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**LA THÈSE A ÉTÉ
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AN EMPIRICAL STUDY OF THE THEORETICAL CONSTRUCTS
IN SHOSTROM'S PERSONAL ORIENTATION INVENTORY

by Jerzy Władysław Jarmasz

Thesis submitted to the School of Graduate
Studies of the University of Ottawa as
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Jerzy Władysław Jarmasz, Ottawa, Ontario, Canada, 1978.

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CURRICULUM STUDIORUM

Jerzy Władysław Jarmasz was born in 1939 in Poland. He obtained the B.A. degree in 1964 from the University of Ottawa. He was granted the Master of Psychology (M.Ps.) degree from the same institution in 1968. His interim report was entitled Alpha Profiles for Three Anxiety Levels on a Normal Adult Sample (1971).

ABSTRACT

The concept of self-actualization is considered by its proponents to represent an individual's ultimate life-goal. The best known and in fact the only generally available test to gauge self-actualization is the Personal Orientation Inventory of Shostrom. This test consists of two major non-overlapping groups of items labelled Time Competence and Inner-Directedness respectively and 10 correlated complementary scales, all of them involved in the measurement of self-actualization.

The purpose of the present study was to check on the test's power to differentiate between self-actualizers and non-self-actualizers; to validate formally the scale structure of the Personal Orientation Inventory (POI) and the items associated with each scale; to reanalyze the scales in order to find the basic content in terms of items; to supplement this by a direct factor analysis of items aiming to obtain a conceptually simpler framework for the items; to verify the existence of any additional personality dimensions beyond those provided by the well established personality inventories of Eysenck and Cattell and to seek a reinterpretation of the factors found in these well established inventories through an extension of meaning provided by the inclusion of certain components of the POI.

ABSTRACT

The main statistical method adopted in the study was correlational in nature. It entailed item analysis, factor analysis and residual analysis holding well established personality factors constant. A special procedure had to be developed for the handling of the large number of items in a single analysis, for the approximation of factors by a finite number of unweighted items, and for the determination of residual dimensions on a practical basis. All analyses were performed on a tertiary education level sample involving students from the Faculties of Arts and Science of the University of Ottawa and including a group of accomplished research scientists from the National Research Council of Canada (NRC), for a total of 137 individuals. The NRC group was included to represent those assumed to be more self-actualizing than the student population.

Assuming that the research scientist group was chosen more as a matter of convenience than as the best exemplar of self-actualizers the POI scales were found to be partly successful in distinguishing them from the student population in that only three scales provided statistically significant discrimination.

ABSTRACT

As expected, the items grouped under the various POI scales did not completely confirm the internal consistency of the test with less than one third of the items being confirmed as associated with the originally proposed scales. The factor analysis of the scales indicated that the total content of the test can be represented in terms of a smaller number of meaningful dimensions than those originally proposed. A direct factor analysis of items based on analytic criteria (defined a priori) confirmed this conclusion in that it established four meaningful factors which required only 41 out of the total 150 items for their adequate assessment. These factors were interpreted as Self-actualization, Existentiality, Independence and Self-acceptance. The hypothesis that the POI contributes dimensions of personality structure additional to those contained in the well-known Eysenck and Cattell tests was clearly confirmed. In addition to the 4 superfactors derived from the combined use of the Eysenck and Cattell tests (Adjustment, Extroversion, Assertive-Radical, Sensitive vs. Practical) there were 4 residual factors found present in the POI. In view, however, of the high original correlation between the Adjustment superfactor and two of the newly established POI factors it was decided that only two residual factors (Existentiality

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and Independence) would be retained as independent additional dimensions and the other two (Self-actualization and Self-acceptance) would be used to redefine the concept of Adjustment, already extended by the joint use of the Eysenck and Cattell scales, to achieve a more comprehensive concept of PSYCHOLOGICAL MATURITY.

The basic motive to conduct this study was thus satisfied in that the required extension of the concept of Adjustment as including certain components of the POI could be empirically demonstrated as possible. This hypothesis was verified by very significant and clear correlational evidence.

A further contribution of this study to the understanding of the structure of personality was the empirical definition of the Existentiality and Independence scales provided by POI although rearranged in a new form.

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INTRODUCTION

Expansion of knowledge in science, aside from the occasional spectacular discovery, occurs through the process of accumulation of information that is obtained mainly by verifying hunches, hypotheses or theories. The mass of information has to be tied into a coherent whole. The unifying link is provided by a theory.

In psychology we are witnessing a slow evolution towards a taxonomy of phenomena which should allow the establishment of the basic tenets of this science. The field of personality in particular is replete with theoretical positions wanting a cohesive link.

Two approaches could pave the way for a theoretical system that would bring order to the present situation. On the one hand, there are painstaking empirical quantitative studies of a restricted area of personality where the high level of verification takes precedence over the comprehensiveness of the approach. On the other hand, there is a more global and synthetic intuition about the personality function where the process of quantitative verification is less emphasized. Such a global approach is exemplified by the Personal Orientation Inventory of Shostrom where the emphasis is made on the whole area of self-fulfilment.

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Clearly, there is a need for a series of quantitative empirical studies before a test like Shostrom's can be used in practice without ambiguity.

In this paper the concept of self-actualization as embodied in the test devised by Shostrom is studied in successive factor analyses, a simplified alternative to the original test is proposed, and the four factors extracted from the test are compared with factors obtained from an analysis of the well established personality inventories of Eysenck and Cattell. Two of the new factors are used to modify the meaning of factors in the Eysenck-Cattell frame of reference. The other two factors are suggested as additional independent dimensions in the structure of personality.

In the first chapter an introduction to the concept of self-actualization is presented and the three self-reporting instruments utilized in this study are described in the light of previous studies together with a justification of the statistical methods selected (factor analysis). Next follows a statement of the objectives and of the expectations of the study. The third chapter describes the sample, the instruments, the design and the detailed data verification procedure with the justification of each analytic step. The

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statistical results are given in chapter four in the form of a series of tables and of descriptions of the findings. A first attempt at psychological interpretation of findings is made. This is followed by the last chapter in which the findings are discussed in the light of their contribution to psychological theory verification and expansion.

References to studies quoted in the paper are listed in a separate section. Appendices containing information that could help the reader unfamiliar with some of the tools utilized are given at the end of this paper.

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1.0.0

REVIEW OF LITERATURE

1.1.0 An Introduction to the Concept of Self-Actualization

Many ideas, many concepts, many systems of descriptors have been offered in order to account for human behaviour. Most are based on a more or less orderly observation of discreet individual acts. The bits of behaviour that tend to recur are considered to form a unit characteristic of a person's way of being. The recurring behaviour forms a pattern. The emerging pattern serves then as a means of describing how people act in general and further, why people act the way they act. Some of the descriptions or explanations thus derived are found to be useful over a range of time and are amenable to verification by persons other than the one who suggested the description originally. When verified, the descriptions can be utilized as benchmarks against which samples of human behaviour can be gauged.

In psychology, the construct of Self-actualization came into being by such a process. The construct which, as Maslow acknowledges, was proposed by Kurt Goldstein (Maslow, 1954, p. 91), gained favour with the former after he had found himself engaged in an attempt to understand what it was that made two of his teachers outstanding (Maslow, 1971, p. 41).

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When discussing it in terms of a theory of motivation, Maslow defined self-actualization as "man's desire for self-fulfillment, namely... the tendency for him to become actualized in what he is potentially" (1954, p. 91-92). Maslow came to realize that what he had observed in the two teachers of his, constituted a clear pattern. He subsequently began to study, not in a strictly controlled fashion but on the basis of observations of individuals he considered as definite or probable "self-actualizers", the behaviour pattern which accounted for the outstandingness of various individuals. The individuals Maslow decided to study were either acquaintances and personal friends of his or well known figures, past or present who, according to his hitherto subjective criterion, merited the label of self-actualizers. He also took a sample of students selected on the basis of absence of pathology. This group on the whole turned out to be useful in the negative sense, that is, as being far from self-actualization.

In the course of years Maslow studied various groups in order to progressively arrive at clearer descriptions of all those characteristics that contributed to his definition of self-actualization. Thus, people he called self-actualizers were those who had "full use and exploitation of talents,

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capacities, potentialities, et c." (1954, p. 200). This also meant that they

"felt safe and unanxious, accepted, loved and loving, respectable and respected, and that they had worked out their philosophical, religious, or axiological bearings" (p. 201).

Finally, in Maslow's posthumous work (1971) one finds eight descriptors, characteristics, or facets of a behaviour pattern typical of self-actualizers.

In the first place, self-actualizers appear to be capable of complete awareness, of full immersion, of total attention to an experience in a given moment. For Maslow, the self-actualizers experience "selflessly" (1971, p. 45), without any awkward self-awareness. Next, self-actualization is seen as a process of steps, of individual choices towards fulfillment. This process implies that a defined and differentiated self is to be actualized. This third facet, that of one's distinctive identity, is what gives the particular flavour to the full experiencing of the individual.

A fourth characteristic of the self-actualizer is that he or she assumes responsibility, takes a stand. This leads to the fifth characteristic which is that the individual is very much aware of his opinions, listens to himself, and exercises his independent judgement at the risk of differing from the most widely held opinion. Sixth, self-actualization means striving to excel at what one is best, to make real

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one's potential. Although self-actualization is an on-going process, there are transitory moments, or "peak experiences" (p. 48) which are moments of rapture and boundless joy.

This seventh facet is akin to mystic experience but does not exclude shattering one's illusions, finding out what one is not capable of doing. In fact, it should lead to a less difficult - the eighth characteristic of self-actualizing - step, namely, identification of defence mechanisms. The defences are then given up, even if painfully, because problems are solved by facing them.

Maslow's conceptualization of self-actualizers suggests that individuals that could be labeled as such are very exceptional people, nearly perfect, rather difficult to emulate for the majority of humanity. Most mortals, if they could measure themselves against such paragons, should find themselves wanting on most descriptors. An attainable state of self-actualization is offered by Shostrom in his Personal Orientation Inventory (1964). It is made more explicit in his book on actualizing psychotherapy which appeared in 1976. This view of self-actualization seems to be not a divergence from but an evolution of Maslow's concept.

1.2.0 Measurement of the Concept of Self-Actualization

Many of the most widely used psychological tools for

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assessment of personality are based on clinically impaired populations. Thus, Rorschach developed his projective technique by observation and tabulation of the most typical responses to an array of inkblots by psychiatric patients in his clinic. The main reference population of the Minnesota Multiphasic Personality Inventory consisted of psychiatrically impaired patients hospitalized in Minnesota institutions along with some "normals", that is, hospital visitors and patients with physical impairments. The Eysenck Personality Inventory (EPI) was compiled on the basis of responses of psychiatric patients at Maudsley Hospital.

A normal individual, when assessed with the help of instruments derived in the above manner, is then defined as not being "sick", "un-well", "pathological" or whatever term would be used in such a frame of reference. This frame of reference is known to psychologists and other human sciences workers as the medical model of personality functioning. This way of perceiving and conceiving of man's personality has been subject to debate for at least two decades, and does not appear to wane as witness the amount of writing on the subject. (The reliance on the medical model does not by itself impair the validity, or the usefulness of a number of excellent personality inventories.)

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1.2.1 The Personal Orientation Inventory

Self-actualization of the individual has become the main theme of humanistic, existential and gestalt psychologies. In order to provide the psychotherapeutic approaches which centre around this concept with an instrument to measure the degree of self-actualization, Shostrom (1963, 1966) developed the Personal Orientation Inventory (POI). In his own words, the POI was to meet "the need for a comprehensive measure of values and behavior seen to be of importance in the development of the self-actualizing person" (Shostrom, 1974, p.4). With the help of this inventory an individual's values are compared to those of a sample of self-actualizing adults.

A self-actualizing person, as Shostrom restates Maslow's idea, is "developing and utilizing all of his unique capabilities, or potentialities, free of the inhibitions and emotional turmoil of those less self-actualizing" (1974, p.4). This description does not dispell the vagueness of the concept. It becomes more precise, that is, more amenable to discussion if it is expressed in the terms employed in the POI following Maslow's (1971, p.28) suggestion that self-actualization is what the POI measures.

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Thus, if each scale represents a characteristic of a self-actualizing individual, this individual is (1) time competent, that is, functioning in the "present", concerned with the here-and-now, and (2) primarily "self" oriented, autonomous in his thought and actions. He further, holds values and beliefs characteristic of other self-actualizing individuals -- which is rather circular in reasoning; is flexible in applying the principles he holds; is sensitive to his own needs and expresses them spontaneously in action; because he is aware of his strength as a person he holds himself in high esteem; he also accepts himself in spite of whatever weaknesses he has; regards the nature of man in a constructive manner, as basically good and relates opposites in life in a meaningful way; accepts aggression within himself as a normal feeling and is capable of developing and maintaining intimate contacts.

The scoring categories of the POI used to describe the self-actualizing person were based on ideas derived by Shostrom (1964) from Riesman's concept of inner- and other-directedness, Maslow's self-actualization, and May's and Perls' time-orientation concepts. The items defining the scoring categories came from value judgements about individuals

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seen by therapists over a period of five years at the Institute of Therapeutic Psychology (Shostrom, 1964, p.208).

The 150 items defining the POI are in the form of two-choice statements (actually more like 300 statements) which are scored first for the two major scales of Time Competence (Tc) consisting of 23 double items, and of Inner-Directedness (I) consisting of 127 double items; and then for the ten frequently overlapping complementary scales of Self-Actualizing Value (SAV), Existentiality (Ex), Feeling Reactivity (Fr), Spontaneity (S), Self-Regard (Sr), Self-Acceptance (Sa), Nature of Man-Constructive (Nc), Synergy (Sy), Acceptance of Aggression (A), and Capacity for Intimate Contact (C). The detailed scale composition is listed in the Appendix to this paper.

The Seventh Mental Measurements Yearbook (Buros, 1972) lists 123 references in its review of the POI. Knapp (1976) reports many additional ones. In the thirteen years since its ~~appearance~~ appearance the Inventory has been utilized in many different situations and has been the subject of a number of validation studies. Besides its application in individual psychotherapy with clinicians who favour the humanistic, gestalt or existential approaches, the POI has been used, among others, in teacher and counsellor training as a predictor of

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success, in industrial setting to study psychological growth as affected by organizational culture, and in various sensitivity training and encounter groups.

The validation studies reported by Shostrom in his 1964 article included 150 patients in therapy, 75 individuals enrolled in a sensitivity training program at U.C.L.A., 15 school psychologists in a group training program and 650 freshmen at Los Angeles State College. There were, further, 160 "normal" adults as well as 29 and 34 patients nominated by a group of clinical psychologists as "relatively self-actualized" and "relatively non-self-actualized" respectively. Shostrom reports that the results obtained indicated that eleven out of the 12 scales constituting the Inventory discriminated significantly between self-actualizing and non-self-actualizing individuals.

Knapp (1965) administered the POI to 136 undergraduate college students selected on the basis of "high" or "low" neuroticism scores on the Eysenck Personality Inventory (EPI). He found all mean differences to be significant at or beyond the .05 level. All of the POI scales were negatively correlated with the EPI's Neuroticism (N) scale. Thus, it could be expected that individuals scoring high on the POI would not obtain a high score on Eysenck's N scale. Also,

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eight of the POI scales showed a significant correlation (at or beyond the .05 level) with the N scale. Seven of the 12 scales were positively correlated at or beyond the .01 level with Eysenck's Extraversion scale.

Damm (1969) undertook to derive an overall measure of self-actualization from the POI since he felt that of the number of different profile patterns which existed none was suited as an overall index for a non-specific population. The POI was administered to 208 high school students (95 male and 113 female). Raw score distributions for all 12 scales were converted to standard scores. Various ratio combinations were attempted. Damm concluded that no significant increase in predictability was gained by converting to standard scores and that the best overall measure of self-actualization was obtained from the raw scores of the Inner-Directedness (I) scale, or by combining the raw scores of the I and Tc (Time Competence) scales.

Margulies (1969) while studying the conditions of psychological growth in an organization found that individuals classified as self-actualizing with the help of the POI tended to exhibit an intrinsic value-orientation. They also tended to be more aware of the "interconnectedness between task

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achievement and social need satisfaction" (p.503). Finally, it was also found that the more self-actualizing the group, the less it drew its norms from "formal authority". These findings lend support to the claims of the POI.

McClain (1970) in an attempt to correlate POI scores with ratings of self-actualization of normal adults used a sample of thirty guidance counsellors attending a National Defence Act Guidance Institute who were rated by a staff of counsellor educators. The highest correlations between the ratings and POI scores were obtained for the Inner-Directedness, Spontaneity and Self-Acceptance scales (beyond .01 level). Existentiality and Feeling Reactivity correlated beyond the .02 level of significance. Time Competence, Self-Actualizing Value, Acceptance of Aggression and Capacity for Intimate Contact were found to be significant beyond the .05 level. The composite ratings did not yield a significant level of correlation for three of the scales: Self-Regard, Nature of Man and Synergy (p.22).

Tosi and Hoffman (1972) submitted the POI scales to a factor analysis of the scores of 132 undergraduate students. Based on the two major scales of Time Competence and Inner-Directedness plus the ten complementary scales, the analysis yielded 3 factors which Tosi and Hoffman labelled

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Extroversion, Open-Mindedness and Existential Non-Conformity. They suggested the use of three or four scales instead of the present number.


Knapp and Comrey (1973) undertook to reconfirm that self-actualization is related to emotional stability (as measured by the Comrey Personality Inventory (CPS), 1970) and to correlate various POI scales with the CPS subscales. The subjects were 84 volunteers from a southern California university, ranging in age from 18 to 32, the average being 21 years old. As in Knapp's 1965 study, a positive significant correlation was found between self-actualization and emotional stability. Further, all but one POI (Existentiality) scale correlated beyond the .05 level and nine scales were significantly correlated at or beyond the .01 level with the CPS Emotional Stability vs. Neuroticism subscale. This suggests that the construct of existentiality as understood in the POI could be independent from the constructs of emotional stability and self-actualization. The overall results indicated a high relationship between the two inventories as well as a degree of independence of some concepts being measured.

Wills (1974) found on a sample of 300 college freshmen (with equal representation from both sex groups) that individuals classified on the POI to be of different

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self-actualization levels also exhibited different personality characteristics according to the level. These personality characteristics were those described in the Tennessee Self-Concept Scale, the Differential Value Profile, and the Achievement Motivation Scales for Males and Females. A different configuration of personality characteristics was also found to exist between males and females at the different levels of self-actualization.

Lorr and Knapp (1974) reported results of a factor-analytic study involving the test items of a sample of 300 subjects, of which 93 were unspecified professionals, educators, counsellors and teachers, 123 students and 84 individuals from unspecified occupational groups. The method of principal-component analysis was used. A total of ten interpretable factors were obtained. The tentative labels for the retained factors were Self-esteem (9 items), Adherence to Principles: Flexible vs. Rigid (7 items), Freedom of Self-Expression (12 items), Obligation to Self (5 items), Positive View of Human Nature (7 items), Self-Actualization (8 items), Flexible vs. Perfectionistic (number of items not stated), Self-Accepting (9 items), Acceptance of Differences (4 items) and Acceptance of Aggression (5 defining items). A number of these factors were quite similar to a number of the POI



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scales. The factors identified in this study accounted for 33% of the total correlational variance only, with many items failing to contribute significantly to any of the retained factors.

Coan, in the Seventh Mental Measurements Yearbook (1972), reproaches the POI that "it represents an arbitrarily and theoretically biased selection of variables" (p.121) and recommends the Inventory be used, at present, as a research tool. Item overlap from scale to scale is pointed out by Bloxom (1972, p.121). The directions for interpretation of the Time Ratio (the proportion of items answered as Time Competent vs. Time Incompetent) are not met with enthusiasm by the reviewers, neither is the varying length of the scales (Bloxom, p.121; Raanan, 1973, p.478) and the inherent cultural bias stemming from a particular value system is also criticised. Thus, it seems that reviewers of the POI are less laudatory than the users of the test.

The writings reviewed in this chapter suggest the POI can be a useful tool to study the values of normal adults. It is also found wanting in the area of validity of its measurable constructs and of interpretation of the meaning thereof. The areas of concern seem to be mainly:

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1. A loosely defined concept of self-actualization, and
2. Overlapping subscales.

It would be challenging to test the constructs of this inventory developed on a logical basis from a dynamic theory of personality against an inventory of personality built empirically on a factor-analytic principle for the purpose of obtaining overall measures of personality characteristics. Two such instruments widely used in applied as well as in experimental settings that have withstood the test of time are the Eysenck Personality Inventory (EPI) and Cattell's Sixteen Personality Factor Questionnaire (16PF). Both instruments have been shown in professional literature to correlate with the constructs which make up the POI. Both can be assumed to constitute together a frame of reference for a study of the constructs included by Shostrom in the POI.

1.2.2 The Eysenck Personality Inventory

The EPI (Eysenck and Eysenck, 1963) is a questionnaire consisting of fifty-seven items yielding two factors, Extraversion-Introversion (E) and Neuroticism (N), and a Lie scale. It is a revised version of its predecessor, the Maudsley Personality Inventory. It has two parallel forms.

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Eysenck's name is the one most associated with factorial studies in Britain. To quote Adcock (1965) Eysenck's concept of extraversion-introversion comes from Jung's classification of personality into two primary types (especially the inhibitory aspect of introversion), McDougall's notion of reduction of inhibitory control of higher centres, and of Pavlov's conditioning. In this way extraversion-introversion is anchored in human physiology and thus constitutes a basic psychological structure. This factor was extracted in a factor analysis as well as the factor of neuroticism (Eysenck and Eysenck, 1968) which describes emotional reactivity, vulnerability to stress.

Individuals with high scores on the Neuroticism scale

"tend to be emotionally overresponsive and to have difficulties in returning to a normal state after emotional experiences [...] to develop neurotic disorders under stress [...] a person may have high scores on N while yet functioning adequately..." (1968, p.6)

Individuals with high scores on the extraversion scale "tend to be outgoing, impulsive and uninhibited, having many social contacts and frequently taking part in group activities" (p.6).

Eysenck points to the importance of introversion and neuroticism in academic achievement. Adjustment is reported to be a function of low neuroticism and average to above average extraversion.

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Reliability figures reported for the EPI are impressive. In a test-retest study of two groups of normal English subjects -- time elapsed nine to twelve months -- coefficients of .84 to .94 for the combined forms, and of .80 to .97 for separate forms are given. Internal consistency (Form A vs. Form B) figures for 1655 normals, 210 neurotics, and 90 psychotics run from .74 to .91. Scale correlations for the combined test are given as $-.04$ for normals, Form A as $.00$ and Form B as $-.09$ (p.15). Although technically scale E should be orthogonal to scale N, logically such a relationship is not a necessary condition to consider both scales relatively independent.

The EPI has been applied in a great number of situations (Buros, 1972). It was used by Knapp (1965) to correlate self-actualization with neuroticism and extraversion as reported earlier in this chapter. But the most frequent mention of the EPI is made in relation to a standing polemic between Eysenck and Cattell on the method of extraction of factors and the number of factors to be extracted that would be necessary and sufficient to describe personality (Adcock, 1965; Eysenck, 1972; Cattell, 1973; Vagg and Hammond, 1976).

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Although different factor rotation techniques in the long run yield similar structures (Eysenck and Eysenck, 1969) the number of factors to be extracted remains the subject of many publications. This aspect will be further discussed in the next section.

1.2.3 The Sixteen Personality Factor Questionnaire

The 16PF, as it is currently known, consists of one hundred and eighty seven items (Form A and Form B) yielding 16 factors. These primary factors cover a wide range of personality functioning. They are made up of small clusters of related items (10 or 13 items). The sixteen factors, as identified by the high score pole, are: A - Outgoing, B - Intelligent, C - Emotionally Stable, E - Assertive, F - Happy-Go-Lucky, G - Conscientious, H - Venturesome, I - Tender-Minded, L - Suspicious, M - Imaginative, N - Astute, O - Apprehensive, Q₁ - Experimenting, Q₂ - Self-Sufficient, Q₃ - Controlled, and Q₄ - Tense (Cattell, Stice and Eber, 1949). The item composition of each factor is given in the appendix to this dissertation.

Cattell's work with factor analytic procedures started nearly forty years ago. He first extracted twelve factors and later added four more (Cattell, 1973). In subsequent investigations Cattell found eight second-stratum or second-

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order factors, four of which are readily interpretable and two of them being similar to Eysenck's factors. The first second-order factor, Q_I, is called Exvia or extraversion and corresponds to what Eysenck describes under the label of Extraversion. Q_{II}, Anxiety, is similar to Eysenck's Neuroticism factor (Eysenck, 1972). Q_{III}, Cortertia or tough poise, stands for enterprise, decisiveness and resiliency. Q_{IV}, Independence, is the label for "aggressive, independent, daring and incisive" behaviour (1972, p.28).

Cattell lists in his latest opus (1973) forty three pages of references to articles, books and other publications pertinent to the assessment of personality, most of which report on the utilization and statistical validation of the 16PF. It would be difficult to improve on this accomplishment.

Adcock (1965) clearly demonstrated the compatibility of both Cattell's and Eysenck's approaches to factor extraction. He also upheld Eysenck's view that "factor analysis must be supplemented by more general hypothetico-deductive methods" (p.95). In other words, theory building cannot be accomplished by statistical methods alone.

Cattell agrees with this position but he maintains that Eysenck's claim that two factors are sufficient to account for the variability of an individual's behaviour is ill-founded

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and that in practical work, psychologists ought to recur to the sixteen primary factors to fully describe the behaviour of the client. Eysenck, in a 1972 study, undertook to test this assertion of Cattell and reported that when the contribution of second-stratum factors was extracted, whatever items were left could not account for much. He concluded that primary factors contributed only to the second-order factors and that their independent contribution to personality assessment was of no consequence. Thus, he argues that second-stratum factors only be utilized.

Vagg and Hammond (1976) in reporting their results of a partial replication of the Eysencks' (Eysenck and Eysenck, 1969) investigation of the invariance of factors derived from three sources (the Eysencks found that Neuroticism and Extraversion only were invariant across sexes in a pool of items selected from the Eysenck, Cattell, and Guilford inventories) state that four invariant factors can be identified from these same sources. The factors found were called neuroticism (loading on Eysenck's Neuroticism and Cattell's Anxiety), sociability (loading on many of Eysenck's items contributing to Extraversion and on a number of Cattell's items that contribute to Exvia), sensitivity versus practicality corresponding mainly to Cattell's Tough Poise, and group-centred

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morality versus self-centred independence composed of mainly Guilford items and those of Cattell's loading on Independence. All four factors were found to be invariant across sexes although the two last ones less so.

The tendency thus is for further studies bringing closer and closer agreement between the concepts of Cattell and Eysenck. The two tests are recognized as valid and reliable tools for personality assessment and are frequently utilized as criteria of validity for other, newer instruments purporting to measure partial aspects of personality or to obtain a complete profile of an individual's personality. The statistical methods for bringing about this closer agreement between concepts and for clarifying the constructs are discussed in the next section. A preferred procedure to achieve this desired agreement and clarification is described in the latter part of the section.

1.3.0 Statistical Methods

Factor analysis is a direct method that is universally applicable for the purpose of producing order out of a loose pool of variables, or, in Cattell's terms, "substitution of a reduced number of concepts and laws (relations) for a vast set of particulars" (1966, p.175). This method is the main analytical tool in this study.

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1.3.1 Oblique versus Orthogonal Factor Analysis

Some authors, for instance Cattell, prefer oblique factor analysis, some others, like Eysenck as well as Guilford and Zimmerman (1963), prefer orthogonal factor analysis. The argument for oblique factor analysis is derived from the fact that most empirical data naturally fall into correlated clusters and are better represented by oblique than by orthogonal factors. The argument for orthogonal factor analysis rests on the opinion that the interpretation of correlated variables is less adequate in terms of another set of correlated dimensions than in terms of independent concepts. Also, for the sake of simplicity of explanation an orthogonal solution is preferable since it requires a small number of dimensions to account for the total correlational variance.

The earlier rotational techniques were dependent on graphical semi-subjective fits. Presently, the analytic rotational procedures are being used; in the case of orthogonal rotations there is on the whole agreement among researchers that the Varimax criterion (Kaiser, 1958) should be used. There is no comparable agreement as to which oblique analytic procedure should be used. The choice of an oblique factor analysis requires therefore further specification as to which particular method one uses.

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One has to assume that the method most frequently used is the one most easily accessible of the oblimin type, such as given in the SPSS (Statistical Package for Social Sciences) (Nie, et al., 1975) and described (p. 485-6). For the purpose of all oblique solution comparisons one can therefore settle for the easiest option for that solution which leaves the default value DELTA unaltered when fixed at zero.

The degree of correlation between extracted factors will not be affected by different values of DELTA if it is permanently fixed at zero. One must expect however that this degree of correlation will vary a little when using different samples of subjects in the analysis. Unless a sample average deviates considerably from the construction sample on which the original factors were established, one would expect some constancy in the number and kind of factors extracted in spite of some variation in the degree of correlation among the factors. Any confirmation or rejection of an oblique factor solution must thus be based more on the examination of which items define a particular factor and on the number of factors extracted than on the degree of correlation between factors.

In many instances oblique and orthogonal factor analyses establish a similar set of factors where, however, the various items contribute differently to the definition of factors.

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If there is an a priori conjecture about the nature and number of factors in given correlational data, both oblique and orthogonal analyses can be usefully employed to check the expectation. In this case one has to depend more on judgemental criteria and on what appears to be reasonable than on strict, objective, mathematical tests.

While recognizing that an oblique fit is much easier to achieve for most empirical data, and that such an oblique factorial fit may always be analyzed into second or higher-order factors in order to establish uncorrelated superdimensions, one must express preference for direct orthogonal rotations as they lead to factors which should be easier to interpret psychologically, while at the same time by-passing the necessity for complex, error producing calculations. If factor scores are approximated by scales derived from subpools of items they will lead to correlated dimensions even if the original factor analysis was orthogonal.

1.3.2 External Validity

As recommended by Porebski (1976), the factors derived by an internal correlational analysis should as often as possible be validated with respect to some external criterion. The meaning of an "internal" factor is established psychologically from an examination of the nature of variables, or

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items which define it. If factor analysis is to be used for the purpose of testing hypotheses, then it should be up to the researcher to specify beforehand that one group of variables will lead to one factor and another group of variables to another factor. If he fails in this prediction, then he must re-examine his theoretical system about the major dimensions of behaviour.

If, on the other hand, he finds the results of the analysis consistent with his expectation he may be more justified in retaining his original theoretical framework. Furthermore, he can subject his results to additional empirical investigation by hypothesizing the existence of differences with respect to that factor between certain known, clearly defined, social groups. This recommendation safeguards the researcher against proliferation of factors in the psychological field. The more stringent condition (involving external as well as internal criteria) for the acceptance of a factor is likely to limit the number of factors that are proposed and to contribute eventually to the elucidation of the most relevant dimensions of behaviour.

1.3.3 Residual Factor Analysis

In a recent paper (Porebski, 1968) it has been suggested that the knowledge about psychological factors should be built gradually from what is well studied and known towards

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new and unexplored fields. It is often said that factor analysis, particularly in the area of personality study, has failed to establish a set of theoretical constructs that are generally accepted. One reason for this failure may be the fact that in the numerous factor-analytic studies from the beginning of this century each researcher has attempted an ultimate analysis of the whole personality area without profiting from the experience of, or even giving any attention to, the past factor-analytic studies.

A more promising approach seems to be the study of one factor at a time, starting with those factors that have been found to be most useful in the description of behaviour. Only when one factor is well researched and generally accepted would a search be made for further factors.

These additional factors will not be found through an ordinary interdependent factor analysis but through a semi-orthogonal residual solution. This means that one or several well established factors will be kept constant in the reference field while the analysis and search for additional dimensions will be made in the residual field.

Thus, the onus of proof for the existence of new factors is left with the investigator. These new factors must measure entirely new dimensions, not considered previously by the factors included in the reference field. At the same

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time, the structure of the already accepted reference field of factors remains unaltered when a new factor analysis is completed.

1.3.4 Further Statistical Considerations

Besides the question of reference variables (which in this study are provided by the Cattell-Eysenck tests), the population and the nature of the variables are of high importance in factor-analytic studies. Although a minimum of 200 subjects is considered "good policy" studies with less than this number have been known to yield verifiable results (Guilford, 1954, p. 528). The assumptions of homogeneity on some variables such as education and age, and of variance on such variables which can contribute to clear identification of factors seem to be well founded as it shall appear in the results. The variables under study are of a dichotomous nature and the risk exists that no clear factors may be obtained should the majority of subjects show a nearly equal preference for either choice of responses to POI items.

1.4.0 Summary

An introduction to the construct of self-actualization was presented in this chapter. The POI was offered as the instrument for assessing self-actualization on the basis of the various studies reviewed. The EPI and the 16PF were shown to correlate with the POI variables. A description and justification of statistical methods was provided.

2.0.0

PURPOSE OF THE STUDY

This chapter deals with the what and why of the study. It has two main divisions, one describing the objectives of the investigation, and one stating the hypotheses to be verified. It provides the logical link between the background of the problem and the actual steps that will be taken to arrive at answers to questions arising from the study.

2.1.0 Objectives

As reported in the review of literature, the POI has been shown to differentiate between selected self-actualizing and non self-actualizing populations. As a first step in this study it is therefore important to check if the test does discriminate on all scales between a group of individuals nominated as self-actualizing and another group who should not be self-actualizing.

The self-actualizing will be assumed to be those who have attained a career in a clear-cut manner, for instance, as well-established artists or scientists. The non self-actualized will be assumed to be those who are some way from achieving their career goal. It could be a group of university students as suggested by various authors (Maslow, 1970; Rizzo and Vinacke, 1973). The selection procedure itself of the

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specific samples for the study will be discussed in the next chapter.

Thus, the first objective of this study should be to test the significance of differences between the means of the two comparison groups on all scales of the POI. This would confirm or reject the test's claim to differentiate self-actualizing from non self-actualizing individuals.

The first objective can formally be stated as:

A Check on the Test's Power to Differentiate Between Self-Actualizers and Non Self-Actualizers. (2.1.1)

Next, an internal validity check of the scale structure must be completed. For this purpose an oblique factor analysis, utilizing all items of the POI should be carried out in order to confirm or reject the presence of constructs identified by the test's author. The verification should be carried out first of all on the level of items, thus confirming or rejecting their grouping under the various scale headings suggested by the author of the test. This verification should be then extended to the scales themselves. It is conceivable that some of the scales might disappear if they are not supported by the original grouping of items.

The second objective can be formally stated as:

A Validation of the POI Scale Structure. (2.1.2)

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Assuming that not all original POI scales will be verified the next concern should be with a re-examination of the factorial content of the test. Thus an orthogonal factor analysis should be completed on the POI scales and second-order factors extracted so as to reveal roughly the basic dimensions involved in the test and to suggest their approximate psychological meanings.

A second and more thorough variant of this objective would be to seek a new factorial structure of the test directly through the analysis of items. This second approach would be particularly useful, if not necessary, should the oblique structure of the POI (as investigated in the first objective) not be confirmed. The results of this analysis should be interpreted psychologically in the light of the original constructs suggested by the author of the POI.

The third objective is the formulated as:

A New Factor Analysis of Scales and Items and the Psychological Interpretation of the Obtained Results. (2.1.3)

The POI scales were constructed in order to reflect a specific theory of personality which emphasizes the ideal of the self-actualizing person. It is expected that dimensions additional to those available in well established tests will be identified.

The personality scales that have been most researched

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and, therefore, assumed to be the most established, are those involved in Eysenck's (EPI) and Cattell's (16PF) tests. They very broadly encompass the constructs which contribute to the definition of self-actualization. The next objective of the study would be to hold these scales statistically constant and determine the number and kind of residual factors present in the POI. More specifically, one would hold constant only the minimum number of orthogonal dimensions present in these two reference tests. These control dimensions would be derived from the previously completed second-order factor analysis. The ensuing residual analysis would then have a somewhat larger theoretical framework than in the case if all Eysenck-Cattell scales were held constant. Since only the more important theoretical constructs would be assumed to be well established, a smaller amount of information would be subtracted from the original POI data prior to its analysis.

The fourth objective of the study would then be:

The Psychological Interpretation of Residual Factors in the POI Holding the Well Established Personality Factors Constant. (2.1.4)

Should this approach fail to lead to a psychologically meaningful personality structure, a higher-order factor analysis involving the three tests could be made. Rather than treat the POI factors as additional residual dimensions some of the factors, if highly correlated with the Eysenck-

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Cattell superfactors, could be used, in their unreduced form, to extend the psychological meaning of the latter. This approach should yield dimensions hitherto not identified by the use of the Eysenck-Cattell superfactors alone. A validation of these superfactors could thus be found through the use of the retained POI factors.

The final, fifth objective would thus involve:

The Integration of All Statistical Results Obtained in This Study Into a Revised, and Hopefully Improved, Personality Structure. (2.1.5)

2.2.0 Hypotheses

The expectations of this study are closely associated with the objectives listed above. The POI is assumed as yet not to have been fully validated with respect to the actual clustering of items under the various scale headings proposed by Shostrom. Despite this incompleteness in the validation it is expected that at least some of the original scales will exhibit the properties the test is claimed to possess in that they would be capable of discriminating between self-actualizing and non self-actualizing individuals. On the other hand, a number of scales are expected not to be relevant to this discrimination. Furthermore, the internal consistency of some of the scales is expected to be put in

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doubt on account of a possible grouping of items in a manner different from that foreseen by the author of the test.

Since the original scales are known to be correlated among themselves one can reasonably hypothesize that the number of theoretical dimensions of personality that can be determined in using the test will be smaller than originally assumed. While some of these dimensions may coincide with the original theoretical constructs, others may involve a different combination of items, and hence a different labelling for the psychological content of the dimensions. In the re-analysis of the test a considerable number of items are expected to be irrelevant to the factorial description of the individual.

The psychological dimensions which would emerge from a new factor analysis of the POI items are expected to provide a valuable extension to the description of the structure of personality beyond what is available through the combined use of the Eysenck and Cattell tests. Using the latter as co-variates it is hypothesized that the ensuing residual analysis is unlikely to reduce substantially the variance of at least some POI factors. While it is difficult to state

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a priori what would be a complete POI factorial framework in psychological terms, specifically one may expect the emergence of a factor which would approximate Shostrom's scale of Existentiality. Such a factor is hypothesized to be relatively independent of the Eysenck-Cattell factorial frame.

Another specific psychological hypothesis may be advanced with respect to the concept of Self-actualization. If this concept can be identified with one of the POI factors, and hence with a finite number of items rather than being generally involved in all items, the correlation of this factor with those obtained from the Eysenck and Cattell tests is expected to be much higher than in the case of Existentiality. A particularly close relationship may be expected between Self-actualization and Adjustment which is defined by the positive direction of the combined scales of Neuroticism and Anxiety. Should the correlation of such a factor of Self-Actualization with Adjustment be .5 or more (as expected) it may be more reasonable to include Self-Actualization with Adjustment so as to extend the psychological meaning of the latter rather than to retain it as an independent factor in a residual, reduced form.

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The above a priori expectations constitute only certain intuitively conceived generalities based on past researches and practical experience. No further statistical hypotheses are proposed. The orientation of the present study is descriptive in nature. Its main purpose is to evaluate externally and internally the POI scales; to compare the content of these scales with that of well established personality tests, that is, the EPI and the 16PF; to simplify the content of the self-reporting tests used in the study; and to suggest a minimal, most efficient, set of theoretical constructs (factors) which would account for all variability in responses to the various items.

The system of descriptive dimensions, if meaningfully interpreted in psychological terms, should then be offered as an alternative, improved, system of using the various well known personality scale items. The final results of the present study must then be regarded as an alternative description of item contents. This new description, in itself, would constitute a hypothesis for further research in personality assessment.

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The present study is a spin-off from a large research program conducted by Porebski with the assistance of Ruffo to determine cognitive and personality factors which differentiate creative research scientists from student populations. Testing involved an array of cognitive tests and three personality inventories: the POI, the EPI and the 16PF. Since the POI was found wanting in clarity of concepts, it was eliminated from the research program.

Self-actualization represents a major concept within existentially based theoretical systems and therapeutic approaches. Shostrom's test is a serious attempt to measure the degree to which individuals approximate the ideal of self-actualization. It became therefore a challenge to evaluate the POI, gaining a better understanding of the constructs and of their place within the wider context of personality measurement. This undertaking was to be facilitated by the availability of test results on the 16PF and the EPI of the same population coming from the above-mentioned research program. Thus, one could not only examine the theoretical constructs of the POI but also relate these constructs to those of the two well known tests, that is, the EPI and the 16PF, at the same time.

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3.1.0 Sample

The entire population consisted of one hundred and thirty-seven individuals. The subjects belonged to four subsamples, all of a tertiary education level. The first subsample consisted of 41 National Research Council of Canada (NRC) physicists. The second subsample was constituted by 40 University of Ottawa engineering students. The third and fourth subsamples numbered 33 University of Ottawa arts and 23 psychology students respectively.

The sample -- students and NRC physicists -- was selected according to cognitive and educational criteria in the original research program. A priori differences on personality dimensions (within the sample) with respect to the entire tertiary educated population are not known and, therefore, no selection of variables for the purpose of factor analysis was considered. However, one a priori determined variable made the use of this particular population sample quite justifiable. The NRC physicists selected for the study were individuals deemed to have achieved recognition in their field, to have successfully contributed and to possess the potential for further contribution to their domain, and to be outstanding examples of the creative

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potential of NRC scientists. The student subsample was, by contrast, at the stage when career choices are only being made. It can be argued that the scientist subsample possessed some characteristics akin to those of self-actualizers and that the students, like those in Maslow's and Shostrom's samples that were earlier reviewed, lacked those very characteristics. The student subsample was not intended to be representative of university populations for purposes other than the one discussed in this paragraph.

3.2.0 Instruments

The experimental instrument was Shostrom's Personal Orientation Inventory (POI) (1963) which consists of one hundred and fifty pairs of opposite statements. The inventory, when hand-scored, produces fourteen sets of scores yielding 12 scales. The two major categories of Time Competence and Inner-Directedness are scored twice (in the positive and negative directions) so that actually there are 2 major and 10 complementary scales. The complete scale composition, according to scoring categories, is given in the Appendix. It takes 20 to 30 minutes to fill out the inventory.

The two reference instruments were the Eysenck Personality Inventory (EPI) (1963) and Cattell's Sixteen Personality

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Factor Questionnaire (16PF) in its 1967 edition. The EPI has two forms, A and B, each consisting of 57 items scored on three dimensions: the Extraversion factor (24 items), the Neuroticism factor (24 items), and the Lie scale (9 items). It takes ten minutes to answer. Form A was used in this study. The 16PF has four forms (A, B, C, D) in common use. Forms E and F, for low literate populations, are also shorter. In this study Form A was used. It consists of 187 three-choice items three of which are checking items. It takes 45 to 60 minutes to answer. The factor composition of both tests is given in the Appendix as well.

The 16PF and the EPI were used as reference tests, since they have been among the most used self-reporting inventories over many years. The established factors utilized in this study are thus operationally defined as those of the EPI and the 16PF. They are used in their original form and as super-factors (Porebski, 1977).

So, the actual instruments of the study are:

1. the 382 test items (150 POI + 48 EPI + 184 16PF);
2. the 29 scales (12 POI + 2 EPI + 15 of 16PF); and
3. the 4 superfactors (based on 2 EPI + 15 of 16PF) used as minimal control.

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3.3.0 Design

- 3.3.1 The first step required that a verification of the POI's power to discriminate between self-actualizers and non self-actualizers be made. For this purpose the NRC physicists, who have reached a well defined professional level, served as a bench-mark against which the student subsample was to be compared. The check was made in the form of appropriate F tests.
- 3.3.2 An internal validation of the POI scale structure was carried out by the means of an oblique factor analysis utilizing all 150 items in order to confirm or reject the presence of constructs proposed by Shostrom.
- 3.3.3 Next, reduction of POI scale complexity was attempted. This was accomplished first, through an orthogonal factor analysis of the scales to obtain second-order factors, and second, through an oblique factor analysis of items to extract direct, independent structures.
- 3.3.4 Extraction of residual factors through a dependent-factor method was completed. The second-order factors obtained previously from Eysenck's and Cattell's tests served as reference factors or covariates with respect to which the residual POI factors were established.

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3.4.0 Procedure

After retrieval of the POI data from the earlier mentioned research data pool the test protocols were hand-scored. The raw scores and the scale scores obtained this way were subsequently keypunched onto Hollerith cards. Since only a few answers were missing on some questionnaires a simple adjustment was made by filling out the blanks with mean scores.

All statistical calculations were carried out with the help of a computer. The programs necessary for the execution of all analyses were either taken from existing packages like SSP and SPSS or provided by Prof. Porebski. The calculations were done in a series of steps as described below.

Step 1

The comparison of NRC physicists (N = 41) with university students (N = 96) was made using the original 14 POI scoring categories, calculating separately the mean values of these categories. The significance of differences was determined for convenience through the F statistic, which in the case of two samples is equivalent to t^2 for independent samples.

Step 2

The intercorrelations of the 14 scoring categories were calculated to determine the degree of overlap between the

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scales and to compare these results with data reported in the POI manual (p.20). The reader is reminded here that there are 12 POI scales.

Step 3

Since the subdivision of the 150 POI items is such that 23 are associated with the measure of the Time Competence (T_C) and 127 with the Inner-Directedness (I) scales, it is clear that the remaining ten scales must comprise the same items. The immediate objective of the analysis was, therefore, the re-analysis of the 10 complementary scales to confirm or reject the possibility of analyzing these ten scales into the two superscales (T_C and I). The cut-off point was eigenvalue equal to 1. Furthermore, the ten complementary scales were analyzed to ascertain if they were definable by the same items as originally proposed by Shostrom.

It is difficult to accommodate 150 variables (items) in any factor analysis. It was therefore necessary to attempt such a factor-analytic verification in a multi-stage approach. This consisted in taking two scales at a time and eliminating items redundant in the definition of the scales. The pairing of the scales was arranged according to the number of items so as not to exceed 50 variables in any analysis. Taking

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only the complementary scales, renumbered from 1 to 10, five preliminary analyses were made. Thus, scales 1 and 3, composed of 26 and 23 items respectively with two common items for a total of 47 independent items, were analyzed first. Next, scales 2 and 8 were combined carrying a total of 38 items ($32 + 9 - 5$ common items); then scales 4 and 10 ($18 + 23 - 3$ common items = 43); further, scales 5 and 9 ($16 + 25 - 1$ common item = 40); and finally, scales 6 and 7 ($26 + 16 = 42$ independent items).

In each analysis only two most important factors were extracted using first the method of principal components (with communalities equal to 1), and following this, by an oblique rotation, as provided by the default procedure in the SPSS package. The grouping of items according to two scales in each analysis was expected to be reflected in the level of correlation these items had with the corresponding factors.

Once the factors were identified as being associated with one of the scales, the redundant items were detected by the absence of correlation of these items with the corresponding scale. Furthermore, items inappropriate for a scale were detected by using the difference in correlation the items had with their own scale as against the correlation with the other scale. Except in the case where an item was recognized

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a priori as common to both scales, an item failed to be verified (it was judged as inappropriate) if it correlated to a higher degree with a scale it was not supposed to define than with its own scale.

It was assumed that after the preliminary five factor analyses and elimination of irrelevant items, a second stage would be possible comprising only two, at the most three, separate analyses which would accommodate all items. The number of factors extracted would be then higher than two and would correspond to the number of scales used. With more than one alternative scale present in the analysis the probability for an item to be associated with one of these alternatives rather than with its own scale is higher than with just a single alternative. It was thus envisaged that additional items would be found redundant (irrelevant, inappropriate). With these eliminated, it had thus to be assumed that eventually all scales would be considered in a single analysis. This assumption was further supported by a possibility that not only items but scales themselves might fail to be verified.

The adopted criterion for non-verification of a scale was twofold. Firstly, if the number of items from a scale was reduced to less than three on an obtained factor, such a scale was totally eliminated. This was regarded as a complete

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non-confirmation of the scale, and resulted in a request for a smaller number of factors in a subsequent analysis involving the same retained items. A partial non-verification of a scale would be the case where items from two scales were found to be merged. In that case, too, the number of factors requested in a subsequent analysis was reduced by one.

Since in these analyses only the complementary scales were investigated and the items fully retained not only belonged to these scales but also provided a measure of either Time Competence or of Inner-Directedness, an attempt was made to verify the appropriateness of classification of all items into these two supercategories. If there were items defining a particular complementary scale derived entirely either from T_C or I , it was possible to analyze them together with items from the other category, which were not used in the final definition of the complementary scales.

Any inappropriateness in the classification of items into the two supercategories could then be detected by the correlational procedure outlined above. By this procedure it was possible to verify whether the scales were represented by different factors and which items were essential in defining the factors. By continuous elimination of redundant items and scales all items necessary to define all the

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existent, however correlated, dimensions were brought together. The comparison of these results with the original scales in terms of composition by items allowed a statistical assessment of the internal validity of the POI.

Step 4

Since the POI scales were known to be correlated and many items were expected not to be confirmed as belonging to these scales, a factor analysis of the complementary scales to detect certain more fundamental dimensions involving a link between several scales was undertaken. In order to ascertain whether these expected links were due to the super-scales (T_C and I) a second factor analysis, this time including the two superdimensions in addition to the complementary scales, was conducted for the purpose of identification of the psychological factors.

Step 5

The expected links between the scales envisaged in the previous step were based on all items. Some items, if not most, were expected to be redundant in the definition of the original scales. Nevertheless, these links could be used in an approximate psychological interpretation of the factors

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which would emerge from the analysis of all 150 items, unrestricted by the prior grouping by Shostrom of his scales. Such an analytic "blind analysis" was subsequently attempted with an expectation that it would lead to a smaller number of item groupings but with a greater number of items used in the definition of each factor (scale).

Since a factor analysis done with the SPSS package is limited to 62 variables and the restriction imposed by the University of Ottawa Computing Centre has further limited this to 50 variables, with no possibility of overriding this restriction, a sub-pool procedure was adopted on the recommendation of Dr. Porebski. This technique takes cognizance of the possibility of large round-off error when using a large number of variables, and bypasses this problem by including only 30 to 50 variables in a single run. It has been previously used in a prediction study involving a few thousand variables. Even though ideally to accomplish the analysis in sub-pools one should consider all possible groupings of a variable with the other variables, the suggested procedure, in order to economize in terms of time and cost, places the variables in a competitive situation. There are thus preliminary rounds from which variables with

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a low significance level (low communality in this case) are eliminated. This provides the space for variables from another sub-pool to enter and be analyzed again.

In the case of factor analysis, the earlier analysis examined only the overall communality of a variable with respect to the factors which may be regarded as relative artifacts for the total data. It is assumed that subsequent rounds with successive elimination of items would progressively lead to factors which are less artifact (in that they are based on more comprehensive data), until eventually all qualified items are reduced to the number which makes it possible that they all be treated in one single run. Since it was not expected that more than three to five factors would emerge, the analysis with about 50 variables would still allow more than enough items to define these factors.

The actual procedure involved 6 lots of 25 items each (items 1-25, 26-50, 51-75, 76-100, 101-125, 126-150). Each lot was then analyzed together with another lot, thus totalling 5 separate analyses for a given lot. An item from a given lot would be rejected only if it were irrelevant to the definition of all factors emerging from 5 different analyses. If the items were found relevant to the definition of any single of these factors in any of the 5 analyses it would be retained

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and promoted to the next run. The communality criterion taken for these preliminary selections and eliminations of items was .16 indicating that if the item were significant for just a single factor it would be correlated with it to the extent of .4. This means that no item which had a correlation of .4 or more with any factor could possibly be rejected in that run. Once the selected items from all sub-pools were put together it was, of course, possible to further eliminate some of the items because the item's communality would not be exclusively present in a single factor but would be subdivided into several factors increasing thus the probability of a non-significant contribution to the definition of any of them.

In all analyses the principal-component method was used with subsequent rotation to an oblique structure so as to maximize the number of retained items. The cut-off point for retention of a factor was the eigenvalue representing at least 5% of the total correlations variance. This meant that no factor representing 5% or more of the total was rejected.

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Step 6

At this stage a first interpretation of factors had to be attempted so as to determine whether a further search, that is a search for residual factors, would be necessary.

The interpretation of the factors obtained by the analytic method can be partly facilitated by examining the defining items in terms of their original grouping by Shostrom. Another, complementary, approach to this interpretation is through the examination of correlations of these factors with the major dimensions of personality established from well known tests. In this particular case, the reference could be made to an available second-order factor analysis of Cattell's and Eysenck's personality tests based on the sample as provided by Dr. Porebski. Four factors were extracted in this analysis: 1.. Adjustment, comprising the Neuroticism factor of Eysenck and Cattell's factors: C - Emotionally Stable, O - Self-Assured and Q₄ - Relaxed; 2. Extroversion, defined by Eysenck's Extraversion factor and Cattell's factors: A - Outgoing, F - Happy-Go-Lucky and Q₂ - Self-Sufficient; 3. Assertive-Radical, consisting of four Cattell factors: E - Assertive, N - Astute, Q₁ - Experimenting and G - Conscientious;

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4. Practical, defined by four of Cattell's primary factors: M - Imaginative, I - Tender-Minded, G - Conscientious and Q₃ - Controlled.

A final, third, approach is through direct examination of the content of the various defining items. The first, initial, interpretation was therefore made in this three-step fashion.

Step 7

Since the Cattell and Eysenck personality tests have been well researched and must therefore be regarded as providing stable, known and most meaningful dimensions among the self-reporting personality measures (in distinction to Shostrom's scales which may be regarded only as in the developmental stage), the former dimensions -- Cattell's and Eysenck's -- at least insofar as the major dimensions are concerned, have to be regarded as providing a frame of reference of fixed dimensions outside which any new additional personality dimension can be sought. The procedure, therefore, required the establishing of residual POI factors, holding the well established Eysenck and Cattell dimensions constant.

In geometric analogy terms, each of the analytic POI factors was rotated until it was orthogonal to the reference factors but at the same time remained as close as possible to

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its original position. Statistically this means that the POI factors were regressed onto the reference factors and any concomitant variance present in the former was attributed to the constructs contained in the Eysenck - Cattell factors. The analysis involved the examination of the amount of variance removed from each of the POI factors and of the degree of correlation that ensued among the residual factors. (It was clear that even though the original factors were orthogonal or nearly orthogonal, the residual factors could become correlated.)

For each individual in the sample the residual factor score was determined as a result of this dependent-factor analysis. Since these residual factors represent different directions from those given by the original POI analytic factors, they required different items for the definition. It was most inconvenient on practical grounds to use continuously the Cattell and Eysenck tests in order to obtain these residual factors. It was much more desirable to have them directly defined in terms of the original Shostrom items. For this reason another factor analysis was done to find whether the items originally needed for the definition of the analytic factors were still necessary.

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This meant that the residual factor-item correlations had to be studied to see whether the items were still correlated with the dimensions and if so, whether it was in the same original direction. The new grouping of items relevant to the definition of each of the residual POI factors was established using optimum weights for the items so included. The raw scores on the residual factors were treated in turn as dependent variables using the items originally defining the factors as predictors. This means that multiple regressions of each residual score on the items were obtained. The weights were subsequently rounded off to integers to allow easy calculation of a raw residual factor score.

Since these new directly established dimensions may differ from the more precisely determined residual factors, a check was made as to how far they departed from the position of strict orthogonality with the Cattell and Eysenck field of factors.

This study had practical as well as theoretical objectives. Consequently, there was a preoccupation with a high level of consistency of results associated with a further concern for ease of administration of the POI. For this reason the adopted procedure although dependent on factor analysis was not bound by it. It was not the intention of this study to

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determine factor scores as accurately as possible, rather the intention was to approximate factors through scales each comprising only items which were significantly related to the factors. In the final decision as to which of the POI factors should be proposed as independent, additional, dimensions of personality and which should be used to modify conceptually the established dimensions of the Eysenck and Cattell tests, it is the correlations between the scales comprising a mutually exclusive group of items and not the correlations between the hypothetical factors that were considered. Even though such a procedure could result in a loss in mathematical efficiency it should lead to a greater statistical reliability for factor (scale) scores and to a much greater convenience in the practical use of the POI.

The statistical results of this study are presented in this chapter in a two-fold manner. The data necessary to understand the discussion to follow are displayed in a number of tables of means, correlations and factorial loadings. The tables are accompanied by a narrative of their contents, explaining the givens obtained in the statistical analyses. The interpretation of data proceeds in logical units of analysis.

4.1.0 Discrimination Power and Intercorrelations of POI Scales

4.1.1 Mean values for NRC physicists and university students are given in Table I. In column 1 are the variable numbers, in column 2 the corresponding POI scale names. In subsequent columns are the mean values and the F statistics. It can be seen that the differences between the means are not significant except in the case of Existentiality (variable 6) where the mean of the NRC sample is higher than that of the students at the 5% level of significance, and in the case of Self-acceptance (variable 10) where the NRC mean is higher at the 1% level of significance. There is only one more significant difference, in this case in favour of the student group, on Nature of Man (variable 11) significant at the 5% level.

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Table I. - Means and F Values for NRC Physicians and University Students on 14 POI Scoring Categories.

Variable	Scoring Categories	NRC Means N = 41	Student Means N = 96	F Values
1	Time Incompetent	5.707	6.510	1.92
2	Time Competent	17.293	16.396	2.39
3	Outward-Directed	42.805	45.990	2.18
4	Inner-Directed	84.195	81.115	2.05
5	Self-Actualizing Value	19.829	19.854	0.00
6	Existentiality	21.537	19.635	5.70*
7	Feeling Reactivity	14.439	15.115	1.35
8	Spontaneity	10.780	11.760	3.62
9	Self-Regard	12.341	12.125	0.22
10	Self-Acceptance	16.756	14.719	9.55**
11	Nature of Man, Constructive	11.415	12.094	4.49*
12	Synergy	7.488	7.063	2.79
13	Acceptance of Agression	15.073	15.250	0.07
14	Capacity for Intimate Contact	17.756	16.729	2.10

* p < .05

** p < .01

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4.1.2 It is clear from an examination of Table IIIa that variables 1 and 2 are nearly identical but going in the opposite direction. A correlation coefficient of -0.970 was obtained. Another pair of scoring categories, 3 and 4, are found to be nearly identical, similarly in the opposite direction, with a coefficient of -0.998 . It would seem, therefore, advisable to eliminate scoring categories 1 and 3, which simply represent a negative dimension of variables 2 and 4.

Scale 2 (Time Competent) shows consistently low to medium positive correlations with the remaining ten scales, similarly to what is reported in the POI manual (Shostrom, 1974, p.20). It should as well be noted that the correlation of scale 4 (Inner-directed) is also consistently positive but at a medium to high level with the remaining ten scales. Again, this confirms the pattern of intercorrelations reported in the manual.

For the sake of completeness, the means and standard deviations for the twelve POI scoring categories in the total sample are given in Table IIb.

4.2.0 POI Scale Factor Structure

The five factor analyses using two scales at a time (as indicated in the preceding chapter on Procedure) resulted in the elimination of a number of redundant variables (items).

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TABLE IIa. - Intercorrelations for 14 POI Scoring Categories in the Total Sample (N = 137) of NRC Physicists and University Students

POI Scoring Categories	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Time Incompetent	-970	563	555	-394	-472	-333	-353	-490	-550	-236	-437	-265	-433
2 Time Competent		-546	538	385	443	318	333	491	562	222	424	272	400
3 Outward-Directed			-998	-663	-756	-668	-705	-615	-687	-334	-600	-624	-772
4 Inner-Directed				670	753	678	708	613	680	341	604	627	776
5 Self-Actualizing Value					431	432	591	615	278	476	747	452	493
6 Existentiality						424	476	367	640	187	501	335	693
7 Feeling Reactivity							578	331	337	131	370	738	701
8 Spontaneity								441	413	260	468	498	621
9 Self-Regard									300	447	454	352	391
10 Self-Acceptance										074	390	352	514
11 Nature of Man											412	017	154
12 Synergy												395	506
13 Acceptance of Aggression													568
14 Capacity for Intimate Contact													

Decimal points have been omitted.

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Table IIb. - Means and Standard Deviations for 12 POI Scoring Categories in the Total Sample (N = 137) of NRC Physicists and University Students

	POI Scoring Categories	Means	Standard Deviations
1	T _I		
2	T _C	16.66	3.12
3	O		
4	I	82.03	11.59
5	SAV	19.85	3.12
6	Ex	20.20	4.34
7	Fr	14.91	3.12
8	S	11.47	2.79
9	Sr.	12.19	2.48
10	Sa	15.33	3.64
11	Nc	11.89	1.74
12	Sy	7.19	1.37
13	A	15.20	3.49
14	C	17.03	3.81

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This allowed putting together the renumbered complementary scales 1- Self-Accepting Value (with 12 items retained), 2- Existentiality (with 15 items), 3- Feeling Reactivity (with 11 items), 8- Synergy (with 3 items) and 4- Spontaneity (with 4 items) yielding a total of 45 items retained, and similarly combining scales, 10- Capacity for Intimate Contact (8 items), 5- Self-Regard (11 items), 9- Acceptance of Aggression (11 items), 6- Self-Acceptance (8 items) and 7- Nature of Man, Constructive (7 items) for another total of 45 retained items.

The first five-scale factor analysis led to the complete elimination of scale 4 and the retention of 25 items: scales 1 (with 7 items), 2 (with 7 items), 3 (8 items), and 8 (with 3 items retained). The second five-factor analysis also yielded 25 items: scales 5 (with 6 items retained), 9 (with 7 items), 10 (7 items) and the merged scales 6 and 7 (with 5 items in total). Since the number of items retained was sufficiently small, all scales could be re-analyzed together in a subsequent step. In fact, there were only 43 independent items left since some of those originally selected were present in more than one scale. These items were thus used to test the hypothesis of 8 factors (with two scales eliminated so far). A solution involving 8 oblique factors was therefore requested.

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As a result of this analysis only six scales (1, 2, 5, 9, 10, and 6-7 merged) with a total of 35 items reappeared. Four additional items were then eliminated, leaving 27 fully confirmed items and four items belonging to a merged two-scale factor. These items were found in scales

- 1- Self-**Actualizing Value** (items 6, 27, 36, 92, 138);
- 2- Existentiality (items 5, 11, 111, 124, 130, 148, 149);
- 5- Self-Regard (items 7, 39, 118, 128, 132);
- 9- Acceptance of Aggression (items 13, 52, 61, 76, 91, 93);
- 10- Capacity for Intimate Contact (items 19, 21, 60, 103); and
- 6-7- Self-Acceptance - Nature of Man (items 72, 134 and 43, 147).

The results of this factor analysis are given in Table III which has 35 items. The table shows the correlations of these items with the 6 factors corresponding to the 6 scales indicated above. The successive columns represent scales 9 (Factor I), 2, (Factor II), 6-7 (Factor III), 1 (Factor IV), 10 (Factor V), and 5 (Factor VI) respectively. The 4 items not confirmed here are I123 formerly associated with scale 1, now giving a higher correlation with scale 6-7 which it is not supposed to measure; I138 belonging originally to scale 5 was found to be related to both scale 9 and scale 6-7; I141 originally from scale 7 now closer to scale 5; and I108 first under scale 10 now more with scale 5.

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Table III. - Factor Structure for 35 POI Items

Item	Factor I	Factor II	Factor III	Factor IV	Factor V	Factor VI
I6	0.029	-0.078	-0.162	0.602	-0.023	-0.032
I27	-0.070	0.048	0.189	0.607	-0.077	0.127
I36	-0.214	-0.116	-0.194	-0.407	-0.105	0.257
I92	0.229	-0.177	0.017	0.427	0.023	0.038
I123	0.047	0.058	0.476	0.290	0.244	-0.081
I138	0.163	0.081	0.304	0.416	0.098	-0.061
I5	-0.162	0.668	-0.183	-0.027	-0.010	-0.080
I11	-0.126	0.580	0.176	0.004	-0.237	0.080
I111	-0.012	0.615	-0.058	-0.008	-0.033	0.093
I124	-0.086	0.521	-0.112	0.068	-0.498	0.032
I130	-0.066	0.414	0.345	-0.355	-0.041	-0.031
I148	-0.037	0.574	0.227	0.037	0.093	-0.072
I149	-0.064	-0.571	0.257	0.124	0.072	0.156
I52	-0.657	0.077	-0.112	0.186	-0.157	-0.095
I76	-0.521	-0.009	0.029	-0.241	-0.247	0.005
I93	0.546	0.089	0.067	0.042	0.038	0.280
I118	0.139	0.149	-0.001	0.464	-0.034	0.577
I7	-0.208	-0.191	-0.431	0.050	0.136	-0.374
I38	0.298	0.145	0.267	0.111	0.114	0.215
I39	0.021	-0.222	0.316	-0.094	0.134	0.468
I128	0.047	0.034	0.253	-0.021	-0.161	0.502
I132	0.220	0.092	0.101	0.198	0.292	0.572
I72	0.053	-0.166	0.577	-0.106	0.037	0.066
I134	0.001	0.008	0.630	0.112	0.142	0.117
I43	-0.271	-0.055	0.425	0.220	-0.059	0.099
I141	0.218	-0.172	-0.316	0.035	0.141	0.427
I147	-0.416	0.060	0.448	0.079	-0.129	0.172
I13	0.511	-0.199	-0.118	-0.024	-0.162	0.069
I61	-0.532	0.124	-0.025	-0.189	-0.083	-0.220
I91	-0.571	0.052	0.053	-0.203	-0.024	0.015
I19	-0.099	-0.124	0.024	0.015	0.669	-0.036
I21	-0.193	-0.026	0.003	0.007	-0.304	-0.221
I60	-0.114	0.132	-0.358	0.045	-0.594	0.005
I103	0.148	0.122	-0.142	0.026	0.679	0.275
I108	-0.095	0.119	-0.085	0.260	-0.278	-0.446

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This result is obtainable identically under two separate conditions, that is, when eliminating items representing less than 5 percent of correlational variance of a factor (cut-off point being minimum eigenvalue 1.5), or by requesting six factors because of the anticipated presence of six scales.

Among the confirmed items only two are classified as measuring Time Competence (T_C) while the remaining enter into the measure of Inner-Directedness (I). It is clear that I does not constitute a single factor but is a composite of several scales. It is possible, however, that T_C may emerge as a factor separate from the above scales which measure I. A study of T_C items is further warranted by the fact that most of the items grouped under that heading do not belong to any of the complementary scales. To investigate the existence of a separate factor T_C and to ensure its maximum distinctiveness from the above confirmed scales it was advisable to use only those items which were listed under the label of T_C .

In order, further, to delineate the T_C factor the least coherent scale 6-7 was excluded from the analysis and replaced by T_C items. The solution involving six factors was requested. In this solution the five confirmed scales (with their items) were identified and the last factor was attributed as due to the

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presence of T_C items. Only five T_C items were seen to be exclusively associated with this factor. For this reason the analysis was repeated using 27 items defining the previously established POI scales plus the five significant T_C items, altogether 32 items. The obtained solution for the six factors did not lead to a clear separation of the scales. The new sixth dimension involved a merger of certain T_C items and of scale 1 (SAV) items. Furthermore, the T_C items themselves were found to be in this dimension and equally in scales 5 and 10. In view of the earlier confirmed scales the introduction of an additional dimension (T_C) appeared, therefore, to lead to confusion rather than to further clarification of the already established scales. Thus, there did not seem to exist any reason for a continued search for a confirmation of a separate, and distinct from other scales, T_C factor.

In the final analysis only five factors were requested to represent scales 1, 2, 5, 9, and 10, retaining still the five significant T_C items in order to see where in fact they belonged. The result of this analysis is given in Table IV where the correlations of items with the five factors are given. It should be noted that the solution for these 32 items when on a priori grounds five factors are requested is identical with the solution which requires that those factors representing

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Table IV. - Factor Structure for 32 POI Items

Item	Factor I	Factor II	Factor III	Factor IV	Factor V
I6	0.087	-0.058	0.089	0.618	0.217
I27	-0.112	0.045	-0.027	0.628	-0.189
I36	0.086	-0.048	-0.070	-0.397	-0.094
I92	-0.078	-0.236	0.128	0.425	-0.152
I138	-0.059	0.014	0.041	0.461	-0.024
I5	0.089	0.690	-0.123	-0.040	0.071
I11	0.200	0.561	-0.183	0.049	-0.218
I111	0.052	0.643	0.059	0.046	-0.001
I124	0.427	0.516	-0.073	0.113	-0.148
I130	-0.123	0.421	-0.118	-0.311	-0.228
I148	-0.124	0.559	-0.061	0.027	-0.050
I149	-0.215	-0.590	-0.123	0.124	-0.251
I52	0.229	0.072	-0.659	0.164	0.124
I76	0.235	0.024	-0.487	-0.221	-0.049
I93	-0.054	0.058	0.606	0.061	-0.220
I13	0.207	-0.204	0.521	0.002	-0.028
I61	0.055	0.119	-0.595	-0.214	0.057
I91	0.015	0.065	-0.561	-0.249	-0.052
I7	0.084	-0.128	-0.146	0.058	0.612
I39	-0.170	-0.245	-0.079	-0.085	-0.373
I128	0.003	-0.007	0.027	0.017	-0.563
I132	-0.376	0.065	0.292	0.243	-0.394
I118	-0.042	0.129	0.229	0.490	-0.419
I119	-0.583	-0.082	-0.007	-0.033	0.260
I21	0.211	-0.052	0.327	0.107	0.023
I60	0.593	0.135	0.157	0.073	-0.074
I103	-0.511	0.160	0.255	0.046	0.135
I59	0.398	0.273	0.026	-0.082	0.221
I82	0.525	0.080	0.025	-0.137	0.464
I88	0.451	0.033	-0.033	-0.147	0.384
I110	0.388	0.081	-0.092	-0.995	0.118
I125	0.608	0.009	-0.107	-0.177	0.343

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less than 5% of the total correlational variance (eigenvalue 1.6) be disregarded. An examination of Table IV in which the successive columns represent complementary scale 10- Capacity for Intimate Contact (Factor I), scale 2- Existentiality (Factor II), scale 9- Acceptance of Aggression (Factor III), scale 1- Self-Actualizing Value (Factor IV), and scale 5- Self-Regard (Factor V), shows that T_C items are predominantly associated with scale 10, with some additional items on scale 5.

4.3.0 Factor Analysis of POI Items

A distinction has to be made between the objective aiming at confirmation and rejection of items and scales from pre-existing structures and the objective aiming at a most efficient and coherent use of available items. In the former case, when an item is not found to be associated with a given scale it is excluded even if it significantly loads on another scale. In the latter, all significant items can be utilized provided one is free to regroup the items and construct scales with different meanings representing the new dimensions.

In a preliminary step to such an analytic approach to the regrouping of items an analysis was run to see how the older scales (containing all items) were interrelated so as to anticipate the emergence of certain fundamental dimensions which

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might be definable in terms of one or several old scales. Two factor-analytic (varimax) solutions are given in Table V. The first involves ten complementary scales and is in terms of two independent factors. The second solution in Table V has Time Competence and Inner-Directedness included in addition, and leads to three independent factors. In both cases the criterion for the acceptance of a factor is the minimal eigenvalue of 1. This means that no factor is recognized unless it contributes at least as much to the correlational variance as does a single scale. The ten-scale solution given on the left of the table suggests a possible link (Factor I) between scales 3- Feeling Reactivity, 9- Acceptance of Aggression, and 10- Capacity for Intimate Contact, and another possible link between scales 1- Self-Actualizing Value, 5- Self-Regard, and 7- Nature of Man in a Factor II. These links are suggested by the highest correlation values of the scales with the given factor.

The three-factor solution obtained from the twelve scales was extracted in order to examine whether the very broad grouping of items into Tc and I was likely to explain the observed links in the other solutions. In this new solution Factor I provided again evidence of the link of scales 3, 9, and 10. It seemed to be devoid of any Tc content represented predominantly in an additional third factor. The link with I did not re-appear. Inner-Directedness was seen to be equally

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Table V. - Rotated Factor Loadings of POI Scales
for Two Alternative Solutions

10 Scale Solution \ 12 Scale Solution		Factor I	Factor II	Factor III	Variable
		0.071	-0.322	-0.718	T _C
Factor I	Factor II	0.616	-0.412	-0.594	I
0.405	0.785	0.430	-0.766	-0.171	1
0.693	0.287	0.345	-0.190	-0.750	2
0.810	0.136	0.876	-0.119	-0.171	3
0.662	0.409	0.644	-0.372	-0.272	4
0.295	0.712	0.229	-0.695	-0.286	5
0.665	0.125	0.222	-0.029	-0.874	6
-0.109	0.839	-0.070	-0.839	-0.015	7
0.428	0.687	0.325	-0.645	-0.336	8
0.774	0.105	0.861	-0.093	-0.122	9
0.847	0.239	0.703	-0.175	-0.488	10

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distributed among the three factors. The second factor seemed to correspond reasonably to the second factor of the 10-scale solution in that the three highest correlations with it were again provided by scales 1, 5, and 7. The third factor indicated a possible link between Tc, scale 2- Existentiality, and scale 6- Self-Acceptance.

[As the chances of getting strong loadings are reduced in the case of dichotomous items, the initial involvement of items in several scales promised a fair likelihood of obtaining reasonable loadings. Also, as it turned out most of the items yielded clear responses in favour of either choice offered by the POI. (See table of Dichotomous Distribution of Scores in the Appendix, p. 120.)]

The analytic "blind analysis" which followed was restricted neither by the original grouping provided in the POI manual nor by the links suggested in the above correlational analysis of the scales. It was, however, of some interest to see whether this entirely analytic-statistical procedure would lead to results which would be interpretable in terms of Shostrom's original labelling of items.

The 150 items of the POI divided into six sub-pools of 25 each were factor-analyzed taking two sub-pools at a time. After the preliminary fifteen factor analyses only 80 items were retained using the rejection criterion discussed under Procedure. This allowed to combine the sub-pools two at a

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time reducing them to a total of three. The first sub-pool had all the retained items from 1 to 50, the second those retained from 51 to 100, and the third those retained from 101 to 150.

Three separate analyses were then conducted; first involving the retained items from the sub-pool running from 1 to 50 together with those from 51 to 100; then, the retained items from 1 to 50 together with those retained from 101 to 150; and finally, the retained items from 51 to 150. This reduced the total of retained items to 54 which, after some overriding of the space restriction in the computer program, could be considered in one analysis. Such analysis resulted in four factors using as a minimum cut-off the eigenvalue of 2.5 which is just under 5 percent. Seven additional items were subsequently excluded as they had no significant loading on any of the factors established in the analysis. The final 47 items were analyzed in three different ways: by the principal-factor method with varimax orthogonal rotation, and by the principal-component method with both varimax and oblique rotation. The number of factors and the structure of correlations of items with factors has been nearly identical in all three analyses. Table VI provides the results involving 47 finally chosen items. If required, I54, I55, I134 and I141 could be still excluded on the grounds that they did not quite reach the correlation of .4 on any of the factors and that they

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Table VI. - POI Factor Structure Based on 47 Selected 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
II1	-0.055	0.579	0.198	0.193
II4	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
II03	-0.516	0.032	-0.347	-0.020
II07	0.354	0.440	-0.039	-0.166
II11	-0.052	0.497	0.004	0.214
II19	0.144	0.557	0.194	-0.018
II24	0.285	0.577	0.106	0.065
II25	0.407	0.043	0.091	0.543
II31	0.498	-0.051	-0.046	0.202
II32	-0.575	0.009	-0.152	-0.274
II34	-0.281	-0.055	0.024	-0.360
II36	0.414	-0.161	-0.129	0.345
II40	-0.482	0.091	-0.029	-0.102
II41	-0.376	-0.245	-0.319	0.195
II42	-0.611	-0.001	-0.184	-0.029
II43	0.469	0.090	0.138	0.088
II48	-0.138	0.521	0.009	0.003
II50	0.128	0.608	0.070	-0.254

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are equally distributed among all factors. With 43 items retained we can see that we can determine

Factor I: 4B, 22B, 82B, 94B, 98B, 103A, 125B, 131B, 132A, 136B, 140A, 142A, 143B, totalling thirteen items;

Factor II: 2B, 5B, 11B, 14B, 51B, 107B, 111B, 119B, 124B, 148B, 150B, yielding eleven items;

Factor III: 28B, 35A, 37A, 44B, 45B, 52B, 58B, 61B, 64B, 76B, 91B, in all eleven items; and

Factor IV: 26B, 29B, 42B, 48B, 50B, 59B, 82B, 84B, 88B, and 125B, together ten items.

It should be noted that items I82B and I125B are common to the definition of Factor I and IV. Thus, there are only 43 independent items retained after this analysis. It should be further noticed that among the selected (47 or 43) items there are 15 that were verified in the previous step (Table IV).

4.4.0 The New POI Factors

The four analytic factors obtained in the "blind analysis", and shown in Table VI, do not correspond integrally to any of Shostrom's original complementary scales. They each run across several different scales. Thus Factor I is defined by six TC items, three Fr items (two of which are scored in the opposite direction) and four more items from three scales

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(SAV, Sa, Sr). Items defining Factor IV come from a similar pool: Sa, T_C, Sr, C and S. Some of these items overlapped in more than one of the original complementary scales. This is also true for many of the items defining Factor III.

Factor III is defined by items from six of Shostrom's scales: Fr, C, A, Ex, Sa and S. Factor II has six Ex items, three Sa, one I item and one No item which is scored in the opposite direction to Shostrom's.

Labelling these factors on the basis of their similarity with the original scales represents a difficulty on account of the obvious variety of items. In a first attempt at psychological interpretation one could suggest the following tentative labels: Factor I- Time competence with individual uniqueness, Factor II- Existentiality, Factor III- Capacity for intimate contact with freedom to act according to one's feelings, and Factor IV- Self-acceptance with time competence. By nature of their composition Factors I and IV would appear to involve similar concepts.

In order to facilitate the psychological interpretation the analytic factors were correlated with four superfactors obtained in a factor analysis of the Eysenck Personality Inventory and Cattell's Sixteen Personality Factor Questionnaire

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based on the same sample as it was mentioned under Procedure. The factor intercorrelations are listed in Table VII. It should be noted that the term "Factor" is used interchangeably either to denote the hypothetical dimensions produced by factor analysis, or the scales comprising sub-pools of items (or variables) which are best correlated with these dimensions. The scales, however, are only approximations to true factors, and the relationship among them is not exactly the same as among the factors. The superfactors derived from the Eysenck and Cattell tests were orthogonal originally but in Table VII they are seen to be correlated to some small extent. Although the approximation to these superfactors was obtained by a weighted combination of the elementary scales, this did not secure a perfectly orthogonal set probably because of a restriction that only four (out of seventeen) elementary scales were used in the practical definition of each superfactor. The estimates of the POI factors show even higher intercorrelations. This is partly due to the use of an oblique-factor solution and partly to the use of a simple (unweighted) summation of a limited number of items to obtain these estimates. But as it was said in the chapter on Procedure, it is these estimates through easily, in practice, derivable scales that are of special interest in this study. They must also provide the basis for a discussion of the psychological nature of the obtained POI factors.

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Table VII. - Intercorrelations for 4 Factors Based on POI Items and 4 Superfactors Based on Cattell's and Eysenck's Tests

Variables	2	3	4	5	6	7	8
1 Adjustment	-0.004	0.167	-0.014	0.540	-0.090	0.151	0.544
2 Extroversion		0.115	-0.039	-0.023	-0.248	0.018	-0.004
3 Assertive-Radical			-0.289	0.101	-0.057	0.357	0.275
4 Practical				-0.028 4	-0.393	-0.290	-0.140
5 Factor I					0.121	0.256	0.603
6 Factor II						0.219	0.074
7 Factor III							0.313
8 Factor IV							

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Factor I shows a correlation of 0.540 with the Adjustment superfactor established on the basis of the Cattell and Eysenck tests. It also has a correlation of 0.603 with Factor IV, and the latter factor also correlates with the Adjustment superfactor (0.544) which confirms the similarity observed in the previous step. These results further allow to expect Factors I and IV to load on positive aspects of the Self, suggesting labels such as Self-Actualization and Self-Assurance. Factor II shows a negative correlation (-0.393) with the Eysenck-Cattell superfactor labelled as Practical. This indicates that at least some of its variance might be related to a general sensitivity of the subject, his imaginativeness and certain lack of emotional control. About the same level of correlation (0.357) is also observed between Factor III and the Assertive-Radical superfactor. This suggests the label of Independence for Factor III since the opposite of the Assertive-Radical superfactor is conforming to traditional moral and social rules.

A last step in this initial interpretation calls for a careful examination of the content of each defining item. Factor I consists of items dealing with managing well one's situation, accepting one's weaknesses and emotions, security in relationships with others, managing time. All together

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it suggests a positive view a person has of himself and is akin to what Shostrom describes as Self-actualization. This is actually the label proposed here for this factor. In contradistinction, Factor IV, which contains items from the same original pool and exhibits a correlation with Factor I as well as with the Adjustment superfactor of Eysenck-Cattell, deals less with personal uniqueness and more with freedom from feelings of threat, fears, resentment, failure. The proposed label for Factor IV is Self-acceptance.

Factor II is defined by items easily recognized as describing an existential attitude. Factor III is defined by items describing an independent attitude in terms of freedom to manage one's life according to one's own principles, and is comparable to the scale Inner-Directedness of Shostrom.

The first psychological interpretation suggests that the search for residual factors should confirm the expected presence in the POI of meaningful factors additional to those already well established with the aid of the Eysenck and Cattell tests.

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4.5.0 Residual Factors

It was of some interest to find, in view of the observed correlation between the POI factors and the Cattell-Eysenck superfactors, whether the former would still contribute additional personality dimensions while the latter were being kept constant. Using a program especially designed for this method the residual POI factors and the individual POI factor scores were obtained. Thus we found that the proportion of the original variance left in the residual factor scores was 0.708 for Residual factor 1, 0.748 for Residual factor 2, 0.824 for Residual factor 3 and 0.662 for Residual factor 4.

Even though it was possible to determine the residual POI factor scores while in possession of all relevant Cattell and Eysenck scale scores it seemed desirable for practical purposes to be able to determine the same scores directly from the POI items. Using then the relevant items, the residual POI scores were predicted through a multiple regression technique. The difference between the analytically derived POI factors and the residual factors was not sufficiently great to eliminate any items except one from the original grouping of defining items. The item eliminated was I50 and it was removed from the definition of the last residual factor. Also, I82 and I125 were retained only in the definition of this same fourth

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residual factor. Besides this, the only changes required in the definition of new residual factors were in the form of differential weights assigned to the defining items.

The representation of POI factors was made originally by constructing scales with all items having equal (that is, unit) weight within the scale, or involving simple summation of items significantly loaded on that factor. Because of that there might have been some loss of accuracy in the estimation of these factors. This could be avoided if weighted sums of items were used instead. The procedure was therefore repeated with the weighted scales giving now very high (about 0.95) correlations with the POI factors. Again, the residual POI dimensions were obtained treating the Eysenck-Cattell factors as covariates. A direct representation of the residual POI dimensions was again attempted and it resulted in a somewhat different set of weights.

The attempt at direct representation was not successful in reproducing dimensions which were uncorrelated with the Eysenck-Cattell factors. In particular, a significant correlation with the Eysenck-Cattell measure of Adjustment remained in the case of Residual factor 1 and Residual factor 4. In the first system of weighting the correlations were 0.500 and 0.487 for these two residual factors respectively. Although

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the second system of weighting reduced the size of correlation it did not eliminate altogether the significance, leaving still a correlation of 0.377 for Residual factor 1 and of 0.487 for Residual factor 4.

Since it did not seem to be possible to determine directly, by the POI items alone, the truly residual factors uncorrelated with the Eysenck-Cattell system, they had to remain only as theoretical possibilities. If there were an exclusively theoretical interest in this study and the practical inconvenience of using the entire Eysenck and Cattell tests to determine the additional dimensions contributed by the POI was acceptable, the individual POI scores truly uncorrelated with the Eysenck-Cattell scores could be obtained; but this procedure would not seem to be reasonable on practical grounds. The preference must therefore be once more expressed for the determination of POI factors solely in terms of POI items.

With this choice made there still remains the question of whether it is worthwhile at all to seek POI dimensions from which the effect of all Eysenck-Cattell factors has been removed. Since the acceptable on practical grounds procedure does not allow the creation of factors independent from the Eysenck-Cattell system it would appear reasonable and preferable to abandon here the attempt at determination of truly residual POI dimensions and leave it to future theoretical studies.

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For the purpose of the present study it seems more practical to deal directly with the POI factors even though they are somewhat more correlated with the Eysenck-Cattell factors than their residual counterparts. They are preferred to the latter because they contain the total assessment information provided by the POI. The latter do not represent the complete content of the POI and do not provide truly residual dimensions once a direct estimate of these dimensions is sought.

Since the two systems of weights that had been tried on the items cannot, using POI items alone, reproduce the residual POI dimensions, the choice has been made to discuss the POI factors in terms of their best representation by a simple unweighted summation of POI items which are significantly correlated with these POI factors.

A possible reason for the inability to reproduce the residual dimensions directly from POI items alone may lie in the content of these items which measure the dimensions associated with the measure of Adjustment. Whatever combination of weights one would impose on these items they would still be related to Adjustment. The only way these associations with Adjustment can be eliminated would be a statistical manipulation

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Table VIII. - Factor Loadings of 4 Eysenck-Cattell Superfactors and 4 Shostrom Factors

Variable	Factor 1	Factor 2	Factor 3
Adjustment	0.826	-0.032	0.153
Extroversion	-0.085	0.127	0.690
Assertive-Radical	0.145	0.611	0.472
Sensitive vs. Practical	0.062	-0.794	0.100
Self-Actualization	0.714	0.048	-0.241
Existentiality	0.053	-0.444	0.712
Independence	-0.278	-0.655	0.028
Self-Acceptance	-0.733	-0.243	-0.031
Eigenvalues	2.153	1.418	1.278

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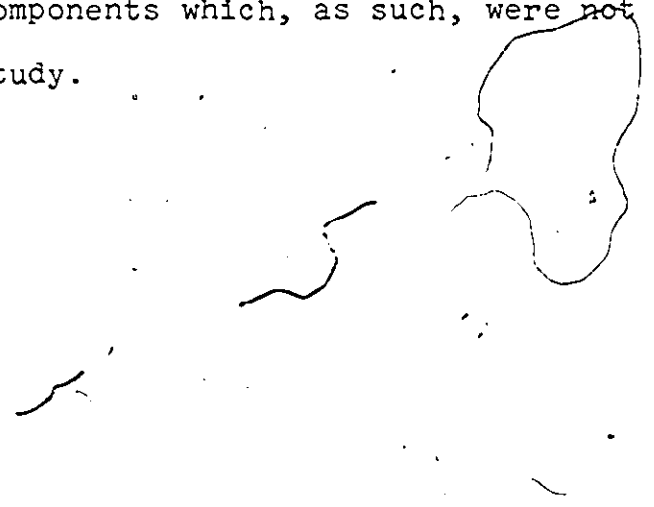
which would hold Adjustment constant. This procedure, as stated before, would require the use of the complete Eysenck and Cattell tests, and is judged unacceptable on practical grounds.

The original intention to treat POI factors only in terms of additional contribution to the assessment of personality is therefore revised in favour of treating the Eysenck-Cattell factors and the new POI factors in terms of their interdependence rather than in terms of dependence of one set on the other. With no prior rights given to either set the meaning of factors can be modified in the light of observed correlations. Thus, the concept of Adjustment defined jointly by the Cattell and Eysenck inventories can be extended by including in it the new POI factors I and IV. The other two POI factors (II- Existentiality and III- Independence), on the other hand, may be more appropriately treated as new dimensions independent of the Eysenck-Cattell system.

Since there were significant correlations between the Adjustment superfactor from the Eysenck-Cattell tests and Self-actualization and Self-acceptance provided by the POI, a higher-order factor analysis was attempted. Three factors were obtained (as can be seen in Table VIII) with the first factor accounting for most of the correlational variance

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(the cut-off point was eigenvalue 2). The first factor grouped variables 1- Adjustment, 5- Self-actualization, and 8- Self-acceptance into one superfactor, thus justifying the discussion of these three concepts under one label. Although tentative labels could be given to the other two factors extracted, their value is limited since concepts outside the three tests utilized here would have to be brought in to satisfactorily define these constructs. The second factor, for instance, could be discussed under the label of adaptability or flexibility as it groups the Sensitive vs. Practical and Assertive-Radical superfactors together with Independence and Existentiality. It is felt, however, that this construct cannot be defined without the introduction of cognitive components which, as such, were not considered in the present study.



5.0.0 PERSONALITY ASSESSMENT AND PSYCHOLOGICAL THEORY

The interpretation of the results of the study reported in this paper will be made in the larger context of personality assessment and since these results seem to add a new facet to the description of personality, their importance will be highlighted at the appropriate moment. The discussion will proceed under such headings as the place of personality assessment within the field of psychology, the contribution to psychological theory from psychological tests and vice-versa, the personality dimensions that are derivable from most commonly used personality tests, the interpretation of the personality dimensions found in the POI, the extension of some of the well-established personality dimensions, and the possibility of further verification of personality constructs as found in the three instruments utilized in this study.

5.1.0 Assessment of Personality

5.1.1 The Place of Personality Assessment within the Field of Psychology

Psychology postulates that human behaviour is subject to "laws" and, therefore, predictable. Personality testing is a means of measuring the degree of conformity to the laws that typify certain forms of behaviour.

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The description of personality characteristics has figured among the earliest endeavours in recorded literature. A wide array of means from personal impressions to theoretical and empirically anchored criteria and objective measures has been amassed over the times. In the discipline of psychology, although avoiding the fallacious specificity of phrenology, many of these attempts were based on concepts of personality hardly surpassing the common-sense definition. This weakness notwithstanding, the assessment of personality is at the centre of the field of clinical psychology. In its practical application personality assessment leads to decisions concerning an individual's stability, suitability, improvement or whatever the purpose of the diagnosis is intended to serve. In a less applied sense personality assessment is a psychological procedure aiming at the description of personality, the definition of its components, and further explanation of what is meant by the concept of personality and its dimensions.

5.1.2 Psychological Theory and Personality Tests

The quantitative measures of personality dimensions that are obtained in routine assessments as well as in specifically designed studies and experiments contribute to the steady process of verification of hypotheses and to the clarification

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of theoretical constructs. A hypothesized personality dimension has to be borne out in repeated measures. Thus, a postulated personality descriptor passes into the working language of the test users and gains popular recognition inasmuch as its conventional meaning is adequately circumscribed. It becomes a building element of psychological theory. Should, on the other hand, a personality descriptor's univocalness become infirmed in a rigorously designed and well conducted study, not only its practical application becomes questionable but also its contribution to the theoretical description of personality becomes lessened or even negated.

Whereas personality tests are a means for verifying psychological theories concerning the dynamics of human behaviour, psychological theories inspire tests intended to measure personality patterns. A coherent personality theory when proposed as a means of describing and explaining human behaviour leads to the formulation of questionnaires, inventories, scales, in short, tests based on it. These tests provide an objective means of describing an individual's behaviour in the sense that the speaker does not rely on his personal impressions but on published reference instruments against which a given behaviour is gauged. What constitutes the test (the construct) can in turn be verified against designated reference populations,

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and a degree of correlation with well-established dimensions found in tests which measure similar concepts can be thus obtained.

In this manner the theoretical framework used for creating a personality test finds also a confirmation of some or all of its constructs. In other words, the existence of a personality dimension postulated in theory x that has served as framework for a personality inventory is verified in a number of logical and statistical steps. Through repeated administrations of the test data are gathered and the results obtained in this fashion are factor-analyzed to check the validity of the dimensions. Data are then analyzed independently of the dimensions proposed by the author of the test in order to reduce the complexity usually found in personality tests. The new, less complex, dimensions obtained in the previous step are then checked against well-established dimensions present in other tests in order to find their degree of correlation with the criterion factors, thus verifying again the validity of the reduced dimensions and to see if any construct additional to the criterion dimensions can be found in the personality tests under study.

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The criterion dimensions serve thus not only to confirm the hypothetical dimensions but also may add to the understanding of these hypothetical dimensions. At the same time, if any of the hypothetical dimensions is highly correlated with one of the criterion variables, its concomitant part may become more important than its residual part for it may be used to expand the meaning of the criterion dimension. Thus, both systems of theories stand to gain as one finds a confirmation for its postulated constructs and the other finds its constructs expanded to encompass further samples of human behaviour.

5.1.3 A Few Established Personality Dimensions

Among the many tests in use two personality inventories stand out for their robustness of construction and of theoretical bases. They are the product of years of experimentation and of refinement. Their scales were derived from factor analyses of items describing a wide sample of behaviours. These questionnaires, the Eysenck Personality Inventory (EPI) and the Sixteen Personality Factors Questionnaire (16PF), provide frequently the criterion dimensions for the purpose of validating the constructs found in other tests.

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In his EPI Eysenck provides a test with physiologically based variables. The two EPI variables Extraversion and Neuroticism correspond to the second-order factors Exvia (Q_I) and Anxiety (Q_{II}) extracted from Cattell's sixteen primary factors present in the 16PF. Cattell's analysis provides also further second-order factors such as Cortertia or tough poise (Q_{III}) and Independence (Q_{IV}). A recent second-order factor analysis of both EPI and 16PF done by Porebski (1977) yields four factors:

1. Adjustment vs. Neuroticism-Anxiety, constituted by Eysenck's N^- - Neuroticism factor and three of Cattell's primary factors, viz., C^+ - Emotionally Stable, O^- - Apprehensive, and Q_4^- - Tense.

2. Extroversion vs. Introversion, consisting of Eysenck's E^+ - Extraversion factor and Cattell's three factors: A^+ - Outgoing, F^+ - Happy-Go-Lucky, and Q_2^- - Self-Sufficient.

3. Assertive-Radical, composed of four Cattell factors: E^+ - Assertive, N^- - Astute, Q_1^+ - Experimenting, and G^- - Conscientious.

4. Sensitive vs. Practical, also composed of four of Cattell's factors, namely, M^+ - Imaginative, I^+ - Tender-minded, G^- - Conscientious, and Q_3^- - Controlled.

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These four dimensions or superfactors have been recurrently found by different investigators using stringent statistical criteria. (see Cattell, 1967; Vagg and Hammond, 1976; Porebski, 1977). They can be considered as firmly established. Their meaning has been clearly defined and they constitute four useful basic theoretical constructs and provide validation criteria for other hypothesized dimensions. They are omnipresent in human behaviour. Description of human behaviour would be grossly incomplete if not impossible without reference to these four dimensions. Inasmuch as they are basic to the concept of personality (a concept that very slowly finds experimental proof for its hypothesized structure), they represent four variables which should not be ignored by learning theorists, social psychologists or specialists interested in the measurement of human achievement or intelligence.

In practical terms, the first dimension, referred to as Adjustment, consists of items describing behaviour characterized by stability, absence of fears and anxieties, freedom from tension, and assurance. The second dimension, Extroversion, corresponds to behaviour characterized by pronounced need for social contacts, ease in meeting people, enthusiasm, and group adherence. The Assertive-Radical

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behaviour is expressed in a spirit of competition, forthrightness, radicalism, and disregard for rules. The last dimension, Sensitive vs. Practical, is constituted by behaviour that is inventive, sensitive to interpersonal relationships, lacking foresight, spontaneous and following one's own impulses, and apt to disregard practical wisdom.

5.2.0 A Contribution to the Definition of Personality Dimensions

5.2.1 Definition of the Personality Dimensions Found in the POI

The statistical analyses based on the responses of our subjects to the Personal Orientation Inventory (POI) suggest two main findings.. One concerns the factor structure of the POI, the other the personality dimensions forming part of the Eysenck-Cattell system (that is, the four superfactors obtained from the second-order analysis of the Eysenck and Cattell tests together).

In a first step in this study the POI results of the NRC physicist subsample and of the university student subsample were compared in order to verify the test's power to discriminate between self-actualizers and non self-actualizers. Only on three of the POI complementary scales did the subsamples differ. The physicists had a higher mean score on the complementary scale called Existentiality. This result could be accounted for

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when one considers that the physicists were individuals whose mean age was above that of the student subsample and who have reached a well defined professional level and presumably have attained achievement and maturity in their lives. This would make them more flexible in application of values than their student counterparts. The next variable on which the two subsamples differed was Self-Acceptance. Similar reasons could be invoked here to explain why the physicists were more self-accepting in spite of their presumable weaknesses. The student subsample could be considered more idealistic. This argument is further strengthened by the results on the last variable on which there was a significant difference, namely, Nature of Man - Constructive. Here the students held a definitely more positive view of man than the physicists. In spite of these three differences the scores of the two subsamples were well within the normal range as defined by the test author, that is, between the standard scores of 40 and 60. Since the population for the present study was not selected on the basis of the self-actualization criterion, any reported differences or lack thereof should not be considered a serious impairment of the validity of the test.

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In the factor analyses of the POI scales that were carried out as a check on the validity of the complementary scale structure five factors were obtained. The final number of items retained to represent these five factors, or retained scales, was 32. The variables represented correspond to five of the complementary scales with a number of items belonging to the Time Competence scale found predominantly in two of the retained scales in addition to the items grouped under their original headings. Thus five of the 10 complementary scales have been retained in the factor analysis. The first conclusion to be drawn here is that the two principal scales of Time Competence and Inner-Directedness were not found to constitute unitary concepts. Time Competence was associated mainly with Capacity for Intimate Contact (Factor I) and less so with Self-Regard (Factor V). Inner-Directedness appeared to be a composite of Existentiality (Factor II), Acceptance of Aggression (Factor III) and Self-Actualizing Value (Factor IV). These five confirmed scales were found within the constraints of the original scale definitions supplied with the POI and do not provide a sufficient description of what could be understood by the construct of self-actualization.

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A more complete explanation can be derived from the two further analytic steps that were undertaken in the study: the direct factor analysis of the 150 POI items and a residual analysis of the factors obtained in this direct analysis of the POI contents. The direct analysis yielded four factors none of which corresponds integrally to Shostrom's original scales. Forty-three POI items account for the factors. Among these forty-three items 15 were also verified in the analysis of the POI scales. The obtained factors load predominantly on one or two original scales each. The item groupings suggest the possibility of using the descriptive labels utilized by Shostrom. The borrowings would not correspond integrally to the original definitions. The labels would, nevertheless, fall within the same broadly defined theoretical frame of reference as that of Shostrom.

The proposed labels for the four factors, or more precisely for the four analytical scales obtained by grouping those items that had a correlational value above 0.4 on a respective scale, are as follows: Factor I, Self-actualization, Factor II, Existentiality, Factor III, Independence, and Factor IV, Self-acceptance. These analytically obtained factors could suggest a redefinition of the concept of self-actualization without diminishing its meaning for the purpose of psychotherapeutic application.

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Self-actualization, as applied to the items forming Factor I, refers to a level of maturity found in an individual who is at peace with himself, manages his life unhurriedly as it unfolds, avoids emotional outbursts while not ashamed of his emotions, in brief, a stable, well-adjusted individual who has reached a satisfactory level of achievement in life. This is in contradistinction to the construct of Self-acceptance, Factor IV, which while related to behaviour that could be described as self-actualized, defines itself by pointing out what it is not. A moderately high correlation between these two factors was obtained (0.6) which establishes a conceptual link among them and points out to their importance in the definition of the concept of self-actualization. The construct of self-actualization as proposed in this study should be viewed not as an entirely independent personality dimension but as a facet of a more basic dimension. Both factors I and IV exhibited a moderate relationship (0.54) with the Eysenck-Cattell superfactor of Adjustment as defined above. While this correlation lends support to the validity of the construct of self-actualization, it also suggests that an examination of the concept of adjustment as defined in the Cattell and Eysenck instruments could prove rewarding. This question will be dealt with in the next section of this chapter.

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Factor II, Existentiality, consists mainly of items that were included under this label in the original POI classification with a sprinkling of kindred items from other subscales, one item being scored in the opposite direction (I119, Nc). It is the only factor-scale that has survived from the factor analysis of the complementary scales. It refers to a flexibility in application of one's principles, an understanding of life's expectations, a capacity to adapt to the demands of a situation. It also shows a low correlation with the Sensitive vs. Practical superfactor (0.39). The construct of existentiality has gained wide acceptance in philosophy and psychology but received scientific recognition with the creation of the POI only.

Factor III, Independence, grouping items from six POI complementary scales, all from the principal scale of Inner-Directedness, reflects an independent-minded attitude. While closely related to Shostrom's Inner-Directedness, it does not suggest nonconformist behaviour free from conflict with society but rather a complete reliance on one's own resources. Shostrom's concept refers to a more balanced attitude, a mature interdependence that can be accounted for only through a composite of scales. While it is appealing, Shostrom's dimension appears to be a composite of more than one constructs

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linked to the integration and rejection of societal and moral values grouped under the label of super-ego. Factor III groups items defining a subjective perception or self-referenced evaluation of external criteria. In other words, this factor suggests a complete autonomy from the rules of society. It bears some resemblance to the Assertive-Radical superfactor (correlation of 0.36) and to a lesser extent (0.31) to Factor IV, that is, Self-acceptance.

Whereas these four factors by themselves could not fully describe an individual's personality functioning, they do open up a different perspective. Together they inform about an individual's outlook on life, his goal attainment, his place in society and reconciliation with himself. The four-factor system lends a positive frame of reference to the assessment of personality and points to a goal within reach when utilized in a clinical situation. It should find a ready practical application, more so than the original POI item pool, as it would require less reliance on the psychotherapist's personal experience and a lesser number of variables to account for the behaviour.

The use of these four factors as outlined would provide for a more efficient and more reliable diagnostic procedure since the components have been verified through rigorous

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analytical and deductive steps. The utility of this proposed assessment tool would be enhanced if it were administered together with the Eysenck and Cattell tests or incorporated with Porebski's analytical regrouping of these tests. This is suggested by the results obtained in the residual analysis of the final four factors retained from the POI. In these residual analyses the Eysenck-Cattell superfactors served as reference factors against which the residual factors were extracted. The residual factors obtained were for all intents and purposes identical in meaning with the analytic factors, particularly when approximated by POI items alone.

5.2.2 The Contribution of the POI to the Definition of the Eysenck-Cattell Personality Dimensions

The attempt at obtaining residual POI structures independent from the Eysenck-Cattell superfactors yet based entirely on POI items was not quite successful. In two different runs significant correlations between the Adjustment superfactor and the Residual Factors 1 and 4 were present. This residual correlation could be eliminated only through statistical manipulations. This was not done for practical considerations as explained in the previous chapter.

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The question arises about the meaning of POI factors and their relationship to the reference factors. In the case of Self-actualization and Self-acceptance the persistent correlation with Adjustment opens up the possibility that the personality dimension referred to as Adjustment is not exhaustively defined by the items of the tests of Eysenck and Cattell and that the constructs of Self-actualization and Self-acceptance form part of the same dimension. In other words, a fuller description of the superfactor Adjustment is gained if the constructs of Self-actualization and Self-acceptance are associated with it. Adjustment and self-actualization should not be considered to be identical as the conditions for adjustment are not necessarily anchored in the same type of life experience as self-actualization. Adjustment appears more the product of a stable and emotionally supportive environment whereas self-actualization would be more achieved through one's own conscious efforts. Self-actualization is contingent upon awareness of one's needs, reactions, effect on the environment. Thus, adjustment and self-actualization would not appear to be subordinate to one another. They are seen as facets of a broader dimension. As the subsequent higher-order analysis demonstrated Self-actualization and Self-acceptance form a unitary concept with

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Adjustment. The construct of Adjustment could be extended to include a dimension not present in its original definition. The factor thus obtained suggests the label of Psychological Maturity. Thus, Maturity could be defined by items from all three tests.

Though one could speculate that the self-sufficiency present in the Independence factor could be related with some of the defining components of the Extroversion superfactor, little insight into it can be gained from the residual analysis of the POI factors. The items defining extroversion stress gregariousness and sociability whereas independence points to absence or rejection of rules, obligations and perceptions imposed by society. Thus the constructs gain by contrast rather than by integration.

Expectations concerning the emergence of Existentiality as a factor independent from the Eysenck-Cattell superfactors were not disappointed. Although the defining items of the Sensitive vs. Practical-superfactor suggest a possible link between the two concepts, the link appears to be weak. The two categories are neither inclusive nor exclusive. Both concern themselves with present realities but whereas one could be thought of as related to a certain style of early upbringing (for instance, overprotected, responsive to the needs of the individual), the latter represents an outlook

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that is acquired with time by examining one's experience with oneself and the environment and which is marked by flexibility and adaptability to the demands of the situation. Thus, the construct of Existentiality adds to the description of personality beyond the Eysenck-Cattell system.

The Assertive-Radical superfactor could be contrasted with all four POI factors. The forthright manner suggested by this label was not found to be significantly present in any of them, although Independence shows the most affinity with this superfactor.

To sum up, the dimension of Adjustment as defined in the Cattell-Eysenck tests could be extended to include the constructs of Self-actualization and Self-acceptance. The inclusion of these two constructs would make the definition of Adjustment more complete than would Eysenck's or Cattell's tests alone. The label of PSYCHOLOGICAL MATURITY is suggested as an overall descriptor of the three concepts, thus integrating humanistically oriented constructs with experimentally anchored ones. It is plausible that the other three superfactors would also lend themselves to a more exhaustive definition should a joint higher-order factor analysis of the 382 items forming the three tests be carried out. Only three to four new higher-order factors would be expected to emerge in such an analysis.

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5.3.0 Conclusions5.3.1 Overview

A number of a priori expectations were raised at the beginning of this study. A number of them were met. A number of them were not met with as much success as expected.

One of the purposes of the study was to evaluate externally and internally the POI scales. The evaluation was undertaken from many bases. The relative failure of the POI scales to discriminate the self-actualizers from the non self-actualizers cannot be ascribed in the first place to a weakness of the test but rather to the nature of the subject sample. The selection criterion for the subjects was related to factors other than self-actualization.

The investigation of the internal validity of the POI showed that all scales were reasonably intercorrelated. A factor analysis of the scales confirmed five of them: Ex, A, and SAV which were associated with Inner-Directedness, and C and Sr associated with Time Competence. A direct factor analysis of the POI items yielded four factors which could be defined by referring to the theoretical framework of Shostrom. These four factors were also compared with superfactors obtained from a factor analysis of Eysenck's and Cattell's

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tests. Thus, the internal validation complemented by the external criteria justified the psychological interpretation given to the factors: Self-actualization, Existentiality, Independence and Self-acceptance. As expected, the retained factors could be proposed as an alternative system to the POI for the purpose of personality assessment.

In all, the factor analysis of the original POI scales did not reproduce the two major scales of Time Competence and Inner-Directedness as unitary factors and five of the ten complementary scales failed to be reproduced in the analysis. This result does not weigh in favour of the utilization of the POI for everyday diagnostic purposes in the original form. However, the four factors obtained directly from the POI items represent constructs in part related with the Eysenck-Cattell system and, if taken as a system by themselves, could constitute a useful instrument for assessment of "normal" individuals so as to gauge the distance at which they find themselves from an ideal, but not unattainable, standard. The combined use of the Eysenck-Cattell superfactors and of the four analytical factors obtained in this study would provide an alternative, improved system to the separate use of the three inventories.

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The proposed new system would involve three second-order factors of Eysenck and Cattell (Extroversion, Assertive-Radical, Sensitive vs. Practical), two POI factors (Existentiality and Independence) and one broad superfactor of Psychological Maturity derivable from all three tests.

The question whether the Self-actualization and Self-acceptance factors yield any meaningful residual dimensions after they have contributed to the definition of Psychological Maturity must be left to further research. Even within the proposed six-factor system there is need for a detailed, separate, study of each dimension. The present results provide but a hypothesis, a basis or starting point, for such a study.

5.3.2 Further Research

The results of the present study suggest primarily two possible areas of investigation. First, a new, more exhaustive but simplified, system for the purpose of personality assessment could be established. It would consist of the minimum number of items necessary to define the Eysenck-Cattell superfactors and of the four analytic POI factors found here. Since these eight factors would not be fully independent, a further search for more unified factors could be next undertaken

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in the form of a simultaneous factor analysis of all three inventories. This would yield a reduced number of factors and provide for parsimony in the accounting for human behaviour. A most interesting outcome of such an investigation would be the bringing together of existentially inspired and experimentally based theories of personality.

As Shostrom and his associates (1976) continue to expand instruments to test the concept of self-actualization, it could be profitable and challenging to verify the validity of these new tools against the system proposed here. It would seem that such an effort would slowly bring about a better defined concept of personality that could be submitted to experimental verification. With the availability of new items it might be worthwhile to attempt again a representation of residual dimensions directly by Shostrom's items.

As personality is at the centre of psychology, the lack of a precise definition of this construct hampers progress in the field of psychology. It is only by such small contributions as the present one that a meaningful definition of personality will be finally established. Constructs such as intelligence and motivation will not be fully understood before personality is properly described. Investigation at the cybernetic and psychophysiological level may displace paper and pencil

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approaches. The particular areas or specific methodologies are less important than knowing where to begin. However, it is only when the commonplace, widely used, concepts are well defined that one will be able to start out towards new, less explored, areas.

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APPENDICES

PERSONAL ORIENTATION INVENTORY Scale Composition

TI

Time Incompetent
(23 items)

48A 59A 82A 87A 88A 90A 102B 105B 110A 111A 112A 113B
124A 125A 129A 133B 136A 140B 142B 143A 144B 145A

TC

Time Competent
(23 items)

48B 59B 82B 87B 88B 90B 102A 105A 110B 111B 112B 113A
124B 125B 129B 133A 136B 140A 142A 143B 144A 145B

O

Outward-Directed
(127 items)

1A 2A 3A 4B 5A 6B 7A 8A 9A 10A 11A 12A 13B 14A 15A 16A
17B 18B 19B 20A 21A 22B 23A 24B 25A 26A 27B 28A 29A 30A
31B 32B 33B 34A 35B 36A 37B 38B 39B 40B 41A 42A 43B 44A
45A 46A 47B 49A 50A 51A 52A 53B 54A 55A 56B 57A 58A 60A
61A 62B 63B 64A 65A 66B 67A 68B 69A 70A 71A 72B 73B 74B
75B 76A 77B 78B 79A 80B 81A 83A 84A 85A 86A 89A 91A 92B
93B 94A 95B 96A 97A 98A 99B 100B 101B 103B 106A 107A 108B
109B 114B 115B 116A 117A 118B 119B 120B 121B 122B 123B 126B
127B 128B 130A 131B 132B 134B 135B 137B 138B 139A 141B 146B
147B 148B 149B 150A

I

Inner-Directed
(127 items)

1B 2B 3B 4A 5B 6A 7B 8B 9B 10B 11B 12B 13A 14B 15B 16B
17A 18A 19A 20B 21B 22A 23B 24A 25B 26B 27A 28B 29B 30B
31A 32A 33A 34B 35A 36B 37A 38A 39A 40A 41B 42B 43A 44B
45B 46B 47A 47B 50B 51B 52B 53B 54B 55B 56A 57B 58B 60B
61B 62A 63A 64B 65B 66A 67B 68A 69B 70B 71B 72A 73A 74A
75A 76B 77A 78A 79B 80A 81B 83B 84B 85B 86B 89B 91B 92A
93A 94B 95A 96B 97B 98B 99A 100A 101A 103A 106B 107B 108A
109A 114A 115A 116B 117B 118A 119A 120A 121A 122A 123A 126A
127A 128A 130B 131A 132A 134A 135A 137A 138A 139B 141A 146A
147A 148B 149A 150B

SAV

Self-Actualizing Value
(26 items)

6A 10B 20B 27A 36B 38A 43B 68A 80A 89B 92A 98B 99A 100A
103A 114A 118A 121A 123A 128A 133A 135A 138A 141A 146A 147A

PERSONAL ORIENTATION INVENTORY Scale Composition

Ex

Existentiality
(32 items)1B 2B 3B 5B 8B 9B 11B 18A 19A 21B 31A 36B 44B 45B 54B 56A
57B 64B 67B 74A 80A 86B 89B 92A 96B 98B 111B 124B 130B 143B
148B 149A

Fr

Feeling Reactivity
(23 items)4A 10B 13A 15B 16A 33A 38A 47A 52B 53A 55B 58B 61B 62A 69B
76B 91B 93A 94B 95A 101A 117B 131A

S

Spontaneity
(18 items)1B 6A 27A 35A 41B 52B 54B 62A 68A 74A 81B 84B 85B 86B 101A
123A 137A 138A

Sr

Self-Regard
(16 items)7B 16B 31A 32A 78A 39A 40A 48B 60B 68A 78A 118A 121A 128A
132A 149A

Sa

Self-Acceptance
(26 items)3B 5B 12B 14B 22A 24A 26B 28B 29B 37A 41B 42B 48B 50B 63A
65B 66A 70B 71B 72A 77A 87B 107B 128B 134A 150B

Nc

Nature of Man, Constructive
(16 items)36B 40A 43A 73A 78A 83B 92A 98B 115A 116B 119A 122A 126A
139B 141A 147A

Sy

Synergy
(9 items)

36B 80A 89B 92A 98B 137A 141A 144A 146A

A

Acceptance of Aggression
(25 items)13A 24A 33A 50B 52B 56A 61B 63A 70B 73B 76B 79B 84B 89B
91B 93A 109A 115B 118A 122A 123A 130B 131A 135A 146A

PERSONAL ORIENTATION INVENTORY Scale Composition

C

Capacity for Intimate Contact
(28 items)1B 2B 8B 19A 21B 25B 33A 36B 44B 45B 49B 52B 53A 54B 55B
57B 60B 61B 67B 70B 76B 81B 103A 106B 107B 108A 117B 127A

EYSENCK PERSONALITY INVENTORY Scale Composition

E

Extraversion
(24 items)1 3 5 8 10 13 15 17 20 22 25 27 29 32 34 37 39 41 44
46 49 51 53 56

N

Neuroticism
(24 items)2 4 7 9 11 14 16 19 21 23 26 28 31 33 35 38 40 43 45
47 50 52 55 57

L

Lie Scale
(9 items)

6 12 18 24 30 36 42 48 54

SIXTEEN PERSONALITY FACTOR QUESTIONNAIRE Scale Composition

A

Outgoing
(10 items)

3 26 27 51 52 76 101 126 151 176

B

Intelligent
(13 items)

28 53 54 77 78 102 103 127 128 152 153 177 178

C

Emotionally Stable
(13 items)

4 5 29 30 55 79 80 104 105 129 130 154 179

SIXTEEN PERSONALITY FACTOR QUESTIONNAIRE Scale Composition.

E

Assertive
(13 items)

6 7 31 32 56 57 81 106 131 155 156 180 181

F

Happy-Go-Lucky
(13 items)

8 33 58 82 83 107 108 132 133 157 158 182 183

G

Conscientious
(10 items)

9 34 59 84 109 134 159 160 184 185

H

Venturesome
(13 items)

10 35 36 60 61 85 86 110 111 135 136 161 186

I

Tender-Minded
(10 items)

11 12 37 62 87 112 137 138 162 163

L

Suspicious
(10 items)

13 38 63 64 88 89 113 114 139 164

M

Imaginative
(13 items)

14 15 39 40 65 90 91 115 116 140 141 165 166

N

Astute
(10 items)

16 17 41 42 66 67 92 117 142 167

O

Apprehensive
(13 items)

18 19 43 44 68 69 93 94 118 119 143 144 168

Q1

Experimenting
(10 items)

21 21 45 46 70 95 120 145 169 170

SIXTEEN PERSONALITY FACTOR QUESTIONNAIRE Scale Composition

Q2

Self-Sufficient

(10 items)

22 47 71 72 96 97 121 122 146 171

Q3

Controlled

(10 items)

23 24 48 73 98 123 147 148 172 173

Q4

Tense

(13 items)

25 49 50 74 75 99 100 124 125 149 150 174 175

Dichotomous Distribution of Scores
in the Total Sample (N=137) for the 150 POI Items

I	Percent A	B	I	Percent A	B	I	Percent A	B	I	Percent A	B	I	Percent A	B
1	.74	.26	31	.84	.16	61	.35	.65	91	.22	.78	121	.86	.14
2	.72	.28	32	.97	.03	62	.52	.48	92	.89	.11	122	.64	.36
3	.53	.47	33	.74	.26	63	.79	.21	93	.55	.45	123	.94	.06
4	.22	.78	34	.53	.47	64	.22	.78	94	.23	.77	124	.28	.72
5	.54	.46	35	.61	.39	65	.36	.64	95	.58	.42	125	.37	.63
6	.42	.58	36	.14	.86	66	.69	.31	96	.20	.80	126	.88	.12
7	.12	.88	37	.55	.45	67	.15	.85	97	.30	.70	127	.77	.23
8	.53	.47	38	.83	.17	68	.88	.12	98	.23	.77	128	.51	.49
9	.10	.90	39	.82	.18	69	.06	.94	99	.85	.15	129	.35	.65
10	.36	.64	40	.86	.14	70	.83	.17	100	.74	.26	130	.48	.52
11	.62	.38	41	.60	.40	71	.12	.88	101	.71	.29	131	.34	.66
12	.22	.78	42	.46	.54	72	.75	.25	102	.91	.09	132	.69	.31
13	.42	.58	43	.84	.16	73	.80	.20	103	.93	.07	133	.88	.12
14	.36	.64	44	.39	.61	74	.88	.12	104	.64	.36	134	.93	.07
15	.55	.45	45	.72	.28	75	.70	.30	105	.29	.71	135	.78	.22
16	.69	.31	46	.45	.55	76	.37	.63	106	.67	.33	136	.12	.88
17	.48	.52	47	.79	.21	77	.69	.31	107	.18	.82	137	.84	.16
18	.72	.28	48	.36	.64	78	.98	.02	108	.15	.85	138	.81	.19
19	.64	.36	49	.18	.82	79	.54	.46	109	.86	.14	139	.42	.58
20	.28	.72	50	.35	.75	80	.58	.42	110	.18	.82	140	.89	.11
21	.38	.62	51	.30	.70	81	.24	.76	111	.22	.78	141	.90	.10
22	.31	.69	52	.39	.61	82	.43	.57	112	.23	.77	142	.96	.04
23	.15	.85	53	.57	.43	83	.40	.60	113	.86	.14	143	.12	.88
24	.31	.69	54	.13	.87	84	.71	.29	114	.81	.19	144	.93	.07
25	.18	.82	55	.19	.81	85	.12	.88	115	.21	.79	145	.55	.45
26	.45	.55	56	.56	.44	86	.60	.40	116	.26	.74	146	.87	.13
27	.67	.33	57	.82	.18	87	.50	.50	117	.22	.78	147	.93	.07
28	.77	.23	58	.17	.83	88	.53	.47	118	.53	.47	148	.41	.59
29	.49	.51	59	.31	.69	89	.36	.66	119	.42	.58	149	.67	.33
30	.22	.78	60	.18	.82	90	.49	.51	120	.41	.59	150	.47	.53