A FACTOR ANALYTIC STUDY OF FUNDAMENTAL PERSONALITY DIMENSIONS IDENTIFIABLE IN SELF-REPORT INVENTORIES

by

DIANE ROLLER

Thesis submitted to the School of Graduate Studies of the University of Ottawa as partial fulfillment of the requirements for the degree of Doctor of Philosophy (Psychology).

University of Ottawa

Ottawa, Canada, 1985

ISBN 0-315-30963-6

ACKNOWLEDGEMENTS

A special thanks to Dr. O.R. Porebski, thesis director, whose continuous support and guidance has been instrumental in the fulfillment of this research. A note of appreciation to Dr. H.P. Edwards and Dr. R.M. Stelmack for their help in the early planning of this project.

CURRICULUM STUDIORUM

Diane Roller was born in 1947 in St. Norbert, Manitoba. She obtained a B.Sc. degree and an M.Sc. degree from the University of Manitoba in 1969 and 1970 respectively. In 1979, she obtained a B.A. degree from the University of Ottawa.

ABSTRACT

It is desirable to determine the main dimensions of personality structure. Of these, Emotional Adjustment (Neuroticism) and Extraversion-Introversion have already been established and recognized as most important. The purpose of the present study was to confirm the existence of these two dimensions and to identify any additional (if any) fundamental dimensions. It was hypothesized that Independence and Sensitivity were required to complete personality structure.

Four self-report personality tests were used namely, the Eysenck Personality Inventory (EPI), the Sixteen Personality Factor Questionnaire (16 PF), the California Psychological Inventory (CPI), and the Personal Orientation Inventory (POI). The four inventories were completed by 179 introductory psychology students.

The study's methods included a re-analysis of the POI, two types of factor analyses, and item analyses linking items wih main personality dimensions. A re-analysis of the POI was conducted because of the lack of scale validity. The item factoring was performed in order to obtain an alternate scale structure to the existing one. Two types of factor analyses were conducted on the scales of the four personality tests: an ordinary, conventional factor analysis (principal factoring), and a residual analysis, where the established dimensions Emotional Adjustment and Extraversion were fixed, in order to investigate the residual orthogonal space. In a subsequent stage, the factors, extracted from the ordinary factor analysis, were

approximated by factor scores, and simple summations of specified scales. Item analysis singled out significant items which were correlated with the factor approximations.

In the re-analysis of the POI, four new scales were obtained: Self-Acceptance, Existentiality, Self-Actualization, and Realistic Belief. These new scales, rather than the original POI scales, were used in the subsequent factor analyses.

The factor analyses were conducted on 41 scales, 3 from the EPI, 16 from the 16 PF, 18 from the CPI and 4 from the POI. In the principal factoring analysis of the 41 scales, four factors were obtained. The first two factors were identified as Emotional Adjustment and Extraversion-Introversion. The residual analysis gave rise to two factors which were very similar in terms of scale loadings to the third and fourth factors of the conventional analysis. On the basis of item analyses, the third and fourth dimensions were identified as contrasting Organized vs Unorganized individuals and Sensitive vs Tough-Minded individuals. The study did not supply evidence for the existence of the Independence dimension as had originally been hypothesized.

TABLE OF CONTENTS

List of Tables

I. REVIEW OF THE LITERATURE

A. PERSONALITY

The Greeks believed in the power of reason and man's ability to understand himself. In order to explain such phenomena as man's uniqueness and a certain consistency in his behavior, personality theories were generated (Baughman, 1972).

There are now in existence many personality theories. Some of these, psychodynamic and phenomenological, were generated from clinical experience. These theories are subjective in nature, coming from man's experiential mode of life (which Van Kaam (1966) sees as a necessary component in the generation of scientific theory). Other personality theorists have taken a different approach. Behavior psychologists, emphasizing observable behavior which they equate with personality, have focused on laboratory experiments studying particular aspects of man's behavior. Eysenck (1967) has concentrated on identifying major personality dimensions and linking them to a biological base. Although Allport (1961) recognized the need for nomothetic studies, his main criticism of Eysenck's approach was that man's individuality and unique interactive patterning is not grasped by a

set of personality variables.

Thus, personality can be approached through different routes. Ultimately, the theories elaborated to explain man's nature must be validated. Experimental validation could be combined with human validation. The latter, as advocated by the humanistic movement in psychology, would rely strongly on human experience (Bugental, 1964).

A.1 Personality Assessment

One approach to personality is concerned with identifying general characteristics of human beings that underlie their functioning; it is also interested in individual differences or the ways in which people differ one from another. General characteristics of people are not self-evident. They are usually inferred from observed or self-reported behavior. Procedures, such as direct observation, interviews and psychometric tests, which obtain information about people to provide an inferential personality base, fall under the designation of personality assessment. A major goal of such techniques is the unearthing of the dimensions which universally define individuals (Bavelas, 1978). The importance of situational

factors in influencing behavior is well-known but personality assessment emphasizes mainly the trait approach to personality. A trait, as defined by Allport (1961), is an internal disposition which guides human behaviour and explains its consistency.

Today, there exists a proliferation of personality tests measuring every conceivable personality characteristic. This is partly due to the almost limitless personality descriptors, ease of administration and scoring, and objectivity of the instruments over other personality assessment techniques. There is a need to identify invariant dimensions of personality in order to eliminate the redundancy aspects of personality inventories.

A.2 Healthy Personality

The field of personality originated with the study of maladjusted individuals. As a result, the normal personality was usually conceived of as "one devoid of pathology". This is exemplified in the Eysenck Personality Inventory (EPI). As defined by the questionnaire, the normal individual is one who lacks neurotic complaints, that is, who is not generally moody, not tense, does not feel guilty often and is not a nervous person. Impetus for a different conception of personality came from the human-

istic movement. Terms such as self-actualization, transcendence and responsibility were used in describing the healthy personality (Maslow, 1971; Frankl, 1959). In Maslow's (1954) conception of the healthy personality, the self-actualized individual possesses positive characteristics, some of which are spontaneity, acceptance of oneself and others for what they are, a good sense of humor, and a capacity for deep interpersonal relationships. Thus, the healthy personality is one who has charateristics above and beyond those of lack of pathology.

B. FACTOR ANALYSIS

B.1 Factor Analysis in Personality Research

What is the use of factor analysis in personality research? Can it establish the validity of personality characteristics?

Factor analysis is a multivariate technique which seeks to discover the minimum number of concepts accounting for the correlations among a given set of variables. Thus, it fulfills a basic goal of science which seeks a parsimonious explanation of data. Factor analysis is used in the development of psychometric tests in order to establish the factorial validity of the proposed measured concepts.

Applying factor analysis to a broad and relevant data set of personality characteristics, this method can elucidate the main components responsible for the correlations. In personality research, factor analysis can provide theoretical constructs as to the underlying dimensions of personality (Royce, 1973). But factor analysis per se cannot create substantive theory. It is not a substitute for empirical validity procedures (Anastasi, 1976). In his critique of factor analysis in personality research, Lykken (1971) pointed out this method is not an adequate basis for drawing conclusions about the real world. Rather, factor analysis should be used in the context of discovery. Lykken concluded that factor analysis had been undistinguished thus far in personality research.

To summarize, factor analysis cannot establish the verity of personality constructs but it is an excellent technique for exploratory work in this area.

B.2 Technical Problems

Factor analytic solutions are not unique. The underlying dimensions in a given set of data may be expressed in many statistically equivalent ways, thus giving rise to many possible factor solutions. There is no unique or generally accepted best solution, but there are

solutions which best fit a given requirement. One of them is that personality factors must be psychologically meaningful. To make them psychologically more meaningful, a rotation of factors is undertaken. The rotation is usually guided by certain mathematical or statistical principles. The most generally accepted principle is that of "simple structure". Rotated factors, satisfying the goal of simple structure, are believed to be more clearly and parsimoniously defined.

There are still many controversies in the literature as regards communalities, number of factors, and methods of rotation. Acceptable methods of estimating communalities involve criteria such as the largest correlation or the squared multiple correlations with the other tests. Harman (1970) recommended squared multiple correlations as the most desirable approximations to communalities when suitable computing facilities are available. He also pointed out that the particular choice of communalities affects factorial solutions very little.

Concerning the number of factors to retain, the Kaiser-Guttman eigenvalue criterion is the rule used in the vast majority of factor analytic studies reported in the literature (Hakstian, Rogers & Cattell, 1982). Althouch this rule has been criticized because it tends to over-extract, Royce (1973) claimed that overextraction is no

problem as the extra factors will eventually be identified as residuals because they contain so little common factor variance. A parsimonious conception of main dimensions of personality is that of independent rather than correlated facets of behavioral functioning. In view of this, an orthogonal method of rotation is desirable. Kaiser's varimax rotation is generally acceptable (Kaiser, 1958). Varimax solutions lead to results that appear more like simple structure and, more important, tend to factorially invariant solutions.

C. PERSONALITY FACTORS

C.1 Higher-Order Personality Factors

Primary factors are those that would appear first when a wide variety of items are factored, whereas second-order factors are obtained by factoring the intercorrelations of the primary factors. Higher-order factors thus represent broad influences acting on a person to which the primaries contribute; primaries are seen as having a more direct effect on behavior. French (1973) identified 28 "established" primary factors, established in the sense that these factors recurred in at least three analyses performed in at least two separate laboratories. Royce

(1973) presented a taxonomy of personality factors under strongly, moderately and minimally invariant criteria. Only two higher-order factors, Neuroticism and Extraversion-Introversion fell in the strong invariance list.

The argument as to whether to concentrate on primary or higher-order factors in order to describe an individual's personality has been ongoing since Thurstone and Spearman (Eysenck and Eysenck, 1969). A redundant personality description occurs with the use of primary factors since they are non-independent. Cattell (1972) argued that, since information specific to the primaries is lost when concentrating only on higher-order factors, both should be used in "depth psychometry". Eysenck (1972) erased the contribution of primary factors to personality description beyond their second-order influences. By analyzing correlations between Cattell's primaries, which were "corrected for attenuation", he showed negligible contributions from the primary factors. In a later article, Eysenck (1978) stated that primary factors were either tautological, that is defined by homogenous item content, or were not replicable. His main point was that correlational evidence for factors is not sufficient, and that personality factors should be implanted in solid theoretical grounds and empirical findings.

Factor invariance is a crucial issue in the debate

between advocates of primary and higher-order factors. With respect to this criterion, higher-order factors hold more promise than primary factors (Peterson, 1965). But, as Peterson (1960) pointed out, the real test and the ultimate goal of factor analysis go beyond the attainment of factorial invariance to the predictive power of the theoretical constructs provided by the factors. Humphreys, Tucker and Dachler (1970) claimed that higher-order factors have a higher predictive validity. Thus, the inherent suitability of studying these more general influences becomes apparent.

C.2 Neuroticism and Extraversion-Introversion

Two higher-order factors have been identified consistently in factor analytic research of self-report inventories (Royce, 1973; Wiggins, 1968). They have surfaced across different samples, instruments, and methodologies. These general concepts are Neuroticism and Extraversion-Introversion (Eysenck and Eysenck, 1969). Neuroticism is defined as a tendency to overrespond emotionally and a difficulty in returning to a normal state after emotional experiences. Lack of neurotic complaints is referred to as emotional stability or emotional adjustment. The meaning of Extraversion nominally resembles Jung's.

The extraverted individual is sociable, outgoing, uninhibited, impulsive, optimistic and ascendant.

Neuroticism and Extraversion are represented in the well-known factorially-based tests, the Eysenck Personality Inventory (EPI), the Sixteen Personality Factor Questionnaire (16 PF), and the Guilford-Zimmerman Temperament Survey (GZTS), which have evolved from the work of Eysenck, Cattell, and Guilford respectively. Other personality inventories, developed using empirical-based criteria, such as the Minnesota Multiphasic Personality Inventory (MMPI) and the California Psychological Inventory (CPI), contain similar factors. Neuroticism and Extraversion have surfaced also in the factor structure of behavior ratings (Digman & Takemoto-Chock, 1981; Cattell & Vogelmann, 1976; Norman, 1963).

Neuroticism and Extraversion have been empirically validated (Eysenck & Eysenck, 1969). The two concepts form the cornerstones of Eysenck's biologically-based theory of personality in which the psychological meaning of Extraverson and Neuroticism is translated into physiological functioning (Eysenck, 1967).

C.3 Tentative Personality Factors

The empirical and factorial evidence has established Neuroticism and Extraversion as broad dimensions of personality. Although Eysenck claims that these two dimensions along with Psychoticism (P), a pathological dimension, are sufficient to describe personality, Cattell (1973), Comrey (1961), and others disagree. Because of methodological variations in factor analytic work, because the personality sphere has been examined at different sections, and because researchers have not paid enough attention to past efforts, little consensus has been reached in recognizing a set of well-established theoretical constructs beyond Neuroticism and Extraversion. Other higher-order factors have appeared often enough in factor analytic studies within the personality realm so it becomes necessary to confirm or deny their existence.

Some factor analytic studies have focused on the first or second-order factorial structure of specific instruments (Tosi & Hoffman, 1972; Ottomanelli, 1972; Berzins, Barnes, Cohen & Ross, 1971; Howarth & Browne, 1971; Veldman & Parker, 1970; Gorsuch & Cattell, 1967; Nichols & Schnell, 1963). Since the aim is to identify the major dimensions of personality, achievements in this area are more likely to come from factor analytic work involving

combinations of inventories. Such studies have as input a broader spectrum of the personality space. They are able to transcend instrument-specific factors and attain a clearer perspective of personality structure.

Inventories such as those defined by the work of Eysenck, Cattell and Guilford are factorially based. Constructed via an internal strategy, they define homogeneous dimensions of correlated behavioral items. They appear best suited among the variously constructed instruments to measure personality traits (Lovegrove & Hammond, 1973). Investigations into higher-order personality structures of their combined data space have given rise to at most four dimensions invariant across sex (Vagg & Hammond, 1977; Eysenck & Eysenck, 1969). These are the strongly invariant factors Neuroticism and Extraversion and two moderately invariant factors Sensitivity and Independence (identified by Vagg and Hammond). Similar factors have been replicated in the second-order analysis of the 16 PF (Stroup & Manderscheid, 1978-79; Bolton, 1977; Krug & Laughlin, 1977; Winder, O'Dell & Karson, 1975; Cattell & Nichols, 1972; Gorsuch & Cattell, 1967), with the factor Independence showing the most variation in its loading pattern across samples. In Vagg and Hammond's study, Sensitivity was essentially Cattell's Pathemia factor, by which is meant the antithesis of being practical and down-to-earth, with a

reliance on feelings rather than rational thought (Cattell, Eber & Tatsuoka, 1970). Cattell et al. described the Independence factor as depicting an individual who is radical, self-sufficient, and does not accept conventional ideas of morality, in essence, a person who is "a law to himself". Vagg and Hammond's conception was identical; Guilford items defining this factor contributed similar meanings. The authors noted the close similarity between the factors obtained in their study and the first four factors extracted in the Sells, Demaree and Will (1971) study.

Questionnaires such as the California Psychological Inventory (CPI), constructed on an empirical-criterion basis, have been shown to possess a similar factorial structure (Stroup & Manderscheid, 1977; Megargee, 1972; Mitchell, 1963). Megargee (1972) reviewed the factor analytic studies that were done using the CPI scales and he described five dimensions. The first factor was generally agreed to measure some degree of positive adjustment, whereas the second factor, whose structure was quite invariant, was variously labelled by the different investigators as "social poise or extraversion", "interpersonal effectiveness or "social confidence and drive". Most of the factor analysts interpreted the third factor in terms of independent thought. A fourth factor referred to social conven-

tionality and the smallest factor, when it appeared, was interpreted as a feminine-masculine trait.

Mitchell's (1963) study, in which he conducted a joint analysis of the 16 PF and CPI scales, elucidated the nature of these factors. The first two factors were Emotional Adjustment and Extraversion. The factor, incorporating the independence facet, described an individual who was clear-thinking, efficient, resourceful, and foresighted. Mitchell identified the factor pertaining to social conventionality as Cattell's Superego Strength which combines elements of inflexibility and moral responsibility. Superego Strength has appeared in some of the 16 PF's second-order analyses but typically has been defined by a large loading from only one scale (Stroup & Manderscheid, 1978-79; Bolton, 1977; Cattell & Nichols, 1972; Gorsuch & Cattell, 1967). The femininity scale of the CPI loaded with the 16 PF's scales defining Cattell's Sensitivity factor to describe a dimension differentiating the practical, realistic individual from the sensitive, subjective individual.

Stroup and Manderscheid (1977) suggested that there was a high degree of congruence between the factor structures of the CPI and the 16 PF, and that the common traits might be more efficiently measured by the use of salient items from the two instruments. Exceptions in the congru-

ence were noted, namely that the Sensitivity factor does not appear as such in the analyses of the CPI scales unless the feminine-masculine dimension, which sometimes is extracted, defines part of this concept and, secondly, that the Superego Strength factor does not consistently appear in the second-order analyses of the 16 PF scales.

Factor analyses of the personality space defined by the 16 PF and other questionnaires such as the Minnesota Multiphasic Personality Inventory (MMPI), Adjective Check List (ACL), and Comrey Personality Inventory (CPS) have generally yielded comparable constructs (O'Dell & Karson, 1969; Gendre & Fournier, 1978; Comrey & Duffy, 1968).

O'Dell and Karson (1969), using as input MMPI and 16 PF scale intercorrelations, obtained the same five factors in four different rotational procedures of a principal axes solution. The first factor was an "MMPI pathology" factor as it contained salient loadings from the MMPI scales only. The other four factors were Cattell's replicable second-order factors. Gendre and Fournier's (1978) principal component analysis of three instruments, the 16 PF, the ACL and the Vocational Preference Inventory, yielded five factors which were Emotional Stability, Extraversion, Independence, Intelligence and "Chaleur Sociale" or "Orientation Humanitaire". A second-order analysis of the EPI, the 16 PF and the CPS produced four factors which were

called Neuroticism, Extraversion-Introversion, Socialization and Empathy-Hostility (Comrey & Duffy, 1968).

Using a different approach, Howarth (1980) claimed that the identification of the major factors of personality can be done through large scale item factoring and item analysis. Sells, Demaree and Wills (1971) factor analyzed 300 Cattell and 300 Guilford marker items and obtained 15 interpretable factors. Howarth and Browne (1971) constructed a 100-item questionnaire to test the replicability of Sells' factors in terms of item-factor analysis. Many of the factors reappeared, indicating to the authors that large-scale item factoring was a worthwhile method to discover replicable factors. Pursuing their work on a comprehensive domain sampling, Browne and Howarth (1977) selected 1726 nonrepeated items from 16 inventories. On the basis of the results of these studies, and others, Howarth (1980) claimed that 12 of the French (1973) factors appeared to be generally supported by item-factor studies.

Eysenck (1978) performed a principal components analysis on the correlations among the Browne and Howarth factors to obtain the superfactors P, E and N, having the predicted loading patterns, although P was less clearly interpretable than E and N. The analysis required a priori that only three factors appear. In a later study, Barrett and Kline (1980) analyzed the two questionnaires referred

to above (Howarth & Browne, 1971; Browne & Howarth, 1977), on 79 subjects. Principal component analysis yielded seven factors, of which Eysenck's P, E and N were the first three. The fourth factor was similar to Comrey's factor of Activity vs. Lack of Energy and the fifth factor corresponded to the concept of Social Desirability. The other two factors were identified as specifics.

The normal personality is described by the inventories which have been discussed, yet a wider spectrum of the normal personality may result from contributions given this concept by humanistic psychologists. Aspects of the healthy personality not previously tapped in the assessment field are accented in the Personal Orientation Inventory (POI), which measures the concept of self-actualization (Shostrom, 1964).

Jarmasz (1979) obtained four factors, Self-Actualization, Existentiality, Independence, and Self-Acceptance in an item factor analysis of the POI. Correlations between these factors and the four superfactors obtained from a combined Eysenck-Cattell inventory (Porebski, 1977), and similar to the ones defined by Vagg and Hammond (1977), indicated that the latter could be extended in meaning by the incorporation of the POI personality space. The dimension of Adjustment, as defined by Eysenck and Cattell's tests, could be extended by inclusion of the constructs of

Self-Actualization and Self-Acceptance. The label of Psychological Maturity was suggested as an overall description of the three concepts. Although there appeared to be a weak link between Existentiality and the Eysenck-Cattell superfactor Sensitive vs. Practical, Jarmasz concluded that Existentiality emerged as an independent factor from the Eysenck-Cattell superfactor and thus added to the description of personality beyond the Eysenck-Cattell system.

D. PERSONALITY INVENTORIES

In order to unearth the main dimensions of personality using factor analysis, the first step is to ensure that the input data base covers a broad spectrum of the personality domain. The use of multiple instruments, emphasizing different aspects of man's personality, is one means of ensuring a wide coverage. Additional advantages of using a combination of inventories are that instrument-specific factors are transcended, and there is a greater probability of obtaining a clearer insight into the nature of the extracted factors. The questionnaires, which are described in this section, have been chosen to define the relevant universe of analysis.

D.1 Eysenck Personality Inventory (EPI)

The EPI is the best known instrument available to measure the two invariant personality dimensions, Neuroticism and Extraversion (Buros, 1978). Although the newly evolved Eysenck Personality Questionnaire (EPQ), intended to replace the EPI, has been studied with positive results (Kline & Barrett, 1983), the EPQ has not acquired the historical significance of the EPI.

The EPI is a widely used instrument known for its reliability and validity in the field of personality assessment. It is so well-established that it is often used as a criterion of validity for newer instruments measuring similar concepts of personality.

The questionnaire consists of 57 items of which 24 define Neuroticism (N), 24 define Extraversion-Introversion (E) and 9 define a Lie (L) scale. The test-retest reliabilities of the scales E and N, with a time lapse of nine months to a year, are impressive; they range from 0.80 to 0.97 for forms A and B of the test. Factorial studies have supported the factorial validity of the E and N scales (Walkey & Green, 1981; Eysenck & Eysenck, 1969).

D.2 Sixteen Personality Factor Questionnaire (16 PF)

Another widely used instrument recognized as a valid and reliable tool for personality assessment is the 16 PF. Similarly, as with the EPI, the 16 PF often serves as a criterion of convergent and/or discriminant validity for newly evolved instruments. The 16 PF attests to wide coverage since its scale concepts have their roots in a vast comprehensive set of items referring to temperament.

The 16 PF consists of 187 items (Form A and Form B) yielding 15 personality scales and one general intelligence scale. The high-score description of the 16 scales are A - Outgoing, B - Bright, C - Emotionally Stable, E - Assertive, F - Happy-Go-Lucky, G - Conscientious, H - Venturesome, I - Tender-Minded, L - Suspicious, M - Imaginative, N - Astute, O - Apprehensive, Q_1 - Experimenting, Q_2 - Self-sufficient, Q_3 - Controlled, and Q_4 - Tense (Cattell, Eber & Tatsuoka, 1970). Test-retest reliabilities for the 16 PF scales are satisfactory; with an interval of less than one week, the combined tests A and B yielded a median reliability figure of 0.81 (Bloxom, 1973).

The evidence for the factorial validity of the 16 PF is not unanimous. A number of item factor analyses have shown that the factorial structure of the 16 PF does not correspond to the scales of the questionnaire (Wells &

Good, 1977; Howarth, 1976; Karson & O'Dell, 1974; Howarth & Browne, 1971; Eysenck & Eysenck, 1969), whereas Burdsal and Bolton (1979) and Burdsal and Vaugh (1974) have argued that the primary personality constructs are recoverable from item data provided similar methodologies are used. Reviewing the evidence, Adcock, Adcock and Walkey (1974) pointed out that the factors that do emerge from these investigative studies, resemble the 16 PF factors, and they suggested refinement of item allocation. Bolton (1977) concluded that the constant replicability of the second-order factors of the 16 PF logically implies the existence of the 16 primary scale factors.

Cattell, Eber and Tatsuoka (1970) described eight second-order factors obtained through factor analysis of the matrix of intercorrelations of the 16 PF scale scores. Only the first four factors were claimed to have any stability and replicability, with even the possibility of the fourth factor, Subduedness vs Independence, not being as invariant as previously claimed (Cattell & Nichols, 1972). The first two higher-order factors, F_I, Exvia-Invia and F_{II}, Anxiety, represented concepts which mirrored Eysenck's conception of Extraversion-Introversion and Neuroticism (Adcock, 1965). The two other second-stratum factors were F_{III}, Cortical Alertness and F_{IV} Subduedness vs. Independence. An individual with a high score on F_{III}

is cheerful, alert, and decisive, handling problems objectively whereas, at the opposite pole, a person shows an overdependence on feelings. A high score on F_{IV} describes a person who is independent, radical and a law onto himself.

Cattell, Eber and Tatsuoka (1970) summarized the chief primaries involved in the second-stratum factors measurable by the 16 PF. Only the first four second-order traits are given here:

F_I: Exvia:	A+	Outgoing
	E+	Assertive
	F+	Happy-Go-Lucky
	H+	Venturesome
	Q_2-	(Not) Self-sufficient
F_{II}: Anxiety:	C-	(Not) Emotionally stable
	H-	(Not) Venturesome
	L+	Suspicious
	O+	Apprehensive
	Q_3-	(Not) Controlled
	Q_4+	Tense
F_{III}: Cortical Alertness:	A-	(Not) Outgoing
	I-	(Not) Tender-minded
	M-	(Not) Imaginative
F_{IV}: Independence:	E+	Assertive
	L+	Suspicious
	M+	Imaginative
	Q_1+	Experimenting
	Q_2+	Self-sufficient

Recent analyses have tended to confirm the stability of the underlying 16 PF second-order factor structure. Studies by Stroup and Manderscheid (1978-79), Bolton (1977), Vagg and Hammond (1977), Krug and Laughlin (1977), and Winder, O'Dell and Karson (1975) have yielded these

four factors.

The first two studies identified an additional factor, labelled "Superego Strength" meaning good moral upbringing and personal discipline, which was previously reported by Cattell (1973), Cattell, Eber and Tatsuoka (1970), Cattell and Nichols (1972), Gorsuch and Cattell (1967) and Mitchell (1963). It is typically defined by the primary factors G (Conscientious), Q_3 (Controlled), and F- (Not Happy-Go-Lucky) (Cattell, Eber & Tatsuoka, 1970).

D.3 California Psychological Inventory (CPI)

The CPI is a comprehensive self-report questionnaire which has been constructed to measure positive aspects of personality (Gough, 1957). Both Anastasi (1976) and Kleinmuntz (1969) assessed the CPI as one of the best personality measuring instruments, because of its excellent technical development. The growing use of the CPI in research reports has been documented (Buros, 1975). Anastasi pointed out that the chief limitation of the CPI was the lack of independence among the scales. Such redundancy in the scales prevented the attainment of a clear and parsimonious personality description.

The CPI is a rationally based inventory consisting of 480 true-false items which define 18 subscales, three of

which are indicators of response validity. The three validity scales are Sense of well-being (Wb), Good impression (Gi), and Communality (Cm). Of the remaining 15 subscales, 11 were developed using an external strategy of contrasted groups, and four subscales were developed using a psychometric criterion, item homogeneity. The 15 scales are Dominance (Do), Capacity for status (Cs), Sociability (Sy), Social presence (Sp), Self-acceptance (Sa), Responsibility (Re), Socialization (So), Self-control (Sc), Tolerance (Tb), Achievement via conformance (Ac), Achievement via independence (Ai), Intellectual efficiency (Ie), Psychological Mindedness (Py), Flexibility (Fx), and Femininity (Fe).

Moderate reliabilities were reported for the CPI scales (Gough, 1957). Over an interval of one to three weeks, retest reliabilities yielded a median coefficient of 0.80. With a longer test-retest period of one year, the median reliabilities were 0.65 for males and 0.68 for females.

Factor analytic studies of the CPI have reduced the 18 subscales of the inventory to four or five dimensions which can account for a major proportion of the variance of the 18 CPI scales (Megargee, 1972). Factors I and II appeared in all analyses and they correspond to the two invariant higher-order factors Extraversion and Personal

Adjustment (Stroup & Manderscheid, 1975; Mitchell, 1963). Mitchell (1963), in his joint analysis of the CPI and 16 PF, was able to define the three other factors more precisely as Intellectual Resourcefulness, Superego Strength and Emotional-Sensitivity. Stroup and Manderscheid (1977) concluded that the CPI and the 16 PF contained essentially equivalent second-order dimensions with Emotional-Sensitivity and Intellectual Resourcefulness corresponding to Cattell's Cortical Alertness and Independence dimensions. Schludermann and Schludermann (1970) have ascertained that these five factors are generalizable to a Canadian college population.

In a review of 20 analyses of the CPI, Megargee (1972) summarized the scales which have high loadings on the five factors of the CPI. Factor I, Personal adjustment, is characterized by high loadings from Sc (Self-Control) and Gi (Good Impression). Other scales typically involved are Wb (Well-being), To (Tolerance), Ac (Achievement via conformance), Re (Responsibility), So (Socialization), Ai (Achievement via Independence), Ie (Intellectual Efficiency) and Py (Psychological Mindedness). Scales having noteworthy loadings on Factor II, Extraversion, are Do (Dominance), Cs (Capacity for Status), Sy (Sociability), Sp (Social presence) and Sa (Self-acceptance). Factor III, Intellectual Resourcefulness, is defined by high loadings

from Ai (Achievement via independence) and Fx (Flexibility). Secondary loadings occur from To (Tolerance) and Ie (Intellectual efficiency) in many of the 20 analyses. Cm (Communality) and So (Socialization) load highly on Factor IV, Superego Strength. Factor V, Emotional-Sensitivity, when it appears, is invariably defined by a high loading from the Fe (Femininity) scale.

The CPI was criticized because different scales sometimes contain an identical item, which would lead to a spurious correlation between the scales. This, however, was not found to be a serious deficiency of the test. By a process of random assignment of overlap items to one scale, Rogers and Shure (1965) concluded that item overlap was not responsible for the factor structure of the CPI.

D.4 Personal Orientation Inventory (POI)

The rationally based inventory, the POI, gives access to new visions of the healthy personality never before quantified. Since the POI is one of the few existing instruments which purports to measure personality within the framework of humanistic psychology with its emphasis on sound functioning, it was included in the set of instruments. Elements of personality from the humanistic perspective are being recognized more and more by clinical

psychologists. In a comprehensive review of empirical research on psychotherapy and behavior change, Rogers (1957)'s humanistically-grounded theory of therapy, personality, and interpersonal relationships was given support (Orlinsky & Howard, 1978). Beneficial or effective psychotherapy was linked to therapist acceptance, empathy, genuineness, and encouragement of independence and autonomy. Possibly, the use of the POI will broaden the scope of the personality area covered.

The POI measures the concept of self-actualization (Shostrom, 1974). A self-actualizer is defined as an individual who is in a continuing process of developing and utilizing all of his unique capabilities, or potentialities, and is free of the inhibitions and emotional turmoil of those less self-actualizing. The POI has been used as a criterion measure in counseling settings focusing on positive mental health (Foulds, 1969).

The 150 forced-choice items of the POI were developed on the basis of the observed value judgments of both healthy and clinical subjects and on the theoretical formulations of writers in the humanistic and existential school of psychology (Shostrom, 1964). The inventory has 12 scales, two of which are major scales of personal orientation and the remaining 10 scales tap values important in the self-actualizing individual. The 12 scales are as

follows, with the first two scales listed being the major scales of personal orientation: Time Ratio (TR), Support Ratio (SR), Self-Actualizing Value (SAV), Existentiality (Ex), Feeling Reactivity (Fr), Spontaneity (S), Self Regard (Sr), Self Acceptance (Sa), Nature of Man (Nc), Synergy (Sy), Acceptance of Aggression (A), and Capacity for Intimate Contact (C). Test-retest reliability coefficients for the POI scales over a time period of one week, ranged from 0.52 to 0.82; over a one-year period, values were in the range of 0.32 to 0.74 (Shostrom, 1974).

Although all but one of the POI scales have discriminated between "self-actualized" and "non-self-actualized" groups (Shostrom, 1964), evidence substantiating the specific nature of each scale is lacking. Since the POI was developed from a theoretical base, the scales are not necessarily factorially valid; Jarmasz (1979)'s study has shown that the POI scales lack factorial validity. In a principal component analysis of the POI items, Velicer, Diclemente and Corriveau (1984) also demonstrated that the components did not correspond to the POI scales.

Although the POI self-actualization scales have been shown to have small but significant positive correlations with the E scale of EPI, and larger significant negative correlations with the N scale of the EPI (Knapp, 1965) (thus showing some degree of relationship), the POI is

assessing something in addition to these constructs. A study by Knapp and Comrey (1973), examining the correlations between the POI scales and the Comrey Personality Inventory (CPS) scales, demonstrated that self-actualization was defined by constructs other than emotional stability and extraversion as defined by the CPS.

Factor analysis of the scales of the POI has given rise to three factors, Extraversion, Open-Mindedness and Existential Non-comformity, in agreement with theoretical constructs describing the healthy individual (Tosi & Hoffman, 1972). These factors were similar to the ones extracted in Silverstein and Fisher's (1968, 1972) attempt to determine whether item overlap was responsible for a "built-in" factor structure in the POI. Siverstein and Fisher (1968, 1972) found that the POI had a "built-in" factor structure but could not conclude whether it was due to item overlap or to actual construct interrelationships.

E. OBJECTIVES AND HYPOTHESIS

E.1 Objectives

Factorial analyses of standard, well-used inventories point to four, possibly five, broad personality dimensions. The nature of the first two dimensions is

sufficiently clear, one is an Emotional Adjustment dimension and the other is an Extraversion dimension. It is paramount to establish the nature of the other main personality dimensions. Such a goal cannot be reached unless studies, using a broad coverage of the personality space, replicate identical factors across samples and methodologies. A general objective of this study is to ascertain the existence and describe the nature of main personality dimensions identifiable in self-report inventories. The focus is to be on the normal adult personality.

Porebski (1968) has stated that well-established factors should be fixed or held constant in factor analytic investigations if the state of the art is to advance. Since Neuroticism and Extraversion are well-established dimensions of personality, it is useless to rediscover them anew in a study that attempts to identify other main personality dimensions. A methodological objective is thus to keep these two factors constant in order to investigate the residual orthorgonal personality space.

The search for personality factors ideally should be based on item analysis. Item analysis is not feasible at this preliminary stage. The large item pool (a total of 874 items) would necessitate an extremely large sample size with the possibility of large round-off error when using such a large number of variables. Since the study is an

exploratory investigation into main characteristics of the healthy personality, factor analysis using the matrix of intercorrelations of scale scores is deemed justifiable in order to gain a preliminary understanding of the meaning of the factors before larger studies can be attempted.

Another methodological issue concerns the validity of the POI scales. The construct validity of the POI scales is judged to be inadequate. Although all but one of the POI scales have discriminated between self and non-self actualizers (Shostrom, 1964), evidence substantiating the specific nature of each scale is lacking. The POI was developed from a theoretical base and its scales have not been validated. Because of the lacunae in scale validity, it seems logical to define new scales based on item factor analysis of the POI. These new scales would then be used as part of the input data, along with the scales from the other tests.

Once the personality factors are established, it would be of practical interest to have them defined in terms of a minimum number of necessary items. The majority of self-report personality questionnaires take considerable time to administer and to score as they usually exceed 100 items. Even the EPI, one of the most economical personality tests, has 24 items measuring Neuroticism and 24 items measuring Extraversion. One objective would be to limit

the number of items to 10-15 to completely define any of the new factors. These items of course would be taken from the personality tests involved in the study. The sole criterion here would be the size of the correlation a particular item has with a given new factor. A certain degree of redundancy is perhaps desirable for the sake of reliability. But the development of a concise instrument to measure general personality dimensions, requiring much less time to administer, would be the primary objective here.

E.2 Hypothesis

Since the study is mainly exploratory in nature, only one tentative hypothesis is put forward. Presupposing the existence of other main personality dimensions independent from Neuroticism and Extraversion, the hypothesis concerns the nature of the proposed dimensions:

> *Personality can be summarized in terms of four general constructs: Emotional Adjustment, Extraversion, Independence and Sensitivity.*

The hypothesis is made in the context of the input personality space defined by the study. Neuroticism is reflected in its positive counterpart, Emotional Adjustment. Extraversion reflects Eysenck and Cattell's description. Although Independence and Sensitivity take their

meaning from Cattell's second-stratum factors, Independence and Pathemia, it is emphasized that the study is an exploratory one. Cattell's definitions serve as guides only, with the distinct possibility existing that the meaning of the hypothetical dimensions will take on different emphasis and/or greater breadth.

II. PROCEDURE

A. INSTRUMENTS

Multiple instruments have been chosen in order to obtain a broad mapping of the normal personality domain. These are the EPI (FORM A) , the 16 PF (FORM A), the CPI and the POI. The rationale for the choice of these particular personality inventories has been presented in Chapter I.

The raw data consisted of the item responses to the four personality inventories. There were 57 test items from EPI, 187 from 16 PF FORM A, 480 from CPI and 150 from POI, a total of 874 item responses.

B. SAMPLE

The sample consisted of 179 university students registered at the University of Ottawa. Factor patterns, which emerged from the analysis of such instruments as the 16 PF and the CPI, have possessed adequate invariance across sex and across different samples (Bolton, 1977; Cattell and Nichols, 1972; Megargee, 1972; Hundleby and Connor, 1969). The findings suggested that the samples can be chosen among the more homogeneous population of

university students.

The university students tested were registered in the introductory psychology courses. Since students electing this course come from a wide variety of fields, the particular sample chosen provided maximum heterogeneity within the population of university students.

Subjects were registered in either day or evening courses. The inclusion of evening students in the sample also broadened the heterogeneity of the sample.

179 students completed the four personality inventories, the EPI, the 16 PF, the CPI and the POI.

C. PROCEDURE

C.1 Test Administration

The personality inventories were administered in two testing sessions to four classes of introductory psychology. The two testing sessions were a week apart. The entire testing was accomplished in a two-month time period during the first semester September-December 1982.

In the first testing session, the CPI was given. The EPI, the 16 PF and the POI were administered in the second session. The subjects used IBM answer sheets to record their responses.

C.2 Data Preparation

The IBM answer sheets were translated into computer-coded data using the University of Ottawa's computer facilities.

Keys, giving the correspondence between item responses and the scales, were constructed. The scales for each personality inventory were then scored. Scale scores were adjusted for missing data by multiplying the actual score by the ratio of total possible score to total possible score minus the number of missing responses.

The data was analyzed using the Statistical Package for the Social Siences (SPSS), principally with the subprogram FACTOR.

C.3 New POI Scales

Due to the inadequate construct validity of the POI scales, the first-order factorial structure of the POI was obtained in order to define new scales possessing some factorial validity.

Three restrictions necessitated the adoption of an alternative procedure to that of factoring 150 POI items all at once. The first restriction involved the limitation of the SPSS package at the University of Ottawa to at most

100 variables at a time. The second restriction involved the small sample size of 179 subjects, small relative to the number of variables to be analyzed (150). The third restriction was the recognition that large round-off error was a possibility when using a large number of variables. A sub-pool procedure, described by Jarmasz (1979), was used in order to overcome these constraints.

The actual procedure consisted of dividing the 150 POI items into six groups. Each group of 25 items was then factor analyzed with each of the other five groups. An item from a group was rejected if it was irrelevant to the definition of any of the factors emerging from any of the analyses involving that particular group. An item was defined to be significant to the definition of the factor if its loading was at least 0.4, that is, if the item correlation with the factor was not less than 0.4. In the first round of analysis, only items with loadings less than 0.4 in all five analyses involving a particular item were rejected.

Thus, in the first round, significant items were identified and were resubdivided into groups. The whole process was repeated until all retained items could be factored in one analysis.

The sub-pool procedure was applied to two different groupings of the data. One grouping was defined by items

1-25, items 26-50, items 51-75, items 76-100, items 101-125 and items 126-150. A second grouping consisted of the following subgroups: items 1-10 plus items 136-150, items 21-30 plus items 106-120, items 31-40 plus items 90-105, items 41-50 plus items 76-90, and items 51-75. Thus, the entire process was replicated on two sample combinations of the POI data.

All analyses used the principal-component method with subsequent rotation to an oblique structure. The direct oblimin criterion defined the oblique rotation with the delta parameter set to zero. In one grouping of data, factors were retained in any one analysis if they contributed at least 5% to the correlational variance. In the second grouping of data, the cut-off point for retaining factors was varied to 4% minimal variance contribution.

Significant items in the final analysis (loadings >0.4) common to both replications were combined with items found significant in Jarmasz (1979)'s study of the POI which used a different sample. A principal component analysis was performed on these items. A factor was retained if it satisfied two criteria. It had to contribute at least 4% to the total correlational variance and it had to be psychologically meaningful. The resulting factorial structure was taken to be the definitive

structure pattern of the POI.

Items correlating at least 0.4 with retained factors were selected. New POI scales were defined as the simple summation of the selected test items.

The newly defined scales were scored and correlated. Scale scores were entered in the master data file containing the scale scores of the other personality inventories.

C.4 Factor Analysis of Scale Scores

In this step, the three EPI scales, the eighteen CPI scales, the sixteen 16 PF scales and the four newly-defined POI scales were intercorrelated. Thus, 41 variables entered this phase of the analysis. The matrix of intercorrelations was analyzed, using both principal-component method and principal axis factoring method with iteration, followed by the orthogonal Varimax rotation. In the principal factoring method, initial estimates of the communalities were the squared multiple correlations. A factor was retained only if its associated eigenvalue represented 5% of the total variance. Four factors were retained.

C.5 Item Analysis

Two types of factor scores were obtained to approximate the four extracted factors of the principal factoring analysis, after Varimax rotation. One method used the factor scores available through the SPSS factor analysis program. This defined a factor score as a weighted function of scales where the weights assigned to the scales are obtained through a multiple regression. The other simpler approach consisted in selecting those scales which correlated 0.4 or more with the factor, and then obtaining a factor score as the simple summation of raw scale scores.

Both types of factor scores (superscales) were correlated with the individual items of the four personality inventories. The 15 items having the highest correlations with each of the superscales were identified.

C.6 Fixing Neuroticism and Extraversion-Introversion

In order to answer the methodological objective outlined in Chapter I, the two invariant factors, Extraversion-Introversion and Neuroticism, were held constant, and the residual orthogonal space was examined. But what definition of Extraversion-Introversion and Neuroticism was

used? The choice was made to use the first two factors that came out of the principal axis factor analysis as the definition of Extraversion-Introversion and Neuroticism.

All scales, included in the definition of the first two factors were excluded from the residual analysis. The B scale on the 16 PF, the intelligence scale, was also eliminated. From the EPI, the L scale was included. From the 16 PF, the I, G, M, N, Q_1, Q_2 and Q_3 scales were included. The newly-defined POI scales were all included except for the first scale which loaded on the Emotional Adjustment factor. Thus, 15 scales took part in the residual analysis.

On the assumption that Extraversion-Introversion and Neuroticism were not correlated, the interscale correlations were adjusted (r_{ij}^*) in the following manner:

$$r_{ij}^* = r_{ij} - (r_{iN}r_{jN} + r_{iE}r_{jE})$$

where N = Neuroticism factor

E = Extraversion-Introversion factor

r_{ij} = original correlation between scales i and j,

r_{iN} = correlation between scale i and factor N,

r_{iE} = correlation between scale i and factor E.

Thus, the correlations were adjusted by reducing the correlation by the amount due to factor N and the amount due to factor E.

The adjusted intercorrelations were analyzed using a

principal axis factoring method with subsequent Varimax rotation. The factors in the residual space were then compared to the factors derived in the original factor analysis, where Extraversion-Introversion and Neuroticism were not held fixed.

III. RESULTS

A. NEW POI SCALES

A.1 First Grouping of Items

From the pool of 150 POI items, the first sample combination was chosen. The groups were as follows:

Group 1: items 1-25
Group 2: items 26-50
Group 3: items 51-75
Group 4: items 76-100
Group 5: items 101-125
Group 6: items 126-150

In the first round of analysis, 15 factor analyses were completed, where group i, for i = 1 to 6, was combined with every other group. With the restriction of minimal 5% variance contribution, which set a minimum eigenvalue of 2.5, imposed on the principal component analyses, 66 items were eliminated in the first round of analysis. An item was eliminated if its loading on any of the factors in all the analyses in which it was involved, did not exceed 0.4. The 84 items that were retained were subdivided into three groups, and a second round of analysis, involving three factor analyses, was completed under the same conditions. Thirty-five items were rejected, leaving a core of 49 items to enter subsequent steps in the analysis.

The core POI items were:

1, 2, 3, 4, 5, 7, 8, 11, 19, 25, 26, 28, 29, 32, 35, 40, 41, 42, 43, 44, 45, 48, 50, 55, 58, 60, 67, 68, 71, 82, 87, 88, 93, 94, 96, 101, 107, 111, 117, 118, 124, 125, 128, 130, 131, 132, 134, 136, 148.

A.2 Second Grouping of Items

The second sample combination consisted of the following grouping of items:

Group 1: items 1-10 and items 136-150
Group 2: items 11-20 and items 121-135
Group 3: items 21-30 and items 106-120
Group 4: items 31-40 and items 91-105
Group 5: items 41-50 and items 76-90
Group 6: items 51-75

To vary a cut-off point, a less stringent 4% minimal variance contribution was used. This established a minimum eigenvalue of 2.0. Thirty-three items were eliminated after the first round of analysis. The 117 items that were retained were subdivided into four subgroups, and a second round of analysis, involving nine factor analyses, was done. The second round of analysis eliminated 34 items. In a third round of analysis, the 83 retained items were subdivided into three subgroups, and three factor analyses were done. Twenty more items were eliminated leaving a core of 43 POI items. These were:

1, 2, 3, 4, 7, 10, 11, 25, 26, 28, 29, 30, 32, 40, 42, 43, 44, 48, 50, 54, 55, 68, 69, 71, 81, 82, 88,

93, 94, 96, 101, 108, 112, 117, 124, 125, 131, 132, 134, 136, 146, 147.

A.3 Preliminary Analysis of Common Items

The items which were common between the two sets of core items derived from the analysis of two sample combinations of the 150 POI items were 33 in number. Common items were:

1, 2, 3, 4, 7, 11, 25, 26, 28, 29, 32, 40, 42, 43, 44, 48, 50, 55, 68, 71, 82, 88, 93, 94, 96, 101, 117, 124, 125, 131, 132, 134, 136.

A principal component analysis was performed on the 33 POI items with subsequent oblique rotation. For the first five factors, eigenvalues were 7.03, 2.43, 1.71, 1.54 and 1.42, with corresponding 21.3, 7.4, 5.2, 4.7 and 4.3 per cent variance contribution. The decision was made to retain the first four factors. These were found meaningful psychologically; the fifth was left out because of the difficulty in interpretation. As it happened, only four meaningful factors were obtained previously by Jarmasz (1979) in his analysis of the POI.

Table 3.1 contains the results of the principal component analysis of the 33 common items, restricted to four factors. For each factor, six items with the highest loadings in the principal component analysis were identi-

TABLE 3.1 Principal Component Analysis of 33 Common POI Items after Oblique Rotation

POI	Factor I	Factor II	Factor III	Factor IV
1	0.124	0.502	0.150	0.138
2	0.361	0.354	0.012	0.251
3	-0.130	0.558	-0.169	0.193
4	0.565	0.039	0.098	-0.198
7	0.513	-0.017	-0.027	-0.561
11	-0.069	0.591	-0.015	0.067
25	0.246	0.164	0.513	-0.290
26	0.518	0.086	0.306	-0.518
28	0.406	0.272	0.428	-0.245
29	0.615	0.039	0.200	-0.238
32	-0.216	0.073	-0.123	0.537
40	-0.347	0.244	-0.116	0.510
42	0.692	0.015	0.228	-0.322
43	-0.133	0.252	-0.632	0.225
44	0.147	0.462	0.199	0.069
48	0.539	0.212	0.435	-0.080
50	0.498	-0.062	0.448	-0.386
55	0.355	0.109	0.583	-0.282
68	-0.388	0.230	-0.2[illegible]	0.472
71	0.135	0.210	0.667	0.004
82	0.509	-0.075	0.357	-0.275
88	0.602	0.006	0.210	-0.177
93	-0.176	-0.150	0.082	0.568
94	0.589	-0.025	0.297	-0.539
96	-0.047	0.507	0.029	-0.089
101	-0.193	0.061	-0.315	0.515
117	0.411	0.202	-0.115	-0.414
124	0.235	0.442	0.314	-0.139
125	0.655	-0.027	0.208	-0.260
131	0.321	-0.304	0.305	-0.336
132	-0.479	0.128	-0.035	0.551
134	-0.185	-0.050	-0.283	0.581
136	0.343	0.027	0.227	-0.543

fied. In descending order of absolute value of item loading, these were:

Factor I: items 42, 125, 29, 88, 94, 4
Factor II: items 11, 3, 96, 1, 44, 124
Factor III: items 71, 43, 55, 25, 50, 48
Factor IV: items 134, 93, 7, 132, 136, 94

A.4 Final Analysis of POI Items

Jarmasz (1979)'s analysis of the POI culminated in a principal component analysis of 49 core items. The results are found in Appendix A. Four factors were obtained, these being interpreted as Self-Actualization, Existentiality, Independence, and Self-Acceptance.

In an attempt to identify salient items, that is, the best possible items to be used in a final analysis, core POI items common to all three sample analyses (the study's two analyses and Jarmasz's) were singled out. These, 19 in number, included the following POI items:

2, 4, 11, 26, 28, 29, 42, 44, 48, 50, 55, 82, 88, 94, 124, 125, 131, 134, 136.

As was done in Section A.3, six items with the highest loadings were identified for each of Jarmasz's four factors.

Factor I: items 142, 98, 132, 103, 131, 140
Factor II: items 11, 124, 119, 150, 14, 5
Factor III: items 91, 61, 44, 52, 76, 28
Factor IV: items 42, 26, 82, 125, 50, 29

The decision was made to combine items with top loadings from Jarmasz and the preliminary common analysis in a single final analysis in order to strengthen the stability of the findings. Given the chance factor involved in the technique utilized to analyze items, Jarmasz's factors would be given a chance to appear on a different sample if indeed these factors existed. The 19 items appearing in the intersection of all three samples were all represented in the combination of items just described except for item 2. Item 2 was included in the final analysis.

The combination of items with top loadings from both analyses and with the inclusion of item 2 gave rise to the following 41 POI items:

1, 2, 3, 4, 7, 11, 14, 25, 26, 28, 29, 32, 42, 43, 44, 48, 50, 52, 55, 61, 71, 76, 82, 88, 91, 94, 96, 98, 103, 119, 124, 125, 131, 132, 134, 136, 140, 142, 148, 150.

A principal component analysis with subsequent oblique rotation was performed using the 41 POI items as the variables. The results are found in Table 3.2. For the first five factors, eigenvalues were 6.60, 2.87, 2.42, 1.79 and 1.65 with corresponding 16.5, 7.2, 6.0, 4.5 and 4.1 per cent variance contribution. Only the first four factors were found to be meaningful psychologically.

TABLE 3.2 Final Principal Component Analysis of POI Items after Oblique Rotation

POI	Factor I	Factor II	Factor III	Factor IV
1	0.064	0.500	0.120	0.118
2	0.126	0.484	0.077	-0.048
3	-0.081	0.518	-0.227	-0.164
4	0.487	0.110	-0.259	-0.162
7	0.523	0.003	-0.347	-0.369
11	-0.022	0.472	0.034	0.134
14	-0.129	-0.067	0.021	0.425
25	0.396	0.218	-0.181	0.307
26	0.663	0.122	-0.130	-0.137
28	0.505	0.264	-0.186	0.121
29	0.595	0.044	-0.178	-0.228
32	-0.355	0.088	0.400	0.217
42	0.685	0.034	-0.080	-0.117
43	-0.375	0.210	0.402	-0.470
44	0.155	0.499	-0.044	0.090
48	0.576	0.265	0.030	0.171
50	0.647	0.036	-0.184	-0.092
52	0.167	0.195	-0.411	-0.085
55	0.423	0.164	-0.431	0.276
61	0.034	0.231	-0.414	-0.100
71	0.272	0.225	-0.163	0.524
76	-0.031	0.267	-0.226	-0.031
82	0.578	-0.077	-0.053	0.113
88	0.544	0.062	-0.063	-0.058
91	-0.006	0.083	-0.375	0.159
94	0.697	-0.008	-0.214	-0.110
96	0.026	0.470	0.032	0.010
98	0.241	-0.153	-0.314	-0.345
103	-0.075	0.137	0.573	-0.181
119	-0.131	0.273	-0.112	-0.458
124	0.231	0.440	-0.215	0.271
125	0.602	-0.077	-0.199	-0.022
131	-0.466	-0.352	-0.056	0.109
132	-0.520	0.161	0.263	0.223
134	-0.378	0.069	0.412	-0.067
136	0.403	-0.004	-0.606	-0.046
140	-0.157	0.062	0.576	0.035
142	-0.176	0.282	0.584	-0.155
148	-0.019	0.448	-0.274	0.299
150	-0.306	-0.018	0.089	0.501

A.5 Definition of New POI Scales

Four new POI scales were defined on the basis of the four factors extracted in the principal component analysis in section A.4 (Table 3.2). Corresponding to each factor, a new POI scale was defined as the simple summation of particular item scores. Chosen items were those which minimally loaded 0.4 on a factor. Because of the numerous items loading on factor I, the minimum value of the loading was set to 0.5 as a cut-off for the selection of items for the scale representing factor I. Items, entering in the definition of each POI scale, are listed in Table 3.3.

All the 12 items defining the first POI scale, were items loading on the first factor extracted from the preliminary factor analysis of the present sample of subjects, as given in Table 3.1. Eight of the twelve items defined Jarmasz's fourth factor. Based on Jarmasz's labelling of his fourth factor, the POI scale was named Self-Acceptance.

All items defining the second POI scale were items in the original Existentiality scale, thus the label Existentiality was retained. Of these eight items, six were found in the preliminary analysis described in Section A.3, and four were found in Jarmasz's analysis, both loading on the second factor. Jarmasz also labelled it Existentiality.

TABLE 3.3 Items Defining New POI Scales

POI Scale 1		
94	b	I do not feel ashamed of my emotions.
42	b	I am not bothered by fears of being inadequate.
26	b	I am not afraid of making mistakes.
50	b	Criticism does not threaten my self-esteem.
25	b	I do not suffer from memories.
29	b	I do not fear failure.
82	b	I do not have feelings of resentment about things that are past.
48	b	I do not find it necesary to defend my past actions.
88	b	I do not worry about the future.
7	b	I am not afraid to be myself.
132	a	I feel certain and secure in my relationships with others.
28	b	My feelings of self-worth do not depend on how much I accomplish.
POI Scale 2		
3	b	I do not always tell the truth.
1	b	I am not absolutely bound by the principle of fairness.
44	b	I do not always need to live by the rules and standards of society.
2	b	When a friend does me a favor, I do not feel that I must return it.
11	b	I am not concerned with self-improvement at all times.
96	b	I am not orthodoxly religious.
148	b	There are times when honesty is not the best policy.
124	b	I do not feel the need to be doing something important all the time.
POI Scale 3		
136	b	I do not regret my past.
142	a	My past is a stepping-stone to my future.
140	a	For me, the future usually seems hopeful.
103	a	It is better to be yourself.
55	b	I can feel right without always having to please others.
61	b	I feel free to express both warm and hostile feelings to my friends.
52	b	I feel free to be angry at those I love.
134	a	I can accept my mistakes.
32	a	I can cope with the ups and downs of life.
POI Scale 4		
71	b	I will continue to grow best by being myself.
150	b	I cannot overcome every obstacle even if I believe in myself.
43	a	I believe that man is essentially good and can be trusted.
119	b	Women should not be trusting and yielding.
14	b	I have a lot of natural limitations even though I believe in myself.

There were nine items defining the third POI scale. Three items loaded on the fourth factor in the preliminary analysis (Table 3.1). Four of the nine items loaded on Jarmasz's first factor, which he called Self-Actualization. Based on item content, and on Jarmasz's naming of this factor, the label Self-Actualization was used for the third newly-defined POI scale.

Only five items defined the fourth POI scale. Of these, two loaded on the third factor of the preliminary analysis. None of the items came from the remaining factor (Factor III) in Jarmasz's analysis, although three of the five items loaded on his second factor. Thus, Jarmasz's second factor was split in the present analysis. Based on item content, which reflects a realistic belief in oneself combined with an optimistic outlook; the fourth POI scale was labelled Realistic Belief.

The correlations between the four POI scales are shown in Table 3.4. Self-Acceptance and Existentiality, as well as Self-Actualization and Existentiality, were minimally correlated, 0.139 and 0.133, whereas Self-Acceptance and Self-Actualization were correlated; 0.497.

TABLE 3.4 Correlations Between Four Newly-Defined POI Scales

	POI Scale 1 Self-acceptance	POI Scale 2 Existentiality	POI Scale 3 Self-Actualization	POI Scale 4 Realistic Belief
Scale 1	1.000	0.139	0.497	0.307
Scale 2		1.000	0.133	0.264
Scale 3			1.000	0.272
Scale 4				1.000

B. FACTORS IN PERSONALITY TESTS

B.1 Factor Analysis of Scales

Forty-one variables (18 scales from the CPI, 3 from EPI, 16 from 16 PF and 4 from POI) entered the final stage of data analysis, a principal component analysis and a principal axis factor analysis, with subsequent Varimax rotation. Table 3.5 contains the list of factors with eigenvalues greater than 1.0, along with the corresponding percent variance contribution. Four factors met the requirement of minimal 5% variance contribution. The results of the principal factoring analysis after Varimax rotation are found in Table 3.6.

Appendix B contains a list of the 41 scales which were used in the final analysis, along with a short description. It is included in order to facilitate the interpretation of the results.

What were the four factors? Using Table 3.6, the results from the principal factoring analysis, the factors were defined in terms of the scales which had loadings exceeding 0.4. For Factor I, only scales which had loadings exceeding 0.5 were used. Table 3.7 contains the definition of the four factors in terms of their scale loadings.

TABLE 3.5 Eigenvalues >1.0 with Associated Percent Variance Contribution from Principal Component Analysis of 41 Scales

FACTOR	Eigenvalue	% VAR
1	11.349	27.7
2	5.745	14.0
3	3.327	8.1
4	2.768	6.8
5	1.727	4.2
6	1.331	3.2
7	1.165	2.8
8	1.007	2.5

TABLE 3.6 Principal Factoring of 41 Scales from Four Inventories after Varimax Rotation

		Factor I	Factor II	Factor III	Factor IV
CPI					
	Do	0.366	0.677	-0.053	0.131
	Cs	0.562	0.500	0.301	0.167
	Sy	0.420	0.771	-0.032	0.077
	Sp	0.341	0.737	0.288	-0.137
	Sa	0.154	0.782	0.039	-0.006
	Wb	0.782	0.160	0.069	0.182
	Re	-0.518	-0.120	0.006	0.590
	So	0.420	-0.050	-0.155	0.604
	Sc	0.782	-0.440	-0.066	0.216
	To	0.763	0.102	0.342	0.293
	Gi	0.789	-0.133	-0.169	-0.040
	Cm	0.038	0.164	-0.062	0.442
	Ac	0.788	0.066	-0.071	0.342
	Ai	0.622	-0.121	0.495	0.271
	Ie	0.695	0.274	0.319	0.299
	Py	0.627	0.114	0.314	-0.010
	Fx	0.160	-0.042	0.702	0.038
	Fe	-0.097	-0.292	0.156	0.619
16 PF					
	A	0.127	0.160	-0.101	0.237
	B	0.117	-0.005	0.387	-0.020
	C	0.768	0.178	0.058	-0.066
	E	-0.130	0.555	0.143	-0.224
	F	-0.107	0.661	0.023	-0.012
	G	0.347	-0.044	-0.627	0.241
	H	0.306	0.792	-0.104	-0.064
	I	-0.032	-0.089	0.161	0.515
	L	-0.599	0.194	-0.043	-0.141
	M	0.267	0.003	0.346	0.010
	N	0.098	-0.364	-0.095	0.236
	O	-0.752	-0.273	-0.060	0.096
	Q_1	0.095	0.109	0.177	-0.415
	Q_2	0.049	-0.330	0.149	-0.202
	Q_3	0.472	-0.016	-0.451	0.042
	Q_4	-0.719	-0.109	0.086	0.227
EPI					
	E	-0.078	0.739	0.059	-0.067
	N	-0.850	-0.148	-0.005	0.051
	L	0.349	-0.309	-0.408	-0.155
POI					
	1	0.771	0.236	0.080	-0.056
	2	-0.018	0.150	0.636	-0.168
	3	0.418	0.338	0.103	0.328
	4	0.331	0.020	0.332	0.181

TABLE 3.7 Definition of Four Factors in Terms of Scale Loadings

FACTOR I	CPI	Gi	Good Impression	0.789
		Ac	Achievement via Conformance	0.788
		Sc	Self-Control	0.782
		Wb	Sense of Well-being	0.782
		To	Tolerance	0.763
		Ie	Intellectual Efficiency	0.709
		Py	Psychological-Mindedness	0.649
		Ai	Achievement via Independence	0.636
		Cs	Capacity for Status	0.575
		Re	Responsibility	0.543
	16 PF	C	Emotionally stable	0.768
		O	Apprehensive	-0.752
		Q_4	Tense	-0.719
		L	Suspicious	-0.599
	EPI	N	Neuroticism	-0.850
	POI	Scale 1	Self-Acceptance	0.771
FACTOR II	CPI	Sa	Self-Acceptance	0.782
		Sy	Sociability	0.771
		Sp	Social Presence	0.737
		Do	Dominance	0.677
		Cs	Capacity for Status	0.500
		Sc	Self-Control	-0.436
	16 PF	H	Venturesome	0.792
		F	Happy-go-lucky	0.661
		E	Assertive	0.555
	EPI	E	Extraversion	0.739
FACTOR III	CPI	Fx	Flexibility	0.702
		Ai	Achievement via Independence	0.495
	16 PF	G	Conscientious	-0.627
		Q_3	Controlled	-0.451
	EPI	L	Lie	-0.408
	POI	Scale 2	Existentiality	0.636
FACTOR IV	CPI	Fe	Femininity	0.619
		So	Socialization	0.604
		Re	Responsibility	0.590
		Cm	Communality	0.442
	16 PF	I	Tender-minded	0.515
		Q_1	Experimenting	-0.415

Since Eysenck's N scale loaded -0.850 on factor I, the label of Emotional Adjustment was used. The 16 PF scales which loaded on this factor define the opposite end of Cattell's second-order Anxiety factor. Similarly, the CPI scales, represented on the Emotional Adjustment factor, are the ones typically found in the second-order analysis of the CPI defining a factor which measures some form of positive adjustment (Megargee, 1972).

Factor II was labelled Extraversion principally because Eysenck's E scale loaded on this factor. Cattell's second-order factor Exvia is a combination of scales A, E, F, H and Q_2. The Outgoing A scale and Self-Sufficient Q_2 scale did not load on this factor. Concentrating on the CPI scales which defined factor II, the results confirmed the invariant structure of the second higher-order factor of the CPI scales (Megargee, 1972), and showed the correspondence between the higher order CPI factor and the Extraversion factor of the EPI.

The nature of factors III and IV was elucidated by referring to descriptions of the scales which had top loadings on these factors.

Factor III had top loadings from the CPI's Flexibility scale, from the POI's newly-defined Existentiality scale and from the 16 PF's Conscientious scale. The CPI's Fx scale measures the degree of flexibility and adaptability

of a person's thinking and social behavior. High scorers tend to be seen as insightful, informal, adventurous, confident, humorous, rebellious, idealistic, assertive and egoistic. Low scorers are deliberate, cautious, worrying, industrious, guarded, mannerly, methodical and rigid. The POI's original Existentiality scale, from which the newly-defined Existentiality scale was derived, was defined as measuring the ability to situationally or existentially react without rigid adherence to principles. Since the items defining the study's Existentiality scale are all in the original scale, a similar definition of what the new scale purports to measure can be retained. Cattell's G scale defines a person whose low score description is expedient and disregards rules whereas high scorers are said to be conscientious, persistent, moralistic and staid.

Thus, in a first attempt to grasp the nature of the third factor, such qualifiers as flexible, informal, rebellious, and expedient might be used to describe the high end of the continuum, whereas inflexible, methodical, rigid, and conscientious would describe the low end of the continuum.

Factor IV had loadings from the CPI's Femininity, Socialization and Responsibility scales. This was followed by Cattell's Sensitivity scale. The CPI's Fe scale is described as assessing the masculinity or femininity of

interests. Qualifiers for high scorers are: appreciative, patient, helpful, gentle, moderate, persevering, and sincere, and are taken as indicating more feminine interests. Low scorers tend to be seen as outgoing, hard-headed, ambitious, masculine, active, robust, and restless. The So scale indicates the degree of social maturity, integrity and rectitude which the individual has attained. High scorers tend to be seen as serious, honest, industrious, modest, obliging, sincere, and steady whereas low scorers are defensive, demanding, opinionated, resentful, stubborn, headstrong, rebellious, and undependable. In the same vein, the Re scale identifies persons of conscientious, reponsible, and dependable disposition and temperament. Qualifiers for Cattell's high-score description of the I scale are tender-minded, sensitive, clinging, and overprotected. Low scorers are tough-minded, self-reliant and realistic.

Again, in a first attempt to summarize the nature of the fourth factor from the scale descriptions, a person with a high score would be described as sincere, gentle, appreciative, dependable, sensitive and clinging. A low scorer would be seen as headstrong, demanding, outgoing, ambitious, tough-minded and self-reliant.

B.2 Residual Analysis

In the residual analysis, factors I and II, Emotional Adjustment and Extraversion-Introversion, were fixed. The 15 scales not taking part in the definition of these two factors (refer to Table 3.7) were the variables entering the analysis. After adjusting the scale intercorrelations by the amount due to the Emotional Adjustment factor and by the amount due to the Extraversion factor, a principal factoring analysis was conducted, followed by a Varimax rotation. Only two factors were called for. The results are found in Table 3.8. The scales having loadings exceeding 0.4 with each factor are listed in Table 3.9.

Clearly, factor III* is almost identical to factor III of the original analysis. The scales having the highest loadings in both analyses are the same, namely CPI's Flexibility scale, POI's Existentiality scale, and the 16 PF's Conscientious scale. In the residual analysis, the Existentiality scale of the POI takes the dominant role as the scale having the highest correlation with the factor. One difference that exists between the two factors is the inclusion of the CPI's Ai in factor III of the original analysis. Ai did not take part in the residual analysis as it was included in the definition of Emotional Adjustment.

There exist greater differences between factor IV*

TABLE 3.8 Principal Factoring Analysis of 15 Adjusted Scale Intercorrelations after Varimax Rotation

	FACTOR III*	FACTOR IV*
CPI		
Cm	-0.133	0.377
Fx	0.748	0.098
Fe	0.269	0.670
16 PF		
A	-0.052	0.426
G	-0.701	0.287
I	0.230	0.696
M	0.394	-0.061
N	-0.042	0.499
Q_1	0.145	-0.545
Q_2	0.146	-0.377
Q_3	-0.572	0.083
POI		
Scale 2	0.764	-0.146
Scale 3	0.181	0.487
Scale 4	0.398	0.202
EPI		
L	-0.553	-0.108

TABLE 3.9 Definition of Residual Factors in Terms of Scale Loadings

FACTOR III*	POI	Scale 2	Existentiality	0.764
	CPI	Fx	Flexibility	0.748
	16 PF	G	Conscientious	-0.701
		Q_3	Controlled	-0.572
	EPI	L	Lie	-0.553
FACTOR IV*	16 PF	I	Tender-minded	0.696
		Q_1	Experimenting	-0.545
		N	Astute	0.499
	CPI	Fe	Femininity	0.670
	POI	Scale 3	Self-actualization	0.487

of the residual analysis and factor IV of the original analysis. The scales having the highest factor loadings for factor IV* of the residual analysis are the 16 PF's Tender-minded (I) and Experimenting (Q_1) scales and the CPI's Femininity scale. Although I and Q_1 enter in the definition of the fourth factor in the original analysis, their contribution there is not as impressive. The CPI's Communality scale loaded on the fourth factor of the original analysis but did not load in the residual analysis. The PDI's Scale 3, Self-Actualization, contributed to the definition of factor IV* in the residual analysis. With the dominant role played by Cattell's I scale, and CPI's Fe scale, the factor extracted in the residual analysis is clearly a Sensitivity factor. Contributions from the 16 PF's Q_1 and N scales give this factor a flavor of conservatism and astuteness.

The residual analysis has not changed the nature of the two factors extracted when Emotional Adjustment and Extraversion-Introversion are fixed. In point of fact, it has emphasized the sensitive and feminine components contained in the fourth factor.

B.3 Approximation of Factors

Two sets of superscales were defined to approximate the factors extracted in B.1. The first set of superscales were the factor scores obtained through the SPSS's factor analysis subprogram. The subprogram calculates the factor scores as a linear function of the particular scales where the weights assigned to the scales are ootained through a multiple regression.

The second set of superscales was defined as a simple summation of particular scale scores. The scales chosen had loadings which exceeded 0.4 on factors II, III and IV, and which exceeded 0.5 on factor I.

Superscale I was defined by the 16 scales:

CPI:	Cs, Wb, Re, Sc, To, Gi, Ac, Ai, Ie, Py
16 PF:	C, L, O, Q_4
EPI:	N
POI:	Self-Acceptance

Superscale II was defined by the 10 scales:

CPI:	Do, Cs, Sy, Sp, Sa, Sc
16 PF:	E, F, H
EPI:	E

Superscale III was defined by the 6 scales:

CPI:	Ai, Fx
16 PF:	G, Q_3
EPI:	L
POI:	Existentiality

Superscale IV was defined by the 6 scales:

CPI:	Re, So, Cm, Fe
16 PF:	I, Q_1

Table 3.10 lists the correlations between the factor scores and Table 3.11 lists the correlations between the second set of superscales. The Emotional Adjustment superscale and Superscale IV are correlated (0.392), whereas the factors they represent are independent. An explanation for the observed correlation resides in the following. Factor scores are estimated from the scales with a certain degree of accuracy depending on the multiple correlation that the scores have with a given factor. The level of estimation of prediction of a given factor decreases with the number of factors extracted as witnessed by the decreased value of the factor loadings (correlations) the factors have with each subsequent factor. While factors are independent, factor scores may be correlated. In using simple summation instead of weighted summation, there is a further decrease in the prediction of factor scores. The obtained superscales therefore may be correlated and may represent roughly the original factors. The fourth superscale representing the last factor of the analysis has the lowest level of prediction. It probably, more than the remaining three superscales, departs from the original dimension represented by the fourth factor.

TABLE 3.10 Correlation Coefficients Between Factor Scores

	FACTOR SCORE 1	FACTOR SCORE 2	FACTOR SCORE 3	FACTOR SCORE 4
FACTOR SCORE 1	1.000	0.011	0.008	0.037
FACTOR SCORE 2		1.000	0.016	-0.024
FACTOR SCORE 3			1.000	0.011
FACTOR SCORE 4				1.000

TABLE 3.11 Correlation Coefficients Between Superscale Scores

	SUPERSCALE 1	SUPERSCALE 2	SUPERSCALE 3	SUPERSCALE 4
SUPERSCALE 1	1.000	0.160	0.092	0.392
SUPERSCALE 2		1.000	0.093	-0.172
SUPERSCALE 3			1.000	-0.018
SUPERSCALE 4				1.000

8.4 Item Analyses

Correlations between superscales and items were obtained for the two sets of superscales. Items with the highest correlations, whether positive or negative, were identified. Table 3.12 lists, for each factor score defining the first set of superscales, the 15 items with the highest correlations. The items are given in descending order of correlation, along with the identification of the questionnaire from which the item comes from. Table 3.13 is a similar table corresponding to the second set of superscale scores. For both tables, only correlations above 0.4 were used. Thus for superscales III and IV, Table 3.12 contained 11 and 6 items respectively, whereas Table 3.13 contained 10 and 13 items respectively.

Out of the 15 items correlating highly with superscale I, 12 were common to both tables. Eleven out of fifteen items were identical for superscale II. The tables have nine identical items, out of a possible ten, for superscale III, and four items, out of a possible six, for superscale IV. The common core of items between the two sets of superscales argues for regarding the two approximations of the factors as comparable.

The two sets of superscales were developed to approximate the factors obtained in the analysis. Factor I has

TABLE 3.12 Items Having Correlations with Factor Scores

Correlation	Test	Item No.	Item Description
FACTOR SCORE 1 (15 items)			
-0.609	EPI	14	Do you often worry about things you should not have done or said?
-0.604	CPI	176	I commonly wonder what hidden reason another person may have for doing something nice for me.
-0.590	CPI	232	Sometimes I feel that I am about to go to pieces.
-0.585	POI	50	Criticism threatens my self-esteem.
-0.570	EPI	2	Do you often need understanding friends to cheer you up?
-0.568	POI	94	I am often ashamed of some of the emotions that I feel bubbling up within me.
-0.566	EPI	38	Are you an irritable person?
-0.561	EPI	23	Are you often troubled about feelings of guilt?
-0.556	16 PF	49	I sometimes get in a state of tension and turmoil as I think of the day's happenings.
-0.554	EPI	7	Does your mood often go up and down?
-0.552	16 PF	74	I find myself upset rather than helped by the kind of criticism that many people offer one.
-0.552	CPI	187	I am inclined to take things hard.
-0.551	CPI	369	I seem to do things that I regret more often than other people do.
-0.546	CPI	279	I often get disgusted with myself.
0.540	CPI	76	I often feel as if the world was just passing me by.
FACTOR SCORE 2 (15 items)			
+0.655	16 PF	135	I consider myself a very sociable, outgoing person.
+0.587	16 PF	110	I find it easy to mingle among people at a social gathering.
-0.568	EPI	29	Are you mostly quiet when you are with other people?
-0.544	CPI	418	I am embarrassed with people I do not know well.
+0.523	CPI	346	I must admit that I am a pretty fair talker.
-0.517	CPI	111	When in a group of people, I have trouble thinking of the right thing to talk about.
+0.516	EPI	53	Can you easily get some life into a rather dull party?
+0.511	EPI	27	Do other people think of you as being very lively?
-0.509	CPI	31	I doubt whether I would make a good leader.
-0.496	CPI	452	I dislike to have to talk in front of a group of people.
-0.485	CPI	429	Even the idea of giving a talk in public makes me afraid.
+0.483	16 PF	111	When a bit of diplomacy and persuasion are needed to get people moving, I am generally the one asked to do it.
-0.482	16 PF	35	I get slightly embarrassed if I suddenly become the focus of attention in a social group.
+0.480	CPI	320	I would be willing to describe myself as a pretty "strong" person.
+0.473	CPI	108	I have no dread of going into a room by myself where other people have already gathered and are talking.

TABLE 3.12 Continued

Correlation	Test	Item No.	Item Description
FACTOR SCORE 3 (11 items).			
-0.506	CPI	408	I always see to it that my work is carefully planned and organized.
-0.496	16 PF	184	I am a fairly strict person, insisting on always doing things as correctly as possible.
-0.494	16 PF	134	I find the sight of an untidy room very annoying.
-0.457	CPI	24	I always like to keep my things neat and tidy and in good order.
-0.437	CPI	361	I like to have a place for everything and everything in its place.
-0.435	POI	111	I follow diligently the motto "Don't waste your time".
-0.426	POI	124	I feel the need to be doing something significant all of the time.
-0.425	16 PF	48	I keep my room well organized, with things in known places almost all of the time.
-0.420	POI	11	I am concerned with self-improvement at all times.
-0.419	16 PF	160	I always make it a point, in deciding anything, to refer to basic rules of right and wrong.
-0.401	CPI	347	I never make judgments about people until I am sure of the facts.
FACTOR SCORE 4 (6 items)			
-0.467	CPI	210	I very much like hunting.
-0.454	CPI	444	My parents never really understood me.
-0.419	CPI	214	In school I was sometimes sent to the principal for cutting up.
-0.412	16 PF	20	Money can buy almost everything.
+0.410	CPI	480	I must admit it would bother me to put a worm on a fish hook.
-0.405	CPI	261	We ought to let Europe get out of its own mess, it made its bed, let it lie in it.

TABLE 3.13 Items Having Correlations with Four Superscales

Correlation	Test	Item No.	Item Description
SUPERSCALE 1 (15 items)			
-0.608	CPI	176	I commonly wonder what hidden reason another person may have for doing something nice for me.
-0.588	EPI	14	Do you worry about things you should not have done or said?
-0.568	POI	94	I am often ashamed of some of the emotions that I feel bubbling up within me.
-0.563	EPI	23	Are you often troubled about feelings of guilt?
-0.561	CPI	232	Sometimes I feel that I am about to go to pieces.
-0.550	CPI	369	I seem to do things that I regret more often than other people do.
-0.548	EPI	2	Do you often need understanding friends to cheer you up?
-0.547	POI	50	Criticism threatens my self-esteem.
-0.546	16 PF	74	I find myself upset rather than helped by the kind of criticism that many people offer one.
-0.536	EPI	38	Are you an irritable person?
-0.532	CPI	145	I have a tendency to give up easily when I meet difficult problems.
-0.530	CPI	270	I often lose my temper.
-0.530	CPI	279	I often get disgusted with myself.
-0.528	CPI	243	I am often bothered by useless thoughts which keep running through my mind.
-0.524	16 PF	49	I sometimes get in a state of tension and turmoil as I think of the day's happenings.
SUPERSCALE 2 (15 items)			
+0.639	16 PF	135	I consider myself a very sociable, outgoing person.
+0.586	16 PF	110	I find it easy to mingle among people at a social gathering.
-0.586	EPI	29	Are you mostly quiet when you are with other people?
-0.585	CPI	418	I am embarrassed with people I do not know well.
+0.564	CPI	52	I usually take an active part in the entertainment at parties.
-0.563	CPI	31	I doubt whether I would make a good leader.
-0.559	CPI	111	When in a group of people I have trouble thinking of the right things to talk about.
+0.556	16 PF	10	On social occasions, I readily come forward.
-0.537	CPI	429	Even the idea of giving a talk in public makes me afraid.
+0.536	CPI	346	I must admit I am a pretty fair talker.
-0.529	CPI	452	I dislike to have to talk in front of a group of people.
+0.515	EPI	27	Do other people think of you as being very lively?
-0.507	16 PF	35	I get slightly embarrassed if I suddenly become the focus of attention in a social group.
+0.506	16 PF	111	When a bit of diplomacy and persuasion are needed to get people moving, I am generally the one asked to do it.
-0.504	CPI	38	It is hard for me to start a conversation with strangers.

TABLE 3.13 continued

Correlation	Test	Item No.	Item Description
SUPERSCALE 3 (10 items)			
-0.536	16 PF	134	I find the sight of an untidy room very annoying.
-0.523	16 PF	184	I am a fairly strict person, insisting on always doing things as correctly as possible.
-0.514	CPI	408	I always see to it that my work is carefully planned and organized.
-0.508	CPI	361	I like to have a place for everything and everything in its place.
-0.501	CPI	24	I always like to keep my things neat and tidy and in good order.
-0.474	16 PF	48	I keep my room well organized, with things in known places almost all the time.
-0.432	16 PF	160	I always make it a point, in deciding anything, to refer to basic rules of right and wrong.
-0.422	POI	11	I am concerned with self-improvement at all times.
-0.422	POI	111	I follow diligently the motto "Don't waste your time".
-0.409	POI	3	I feel I must always tell the truth.
SUPERSCALE 4 (13 items)			
-0.530	CPI	214	In school, I was sometimes sent to the principal for cutting up.
-0.493	16 PF	20	Money can buy almost everything.
-0.457	CPI	444	My parents never really understood me.
-0.453	CPI	420	I used to steal sometimes when I was a youngster.
-0.450	CPI	210	I very much like hunting.
-0.444	CPI	196	I think I would like to fight in a boxing match sometime.
-0.411	CPI	398	Life usually hands me a pretty raw deal.
+0.411	16 PF	138	I admire the beauty of a poem more than that of a well-made gun.
-0.410	CPI	36	When I was going to school I played hooky quite often.
-0.409	CPI	189	In school my marks in deportment were quite regularly bad.
-0.407	CPI	117	I don't blame anyone for trying to grab all he can get in this world.
-0.406	CPI	114	At times I feel like picking a fist fight with someone.
-0.404	CPI	26	It's a good thing to know people in the right places so you can get traffic tags, and such things taken care of.

already been labelled Emotional Adjustment based on the EPI's N scale loading. Further evidence to support the nature of this factor is derived from the items correlating highly with factor score I and superscale I. The item content focuses on lack of neurotic complaints coupled with acceptance of self. Similarly, the items found under factor score II and superscale II support factor II being interpreted as Extraversion. Item content includes sociability, being at ease in social gatherings, and the ability to lead and manage people.

Both approximations for factor III have high correlations with items focusing on the freedom from planning, organization and order, as well as the lack of preoccupation with always having to do something, with adherence to rules. The emphasis is on an unorganized approach towards life as opposed to an organized lifestyle. Thus, the label of Organized vs Unorganized seems appropriate for factor III.

What comes through in the item content found under both sets of superscales approximating factor IV is the opposite of a tough-minded, rebellious, aggressive approach to life. The label of Sensitivity vs Tough-Minded for factor IV seems justified.

IV. DISCUSSION

A. FOUR FACETS OF PERSONALITY FUNCTIONING

Once more, Emotional Adjustment and Extraversion-Introversion have surfaced as the two pivotal points of personality functioning contributing the most in terms of variability. The study's hypothesis stated that beyond these two main personality dimensions, there existed two additional dimensions, Independence and Sensitivity. Evidence for the existence of Independence among major personality dimensions has not been found in the study. Some support however has been found for the existence of the Sensitivity dimension, where a sensitive person is contrasted with a tough-minded one. Another major personality dimension discovered is one contrasting organized versus unorganized people.

The major personality dimensions found in the study correspond to the first four factors of the five-factor model of personality derived from analyses of the natural language vocabulary of personality (McCrae & Costa, 1985). Sensitivity corresponds to Agreeableness (good-natured vs. irritable, soft-hearted vs. ruthless) and the Organized dimension corresponds to Conscientiousness (careful vs. careless, organized vs. disorganized). McCrae and Costa

have sugested that Agreeableness and Conscientiousness are disctinct and fundamental second-order factors that should be included in research concerning the biological bases of personality.

The Independence dimension was not found in the study. Aspects of independent behavior are subsumed under both the Extraversion dimension and the Organized vs Unorganized dimension. The Extraversion dimension emphasizes social leadership implying assertiveness and dominance, and the Organized vs. Unorganized dimension emphasizes freedom from conventional standards, implying an independent and radical frame of mind. Thus, component elements of a hypothesized Independence dimension were more important in defining the second and third major dimensions than in forming a separate facet of personality functioning. Independence is a concept of major importance in the humanistic approach to personality. Although it has not appeared among the four personality dimensions, it has contributed to the definition of two of them: Extraversion (vs. Introversion) and Unorganized (vs. Organized).

Although the main focus of the study was on additional personality characteristics beyond Emotional Adjustment and Extraversion-Introversion, it is worthwhile to note the psychological description of these two main dimensions as revealed by the item analysis.

A.1 . Emotional Adjustment

Emotional Adjustment, the first main personality dimension, contrasts the emotionally stable person with the neurotic individual. The items describe the emotionally unstable individual as one who worries and feels guilty and who is generally tense, anxious, irritable and moody. He mistrusts the other ("what hidden reason another person may have for doing something nice for me"). His self-esteem is low as it is easily threatened by criticism and he feels ashamed of his emotions. There is dependence on others in that he often relies on them to cheer him up. There is undue time and energy spent regretting past actions. Anger hovers near the surface ("I often lose my temper"). He lacks perseverance, giving up when the going gets tough. The overall impression is that the individual is at the mercy of life. He is not in control of his emotions and he does not believe in himself. His dependence on others does not engender trust but rather distrust. Instead of forging ahead, he stays with the past and relives its mistakes.

At the opposite end of the continuum, the emotionally stable person is one for whom unpleasant emotional states such as worry, anxiety, guilt, moodiness, and irritability are not predominant. Belief in others exists. There is implied strength in that the person can take

criticism and he does not wallow in the past with its mistakes but rather forges ahead despite difficulties. Thus, one has the picture of an individual who is in control of his emotions rather than subjected to them, who believes in himself and trusts his fellowman, and who is independent of others to bolster him up.

To summarize, the Emotional Adjustment dimension obtained in the study contrasts an individual who is buffeted by unpleasant emotions, whose self-esteem is low, and whose interaction pattern is one of dependence and lack of trust, with one who is in control and who believes in himself and others.

A.2 Extraversion-Introversion

Extraversion-Introversion was the second main personality dimension found in the study. The items reveal an extraverted individual who is sociable, lively and talkative, and who basically feels at ease wih other people. He is not afraid to speak in public or with strangers. At social gatherings, he actively gets involved. He sees himself as a good leader, with an ability to influence and animate other people. In general, the extravert is described as sociable and outgoing, a person who stands out at social gatherings. He is socially dominant in the sense

that he is a leader who sees himself as "strong" and who can influence others in social settings.

At the opposite end, the introverted individual is quiet and not very sociable. He has difficulty talking to people and feeling at ease with them. He shuns the limelight, preferring to lose himself in a group of people rather than be the focus of attention. He is not a leader and he does not wish to initiate and lead social activities. The picture is one of a quiet, reserved individual who is not comfortable with groups of people and who prefers to be anonymous in social gatherings, following rather than leading. Consistent with Jung's description, the introvert is one who keeps his thoughts to himself, directing his energies within rather than outside in interacting with other people.

A.3 Organized vs. Unorganized

The dimension representing organized versus unorganized people appeared as the third most significant dimension within the confines of the personality input space. A detailed inspection of the items defining the dimension gives further insight into the nature of this characteristic. At one end of the continuum, a person puts emphasis on organization, order, and planning. Untidiness

is frowned upon, one's work is carefully organized, and things are kept neat and tidy, and in known places. There is a preoccupation with employing one's time constructively and doing things correctly. In some items, there exists a flavor of moral obligation to improve oneself, and to tell the truth. Basic rules of right and wrong are essential referral points in decision-making. Elements of righteousness and conservatism seem to enter into these items.

Looking beyond the content of the individual item to its underlying meaning, the theme of structure can be applied to all items. For example, the items about not wasting one's time can be interpreted as the belief that one's time must be planned and organized in order to make more appropriate use of it. Such items as "concerned with self-improvement at all times", "in deciding anything, to refer to basic rules of right and wrong" and "never make judgments about people until I am sure of the facts" can be viewed from the person's belief that his life must be structured in order to gain the most out of it. Goals, such as self-improvement, provide a certain structure. Decision-making is based on facts and/or rules. The items which mention tidiness, order, and planning, imply that the individual imposes structure on his environment in order for it to be congruent with his inner state.

The items are concerned with one's life structure,

and also include implicitly what provides the structure. Organization, order, efficiency and diligence are all characteristics valued by our society which believes in accomplishing things. Decision-making is based on rules of right and wrong. The individual feels that he must always tell the truth. His frame of reference is that of society's conventional standards of appropriate behavior. He believes in certain fixed rules of proper behavior. Situational variables do not seem to alter the individual's way of looking at and interpreting his world. From this point of view, he appears inflexible.

At the opposite end of the continuum, the unorganized person is described in terms of what he is not. The individual is not concerned with organization, order and planning. He is not preoccupied with self-improvement and is not unduly bothered by procrastination. Basic rules of right and wrong do not influence his decision-making. There is lack of a definitive social structure in the person's life. The individual has not adopted society's standards of appropriate and productive behavior as guides for his own behavior. A somewhat radical and independent frame of mind is implied. There exists a flavor of flexibility in the sense that the person does not keep in mind certain fixed principles. The implication is that situational variables play a part for the unorganized

person. Although the unorganized individual does not abide by society's standards, this does not mean that he has no rules. He may have developed his own personal system of values.

To summarize, the third personality dimension differentiates between an organized individual who adopts societal standards as the basis for his behavior and one who is unorganized and radical, who does not adhere to conventional principles and who is influenced by situational variables in his behavior and decision-making. Within the conventional standards of the organized individual, order, organization and planning are included.

A.4 Sensitive vs. Tough-Minded

The study supplies evidence for the existence of a Sensitivity dimension. One end of the continuum describes a person with a gentle, sensitive nature who dislikes physical violence and who is appreciative of art. The opposite end emphasizes the tough-minded, aggressive and rebellious aspects of the individual who resents life's raw deal and believes in getting everything he can out of life.

A detailed inspection of the items reveals further insights into the nature of this personality dimension. The sensitive end of the continuum is mostly described by

negative statements, that is, by what one is not. The two statements which are phrased positively have to do with being bothered by putting a worm on a hook and preferring an art expression to a gun, an object used for killing. These statements suggest a person who is uneasy with respect to aggression against animals. Consistent with this unease is the dislike of hunting. Combined with the distaste of physical aggression against animal life is the denial of aggressive urges against other people. Also included is the idea of a well-behaved socialized youngster. There is also the expression of a helping attitude towards others. Thus, the picture of a gentle and sensitive being who expresses distaste and dislike of aggression and/or fighting is evoked.

The opposite extreme is the tough-minded individual who feels hard done by ("my parents never really understood me"). In his life, he has acted rebelliously and broken rules (bad marks in deportment, played hooky, cutting up, stealing). He admits his aggression: "feel like picking a fist-fight with someone" and "would like to fight in a boxing match". There is the belief that life has not been fair to him in consequence of which he believes in providing for himself. He is also realistic and opportunistic: "money can buy almost everything" and "knowing people in the right places". Here is the portait of a tough-minded

individual who survives by his pragmatic appraisal of life and by his aggressive behavior, and who is ready to adopt a tough stance towards others.

A certain aggressive component underlies many of the items defining the tough-minded individual. Some items directly admit to aggressive impulses or refer to a past when rebellion existed, whereas some items indirectly imply some form of aggression (gun, hunting). Another set of items represents the idea of a pragmatic outlook on the facts of life.

The fourth main personality dimension is thus one that contrasts a tough-minded individual who has a pragmatic and aggressive approach towards life, with a sensitive individual who possesses a non-aggressive and helpful nature.

B. FURTHER RESEARCH

B.1 Theoretical Implications

The study has provided its own description of the two major dimensions of personality functioning, Emotional Adjustment and Extraversion-Introversion. Because of the variations that can exist in the descriptive nature of these concepts, further work might be done to define them

more comprehensively or more accurately.

Emotional Adjustment typically has been concerned with an individual's acceptance of self and his lack of neurotic complaints. The item analysis conducted in the study confirms the description. In addition, the study suggests that Emotional Adjustment could be broadened by including, along with a self component, an interactive component. The dimension is not only concerned with the self but also with how the self interacts with others.

The Extraversion dimension obtained in the study is notably one of social extraversion. It does not contain the impulsiveness component found in Eysenck's E scale. There has been controversy in the literature as to whether sociability and impulsiveness are two related components defining Extraversion or whether they are independent aspects of behavior. The study favors the idea of Extraversion being a unitary dimension, including sociability and excluding impulsiveness. The question as to whether Extraversion contains an impulsiveness component might be answered more conclusively outside the factor analytic realm. Empirical studies linking Extraversion to physiological underpinnings would profit from subdividing Extraversion into its component elements, sociability and impulsiveness, whenever it is so defined.

Humanistically-based and empirically-based personal-

ity inventories have been combined in order to derive major characteristics of the normal individual. The POI's existentiality construct has been instrumental in the definition of the third personality dimension. Its contribution has been to define the frame of reference that provides structure for the organized person. One question that can be asked is whether the unorganized person and the existentially-minded person are one. The unorganized end of the continuum includes the existentially-minded individual, one who has developed a personal system of values not necessarily congruent with society's. But it also includes the principleless bum who drifts from situation to situation with no plan and forethought.

Today's times are being influenced by existential principles where the individual's freedom of choice and responsibility are stressed. New generations are departing from society's standards in favor of developing their own personal conscience. Thus, the Organized vs Unorganized dimension eventually might represent the existentially-minded person as the norm, with two opposing extremes, one being the valueless drifter, the other being the rigid, conventional person.

The question arises as to whether there exists a link between organization and neuroticism. The organized individual's self-imposed behavioral structure is limiting,

allowing little flexibility. Possibly, his style of living is a means of coping with life and making it manageable. It could be viewed as a defense against neuroticism, working well in stable times when no flux and rapid change threaten the status quo. Might not the organized individual be a constitutionally-disposed neurotic individual who is defending against his major tendency by structuring his life rigidly? Rigidity characterizes the behavior of neurotics. The neurotic individual appears locked into a self-defeating behavioral pattern. Possibly, the organized individual's behavioral pattern becomes dysfunctional in disrupted times. A threat to the self-imposed structure might lead to the insurgence of neurotic behavior. Such ideas are hypothetical and must be further studied. Two separate psychological dimensions have been found but the issue raised here is whether there exists a physiological common ground between the two.

Another possibility, different from the above, seeks a physical explanation as to what underlies the third-personality dimension in the realm of energy. It is possible that the organized individual orders his life in order to conserve energy. The organization of his environment and the relatively set standards he adopts minimize the energy used in decision-making. His behavior in different situations is predictable. Little energy is

spent deciding on a possible course of action. Thus, the socially organized individual might have, in temperamental terms, less élan vital, or in physical terms, less energy to deal with life's vagaries and fluctuations than the unorganized person.

The Sensitivity dimension is one which necessitates further elaboration. Being the fourth factor extracted, it could not be determined from scales as exactly as the first three factors. It was less well approximated by the simple summation of specified scales. A relationship existed between its superscale approximation and the Emotional Adjustment superscale, whereas the factors were independent. The link between Sensitivity and Emotional Adjustment might be explained on the basis of suppressed anger. Certain aggressive impulses apparent at the tough-minded end such as "picking a fist fight with someone" and "like to fight in a boxing match" might represent the unresolved, suppressed anger of the neurotic. Notice the item "I often lose my temper" included in the set of items under the Emotional Adjustment superscale. Notwithstanding the relationship existing between the factor approximations, the factors themselves are independent.

There does exist an aggressive attitude in the Sensitivity dimension, different from the unresolved anger mentioned above. Is there a physical equivalence to the

psychological tough-mindedness within the dimension? How could a physical tough-mindedness be represented? In terms of the psychological description, a tough-minded individual readily adopts an aggressive stance in response to situational facts. Could it be that the person is unable to perceive or to stay with more than one interpretation of the facts, remaining immune to all its possibilities? Is there a physiological slowness in reaction to stimuli which renders an individual impervious to its many possibilities? Does there exist a non-reactivity to stimuli in the tough-minded individual?

B.2 Practical Implications

A parsimonious view of personality is desirable. Personality inventories usually are criticized because of the redundancy of the characteristics they measure. With the summarization of what underlies individual differences into four major personality dimensions, the task of assessing an individual is simplified.

The four main personality dimensions can be used to discriminate between various clinical groups. The first dimension selects the neurotic from the emotionally stable individual. Within the neurotic population, both introverted and extraverted individuals can be found. Eysenck

and Eysenck (1969) distinguished between neurotic extraverts, who were more prone to suffer hysteria, and neurotic introverts, who were more susceptible to anxiety states. Classification studies could use the four dimensions to see how people cluster and, possibly, to recognize, within the clusters, certain clinical groups.

In vocational and educational counselling, measurement of these four personality dimensions would help delineate occupational and educational choices. The personality patterns of occupational groups could be developed. Thus, people attracted to hard sciences like physics and engineering typically might show a pattern of introversion, organization and tough-mindedness. Occupations in the fields of art and music might have a pattern of introversion, sensitivity and rather loose organization. An unorganized individual might, because of his flexibility, show more promise in creative fields. The organized person probably would do well in an environment where efficiency and production quotas are de rigueur.

Job success in particular occupational groups (academic success in particular fields of study) could be predicted on the basis of the four main personality dimensions. Such information, along with the personality configurations of occupational groups, would improve on occupational and educational choices and also help in the selection of candidates for particular jobs.

BIBLIOGRAPHY

Adcock, C.J. A comparison of the concepts of Cattell and Eysenck. British Journal of Educational Psychology, 1965, 35, 90-97.

Adcock, N.V., Adcock, C.J. and Walkey, F.H. Basic dimensions of personality. International Review of Applied Psychology, 1974, 23, 131-137.

Allport, G.W. Pattern and Growth in Personality. New York: Holt, Rinehart and Winston, 1961.

Anastasi, A. Psychological Testing, 4th ed. New York: MacMillan Publishing Co. 1976.

Barrett, P. and Kline, P. The location of superfactors P, E and N within an unexplored personality factor space. Personality and Individual Differences, 1980, 1, 239-247.

Baughman, E.E. Personality: The Psychological Study of the Individual. New Jersey: Prentice-Hall, 1972.

Bavelas, J.B. Personality: Current Theory and Research. California: Brooks/Cole, 1978.

Berzins, Juris I., Barnes, Daniel F., Cohen, Daniel I. and Ross, Wesley F. Reappraisal of the A-B therapist "type" distinction in terms of the Personality Research Form. Journal of Consulting and Clinical Psychology, 1971, 36(3), 360-369.

Bloxom, B.M. reviewing the "Sixteen Personality Factor Questionnaire", in O.K. Buros, Ed., The Eighth Mental Measurements Yearbook, Highland Park, New Jersey, The Gryphon Press, 1978, 1, 1077-1078.

Bolton, Brian. Evidence for the 16 PF primary and secondary factors. Multivariate Experimental and Clinical Research, 1977, 3(1), 1-15.

Browne, James A. and Howarth, Edgar. A comprehensive factor analysis of personality questionnaire items: a test of twenty putative factor hypotheses. Multivariate Behavioral Research, 1977, 12 339-427.

Bugental, J.F.T. The third force is psychology. Journal of Humanistic Psychology, 1964, 4, 19-25.

Burdsal, Charles and Bolton, Brian. An item factoring of 16 PF-E: further evidence concerning Cattell's normal personality sphere. Journal of General Psychology, 1979, 100, 103-109.

Burdsal, C.A. and Vaughn, D.S. A contrast of the personality structure of college students found in the questionnaire medium by items as compared to parcels. Journal of Genetic Psychology, 1974, 125, 219-224.

Burger, G.K. A short form of the CPI. Psychological Reports, 1975, 37, 179-182.

Buros, O.K. (ed.) The Seventh Mental Measurements Yearbook. Highland Park, New Jersey, The Gryphon Press, 1975.

Buros, O.K. (ed.) The Eighth Mental Measurements Yearbook. Highland Park, New Jersey: The Gryphon Press, 1978.

Cattell, R.B. Oblique, second-order and cooperative factors in personality analysis. Journal of Genetic Psychology, 1947, 36, 3-22.

Cattell, R.B. Second-order personality factors in the questionnaire realm. Journal of Consulting Psychology, 1956, 20, 411-418.

Cattell, R.B. The 16 PF and basic personality structure: a reply to Eysenck. Journal of Behavioural Science, 1972, 1, 169-187.

Cattell, R.B. Personality and Mood by Questionnaire, San Francisco: Jossey Bass, 1973.

Cattell, R.B., Eber, H.W. and Tatsuoka, M.M. Handbook for the Sixteen Personality Factor Questionnaire (16 PF), Champaign, Illinois: Institute for Personality and Ability Testing, 1970.

Cattell, R.B. and Nichols, K.E. An improved definition from 10 researches of second-order personality factors in Q data. Journal of Social Psychology, 1972, 86, 187-203.

Cattell, R.B. and Vogelmann, S. Second stratum personality structure in joint rating and questionnaire measures: with new light on questionnaire distortion. Multivariate Experimental Clinical Research, 1976, 2(1), 43-56.

Comrey, Andrew L. Factored homogeneous item dimensions in personality research. Educational Psychological Measurement, 1961, 21, 417-431.

Comrey, Andrew L. and Duffy, Jurt E. Cattell and Eysenck factor scores related to Comrey personality factors. Multivariate Behavioral Research, 1968, 3(4), 379-392.

Digman, J.M. and Takemoto-Chock, N.K. Factors in the natural language of personality: Re-analysis, comparison, and interpretation of 6 major studies. Multivariate Behavioral Research, 1981, 16, 149-170.

Eysenck, H.J. The Biological Basis of Personality. Springfield, Illinois: Thomas, 1967.

Eysenck, H.J. Primaries or Second-order Factors: A critical consideration of Cattell's 16 PF battery. British Journal of Social and Clinical Psychology, 1972, 11, 265-269.

Eysenck, H.J. Personality and Factor Analysis: A Reply to Guilford. Psychological Bulletin, 1977, 84, 405-411.

Eysenck, H.J. Superfactors P, E and N in a comprehensive factor space. Multivariate Behavioral Research, 1978, 13, 475-481.

Eysenck, H.J. and Eysenck, S.B.G. Manual for the Eysenck Personality Inventory. San Diego: Educational and Industrial Testing Service, 1968.

Eysenck, H.J. and Eysenck, S.B.G. Personality Structure and Measurement, London: Routledge and Kegan Paul, 1969.

Eysenck, S.G.B. and Eysenck, H.J. On the dual nature of extraversion. British Journal of Social and Clinical Psychology, 1963, 2, 46-55.

Farley, F.H. Further investigation of the two personae of extraversion. British Journal of Social and Clinical Psychology, 1970, 9, 377-379.

Foulds, M. Positive mental health and facilitative genuineness during counseling. Personnel and Guidance Journal, 1969, 47, 762-766.

Frankl, V.E. Man's Search for Meaning. Boston, Mass.: Beacon Press, 1959.

French, J.W. Toward the Establishment of Non Cognitive Factors Through Literature Search and Interpretation, Princeton, New Jersey: Educational Testing Service, 1973.

Gendre, F. and Fournier, G. Etude des relations entre le 16 PF, l'ACL et l'IPH. Travail Humain, 1978, 41(1), 55-65.

Gorsuch, R.L. and Cattell, R.B. Second stratum personality factors defined on the questionnaire realm by the 16 PF. Multivariate Behavioral Research, 1967, 2, 211-224.

Gough, H.G. Manual for the California Psychological Inventory. Palo Alto, California: Consulting Psychologists Press, 1957.

Guilford, J.P. Factors and factors of personality. Psychological Bulletin, 1975, 82(5), 802-814.

Guilford, J.P. Will the real factor of extraversion-intraversion please stand up? A reply to Eysenck. Psychological Bulletin, 1977, 84(3), 412-416.

Hakstian, A.R., Rogers, W.J. and Cattell, R.B. The behavior of number-of-factors rules with simulated data. Multivariate Behavioral Research, 1982, 17, 193-219.

Hall, C.S. and Lindzey, G. Theories of Personality, 2nd ed. New York: John Wiley and Sons, 1970.

Harman, H.H. Modern Factor Analysis. Chicago, Illinois, University of Chicago Press, 1970.

Howarth, E. Were Cattell's "personality sphere" factors correctly identified in the first instance? British Journal of Psychology, 1976, 67(2), 213-230.

Howarth, E. Major factors of personality. The Journal of Psychology, 1980, 104, 171-183.

Howarth, E. and Browne, J.A. Investigation of personality factors in a Canadian context. 1. Marker structure in personality questionnaire items. Canadian Journal of Behavioral Science, 1971, 3, 161-173.

Howarth, E. and Browne, J.A. An item factor analysis of the 16 PF. Journal of Personality Assessment, 1971, 2(2), 117-139.

Humphreys, L.G., Tucker, L.R. and Dachler, P. Evaluating the importance of factors in any given order of factoring. Multivariate Behavioral Research, 1970, 5, 209-216.

Hundleby, J.D. and Connor, W.H. Interrelationships between personality inventories: the 16 PF, the MMPI, and the MPI. Journal of Consulting and Clinical Psychology, 1968, 32, 152-157.

Jarmasz, W. An Empirical Study of the Theoretical Constructs in Shostrom's Personal Orientation Inventory. Unpublished doctoral dissertation, University of Ottawa, 1979.

Kaiser, H.F. The varimax criterion for analytic rotation in factor analysis. Psychometrika, 1958, 23, 187-200.

Karson, Samuel and O'Dell, Jerry W. Is the 16 PF factorially valid? Journal of Personality Assessment, 1974, 38, 104-114.

Kleinmuntz, B. Personality Measurement: An Introduction. Illinois: Dorsey Press, 1969.

Kline, P. Personality: Measurement and Theory. London, Hutchinson, 1983.

Kline, P. and Barrett, P. The factors in personality questionnaires among normal subjects. Advances in Behaviour Research and Therapy, 1983, 5, 141-202.

Knapp, Robert E. Relationship of a measure of self-actualization to neuroticism and extraversion. Journal of Consulting Psychology, 1965, 29, 168-172.

Knapp, Robert R. and Comrey, Andrew L. Further construct validation of a measure of self-actualization. Educational and Psychological Measurement, 1973, 33, 419-425.

Krug, Samuel E. and Laughlin, James E. Second-order factors among normal and pathological primary personality traits. Journal of Consulting and Clinical Psychology, 1977, 45(4), 575-582.

Lovegrove, S.A. and Hammond, S.B. A procedure for factoring an unlimited pool of items with results for the C.P.I. using young Australian males. Australian Journal of Psychology, 1973, 25, 29-43.

Lykken, D.T. Multiple factor analysis and personality research. Journal of Experimental Research in Personality, 1971, 5, 161-170.

Maslow, A. Motivation and Personality. New York, Harper, 1954.

Maslow, A. The Further Reaches of Human Nature. New York: Viking Press, 1971.

McCrae, R.R. and Costa, P.T. Jr. Comparison of EPI and Psychotism scales with measures of the five-factor model of personality. Personality and Individual Differences, 1985, 6, 587-597.

Megargee, E.I. The California Psychological Inventory Handbook, San Francisco: Jossey-Bass, 1972.

Milton, G. Alexander and Lipetz, Milton E. The factor structure of needs as measured by the EPPS. Multivariate Behavioral Research, 1968, 3(1), 37-46.

Mitchell, J.V. Jr. A comparison of first and second order dimensions of the 16 PF and CPI inventories. Journal of Social Psychology, 1963, 61, 151-166.

Nichols, R.C. and Schnell, R.R. Factor scores for the California Psychological Inventory. Journal of Consulting Psychology, 1963, 27, 228-235.

Norman, W.T. Toward a taxonomy of personality attributes: Replicated factor structure in peer nomination personality ratings. Journal of Abnormal and Social Psychology, 1963, 66, 574-583.

O'Dell, J.W. and Karson, S. Some relationships between the MMPI and 16 PF. Journal of Clinical Psychology, 1969, 25, 279-283.

Orlinsky, D.E. and Howard, K.I. The relation of process to outcome in psychotherapy. In S.L. Garfield and A.E. Bergin (Eds.) Handbook of Psychotherapy and Behaviour Change: An Empirical Analysis. New York: Wiley, 1978.

Ottomanelli, Gennaro. Second order analysis of Comrey's eleven factor solution. Multivariate Behavioral Research, 1972, 7(3), 299-304.

Peterson, D.R. The age generality of personality factors derived from ratings. Educational and Psychological Measurement, 1960, 20, 461-474.

Peterson, D.R. Scope and generality of verbally defined personality factors. Psychological Review, 1965, 72, 48-59.

Porebski, O.R. A semi-orthogonal dependent factor solution. Psychometrika, 1968, 33, 451-468.

Porebski, O.R. The Estimates of Second Order Factors in Eysenck-Cattell Personality Tests. Unpublished paper, University of Ottawa, 1977.

Rogers, C.R. A theory of therapy, personality, and interpersonal relationships as developed in a client-centered framework. In S. Kock (Ed.) Psychology: A Study of a Science, Vol. 3. New York: McGraw-Hill, 1959.

Rogers, M.S. and Shure, G.H. An empirical evaluation of the effect of item overlap on factorial stability. Journal of Psychology, 1965, 60, 221-233.

Royce, J.R: The conceptual framework for a multi-factor theory of individuality. In Royce, J.R. (Ed.), Multivariate Analysis and Psychological Theory. London: Academic Press, 1973, p. 309-407.

Schludermann, S. and Schludermann, E. Generalizability of California Personality Inventory Factors. Journal of Psychology, 1970, 74(1), 43-50.

Sells, S.B. Demaree, R.G. and Will, D.P. Jr. Dimensions of personality: II. Separate factor structures in Guilford and Cattell trait markers. Multivariate Behavioral Research, 1971, 6, 135-185.

Shostrom, E.L. An inventory for the measurement of self-actualization. Educational and Psychological Measurement, 1964, 24, 207-218.

Shostrom, E.L. Manual for the Personal Orientation Inventory. San Diego, Educational and Industrial Testing Service, 1974.

Silverstein, A.B. and Fisher, G. Is item overlap responsible for a "built-in" factor structure? Psychological Reports, 1968, 23, 935-938.

Silverstein, A.B. and Fisher, G. Item overlap and the "built-in" factor structure of the Personality Orientation Inventory. Psychological Reports, 1972, 31, 492-494.

Stroup, A.L. and Manderscheid, R.W. The California Psychological Inventory: Reappraisal of Reliability. Journal of General Psychology, 1975, 92, 217-224.

Stroup, A.L. and Manderscheid, R.W. CPI and 16 PF second-order factor consequence. Journal of Clinical Psychology, 1977, 33, 1023-1026.

Stroup, A.L. and Manderscheid, R.W. Analytical, sample and gender variations in 16 PF second-order personality factors. Journal of Experimental Education, 1978-79, 47(2), 118-125.

Tosi, D.J. and Hoffman, S. A factor analysis of the Personality Orientation Inventory. Journal of Humanistic Psychology, 1972, 12, 86-93.

Tosi, D.J. and Lindamood, C.A. The measurement of self-actualization: A critical review of the Personality Orientation Inventory. Journal of Personality Assessment, 1975, 39, 215-223.

Vagg, P.R. and Hammond, S.B. The number and kind of invariant personality (Q) factors: a partial replication of Eysenck and Eysenck. British Journal of Social and Clinical Psychology, 1977, 15, 121-129.

Van Kaam, A. Existential Foundations of Psychology. Pittsburgh, Pa.: Duquesne University Press, 1966.

Veldman, D.J. and Parker, G.V.C. Adjective rating scales for self-description. Multivariate Behavioral Research, 1970, 5(3), 295-302.

Velicer, W.F., DiClemente, C.C. and Corriveau, D.P. Item format and the structure of the Personal Orientation Inventory. Applied Psychological Measurement, 1984, 8, 409-419.

Walkey, F.H. and Green, D.E. The structure of the E.P.I.: a comparison between simple and more complex analysis of a multiple scale questionnaire. Multivariate Behavioral Research, 1981, 16, 361-372.

Wells, W.T. and Good, L.R. Item factor structure of the 16 PF. Psychology, 1977, 4(2), 53-55.

Wiggins, Jerry S. Personality structure. Annual Review of Psychology, 1968, 18, 293-350.

Winder, P., O'Dell, J.W. and Karson, S. New motivational distortion scales for the 16 PF. Journal of Personality Assessment, 1975, 39, 532-537.

APPENDIX A Jarmasz (1979)'s Four-Factor Solution of POI Items

Item	Factor I	Factor II	Factor III	Factor IV
I2	-0.031	0.410	0.374	0.006
I4	0.481	0.222	0.044	0.269
I5	-0.091	0.529	0.207	0.197
I11	-0.055	0.579	0.198	0.193
I14	0.177	0.566	-0.216	-0.166
I22	-0.446	-0.332	-0.112	0.004
I26	0.199	0.166	0.201	0.661
I28	0.120	0.142	0.441	0.169
I29	-0.037	-0.049	0.376	0.554
I35	-0.125	0.180	-0.426	-0.308
I37	-0.058	-0.353	-0.505	0.042
I42	0.075	-0.062	0.230	0.666
I44	0.108	0.100	0.524	-0.316
I45	-0.035	-0.191	0.413	0.119
I48	0.354	0.253	0.082	0.449
I50	0.228	-0.032	0.143	0.550
I51	0.091	0.403	0.279	-0.276
I52	0.104	0.132	0.544	0.212
I54	0.359	0.056	0.291	0.180
I55	0.373	0.220	0.331	0.265
I58	0.243	0.195	0.428	0.138
I59	0.124	0.167	0.102	0.468
I61	0.013	0.096	0.543	0.108
I64	0.309	0.112	0.413	0.028
I76	0.194	0.023	0.473	0.164
I82	0.420	0.034	0.072	0.578
I84	0.236	-0.073	0.315	0.405
I88	0.145	-0.034	0.104	0.530
I91	0.004	0.051	0.545	0.009
I94	0.440	0.089	0.191	0.364
I98	0.595	0.099	0.023	0.267
I103	-0.516	0.032	-0.347	-0.020
I107	0.354	0.440	-0.039	-0.166
I111	-0.052	0.497	0.004	0.214
I119	0.144	0.557	0.194	-0.018
I124	0.285	0.577	0.106	0.065
I125	0.407	0.043	0.091	0.543
I131	0.498	-0.051	-0.046	0.202
I132	-0.575	0.009	-0.152	-0.274
I134	-0.281	-0.055	0.024	-0.360
I136	0.414	-0.161	-0.129	0.345
I140	-0.482	0.091	-0.029	-0.102
I141	-0.376	-0.245	-0.319	0.195
I142	-0.611	-0.001	-0.184	-0.029
I143	-0.469	0.090	0.138	0.088
I148	-0.138	0.521	0.009	0.003
I150	0.128	0.608	0.070	-0.254

APPENDIX B | List of Scales from Four Inventories and Summary Definition.

CPI

Do Dominance
Leadership ability, dominance, persistence, and social initiative

Cs Capacity for Status
Personal qualities and attributes which underlie and lead to status

Sy Sociability
Outgoing, sociable, participative temperament

Sp Social Pressure
Poise, spontaneity, and self-confidence in personal and social interaction

Sa Self Acceptance
Sense of personal worth, self-acceptance, and capacity for independent thought

Wf Sense of Well-being
Minimize worries and complaints, free from self-doubt and disillusionment

Re Responsibility
Conscientious, responsible, and dependable disposition and temperament

So Socialization
Social maturity, integrity and rectitude

Sc Self-control
Self-regulation and self-control and freedom from impulsivity and self-centeredness

To Tolerance
Permissive, accepting, and non-judgmental social beliefs and attitude

Gi Good Impression
Concerned with creating a favorable impression, and about how others react

Cm Communality
Individual's reactions and responses correspond to modal pattern

Ac Achievement via Conformance
Interest and motivation which facilitate achievement where conformance is a positive behavior

APPENDIX B continued

Ai Achievement via Iindependence
Facilitate achievement in setting where autonomy and independence are positive behaviors

Ie Intellectual Efficiency
Degree of personal and intellectual efficiency which indivudal has attained

Py Psychological-Mindedness
Interested in, and responsive to the inner needs, motives, and experiences of others

Fx Flexibility
Flexibility and adaptability of a person's thinking and social behavior

Fe Femininity
Feminine interests

16 PF

A Outgoing
Warmhearted, easy-going, participating

B Intelligence
More intelligent, abstract-thinking, bright

C Emotionally stable
Mature, faces reality, calm

E Assertive
Aggressive, stubborn, competitive

F Happy-Go-Lucky
Enthusiastic

G Conscientious
Persistent, moralistic, staid

H Venturesome
Uninhibited, socially bold

I Tender-Minded
Sensitive, clinging, overprotected

L Suspicious
Hard to fool

M Imaginative
Bohemian, absent-minded

APPENDIX B continued

N Astute
Polished, socially aware

O Apprehensive
Self-reproaching, insecure, worrying, troubled

Q_1 Experimenting
Liberal, free-thinking

Q_2 Self-Sufficient
Resourceful, prefers own decisions

Q_3 Controlled
Exacting will power, socially precise, compulsive

Q_4 Tense
Frustrated, driven, overwrought

EPI

N Neuroticism
Tendency to overrespond emotionally; difficulty in returning to normal state

E Extraversion
Sociable, outgoing, uninhibited, impulsive, optimistic and ascendant

L Lie
Create favorable impression

POI

Scale 1 Self-Acceptance
Freedom from feelings of threat, fears, failure

Scale 2 Existentiality
Ability to situationally react without rigid adherence to principles

Scale 3 Self-actualization
Sense of strength; positive view of oneself

Scale 4 Realistic Belief
Realistic assessment of oneself