factor L (16 P.F.)	.25
23	Technological (JIT)	.23
22	Organizational (JIT)	-.23

---

It is logical to assume that one must be critical to function well in design judgment. Noticeably the other loadings are anti-social in nature with A- and L contributing to the critical, aloof, and obstructive content of the factor. Because of the composition of the present factor, reasoning can be extended so as to state that the same critical orientation is present in both the evaluation of people and designs. The criticalness toward people probably manifests itself in a censorious manner because of the anti-social loadings on the factor. Factor V then suggests an ill-natures (anti-social) or perverse picking of flaws as well as a generalized disposition to find fault. "Hypercriticalness" best describes Factor V.

Guilt Proneness (timid, insecure) loads highly on Factor VI. Worrying, anxious, depressed, sensitive, tender, easily upset, and moody are further traits associated with Factor C. Present here is a depressive tendency and anxiety. (C is a strong component in the second-order anxiety factor.)

A pattern characteristic of high anxiety is present, high guilt proneness (C +), high frustration of drive (Q4), and poor ego strength (C-). This factor arrangement consistently occurs in many clinical groups.

Factor I (eye) contributes sensitive, dependent,

TABLE XVI

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FACTOR VI.    IMPORTANT LOADINGS

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<u>Test</u>	<u>Name</u>	<u>Loading</u>
15	Factor O (16 P.F.)	.87
11	Factor I (16 P.F.)	.30
8	Factor F (16 P.F.)	.27
12	Factor L (16 P.F.)	-.25
19	Factor Q4 (16 P.F.)	.23
6	Factor C (16 P.F.)	-.23

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and subjective characteristics to the factor. L and F are somewhat disparate with the foregoing but their loadings are low.

The label "Emotional Sensitivity" seems applicable to the present factor.

A very high loading on Factor VII is for Q<sub>2</sub>, the self-sufficient, resourceful personality factor. The Q<sub>2</sub> individual is resolute, does not strive for social approval or conventionality, and tends to be rejected in cohesive groups.

Three other personality factors with low loadings seem to add little else of note. L - denotes relaxed security, G - suggests an obstructiveness in personal relations, while N - represents the "natural man" of Rousseau, (Cattell, 1957).

Basing interpretation largely on Q<sub>2</sub>, as dictated by the loadings, the name "Self-Reliance" but fits Factor VII.

Loaded heavily with negative loadings from four interest scales of the JIT, Factor VIII represents anti-supportive work attitudes and tendencies toward being uncooperative in dealing with others in the occupational setting.

Lower-level jobs in the scientific area are supportive in nature and require cooperative effort

TABLE XVII

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Factor VII. Important Loadings

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<u>Test</u>	<u>Name</u>	<u>Loading</u>
17	Factor Q <sub>2</sub> (16 P. F.)	.38
12	Factor L (16 P.F. )	-.36
6	Factor G (16 P.F.)	-.25
14	Factor N (16 P.F.)	-.23

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TABLE XVIII

## Factor VIII, Important Loadings

<u>Test</u>	<u>Name</u>	<u>Loading</u>
25	Science (JIT)	-.82
22	Organizational (JIT)	-.77
20	Service (JIT)	-.30
21	Business Contact	-.27
2	Adjective Check List (Deviation Score)	.22

on the part of the worker. Organizational occupations, since they are concerned with efficient working and organization of enterprises, obviously involve a great deal of cooperation and mutual effort with co-workers. Both Organizational and Business Contact are highly correlated with sociable traits and a preference for dealing with people, hence the assertion of un-cooperativeness with others. Service to people also has a minus loading.

It is interesting to note that the Adjective Check-List, associated with "Emotional Instability" (Factor I) is related to the present factor.

This factor will be designated "Occupational Obstructionism."

Of all the factor loadings for the twelve factors, the highest loading (.93) belongs to the PRT for Factor IX. On no other factor does this test load more than .09. Because of the low loadings of the other variables on Factor IX, the PRT appears to belong in a class by-itself with regard to specificity of variance.

It is quite enigmatic that a dislike for Outdoor jobs is related, even in a minor way, to this factor.

In view of these results, the label "Delta" seems best.



TABLE XIX

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Factor IX, Important Loadings

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<u>Test</u>	<u>Name</u>	<u>Loading</u>
1	PRT	.93
24	Outdoor (JIT)	-.30

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The introverted, absent-minded, unconventional and self-absorbed factor (M + ) of the 16 P.F. has the highest loading on Factor X. In general, M + refers to internally autonomous thinking. L + here denotes suspicious, withdrawn, self-sufficient, and irritable traits with marked inner tension. Present also is the deviant Adjective Check-List.

Other tests have low loadings. Factor E contributes unconventional, stern, and independent minded characteristics to the present factor. The Graves Design Judgment Test was in Factor V associated with a critical attitude and suggests (as also indicative of M + ) an interest in art. Emotional instability is hinted by the Byrne R-S.

Present here then is unconventionality, autonomy, and, in general, an indifference to, or protest against the conventions of society. "Bohemianism" as a name for this trait constellation is offered.

Contributing heavily to this factor is Q<sub>1</sub> of the 16 P.F. called Radicalism. The other loadings serve to reinforce strongly the characteristics associated with Q<sub>1</sub> and for this reason, factor interpretation can largely be considered in terms of that personality dimension.

TABLE XX

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**Factor X. Important Loadings**

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<u>Test</u>	<u>Name</u>	<u>Loading</u>
13	Factor M (16 P.F.)	.81
12	Factor L (16 P.F.)	.46
2	Adjective Check-List (Deviation Score)	.37
24	Outdoor (JIT)	- .32
7	Factor E (16 P.F.)	.28
4	Graves Design Judgment	.25
3	Byrne R - S	.24
21	Technological (JIT)	-.21

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TABLE XXI

## Factor XI, Important Loadings

<u>Test</u>	<u>Name</u>	<u>Loading</u>
16	Factor Q1 (16 P.F.)	.85
2	Adjective Check List	.31
12	Factor L (16 P.F.)	-.25
21	Business Contact (JIT)	.24
24	Outdoor (JIT)	-.23
4	Graves Design Judgment	.22

Q<sub>1</sub> + persons are experimenting (L - in like manner adds an open, ready-to-take-a-chance orientation), and express interest in leading and persuading people (Business Contact loads on Factor XI and reinforces the presence of this trait). In group discussions, Q<sub>1</sub> persons contribute many critical remarks (the Graves is related to criticalness). That Q<sub>1</sub> persons endorse items dealing with "breaking the crust of custom and tradition" (Cattell, 1957, p. 18.) is logical. In this light, the Adjective Check-List which was loaded negatively on Factor III, social convention, and positively loaded on Factor X, "Bohemianism," is also loaded in a positive manner on this factor.

"Radicalism" best describes these loadings.

The shrewdness, sophisticated, and polished dimension of the 16 P.F. loads highest on Factor XII. Associated also are social alertness and perceptiveness as well as ambitiousness, with possible insecurity.

Factor E (Dominance / Ascendance), Factor A (Warm / Sociable), and a preference for Business Contact occupations have low loadings.

Dissatisfied emotionality (emotional, immature, unstable) contributes to this factor. Were it not for a negative loading from Factor C, the present factor would indicate a positive salesman trait pattern; however, a

TABLE XXII

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**Factor XII, Important Loadings**

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<u>Test</u>	<u>Name</u>	<u>Loading</u>
14	Factor N (16P.F.)	.72
6	Factor C (16 P.F.)	-.57
7	Factor E (16 P.F.)	.23
5	Factor A (16 P.F.)	.23
21	Business Contact (JIT)	.22

---

neurotic fatigue, worrying reaction (C-) is the response to situational stress, and quick adjustment to sudden difficulties is hampered. Here then is an "Insecure Sales Personality."

A summary table of the twelve factors appears in Table XXV with an asterisk beside those factors associated with deviant responding.

Following the lead of Sechrest and Jackson (1961, 1962) a brief study was made of individuals at both extremes of the two deviation measures in an attempt to see if deviation in one direction would have a different meaning than deviation in the other direction (deviantly deviant vs. deviantly non-deviant). For this analysis the 13 subjects scoring highest on the PRT were compared with the 13 scoring lowest and the 13 scoring around the median. It was necessary to use exactly 13 subjects in each of the groups since that number could be selected with fewest tied scores. Table XXIII presents the results of the non-parametric tests (Siegel, 1956).

This analysis showed no significant differences in the rankings for the three groups on the three tests included, since the  $H$  values in each instance fell short of the critical value (Chi-Square) of 5.99 at the .05 level. It is of interest to note, however, that in each case the direction of the differences of the ranks was the same.

TABLE XXIII

Comparisons at High, Middle, and Low Scoring PRT Groups  
on Three Variables Using the Kruskal-Wallis ANOV By Ranks.

<u>Variable (Sum of Ranks)</u>	<u>High</u>	<u>Middle</u>	<u>Low</u>	<u>H</u>
Adjective Check List	235.0	242.0	283.0	.64
Byrne R-S	259.5	218.0	302.5	2.23
Anxiety (16 P.F.)	252.0	220.5	307.5	2.42

Critical Value  $\chi^2$  at .05  
level = 5.99



The same procedure employed for the PRT was followed for the other deviation measure, the Adjective Check-List, with results presented in Table XXIV.

In each of the comparisons the differences between the sums of the ranks reaches significance. It is not surprising that this should be so for the Byrne and Anxiety,\* since the correlation between the former and the ACL is .44, the more deviant responses, the higher the sensitization score. In fact the H values for these two variables are significant at the .005 level of significance.

That a significant difference should exist with regard to the PRT is of interest. The over-all H value indicates that high, middle, and low deviant responders on the Adjective Check-List differ in deviant responses on the PRT. To investigate where the differences were, the Mann-Whitney U Test was employed, and three tests of significance performed. By this analysis the middle group rankings were significantly higher than the low group ( $p < .01$ ), whereas the two other comparisons were not significant. Thus median range deviant responders on the ACL make significantly more deviant responses on the PRT than the low deviant responders on the ACL.

\* The Anxiety Scale is composed of scales which correlate with the ACL.

TABLE XXIV

Comparisons at High, Middle, and Low Scoring ACL Groups  
on Three Variables Using the Kruskal-Wellis ANOV By Ranks

<u>Variable (Sum of Ranks)</u>	<u>High</u>	<u>Middle</u>	<u>Low</u>	<u>H</u>
PRT	248.5	336.0	195.5	6.08*
Byrne R-S	370.5	251.0	158.5	13.50**
Anxiety (16 P.F.)	382.0	215.0	183.0	13.65**

Critical Value  $\chi^2$  at .05  
level = 5.99.  
\*\* Sign. at .005 level.

TABLE XXV

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**Summary Table of Factor Names**

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- I Emotional Instability\*
  - II Need to Be Needed
  - III Rigid Social Acquiescence\*
  - IV Harria
  - V Hypercriticalness
  - VI Emotional Sensitivity
  - VII Self-Reliance
  - VIII Occupational Obstructionism\*
  - IX Delta\*
  - X Bohemianism\*
  - XI Radicalism\*
  - XII Insecure Sales Personality
- 
-

## CHAPTER IV

### THE DISCUSSION

The results reported in Chapter III will be discussed primarily in terms of the following topics relevant to the measurement and interpretation of deviant response tendencies: (1) the generality of deviation; (2) psychometric correlates of deviant response measures; (3) the factors involved in deviant responding; and (4) a study of individuals at the extremes of the deviation measures.

One important assumption of the Deviation Hypothesis is that deviant responses are general; thus those individuals who are deviant in a noncritical area of behavior will be likely to be found deviant in a critical area of behavior. This assumption is quite broad, and one is led to think from the foregoing that a general deviation factor responsible for the relationship between deviations, both critical and noncritical, may be present. If this general factor does exist, it would be logical to assume that deviations in noncritical areas are associated. Also since deviant behaviors in critical areas (e.g., symptoms) are associated and do covary, one can reason that deviant behaviors in noncritical areas should show some correlation. Sechrest

and Jackson (1962) could not find a general factor of deviation in their data since the obtained inter-correlations between deviation measures were "inconsequential."

In the present study, two deviation scores - from the PRT and the ACL - are not significantly correlated (-.04), so there is no support for generality of deviant responding in non-critical areas (test scores). Also, factor analysis here does not substantiate the presence of any general factor in the data. It should be remembered that the generality assumption is being tested employing a within group frame of reference. To-date only one other study (Sachrest and Jackson, 1962) has been concerned with deviant response tendencies within a group. From the present data it is difficult to advance definitive statements regarding generality of deviation in noncritical areas. Here and also with the previous study, one tentative conclusion suggests itself: generality of deviant responses in noncritical areas of behavior has not been clearly demonstrated.

A more specific appraisal of deviation generality could be based upon item properties and content of the indices of deviant responding in noncritical (psychometric) areas of behavior. For example, it could be stated that deviation scores on self-descriptive measures of deviant

responding are associated. This assertion does, of course, impose a restriction on the breadth of the generality assumption, but in light of present evidence would possibly be more accurate.

None of the other 25 measures was related significantly to the PRT. The highest coefficient (PRT vs. Factor A, 16 P.F., - .12) was not significant at the .05 level. Here it is somewhat surprising that a test which allegedly indicates the extent to which an individual, with regard to his PRT responses, resembles a neuropsychiatric population is not associated with personality scales which attempt to measure traits indicative of psychiatric groups. In other words, if the PRT and 16 P.F. scales attempt to predict the same general thing (similarity to psychiatric groups), why are they not correlated?

There are, however, many facets involved in interpretation of the lack of association between the PRT and self-report personality scales. The influence of content must initially be considered in view of the finding that deviation scores on the Adjective Checklist are related to personality variables.

It will be remembered that the PRT is composed of only abstract designs and for this reason does not have the level of content (degree of meaningfulness) present in self-report personality scales. From past

research it is known, of course, that both the PRT and the scales of the 16 P.F. do differentiate normals from psychiatric cases. It seems then that for both tests the ends are the same (differentiation of normals from abnormals), but that the means are not the same because the two measures are not related to each other statistically. Level of content could cause these low and insignificant correlations.

Different definitions of deviation are also involved. The Delta Key is based upon an "absolute" deviation definition. If a person who scores on the extremes of 16 P.F. scales is called deviant, then a "relative" deviation is being followed. In this instance there is a lack of correspondence as to the nature of the deviation criterion.

Lastly, if there is only limited generality of deviation in noncritical (psychometric) areas of behavior, the low correlations might seem logical. Conclusions, however, had best wait until psychometric correlates of the Adjective Check-List are examined.

Table XXVI presents the scales which were significantly correlated with deviation scores on the Adjective Check-List.

It should first be observed that there are eleven variables which are significantly associated

TABLE XXVI

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 Psychometric Correlates of the Adjective Check List
 

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<u>Scale</u>	<u>Name</u>	<u>Correlations</u>
Byrne	Repression - Sensitization	.44
Factor C	Emotionally Unstable *	-.36
Factor L	Paranoid Tendency	.35
Factor E	Dominance/ Ascendance	.34
Factor Q <sub>3</sub>	Low Self-Concept Integration*	- .34
Factor M	Echelian Introversian	.31
Factor G	Lack of Character Strength*	- .25
Factor N	Shrewdness	.24
Factor H	Shy/Timid*	- .20
Factor Q <sub>4</sub>	Tense/Excitable	.19
Factor F	Glum/Serious	.18

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\* Name of negative factor pole given.



with the deviation scores. In general, deviant responding on the Adjective Check-List is associated with scores allegedly reflecting unfavorable personality traits.

The issue of level of content of this second deviation measure now arises. Obviously when compared to the PRT, the ACL has a higher (more meaningful) level of content. In fact the ACL is considered a self-descriptive measure, whereas the scales with which it is associated are considered self-report in nature. Level of content (degree of inherent meaningfulness to the subject) can be considered quite similar or identical for the ACL and its correlates.

A highly analogous question was tested by Lucky and Grigg (1964). These investigators studied the relationship between deviant responding on content (ACL) and contentless (an ESP set) tasks and the Byrne R-S Scale, a measure of the repression-sensitization dimension. Their results which have already been discussed, are substantiated by findings in the present study. Specifically Lucky and Grigg found a correlation of .40 between the Grigg-Thorpe Adjective Check-List and the Byrnes R-S Scale; the correlation between the contentless task of deviant responding and the R-S Scale was low and insignificant, being .069. The respective correlations for the present study are .44 and -.09. These results are comparable in

that both adjective check-lists were based upon essentially the same rationale and construction, as well as taking adjectives from the same pool (Gough, 1955). Both the ESP set and PRT can be considered contentless tasks.

Lucky and Grigg's conclusions will again be quoted because of their relevance and congruence to the present findings: "(1) Deviant responses on a self-description test are related to defensiveness scores: sensitizers are more self-critical than responders; (2) When a task does not involve self-description, defensiveness scores do not appear to be related to deviant responding."

One salient conclusion is strongly suggested by the foregoing: The level of content of a measure of deviant responding is an important factor in the determination of whether or not relationships (correlations) will be expected and found between the deviant response measure and any self-report personality scale.

The significance and implications of the specific scales which were correlated with the ACL will be better seen in the discussion bearing on factor analytic findings.

As to be expected the two measures of deviant responding were quite different with respect to factor analytic findings. Table XXVII presents the important factor loadings of the ACL.

TABLE XXVII

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Important Loadings of the Adjective Check-List

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<u>Factor</u>	<u>Loading</u>
I Emotional Instability	.44
III Rigid Social Acquiescence	-.41
X Bohemianism	.37
XI Radicalism	.31
VIII Occupational Obstructionism	.22

---

These factor loadings demonstrate that the Adjective Check-List as a measure of "deviant" responding is appropriately labeled. The loading (the highest for the ACL) on the "Emotional Instability" factor suggests deviancy in an emotional or psychological sphere. Loadings on "Rigid Social Acquiescence" (negative), "Schemianism", and "Radicalism" seem to point to deviancy in the social psychological realm. Lastly deviancy in the occupational setting is suggested by the loading on "Occupational Obstructionism." In light of these findings, an individual whose deviation score on the ACL is high would probably manifest deviation in several areas of behavior. The ACL thus appears to be an omnibus index of deviation.

The PRT by its singular, significant factor loading (.93 on "Delta") belongs in a class by itself with regard to specificity of variance. The "Delta" factor has only one other loading of consequence, and this is relatively low (the Outdoor interest scale, -.30). A close examination of the factors underlying the Od scale does, however, propose a possible connection which is worthy of consideration. Table III - B, Appendix II presents the factor loadings of the Od scale.

Endorsement of Od items is associated with an individual who desires acceptance ("Need to Be Needed"), and of especial significance for this discussion, is conventional ("Rigid Social Acquiescence," "Bohemianism" (minus), "Radicalism" (minus), while having certain traits not conducive to acceptance ("Hypercriticalness", "Emotional Instability," and possibly "Harris" ). If the factor loadings of the above factors underlying the Od scale are scrutinized, the assertion that Od is associated with conventionality is buttressed. First "Bohemianism" is highly loaded (.81) with Factor M of the 16 P.F. or Bohemian Introverted. The opposite pole of Factor M involves conventional behavior. Second "Radicalism" is highly loaded (.85) with Factor Q<sub>1</sub> of the 16 P.F. or Radicalism. Q<sub>1</sub> - involves conservatism of temperament. For these two factors ("Bohemianism" and "Radicalism"), interpretation was considered largely in terms of the prominent loading. Thus the Od scale may be interpreted as associated with conventionality by virtue of its factor components. The Od scale has a loading of -.30 on the "Delta" factor. Here the direction of the loading is noteworthy, because the opposite pole from conventionality is present. The "Delta" factor apparently involves a small degree of unconventionality.

In this context Sechrest and Jackson found significant relationships between reputational unconventionality (as based upon sociometric ratings) and deviant responding on the PRT, but employing a definition of relative (within group) deviation. Even though their definition of deviation on the PRT was two-tailed in nature, high deviant responders received the greatest number of sociometric nominations for unconventionality.

It is difficult to compare the findings of Sechrest and Jackson with the present "Delta" factor because of the two different definitions of deviation used, but several points can be made. First the PRT is associated with unconventionality defined both psychometrically and by ratings, though the psychometric relationship is somewhat vague and indirect. Second the Outdoor interest scale of the Job Interest Test appears to measure something not tapped by other scales or tests.

One primary conclusion does emerge from this discussion: Relationship can be expected when the deviation scores on the PRT are correlated with Sociometric ratings and social value judgments (as to critical behavioral deviations); relationships between the PRT and psychometric measures are inconsequential, even in

view of the fact that these same psychometric scales (self-report) do allegedly measure or reflect behavior which might be considered deviant or "critical." The conclusion is that degree of meaningful content is the significant factor in the determination of whether or not covariance between a deviation measure and other psychometric scales will be found.

Sechrest and Jackson (1961, 1962) suggested that deviation could be considered a bipolar trait and cited evidence to show that those individuals who were "deviantly non-deviant" were similar in many respects to the high deviant responders. Although no significant differences in rankings (Kruskal-Wallis ANOV) were found when high, middle, and low deviant responders on the PRT were compared on the ACL, Byrne R-S, and 16 P.F. Anxiety, the highest rankings in each instance belonged to the low PRT deviant responders and second highest were the rankings for the high deviant responder group. The three distributions were bi-modal, thus indicating some agreement with past findings.

When the same three categories were utilized for the ACL deviation scores, median deviant responders were significantly higher than low deviant responders. This finding points up the lack of correspondence between independent measures of deviant responding. The other

two significant findings were expected on the basis of the correlations between the ACL and the Byrne R-S Scale and the 16 P.F.

Now, some minor results will be mentioned. The ability to judge abstract designs (Graves Test) was not related to deviant responding; apparently, whether or not an individual selects a deviant alternative is not a function of his art or design judgment ability. Second it is of interest to note that the convict sample made a significantly greater number of deviant responses on the PFI than Barnes' normal sample, but at the same time made significantly fewer deviant responses than the psychiatric group tested by Barnes (1955). As a group this convict sample can be differentiated from a normal non-convict on the basis of the Delta key.



CHAPTER V  
THE SUMMARY

This study was undertaken in an effort to elucidate several issues relevant to the measurement and interpretation of deviant response tendencies. Specifically, the factors involved in deviant responding on the Perceptual Reaction Test (PRT) and on the Deviant Adjective Check-List received the most attention.

One hundred and forty male inmates housed in the Receiving Unit of the Virginia State Penitentiary took the PRT, ACL, Byrne Repression-Sensitization Scale, Graves Design Judgment Test, Sixteen Personality Factor Questionnaire (Form C), and the Job Interest Test, an occupational interest inventory constructed by the writer especially for lower level occupations. These scales were selected to span and sample a wide range of personality and interest domains as well as to include two different measures of deviant responding.

Twenty-six test score variables were intercorrelated, factor analyzed and rotated to simple structure with the aid of the IBM 1620 Computer.

In view of the findings the following conclusions are made:

1. As based upon the measures of deviant responding employed in this study (PRT Delta and ACL), deviant response tendencies in noncritical (psychometric) areas of behavior are not general.

2. Independent measures of deviant responding (PRT Delta and ACL) were not related to each other, and had different psychometric correlates.
3. None of the psychometric variables was significantly correlated with the PRT Delta, while eleven personality variables allegedly reflecting unfavorable personality traits were significantly related with deviation scores on the ACL.
4. In the present study the degree of meaningful content of a measure of deviant responding was an important factor in the determination of whether or not correlations occurred between a deviant response measure and a self-report personality scale. Deviant response measures with meaningful content correlated with personality scales; deviant response measures with meaningless content did not correlate with personality scales.
5. The ACL appears to be a rather omnibus index of deviation, since factor analytically, the scale reflects deviation in an emotional sphere, in the social psychological area, and in the occupational setting.
6. The PRT Delta belongs in a class by itself with regard to specificity of variance, having a singular and extremely high loading on a factor whose membership includes only one other scale, which indicates unconventionality.
7. Initial results with the Job Interest Test, in the form of extremely high reliability and encouraging validity, were found. Further investigations employing this test are warranted.

## APPENDIX I

## THE JOB INTEREST TEST: RATIONALE AND CONSTRUCTION

The Job Interest Test was constructed by the writer to provide an occupational interest inventory for groups with limited educational backgrounds and training. Its rationale is predicated upon the work of Roe (1936) and her two-fold classification of occupations. Specifically Roe has classified occupations according to (1) "primary focus of activity" and (2) level of function (responsibility, skill, and training) required.

Activity Classification by Areas

1. Service -- These jobs concern themselves with "serving and attending to the personal tastes, needs, and welfare of other persons." High scores on Service indicate a preference for helping others. (DOT code 0 - and 2-).
2. Business Contact - - Jobs in this area involve selling and personal persuasion and relationships in which face-to-face rapport must be established. Interest here is in personal relations of an exploitative nature rather than just routine selling. (DOT code 2).
3. Organizational - - These jobs are concerned with the "organization and efficient functioning of commercial enterprises and of govern-

ment activities" and are usually those jobs generally referred to as "white collar."

(DOT code 0-4 through 0-9 and 1-0 through 1-9).

4. Technology -- Jobs in this area are involved with repair, maintenance, construction, production, and transportation of goods, commodities, and utilities. (DOT codes 4, 5, 6, 7, 8, 9 ).
5. Outdoor -- Occupations within this group involve outside activities such as farming, preservation of natural resources, and animal husbandry. (all DOT code 3-).
6. Science -- These jobs are "concerned with scientific theory and its application under specified circumstances other than technology. Lower level jobs are all supportive in nature." (DOT code 0-).
7. Arts and Entertainment -- This area embraces occupations which involve the use of artistic skills and creativity or entertainment and amusement of others. (DOT 0-0 through 0-6, labeled "amusement and recreation").

The seven occupational groupings above are those included in the JIT. Roe feels that each area has

its own "focus of activity" which is strongly related to interest patterns. Another interest area, General Cultural, has been described by Roe, but there are too few lower level jobs in this area to justify a JIT scale. An interest classification such as the one above does not take into account the level of functioning required to perform the necessary job activities. For this purpose a level of function classification has been provided by Roe. Her system defines six levels ranging from level one, graduate and/or professional school required, through level six, unskilled labor. For the JIT the following three levels were employed.

Level Three - - Semi-professional and small business. Specific criteria: "(1) low level of responsibility for others; (2) application of policy, or determination for self only; (3) education, high school plus technical school or equivalent."

Level Four -- The traditional skilled occupations requiring special apprenticeship and/or experience.

Level Five -- The traditional semi-skilled occupations requiring much less experience and training than level four.

Jobs in level six were not included, since for them "group differentiation depends primarily upon the occupational setting."

Selection of Items -- In the JIT each of the seven occupational interest areas is represented by fourteen occupational titles, a total of 98 titles. Roe has listed a number of jobs according to interests and levels. On those 98 titles, 77 (approx. 80%) were taken directly from Roe. It was necessary for the writer to add 21 additional titles either because Roe's lists of jobs were not extensive enough or to provide a breadth of jobs to span the interest areas. Each of the 21 added jobs met at least two of the following three criteria: (1) Judgment by the writer and two Ph.D. psychologists that the job fitted Roe's definition of the interest area; (2) Listing in the Dictionary of Occupational Titles (II, 1949) in the appropriate area specified by Roe for each interest category; (3) Classification by Kuder (1960) as to interest area. Roe lists Kuder categories analogous to her own.

Within each of the seven occupational interest areas, the 14 jobs are divided approximately equally with regard to level of functioning.

Plan of the JII -- The format of the JII is similar to that used by Thurstone (1948) and consists of three pages of legal size. Pages two and three are divided into seven rows and seven columns. In each of the 49 boxes on these two pages there are a pair of occupations. Following Thurstone, "The pairs of occupations are so

arranged that the first items in any column represent the same field. Similarly, the second item in any row represent the same field" (1948, p. 3). In this way each field is compared twice on each page with every other field.

The subject indicates his preference for each pair of occupations by encircling the number opposite the preferred occupation. If both occupations are liked, both numbers may be circled. Similarly, if both occupations are disliked, each may be crossed out. Page one of the JII gives complete directions and four sample items.

An attempt has been made by the writer to match the occupations according to level of functioning. In this manner, social desirability is at a minimum. In addition, each occupation is paired with a different field on the second page from that on the first page, thus yielding a broad range of comparisons.

Scoring of the JII -- The test gives seven interest scores, one for each job area, ranging from 0 to 28. Since each field is compared with all other fields four times, the seven scores are directly comparable. To score for Business Contact, for example, count all circled numbers (one's) in column BC1 and all circled numbers (two's) in row BC2 for each of the last two pages. This score represents the extent or strength

of the subject's interests in the Business Contact area.

Most subjects complete the JIT within ten minutes, and scoring takes one or two minutes. No special key or stencil is needed.



## APPENDIX II

## THE JOB INTEREST TEST: TECHNICAL INFORMATION

RELIABILITY

Since most subjects complete the JIT in less than ten minutes, reliability becomes an important consideration. Split-half reliabilities for the inmate sample (  $N = 140$  ) are presented in Table I-B.

The corrected reliabilities are quite high despite the brevity of the scale. From a reliability standpoint, the scales can be employed in individual prediction. Five of the seven scales are .90 or above.

Table II-B shows the product-moment intercorrelations of the seven scales.

The intercorrelations are clearly a function of the vocational interests of the group under study, and generally should be expected to change with group composition. In Table II-B, it can be seen that moderate correlations are found between scales whose occupations involve contact with people (Business contact vs. Organizational,  $r = .48$ ; Business Contact vs. Service,  $r = .42$ ; Service vs. Organizational,  $r = .31$ ). Also science jobs within the Science category are generally supportive in nature, the correlation of .45 between Science and Organizational is logical; these scales in broad terms are concerned with cooperation to achieve a goal, be that goal smooth operation of an organization or joint action to attain a scientific end.

TABLE I - B

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<u>Scale</u>	<u>Uncorrected</u>	<u>Corrected</u>
Service (Sv)	.86	.93
Business Contact (BC)	.81	.89
Organizational (O)	.82	.90
Technological (T)	.89	.94
Outdoor (Od)	.91	.95
Scientific (Sc)	.77	.87
Arts & Entertainment (A & E)	.90	.95

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TABLE II - B

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Correlations Between the Seven Interest Scales

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Sv	BC	O	T	Od	Sc	A & E
Sv	.42	.31	.01	.16	.38	.55
BC		.48	-.26	-.16	.20	.35
O			-.14	-.23	.45	.19
T				.30	.04	-.02
Od					-.01	.02
Sc						.24

---

Service, Business Contact, and Arts & Entertainment are related, in that jobs in these areas provide services which fulfill the needs of people; yet these jobs fulfill a need to be needed by their holders. Individuals in the Service area can satisfy this need directly; interest in service-oriented jobs can thereby be maintained. Those in the arts and entertainment area want their talents appreciated and accepted by others. It is possible that these people need acceptance in order to satisfy their own narcissistic needs. Business Contact workers must be needed by others to function proficiently in their jobs. The following correlations lend some support to these deductions: Service vs. Arts & Entertainment,  $r = .55$ ; Business Contact vs. Arts & Entertainment,  $r = .35$ ; Service vs. Business Contact,  $r = .42$ . Factor-analytic findings (Chapter III, Factor II) support these observations.

The abbreviations used in Table I-B will be employed in the discussions of the Job Interest Test.

## Relationship of the Interest Scales with Personality Factors

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From the intercorrelation matrix, certain significant correlations between the interest scales of the JIF and the 16 P.F. were noted. These relationships are quite consistent with what would be expected on logical grounds when Roe's definition of each interest category is thought of in terms of the personality traits commonly regarded as characteristic of the occupational grouping.

- I. Service to people - no significant correlations.
- II. Business Contact - It was encouraging to note a correlation of .42 ( $p < .01$ ) with factor A. Those who endorse these business contact items tend to be warm, sociable, and attentive to people. Previous studies reported in the 16 P.F. Handbook have demonstrated that high A scores are closely related to salesmanship.

The aggressive - competitive personality factor (factor E) was also related ( $r = .17, p < .05$ ).

Shrewdness, alertness to the social reactions of others; and calculated mental activity (factor N) were associated ( $r = .18, p < .05$ ) with endorsement of these persuasive items.

Radicalism (factor  $Q_1$ ), probably manifesting itself in leading and persuading people (Cattell, 1937)

is also significantly related ( $r = .17, p < .05$ ).

A correlation of .22 ( $p < .01$ ) with factor I (sensitive, effeminate) was found. High I scores indicate a dislike for rough occupations and a tendency to act on sensitive intuition.

III. Organizational - Occupational studies have shown that high scores on factor O of the 16 P.F. occur in senior clerks, a job which, by definition, is organizational in nature. That this personality factor is related to the present category ( $r = .21, p < .02$ ) is borne out in this study. The high O person manifests a strong sense of duty, an attribute of especial necessity for organizational - type functioning.

Factor A was related to the organizational category ( $r = .31, p < .01$ ). The following traits are associated with A, all of which seem necessary for organizational functioning: ready to cooperate, trustful, attentive to people, and a willingness "to 'go along' with expediency" (Cattell, et al., 1957, p.11)

The sensitive - effeminate factor (I) was associated significantly ( $r = .17, p < .05$ ). Present are a dislike of "crude" people and rough occupations, as well as dependent tendencies.

IV. Technological - Two factors related in a positive way to O and BC showed strong negative relationships to

technological interest. Factor A ( $\bar{x} = -.33, p < .01$ ) here is characteristic of the hard, precise, cold, and rigid person who does prefer working with things rather than people. Occupational studies have placed electricians as a group lowest in factor A.

The correlation between the Technological category and factor I ( $\bar{x} = -.38, p < .01$ ) was expected. I- represents hard, masculine, tough, and practical traits. These people do not dislike rough occupations and are generally aggressive. Occupationally, mechanics and electricians score at the extreme (I-) of this factor.

V. Outdoor - Factor A, as in Technological, correlated negatively ( $\bar{x} = -.22, p < .01$ ) with this category. A- is indicative of dislike of jobs in which dealing with people is necessary, and characteristic of an aloof, cool, and rigid personality.

Statements made with regard to factor A are borne out by the relationship between Outdoor and factor H ( $\bar{x} = -.22, p < .01$ ). H- which may be described clinically as "a syndrome of quiet withdrawal" (Cattell, et.al., 1957 p.14) shows itself in an aloof, cold, and self-contained personality. Since many included outdoor occupations are agricultural in nature it is not surprising that the H - person is "not able to keep in contact with all that is going on around him" (p.14), and prefers a few close

friendships to many. Present also is a restriction of interests.

Other personality factors were also related to this category. Factor E ( $r = -.21, p < .02$ ), submission-dependent, or non-aggressive non-competitive personality factors seem to fit in with the A - and H - patterns. Factors N and Q3 both were related to a lesser extent ( $r = -.17, p < .05$ ), with N- manifesting itself in unpretensions naive' socially clumsy, simple tastes, etc. Low Q3 has reference to poor self-concept integration.

VI. Science - A liking for supportive scientific occupations is associated ( $r = .18, p < .05$ ) with the absent-minded, introverted factor (M). M + individuals are unconventional, interested in theory, and irresponsible on practical matters.

VII. Arts and Entertainment - no significant correlations.

These sixteen significant correlations are offered as indices of construct validity. Each relationship between interest category and personality trait is logical, fitting both general and empirical knowledge. The correlations, while significant, are moderate, but not too high, and in each case help to illuminate the nature of the particular interest scale under consideration.



### Relationship of the Present Results with Past Studies

Roe (1956) has reported a number of studies with her occupational groupings. There is a close agreement between these and findings with the JIT.

Business Contact - Roe stated that the dominant interest of this group was in personal relations, but of an exploitative nature. Dominance scores on tests are usually quite high. BC correlated .42 with factor A of the 16 P.F., the scale involving warm, sociable dealings with people or the "social scale." There was also a significant correlation with dominance (factor E). Radicalism (Q<sub>1</sub>), probably manifesting itself in leading and persuading people, was also significantly related. Factor analytically BC was loaded on "Radicalism," while negative loadings on "Hypercriticalness" and "Occupational Obstructionism" emphasize the sociability-orientation of this scale.

Technological - In this group, masculinity ratings have characteristically run quite high, while "social ability is rarely of importance" (p.197). The T scale correlated -.33 with factor A of the 16 P.F. and -.38 with factor I (eye), representing hard and tough masculine traits. Definitive results were found factor analytically. This scale loaded .82 on "Harris" the hard-core masculinity factor. Factor A of the 16 P.F. has a negative loading on "Harris" and "Hypercriticalness" on which T is positively loaded.

Organizational - According to MORS ratings social ability is important in this occupational category. Factor A of the 16 P.F. was significantly correlated with the O scale.

Factor Analytic Findings With the Interest Scales

Service - This scale showed a very high loading (.80) on Factor II, "Need to Be Needed." It is offered that Service jobs holders can, by virtue of their work of a succorant and nurturant nature, satisfy their need to be needed. Present also is the negative loading (-30) on "Occupational Obstructionism." The orientation here is toward acceptance and cooperation. Business Contact - As with Service the highest loading (.54) was on Factor II. Sales personnel would logically have a desire to have their goods and services needed and appreciated. Five low loadings were found: with "Harrisa" the tough, rugged, masculinity factor (IV) (-29); with Factor V, "Hypercriticalness", another negative loading (-28); and with "Occupational Obstructionism" a loading of -.27. The negative loading on Factor IV is probably due to the fact that "Harrisa" was characterized by an indifference to personal interaction. The membership of BC (negatively) in Factors V and VIII points up the sociability-orientation of the BC scale. The low loading on "Radicalism" (XI) shows itself in leading and persuading others. BC also loads on "Insecure Sales Personality," Factor XII, (.22).

Organizational - This scale showed a very high negative loading (-.77) on "Occupational Obstructionism." Since organizational occupations are concerned with efficient functioning and organization of enterprises, the factor

analytic findings strongly support the definition of the scale. Negatively loaded on "Hypercriticalness" is the O scale ( -.23).

Technological - A great deal of the variance of this scale can be accounted for by Factor IV, "Harria." This factor denotes hard-core masculinity with an indifference to personal interaction. Technological jobs are "tough" jobs and membership of the T scale in such a factor is to be expected. Further evidence on the anti-sociability nature of this scale is witnessed by its loading on "Hypercriticalness" (.23). Concern for the practical and concrete is suggested by the loading (-.21) on Factor X, "Bohemianism."

Science - The SC scale has the strongest negative of any test on the "Occupational Obstructionism" factor. Lower-level jobs in the scientific area are supportive in nature and require cooperative effort on the part of the worker. The high negative loading agrees with the cooperation necessary for these jobs. There is also a low loading (.22) on Factor II.

Arts & Entertainment - This scale loads highly (.83) on "Need to Be Needed." Discussion of this finding is found in the Results section.

Outdoor - Of the twelve factors extracted, eight had loadings of note from the Od scale. Table III-B presents a summary of the factor analytic findings with regard to this interest category.

TABLE III - B

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**Factor Loadings of the Outdoor Interest Scale**

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<u>Factor</u>	<u>Loading</u>
V    Hypercriticalness	.36
X    Bohemianism	-.32
III  Rigid Social Acquiescence	.31
IX   Delta	-.30
IV   Harria	.26
II   Need to Be Needed	.24
XI   Radicalism	-.23
I    Emotional Instability	.21

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From the factor membership of Od, it is difficult to analyze this scale so as to yield definitive results. There is the possibility that endorsement of Od items is associated with an individual who desires social acceptance (Factor II) and is conventional (Factor III, Factor X -, Factor XI-, and possibly IX-), while having certain traits not conducive to acceptance (Factor V, Factor I, and possibly IV).

It is of interest to note that Od is loaded on five of the six factors involved in deviant responding.

In summary, these factor analytic findings serve to increase the construct validity of the interest scales, since in each instance the factor analytic findings are logically consistent.

## APPENDIX III

## THE JOB INTEREST TEST: A VALIDATION STUDY

Since preliminary work with the test (Robinson, 1964) indicated promising results in the form of extremely high reliability and convincing construct validity, it was decided to validate several of the individual scales by giving the test to five groups of workers whose jobs are included in the JIT, specifically auto salesmen (Business Contact), mechanics (Technological) embalmers (Science), mail clerks (Organizational), and barber school students (Service). It was reasoned that each group of workers should score higher on its respective JIT scale (i.e. Auto Salesmen on Business Contact) than any of the six other scales. Also each group of workers should score higher on its respective JIT scale than should the other four groups in the study on that scale (i.e.) Auto Salesmen on Business Contact higher than mechanics, clerks, etc. on Business Contact). In the former analysis, results were analyzed using a single classification analysis of variance, repeated measures design, while a single classification analysis of variance design was employed for the later comparisons (Winer, 1962).

## RESULTS

AUTO SALESMEN

This group consists of 21 full-time new and used car salesmen from seven dealerships, representing all American cars and a few foreign models. Since the test was taken under anonymous conditions, specific sample descriptive information is scant, other than to say that each subject was not new to automobile sales and that the estimated average age of the sample would run around 30 years of age. Table I - C presents the means and standard deviations from the seven scales, while in Table II-C is the analysis of variance (repeated measures).

From Table II - C, it can be seen that there are significant differences between the seven scales for auto salesmen, since the obtained F ratio is significant for beyond the .01 level (actually far beyond the .001 level).

In order to see where the differences between means were, and most important, to see if the mean for Business Contact was significantly higher than the six other scales, the Duncan procedure for testing differences between ordered means (Duncan, 1955, and Winer, 1962) was employed. Table III - C presents the ordered differences and the critical values at the .05 and .01 levels.

It can be seen from Table III- C that the Business Contact mean is significantly higher ( $p < .01$ ) than the



Table I-C

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Means and Standard Deviations on the Job Interest Test for  
Auto Salesmen (N = 21)

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<u>Scale</u>	<u>Mean</u>	<u>Standard Deviation</u>
Service	7.00	4.72
Business Contact*	14.52	5.42
Organizational	10.00	6.59
Technological	8.86	5.89
Outdoor	9.95	6.41
Science	4.81	3.61
Arts and Entertainment	10.14	6.26

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Table II - C

Single Classification Analysis of Variance (Repeated-Measures)  
 Between the Scales of the Job Interest Test for Auto Salesmen  
 N = 21)

Source	S.S.	d.f.	M.S.	F.
Between People	1943.19	20		
Within People	3881.14	126		
Treatment	1145.76	6	190.96	8.38**
Interaction	2735.38	120	22.79	

F.99 = 2.96

Table III-C

The Duncan Procedure for Testing Differences Between  
Ordered Means on the Job Interest Test for Auto Salesmen  
(N = 21)

Ordered Means	(SC (1))	Sv (2)	T (3)	Od (4)	O (5)	AE (6)	BC (7)
	4.81	7.00	8.86	9.95	10.00	10.14	14.52
Critical Values (5%):		2.89	3.04	3.15	3.22	3.28	3.32
(1%):		3.79	3.96	4.06	4.15	4.21	4.26
Ordered Differences		(2)	(3)	(4)	(5)	(6)	(7)
(1)		2.82	4.68**	5.77**	5.82**	5.96**	10.34**
(2)		-	1.86	2.95	3.00	3.14	7.52**
(3)			-	-	-	-	5.66**
(4)				-	-	-	4.57**
(5)					-	-	4.52**
(6)						-	4.38**

\* Sig. at .05 level

\*\* Sig. at .01 level

six other means. All other means, with the exception of Service, are higher ( $p < .01$ ) than Science.

Table IV-C presents the results of the analysis of variance which compared the five groups on their respective Business Contact means.

Since the obtained  $F$  was significant (actually beyond the .001 level) the Duncan procedure was applied to the means. These data appear in Table V - C.

That the Salesmen are significantly higher on the Business Contact Scale ( $p < .01$ ) than all other groups is illustrated in Table V-C. These analyses show that the BC Scale is capable of differentiating between occupational groups in addition to making significant discriminations within the sales group itself.

#### MECHANICS

Included in this sample are 17 full-time mechanics and part-time instructors at the Virginia Mechanics Institute. Although little information is available with regard to sample composition, it appears quite logical to assume that the present group is high in technological interests, since these men both work and teach in their area. Table IV-C presents the means and standard deviations on the JIT, whereas the analysis of variance of these data appear in Table VII-C.

Table IV-C

Single Classification Analysis of Variance for the Five Occupational Groups on the Business Contact Scale

Source	S.S.	d.f.	M.S.	F.
Scales	1041.7	4	260.42	7.92**
Error	3093.0	94	32.90	

F.99 = 3.40

Table V-C

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The Duncan Procedure for Testing the Differences Between  
Ordered Means on the Business Contact Scale

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	Mechanics	Barbers	Emb.	Clerks	Sales
Ordered Means:	(1) 5.18	(2) 6.55	(3) 7.80	(4) 9.31	(5) 14.52
Critical Values (5%):		3.58	3.76	3.90	3.99
(1%):		4.75	4.94	5.09	5.20
Ordered Differences:		(2)	(3)	(4)	(5)
(1)		-	2.62	4.13*	9.34**
(2)			-	2.76	7.97**
(3)				-	6.72**
(4)					5.21**

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Table VI-C

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Means and Standard Deviations on the Job Interest Test for  
Mechanics (N = 17)

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<u>Scale</u>	<u>Mean</u>	<u>Standard Deviation</u>
Service	6.94	5.32
Business Contact	5.18	5.72
Organizational	7.76	5.38
Technological*	16.76	6.98
Outdoor	11.94	7.49
Science	8.82	6.19
Arts & Entertainment	5.76	5.42

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Table VII-C

Single Classification Analysis of Variance (Repeated-Measures)  
 Between Scales of the Job Interest Test for Auto Mechanics  
 N = 17)

Source	S.S.	d.f.	M.S.	F.
Between People	1772.63	16		
Within People	4416.29	102		
Treatment	1696.92	6	282.82	9.98**
Interaction	2719.37	96	28.33	

F.99 = 2.99



That the seven scales differ is illustrated by the significant F value (beyond the .001 level).

Table VIII - C presents the Duncan procedure.

For mechanics the Technological mean is significantly higher than all other means, five of which at the .01 level of significance. The Outdoor scale is higher than the lowest four means. Table IX-C presents the analysis of variance on the Technological scale for the five occupational groups, and Table X, the analysis of differences between means.

It can be seen from Table X-C that the Mechanics score is significantly higher than all groups except the mail clerks on the Technological scale. The Technological scale then has good discrimination power in view of the magnitude and number of significant differences found.

#### EMBALMERS

Although the present sample includes 25 men actively engaged in embalming, 35 embalmers were tested in all. It was necessary to delete from the sample those ten, who for some years had worked exclusively as funeral directors. That initial interest in the occupation gets its impetus from scientific interest (apprentice embalmers are especially high on Scientific) and that, once in the occupation, interests migrate to

Table VIII-C

The Duncan Procedure for Testing Differences Between Ordered Means on the Job Interest Test for Mechanics (N = 17)

Ordered Means:	BC (1)	AE (2)	Sv (3)	O (4)	SC (5)	Od (6)	T (7)
	5.18	5.76	6.94	7.76	8.82	11.94	16.76
Critical Values (5%):	3.61	3.81	3.94	4.03	4.11	4.16	
(1%):	4.79	4.98	5.14	5.24	5.31	5.38	
Ordered Differences:		(2)	(3)	(4)	(5)	(6)	(7)
	(1)				3.64	6.76**	11.58**
	(2)					6.18**	11.00**
	(3)					5.00*	9.82**
	(4)					4.18*	9.00**
	(5)					3.12	7.94**
	(6)						4.82*

Table IX-C

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Single Classification Analysis of Variance for the Five  
Occupational Groups on the Technological Scale

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Source	S.S.	d.f.	M.S.	F.
Scales	658.7	4	164.68	3.99**
Error	3871.9	94	41.19	

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F.99 = 3.40

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Table X-C

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The Duncan Procedure for Testing the Differences Between  
Ordered Means on the Technological Scale

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Ordered Means:	Sales (1)	Emb. (2)	Barbers (3)	Clerks (4)	Mechanics (5)
	8.86	10.60	11.10	12.69	16.76
Critical Values	(5%):	4.03	4.25	4.39	4.49
	(1%):	5.34	5.56	5.73	5.85
		(2)	(3)	(4)	(5)
Ordered Differences:	(1)			3.86	7.90**
	(2)				6.16**
	(3)				5.66*
	(4)				4.07

---

the general business area were strongly suggested by the data. The present sample, gathered from all Richmond funeral homes except one, include 25 men in whose duties embalming demands the majority of the working day. Table XI-C presents the means and standard deviations for this group and in Table XII-C is shown the analysis of variance of embalmer interests.

Since the analysis pointed up significant differences between the scales (actually beyond the .001 level) the Duncan was performed and appears in Table XIII-C.

Table XIII-C shows that for embalmers, the Science scale is significantly higher than all other interest scales, four of the comparisons being above the .01 level. The analysis of variance for each group on the Science scale and the Duncan Analysis appear in Tables XIV-C and XV-C respectively.

Table XV-C points out that Embalmers score higher than the other occupational groups tested on the Science scale. The Science scale then can differentiate between occupations and also within a scientific group (embalmers).

#### MAIL CLERKS

Present in this group were 16 general mail clerks at the Main Post Office in Richmond. The test was taken on a voluntary basis after working hours. Unfortunately, the present sample is contaminated by a few extra, Christmas mail clerks. In spite of the experimenter's efforts to

Table XI-C

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Means and Standard Deviations on the Job Interest Test for  
Embalmers N = 25)

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<u>Scale</u>	<u>Mean</u>	<u>Standard Deviation</u>
Service	8.08	4.57
Business Contact	7.80	6.00
Organization	9.92	5.80
Technological	10.60	5.93
Outdoor	10.16	5.19
Science*	13.84	6.27
Arts and Entertainment	8.48	6.17

---

Table XII-C

Single Classification Analysis of Variance (Repeated-Measures)  
 Between Scales of the Job Interest Test for Embalmers (N = 25)

Source	S.S.	d.f.	M.S.	F.
Between People	2457.52	24		
Within People	3934.00	150		
Treatment	644.88	6	107.48	4.71**
Interaction	3289.12	144	22.84	

F.99 = 2.92

Table XIII-C

The Duncan Procedure for Testing Differences Between  
Ordered Means on the Job Interest Test for Embalmers (N =25)

	BC	SV	AE	O	OD	T	SC
Ordered Means:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	7.80	8.08	8.48	9.92	10.16	10.60	13.84
Critical Values (5%):		2.64	2.79	2.89	2.95	3.01	3.05
(1%):		3.48	3.63	3.73	3.80	3.86	3.91
Ordered Differences:		(2)	(3)	(4)	(5)	(6)	(7)
	(1)					2.80	6.04**
	(2)						5.76**
	(3)						5.36**
	(4)						3.92**
	(5)						3.68*
	(6)						3.24*



Table XIV-C

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Single Classification Analysis of Variance for the Five Occupational Groups on the Science Scale

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Source	S.S.	d.f.	M.S.	F.
Scales	947.9	4	236.98	6.24**
Error	3568.6	94	37.96	

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F.99 = 3.40

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Table XV-C

The Duncan Procedure for testing the Differences Between  
Ordered Means on the Science Scale

Ordered Means:	Sales (1)	Clerks (2)	Mechanics (3)	Barbers (4)	EMB. (5)
	4.81	8.75	8.82	9.15	13.84
Critical Values(5%):		3.86	4.07	4.21	4.30
(1%):		5.12	5.33	5.49	5.60
Ordered Differences:		(2)	(3)	(4)	(5)
(1)			4.01	4.34*	9.03**
(2)				.40	5.09*
(3)					5.02*
(4)					4.69*

avoid this type of contamination, a weeding out of these three or so tests was impossible since the test was taken on an anonymous basis and since the experimenter had no direct control over the sample. Table XVI-C is the analysis of variance (repeated measures).

Since the F ratio is significant (actually at the .025 level), the Duncan analysis was performed and appears in Table XVIII-C.

For the Mail Clerk sample, the Organizational mean is significantly higher than four of the six other means, but does not differ significantly from the Outdoor and Technological scales. Table XIX-C continues the analysis by comparing the five occupational groups on the Organizational scale.

Since the obtained F value fails to exceed the critical value at the .05 level, it is concluded that, by this analysis, the occupational groups cannot be differentiated on the basis of the Organizational scale alone. In view of these results, it was decided to ascertain if clerks could be differentiated from other occupational groups in general on the Organizational scale. Therefore the four other worker groups were combined to form one large sample of "non-clerks" or a general group. The assumption of homogeneity of

Table XVI-C

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Means and Standard Deviations on the Job Interest Test for  
Mail Clerks (N = 16)

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<u>Scale</u>	<u>Mean</u>	<u>Standard Deviation</u>
Service	8.81	6.02
Business Contact	9.31	5.67
Organizational*	13.69	6.59
Technological	12.69	6.39
Outdoor	10.31	7.50
Science	8.75	6.31
Arts and Entertainment	9.38	5.16

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Table XVII -C

Single Classification Analysis of Variance (Repeated Measures) Between Scales of the Job Interest Test for Mail Clerks (N = 16)

Source	S.S.	d.f.	M.S.	F.
Between People	2248.1	15		
Within People	2533.2	96		
Treatment	376.4	6	62.73	2.62*
Interaction	2156.8	90	23.96	

F.95 = 2.21



Table XIX-C

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Single Classification Analysis of Variance for the Five Occupational Groups on the Organizational Scale

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Source	S.S.	d.f.	M.S.	F.
Scales	305.8	4	76.45	2.04
Error	3518.2	94	37.40	

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F.95 = 2.49

---

of variance was met, and the obtained t-ratio of 2.36 was significant at beyond the .01 level (one tailed-test). This, of course, is a less stringent analysis than the foregoing, but it still establishes the Organizational scale as a discriminator, thus giving validity to the test.

#### BARBERS

Twenty students at the Richmond Barber College were administered the JIT. The sample consists largely of young men who were in their final phase of the six-month training program. Average age would be less than 20 years. Table XX-C presents the means and standard deviations, while the analysis of variance appears in Table XXI-C.

Although the F value in Table XXI-C is significant ( $p < .05$ ), the Duncan analysis, which will not be shown, revealed only one relevant fact: the Service mean differed only from Business Contact ( $p < .01$  and not from any other means. Table XXII-C illustrates the analysis of variance for the five groups on the Service scale.

Since the over-all F ratio did not exceed the critical value for the .05 level, an analysis similar to the one performed for Clerks was done. When service workers were compared with the general group, the former



Table XX-C

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Means and Standard Deviations on the Job Interest Test for  
Barbers (N = 20)

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<u>Scale</u>	<u>Mean</u>	<u>Standard Deviation</u>
Service*	11.15	4.29
Business Contact	6.55	5.04
Organizational	9.55	5.36
Technological	11.10	6.26
Outdoor	9.43	4.49
Science	9.13	7.04
Arts & Entertainment	9.85	5.49

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Table XXI-C

Single Classification Analysis of Variance (Repeated Measures)  
 Between Scales of the Job Interest Test for Barbers (N = 20)

Source	S.S.	d.f.	M.S.	F.
Between People	1867.31	19		
Within People	2650.43	120		
Treatment	284.44	6	47.41	2.28*
Interaction	2365.99	114	20.75	

F.95 = 2.18

Table XXII-C

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Single Classification Analysis of Variance for the Five Occupational Groups on the Service Scale.

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Source	S.S.	d.f.	M.S.	F.
Scales	234.0	4	58.50	2.27
Error	2417.6	94	25.72	

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F.95 = 2.49

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was significantly higher in mean value ( $p < .01$ ,  $t = 2.99$ ). The Service scale then also shows discriminatory power.

### CONCLUSIONS

In view of the stringent validation criteria, the present study represents a successful attempt to demonstrate differential validity for the scales of the Job Interest Test. That interest patterns in middle and lower level occupations are not pronounced as a result of less intrinsic liking for the occupations (Anastasi, 1961) would normally encumber validation to a great extent. For the five scales here examined, these difficulties seem to have been overcome.

The Business Contact Scale differentiated all five of the occupational groups and also within the sales group, at or better than 1% level of significance. The Technological Scale, with one exception (Mechanics vs. Clerks,  $p < .10$ ) was able to discriminate in the same manner at at least the 5% level, with most of the comparisons falling beyond the 1% level of significance. The Science scale met every test, showing differentiation within the embalmer group as well as between all five occupational groups.

Because of contamination factors and small sample size the Organizational scale, as represented by mail clerks, did not fare quite so well as the three scales

mentioned above. Still, however, the clerks' Organizational mean was significantly higher than four of the six other scales, and the mean for clerks was higher than that for non-clerks ( $p < .01$ ).

The representativeness of barber school students for the Service category is open for question. These young men indicated interest in the barbering trade by their presence in the barber college, but at the same time are not full-flledged members of the trade. It still was possible to differentiate the present group from all others (combination) at the 1% level on Service.

A study by Spear (1948), while not directly relevant to the present investigation, offers an interesting parallel. This author studied Kuder interest patterns of 1,000 freshmen in the fire protection engineering program at the Illinois Institute of Technology. Students high in Persuasive and low in Science (here analogous to Business Contact and Scientific respectively) - ultimately would enter the sales field. The present auto salesmen group were, of course, quite high on the Business Contact scale, while each of the other scales except one for that group were significantly higher than Science ( $p < .01$ ).

While these validity findings do not establish definitive validity for the Job Interest Test, they strongly suggest that future investigations are warranted.

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## APPENDIX IV

LISTING OF THE TESTS ACCORDING TO  
TEST NUMBER

1. Perceptual Reaction Test (PRT)
2. Adjective Check-List (ACL)
3. Byrne Repression - Sensitization Scale
4. Graves Design Judgment Test
5. 16 PF. Factors: A
6. C
7. E
8. F
9. G
10. H
11. I
12. L
13. M
14. N
15. O
16. Q<sub>1</sub>
17. Q<sub>2</sub>
18. Q<sub>3</sub>
19. Q<sub>4</sub>
20. Job Interest Test: Service
21. Business Contact
22. Organizational
23. Technological
24. Outdoor

25. Science

26. Arts & Entertainment



APPENDIX V  
THE FACTORS OF THE 16 P.F.

<u>Factor</u>	<u>Description</u>
A	Warm, Sociable vs. Schizothymia
C	Emotional Stability vs. Instability
E	Dominance vs. Submission
F	Surgency vs. Desurgency
G	Character Strength vs. Lack of Rigid Internal Standards
H	Adventurous/Outgoing vs. Shy/Timid
I	Sensitive/Effeminate vs. Tough-minded
L	Paranoid Tendency vs. Relaxed Security
M	Bohemian Introverted vs. Practical/Conventional
N	Shrewdness vs. Naivete
O	Guilt Proneness vs. Confident Adequacy
Q <sub>1</sub>	Radicalism vs. Conservatism
Q <sub>2</sub>	Self-Sufficiency vs. Group Dependency
Q <sub>3</sub>	Controlled, Exacting Will Power vs. Low self-concept Integration
Q <sub>4</sub>	High Tension vs. Relaxed/Composed

## APPENDIX VI

## IBM 1620 PROGRAMS EMPLOYED

1. Library Listing: 6.0.089 - 1620 Correlation Program, by Donald P. Miller, Ohio State University. Computes Pearson Product Moment correlations for up to a 50 x 50 matrix.
2. Library Listing: 6.0.091 - Principal Axis Factor Analysis Using Hotelling's Iterative Procedure, by Thomas C. Teeples, George Washington University. Extracts any number of factors from up to a 27 x 27 matrix. Also yields sums of squares (for each set of factor loadings) and cumulative per cent of total variance accounted for.
3. Library Listing: 6.0.094 - Varimax Matrix Rotation, by Thomas C. Teeples. Uses as input the output from 6.0.091 above. Will handle 27 tests by 12 factors. The present study employed the epsilon value of  $\leq .06993$  for determining when factors should not be rotated. It implies that there will be no rotation if the angle is less than  $1^{\circ}$ . This value was recommended by the author.

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