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AN ITEM-FACTOR ANALYSIS OF THE GPQ
ADMINISTERED TO A SAMPLE OF NEW ZEALAND SCHOOL CHILDREN

A thesis submitted in partial fulfilment of the
requirements for the degree of Master of Arts in
Education at Massey University

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The 1963 version of the Children's Personality Questionnaire was administered to 374 New Zealand children aged from 8 to 14 years with a mean age of 11 years 5 months attending state primary and intermediate schools. Both Forms A and B were administered to each child. Items designed to load on CPQ factor B (Intelligence) were omitted for simplicity of analysis, leaving 130 items in each Form.

Data obtained were factor analysed using the principal components method, Varimax rotation, communalities in the diagonals, and proceeding to oblique rotation. Separate analyses were carried out on Form A and Form B and thirteen factors extracted from each Form, as follows, for comparison with the remaining thirteen CPQ factors.

<u>Form A Factors:</u>		<u>Form B Factors:</u>	
A1	Assertiveness	B1	Self-control (Conformity)
A2	Conformity	B2	Self-reproach
A3	Dependency	B3	Confidence
A4	Serious-mindedness	B4	Sociability
A5	Shyness	B5	Tender-mindedness
A6	Security	B6	Emotional Maturity
A7	Confidence	B7	Consociation
A8	Self-satisfaction	B8	Laxity
A9	Irresolution	B9	Serious-mindedness
A10	Self Sentiment	B10	Egocentricity
A11	Defeatism	B11	Passivity
A12	Placidity	B12	Realism
A13	Participation	B13	Friendliness

Items from all CPQ factors except I (Tough minded-versus-Tender minded) showed significant loadings (sig. = \pm 0.30) on four or more of the emergent factors, indicating that the items did not clearly define the CPQ factors which they are alleged to measure. However, 89 items from Form A and 85 items from Form B showed significant loadings on only one emergent factor. Ten of the CPQ factors provided recognisable contributions to the emergent factors. Form A factors showed only two significant intercorrelations (sig. = \pm 0.30) whereas there were six such intercorrelations among the Form B factors and thirteen among the CPQ factors.

It is suggested that the Form A factors may provide a more suitable reference frame for the measurement of personality dimensions among New Zealand children. Before proceeding to adaptation of an international test which has demonstrated its discriminatory ability, further research including replication with both representative samples and special groups should be undertaken.

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INTRODUCTION

One of the tests used by the Psychological Service of the Education Department of New Zealand in investigating social and academic difficulties of primary school children is the Children's Personality Questionnaire (CPQ) (Porter & Cattell, 1963).

The Interim Manual for the Children's Personality Questionnaire claims that the CPQ yields a general assessment of personality development of 8-12 year olds by measuring 14 Bipolar dimensions of personality which have been found by psychologists to approach the total personality (Porter & Cattell, 1963). These factors are linked with those of the related Pre-School Personality Questionnaire (Dreger & Cattell, In preparation), the Early School Personality Questionnaire (Cattell & Coan, 1966), the High School Personality Questionnaire (Cattell & Cattell, 1969), and the Sixteen Personality Factor Questionnaire (Cattell, Eber, & Tatsvoka, 1970). Cattell regarded all these questionnaires as broadly equivalent scales for measuring personality dimensions at different age levels.

The Interim Manual asserts that, by working with these 14 factors individually and in different combinations, predictions of school achievement are possible, especially under-achievement, tendency towards delinquency, likelihood of leadership potential, and possible need for clinical help in avoiding excessive emotional disturbance. The Handbook issued with the earlier form of the CPQ shows in addition scale-scoring available for neuroticism versus stability, anxiety versus adjustment, and extraversion versus introversion (Porter & Cattell, 1959).

However, the 14 factors of the CPQ do not appear to have been investigated by any research at the appropriate age levels in New Zealand. Adcock, Adcock & Walkey (1971) conducted research with New Zealand samples on the closely-related adult version, the Sixteen Personality Factor Questionnaire (Cattell & Eber, 1957; Cattell et al., 1970), and discovered that, though items vary considerably in their significance cross-culturally, major factors are reasonably stable. Cattell, Schmidt, & Pawlik (1973) recently reported on a cross-cultural comparison of the personality factor structures of 10-14 year olds in U.S.A., Japan, and Austria. This included as a less important feature measurement using the CPQ and the HSPQ, in English and translations, which showed "substantial

stability" for 9 factors (Cattell, Schmidt, & Pawlik, 1973, p. 210).

Likewise, the norms supplied with the CPQ, which are used by the Psychological Service in its assessments, were not calculated from samples of New Zealand school children.

Further, the instrument was developed as a downward extension of the 16 PF which has been criticised on the grounds that "it does not measure the factors which it purports to measure at the primary level (Howarth & Browne, 1971, p. 117; see also Adcock, 1971; Eysenck & Eysenck, 1969). Commenting on this allegation Dielman (unpublished article) drew attention to procedural defects in Howarth & Browne's replication and concluded that insufficient evidence had been presented to outweigh "the evidence from forty or more mutually integrating studies" of the existence of such factors and the capability of the 16 PF to measure them consistently.

Comments by the three reviewers in The Sixth Mental Measurements Yearbook (Buros, 1971) unanimously advocated caution in the use of the CPQ for a variety of reasons.

Robert D. Wirt commented:

"Nowhere are there data which describe the norm groups. . . . The reader is given skimpy secondary data on validity and is referred to other sources for further detail. The references cited for this purpose relate almost exclusively to general texts on the subject of test construction . . . having nothing whatever to do with the particular standardization of the CPQ (pp. 260-261)."

Wilbur L. Layton also criticised the CPQ on the grounds that there was no information given in the Handbook to indicate how the sample was obtained, nor was there any further information about the normative sample (p. 257).

The third reviewer, Anne Anastasi, echoed these criticisms:

"Norms are reported for each sex separately, but age differences (which are only significant in three traits) are handled by the use of correction terms. The normative samples comprise 735 boys and 741 girls aged 8 to 12, not otherwise described. . . . Validity is discussed largely in terms of factorial analysis of items, based primarily on a group of 200 boys and girls not otherwise described. . . . Many references are to Cattell's Personality and Motivation Structure and Measurement in which studies pertaining to the age level 8 to 14 receive only brief and general mention because they were still in progress when the book was published (p. 257)."

While these comments were based on the 1959 edition of the CPQ Handbook (Porter & Cattell, 1959), the Interim Manual (Porter & Cattell, 1963) supplied for use with the revised 1963 edition of the CPQ was aimed primarily at increasing the reliability of the scales and did not represent a change in the scales themselves (Buros, 1971, p. 256).

The consensus was that, lacking further evidence, this instrument should be used solely for research purposes and Wilbur L. Layton added that it "must be considered a research test which should not be used in counseling or otherwise dealing with individual children (p. 260)."

In view, however, of the scarcity of tests for personality measurement of children it is not surprising that the CPQ has come to be used in precisely this field.

This study was therefore initiated because the CPQ is in practice being used for individual personality assessment in New Zealand primary and intermediate schools. The object of the study was to conduct an item-factor analysis of this instrument, using the principal components procedure, with a sample of 374 New Zealand primary and intermediate school children in Standard 2 to Form 2. Emergent factors are compared with those the CPQ was originally designed to measure and the allegiance of specific items is investigated in order to assess whether the CPQ appears to be measuring the personality factors it purports to measure, and thus whether its present use in New Zealand primary and intermediate schools is justified.

PART 1

REVIEW OF RELATED RESEARCH

In investigating the CPQ a major difficulty was the paucity of information specifically relating to the instrument. Cattell himself regarded the CPQ as a closely related form of the 16 PF for use with the 8-12 year old age range as attested by his references to it in the Handbook of the 16 PF (Cattell et al., 1970):

"The information in this technical Handbook is thus relevant to all six equivalent forms of the 16 PF, and also, with some modifications, to the personality factor questionnaires for other age ranges which use the same personality dimensions and concepts. (These parallel tests include . . . the CPQ . . .) (p. 2)."

"Unlike a host of questionnaire scales which have been offered to psychologists in the past, the 16 PF, HSPQ, CPQ, ESPQ, and PSPQ are accompanied by extensive cross-checked, factor-analytic research publications and systematic relations to a central personality model and body of theory (p. 3)."

"Investigation at different ages by a series of coordinated cross-sectional analyses at different points in the growth period has established that the chief personality factors in the 16 PF exist also throughout the developmental sequence. Four scales have thus been developed - the HSPQ, CPQ, ESPQ, and the PSPQ whereby comparisons can be made of personality measurements of people at different ages, or of parents and children on the same factors (p. 10)."

"The basic scientific position of the constructors of the 16 PF (and of the associated range of instruments, namely, the HSPQ, CPQ, ESPQ, and PSPQ) is that the greatest psychological utility lies in instruments with scales built around pure scientific concepts of personality structure (p. 299)."

Thus it became necessary to heed the comment by Anne Anastasi in Buros (1971) that the CPQ "should be considered within the framework of the other inventories constructed by Cattell and his associates and of the factorial research on personality traits that led to their development (pp. 256-257)." A major feature of Cattell's personality tests is his claim to have derived his personality dimensions by scientific analysis of items designed to sample the entire personality sphere. The theory underlying this claim is now discussed.

Bases of Cattell's Personality Theory

Hall & Lindzey (1970, p. 2) distinguished four major streams of thought which have influenced the development of personality theory since 1900:

1. Clinical observation including the theories of Freud, Jung, and McDougall.
2. The Gestalt tradition emphasising the unity of behaviour as in Wertheimer, Kohler, and Lewin.
3. Experimental psychology, and in particular learning theory, which led to "increased concern with carefully controlled empirical research, a better understanding of the nature of theory construction, and a more detailed appreciation of how behaviour is modified (Hall & Lindzey, 1970, p. 2)."
4. Psychometrics, which focus upon the measurement and study of individual differences.

This last has led to increasing sophistication in measurement and the quantitative analysis of data (Cattell, 1965, p. 5).

Foremost among these empirical methods has been the technique of factor analysis and this in turn has led to a further theoretical position the outstanding proponents of which are Raymond B. Cattell, H. J. Eysenck, J. P. Guilford, Cyril Burt, and L. L. Thurstone. Of these "Cattell's theory is by far the most comprehensive and fully developed theory of personality based on factor analysis (Hall & Lindzey, 1970, p. 380)."

General Sources of Data

In the formulation of his theory the confluence of all the foregoing major streams of thought is evident in Cattell's utilisation of three major sources of data:

1. The life record (L-data) which may be obtained from such sources as actual school records, or ratings by other persons who know the individual in real-life settings, such as teacher- or parent-ratings (Cattell, 1963).
2. Objective testing (T-data) obtained by creating special situations in which the individual's behaviour may be objectively scored. Over 400 such tests have been listed by Cattell & Warburton (1967). This type of testing was first applied to exploration of personality dimensions among adults but since 1957 such tests have been extended downward

to older children and further to young children. Cattell & Howarth (1962) state:

"The main finding, as in the corresponding field with questionnaire measures of personality, has been that the same primary factors are discoverable, changed somewhat in expression, through the change in age, but essentially identifiable (p. 145)."

3. Self-rating questionnaires (Q-data) which involve the individual's own statements about his behaviour and thus provide a "mental interior" to the external record yielded by L-data, and yield the same primary factors (Cattell, 1959). Cattell (1963) commented that "Clarity of the rating factor situation is important, because these personality factors are the real, criterion behavior, from which Q and T-data, as merely test data, must draw their validity (p. 219)." While it is debatable whether L-, Q-, or T-data do in fact represent "real" behaviour, evidence of similar factors emerging from these three different methods of measurement would tend to confirm the existence and constancy of such dimensions of personality.

Search for General Source Traits

By conducting separate factor analytic studies using all three types of data Cattell hoped to identify general traits¹ arguing that if the same source traits emerged from all three types of investigation this would tend to confirm that the source traits were real functional entities and not mere artifacts of the method. He later claimed that:

"As research is now showing, these source traits correspond to real unitary influences - physiological, temperamental factors: degrees of dynamic integration; exposure to social institutions - about which more can be found out once they are defined (Cattell, 1950, p. 27)."

Extensive analyses by Cattell and his associates led him to the conclusion that a similar factor structure emerged from L-data and Q-data, but somewhat different factors tended to emerge from T-data. Howarth & Browne (1971, p. 136) claimed that Cattell

¹Trait is defined by Cattell (1965) in his glossary as "a unitary configuration in behavior such that when one part is present in a certain degree, we can infer that a person will show the other parts in a certain degree." He also distinguishes between surface traits (or correlation clusters) and source traits (factors) (Cattell, 1957, pp. 10-18). See also Hall & Lindzey, 1970, p. 386.

had failed to show this and quoted a study by Cattell & Saunders (1950) in which Cattell himself said that "except for two or three instances, the known personality factors, contrary to our hypothesis, are not outcrops of the same factor in a different media (p. 256)." In reply, Dielman (unpublished article) pointed out deficiencies in the procedures employed in Howarth & Browne's (1971) investigation.

Since factor analysis is a method for determining the number and nature of the underlying variables among large numbers of measures (Kerlinger, 1965, p. 630), a critical determinant of the factors extracted is the population of items selected for analysis, and Cattell has repeatedly stressed the importance of sampling the entire "personality sphere":

"The psychometrist of personality, if he is to get an unbiased picture of the whole, must have some concept of the totality of human behavior, which we shall call the PERSONALITY SPHERE. This may be roughly defined as what people do over a sample 24-hour period, and it will vary somewhat with different ages and culture (Cattell, 1965, p. 60)."

In deciding on a basis for determining the total personality sphere, Cattell turned to language as an indicator, arguing that:

"It would be strange if language had not yet developed reference symbols for all aspects (of human nature) having any importance Language vocabulary on the whole appears almost to have reached a plateau in its development of symbolism for personality traits (Cattell, 1946, p. 215)."

Though Cattell conceded that language is not guaranteed to cover all aspects of personality behaviour, he contended that it does cover all those which have social and material importance for humanity and cited this as his justification for taking language as the basis of his concept of the personality sphere. This he went on to describe more fully:

"The Personality Sphere may be considered to present a complete surface, constituted by many 'trait areas,' each trait area defined by a trait term and abutting on traits most closely resembling it, the whole constituting an endless but finite continuum of behavior meaning. If trait character is represented by direction as in factor-analytic representation, the sphere must be considered as one in n-dimensional space (Cattell, 1946, p. 216)."

Cattell utilised Allport & Odbert's (1936) list of approximately 4500 trait names from an unabridged dictionary and condensed these to under 200 by grouping near-synonyms and

discarding rare and metaphorical terms. These were then intercorrelated and further reduced by empirical clustering procedures to yield 35 surface traits. Ratings on these provided the basis for the initial L-data factor analysis. The main personality factors that Cattell considered reasonably well established in both L- and Q-data are listed in Table 1.

TABLE 1

Major Personality Factors found in both L-data and Q-data

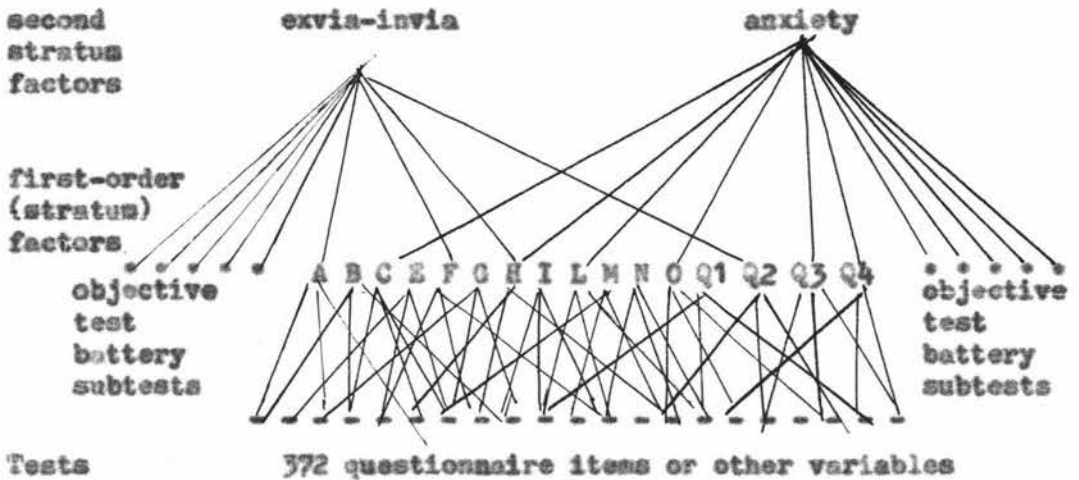
Symbol	Technical Title	Popular Label
A	Affectothymia-Sizothymia	Outgoing-Reserved
B	Intelligence	More intelligent-Less intelligent
C	Ego strength	Stable-Emotional
E	Dominance-Submissiveness	Assertive-Humble
F	Surgency-Desurgency	Happy-go-Lucky-Sober
G	Superego strength	Conscientious-Expedient
H	Parmia-Threctia	Venturesome-Shy
I	Premia-Harria	Tenderminded-Toughminded
L	Protension-Alaxia	Suspicious-Trusting
M	Autia-Praxernia	Imaginative-Practical
N	Shrewdness-Artlessness	Shrewd-Forthright
O	Guilt proneness-Assurance	Apprehensive - Placid

Adapted from Cattell, 1965, p. 365

Cattell regarded the 12 personality factors in Table 1 as source factors, or primary factors. Carrying this a stage further, he then calculated correlations between these primary factors themselves and so obtained second-order factors. Interestingly, some of the T-data factors, which it will be remembered did not on the whole match the factors found on L- and Q-data, seemed to correspond to the second-order factors in L- and Q-data. For example, the T-data yielded directly the Anxiety and Exvia-Invia (extraversion-intraversion) factors which appeared as second-order factors from the Q-data, as shown in Figure 1.

FIGURE 1

Second-order Factor Structures and the Relation of Questionnaire and Objective Test Factors



Cattell, 1965, p. 118 (data based on the 16 PF)

In the Handbook for the CPQ, Porter & Cattell (1959) left no doubt that they claimed to have considered "all personality dimensions" and taken into account "the total personality" (p. 4). Wilbur L. Layton (Buros, 1971) remarked that "since Cattell believes he has discovered 14 or more pure factors in the personality domain, he feels free to discuss the behavioral meaning of these factors at all age levels from 8 to 80 (p. 122)."

Porter & Cattell (1959) themselves stated:

"Finally it should be noted that throughout these discussions, young adult and adult associations (occupation, adjustment, group behavior) are brought in to enrich the meaning of most of the factor-dimensions. These additional associations are a permissible part of the discussion because it has been established that each of the CPQ personality dimensions continues in essentially similar form as applicable to all later ages. However, adult associations of a dimension are useful as well as merely permissible, since they point up the adult occupational, mental health, and other expectations for a child in terms of his present profile on the factors (p. 24)."

In view of the lack of adequate reporting of confirmatory research these claims appear extravagant. The strength of Cattell's conviction that he had indeed reliably identified factors which were real functional unities broadly applicable to all ages was doubtless responsible for the downward extension to the CPQ,

justification for which is not documented in the Handbook by longitudinal evidence, factor analytic or other, and for other practices which have attracted criticism.

In an endeavour to check the extent to which personality factors found at other age levels are also to be found with 12-year-olds, Hundleby & Cattell (1968) used the CPQ, some objective tests, educational criteria, and home and family background measures with a sample of 273 sixth-grade children, 141 boys and 132 girls, with a mean age of 11 years 11 months. Using the principal components method, 17 factors were extracted and 8 of these were identified in the light of previous findings at other age levels. Their sample comprised the complete sixth grade of a small town in East Central Illinois, whereas the sample in the present investigation comprised all the Form 1 and 2 children together with a sample of children from Standards 2, 3, and 4, a total of 374 children, 183 boys and 191 girls, with a mean age of 11 years 5 months, in a small New Zealand town. However, no direct comparisons of the two studies were possible because Hundleby & Cattell did not make any separate analysis of the CPQ in its entirety.

Criticisms of Procedure

The controversy concerning the adequacy of Cattell's factor system in the development of the 16 PF was initiated by Levonian (1961) and continued by Eysenck & Eysenck (1969), Howarth & Browne (1971) and Dielman (unpublished article). Howarth & Browne's (1971) chief criticisms arose from Cattell's use of targetting and parcelling.

Targetting, which was aimed at the 12 factors which Cattell had observed in two early rating studies (Cattell, 1945, 1947), had earlier elicited forthright comment from Eysenck & Eysenck (1969):

"The outstanding fact about such systems as those of Cattell and Guilford is not that they are objective, and based on correlation and factor analysis, but that they are subjective, and based on arbitrary and intuitive judgments. . . . objectivity demands that factor analysis should begin . . . with the intercorrelation and factor analysis of items. Yet this has in fact not been done At no time did either (Guilford) or Cattell intercorrelate all the items in his scales in one single analysis, to establish the fact that the postulated factors did in fact exist, and emerge with the correct items having high loadings on these and only these factors (pp. 326-327)."

The second practice which attracted criticism, that of packaging, probably arose from the practical difficulties involved

in compressing the greatest possible item meaning coverage into the small matrices which could be factored at that time and would not have been necessary had modern computing programmes for factor analysis been available. Thus the practice was adopted on practical rather than theoretical grounds, but this packaging plus the actual structuring of the items and their sometimes complex response alternatives (some answers had four alternatives) "has rendered his task of factoring to be unnecessarily confused (Howarth & Browne, 1971, p. 132)."

Further, in the development of the 16 PF factoring was carried out by means of the group centroid by which method 19 factors were extracted and then rotated to simple structure. This procedure again was probably adopted because of the limited computing programmes available. Kerlinger (1965) commented that the centroid method "is a computational compromise to avoid the excessive computational labor of more satisfactory solutions (p. 659)" and went on to state: "It will no doubt be replaced in time by the principal factors and other mathematically and statistically more satisfying methods." Howarth & Browne (1971) also commented that the principal components method "offers advantages in accuracy and determinacy and rapidity of computer processing and is preferable for large-scale item-factoring. Cattell himself is now using this method (p. 121)."

Howarth & Browne's (1971) criticisms were summarised as follows:

"Cattell & Eber (1957) state that every item has a demonstrated saturation on each factor which it sets out to measure. They do not mention packaging and targeting, and leave the reader with the impression that item factoring has been used. Moreover, they state that they have "proof that each of the questionnaire factors corresponds to a primary personality factor found elsewhere, i.e. beyond the questionnaire realm, notably in rating in real-life behavior situations" and thus imply that cross-media relations have been clearly demonstrated (p. 2). In the most recent manual (Cattell et al., 1970) it is stated that "the central feature of the 16 PF is that it is firmly based on the personality sphere concept -- a design to ensure initial item coverage for all the behavior that commonly enters ratings Thus, it has been built up not only by factoring of a questionnaire material, but is part of the general structuring research on personality in everyday life rating data (p. 6)." (pp. 137-138)."

After noting that these claims were not fully supported in the literature, they concluded that Cattell's questionnaire factor system had been developed on the basis of inadequate investigation of the primary factors.

Dielman (unpublished article) countered this allegation by pointing out that in the 22 years the 16 PF had been in use "it has undergone several revisions, each based on item analysis, and a vast body of criterion evidence has accumulated (see Cattell, Eber & Tatsuka, 1970)," and by questioning the methods of factoring employed by Howarth & Browne in the studies on which their criticisms were based.

A major paper by Cattell et al., (1973) reported:

"As a part of a 25-year program, now nearing completion, designed to map the principal personality factor structures in objective behavioral expressions, there exist in the literature, at present, some 12 interlocking researches at the pre-adult level. A complete survey of these studies, bringing out the essential structural findings for child personality and making precise pattern comparisons with the adult source trait findings (Cattell et al., 1965), is about to appear (Cattell & Bolz, in preparation). Meanwhile, the present paper presents the results for three of the most important of these studies, not previously reported (p. 182)."

In these studies, seventy behavioural measures (T-data) and a dozen questionnaire scales (Q-data) were applied to samples of American, Japanese, and Austrian children in the 12 to 14 years age range, the objectives being to test the specific relations of Q- to T-data factors, and to check structure in Q-data across cultures. The authors concluded that "the specific Q-T personality factor alignments so far hypothesized (Cattell, 1955, 1957) are thus supported in three testable instances," and that "The frequently expressed doubts that primary personality source traits will preserve their form across cultures seem unjustified on the basis of present experimental evidence (pp. 209-210)."

In endeavours to identify major dimensions of personality it has been noted that similar factors sometimes appear at different levels (see Fig. 1). This phenomenon seems to be well-attested and was reported in a joint factorial study of the Guilford, Cattell and Eysenck Scales (Souell, Eysenck & White,

1969) which found that though primary factors were non-replicable from one investigator's set of questions to another's, higher order or "super-factors" were replicable. This led to the suggestion that "for experimental work and also for practical and applied work super-factors rather than primary factors are more likely to give useful and worthwhile results (p. 250)."

Other investigators, using somewhat different procedures, have found different sets of replicable factors in the personality domain (Guilford & Zimmerman, 1956; Comrey & Jamieson, 1966).

While there is general agreement that it is possible to identify replicable factors for personality measurement, different sets of factors appear to emerge with the use of different methods of measurement, procedure, and/or analysis. Adcock et al. (1971) considered that despite the difficulties of measurement there is far more agreement with regard to basic personality dimensions than is commonly assumed and accepted that the major dimensions of personality represented by Eysenck's Neuroticism and Extraversion and Cattell's second-order equivalents were well-attested, but suggested that emphasis in research should in future be on the primary factors since these appeared to be ill-defined.

Cross-cultural Studies

Hall & Lindzey (1970) suggested that the generality of Cattell's factors was supported by the fact that these studies had ranged over different age groups (adults, adolescents, children) and different countries (U.S.A., Britain, Australia, France, Italy, Austria, and Japan) but gave no source for this statement (p. 389).

Cattell (1957) referred to a study then in progress comparing American, British, French, Italian, Indian, and Chinese groups for similarity of factor patterns of the 16 PF but suggested there might be both culture-free and culture-bound factors (p. 417).

Intercultural differences in score level on transcultural factors were found by Morris & Jones (1956) and by Cattell (1957) who reported that "British populations are significantly more schizothyme than Americans, and that French are more surgent than

either (p. 418)." Tsujioka & Cattell (1965) also reported on the "constancy and difference in personality structure and mean profile, in the questionnaire medium, from applying the 16 PF test in America and Japan." A diagram showing intercultural differences in anxiety (one of Cattell's second-order factors) between samples from United States, United Kingdom, Japan, Italy, France, and India appeared in Cattell (1965, p. 122).

Jamison & Comrey (1969) found a substantial correspondence between British and American personality factor structures based on variables derived from the Comrey Personality Scales, but also "many significant differences in factor scores between the two samples. The British were found to be more shy, submissive, compulsive, and hostile, and less dependent than their American counterparts (p. 57)."

It seems possible that at least some of these studies have assumed cross-cultural stability of personality factors which the respective tests were designed to measure in the original culture, and have merely tested for differences in cross-cultural scores on these factors. No preliminary research has been reported to ascertain whether individual items designed to load on a specific factor were in fact loading on that factor.

This point was well made by Adcock (1973) when reviewing the British Standardisation of the 16 PF (Saville, 1972):

"Differences in score distribution as between one country and another may be the result of real sample differences with regard to the variables measured or may be a function of differences with regard to what is being measured by the test items. In the latter case differences which the test user may be inclined to interpret as reflecting differing basic personality patterns may really be due to the failure of some items to tap the factor which they are supposed to represent (p. 43)."

Local norms may therefore merely mask the unsuitability of the test for local conditions, and Adcock suggested that "what is needed is a thorough analysis of the data obtained to provide evidence for a more adequate British version of the test (p. 43)."

Similar reasoning led to the decision to undertake this present item-factor analysis of the GPQ rather than proceeding directly to a New Zealand standardisation based on the possibly

erroneous assumption that the basic factor structure remained unchanged in a cross-cultural context.

However, in reporting on their 25-year programme, Cattell et al. (1973) report a substantial cross-cultural stability for U.I. 16, Assertiveness, U.I. 19, Independence, U.I. 21, Exuberance, U.I. 23, Capacity to Mobilize, U.I. 24, Anxiety, U.I. 25, Realism, U.I. 28, Asthenia, U.I. 32, Extraversion, and U.I. 33, Disway, and less definitely for some eight other factors (p. 210).

New Zealand Studies

Within the New Zealand setting Forbes & Dexter (1972) administered the 1970 version of the Comrey Personality Scales to a group of 179 university and teachers' college students and found that, while factor analysis confirmed that the basic structure of the scales was almost identical with that found in the American normative sample, the means of the two samples showed significant differences on all but one of the eight scales.

Adcock et al. (1971), in studying the suitability of the 16 PF items for New Zealand subjects, reported that their results though not complete appeared to reveal a lack of confirmation of the Cattell factors themselves and suggested that until further evidence was available recent research "is not so much undermining the factorial basis of the 16 PF as drawing attention to the weakness of the test as a practical instrument and particularly in a cross-cultural context (p. 3)."

Despite the fact that "all the recent evidence seems to indicate that the items themselves do not define the factors to which they are alleged to relate" Adcock et al. (1971) drew attention to their finding that the factors which did emerge were in many cases strikingly similar to the 16 PF factors as described. They suggested in explanation:

"that the present situation has arisen from the writing of items to measure factors established by other research and without a comprehensive re-analysis of the new items, a task which has been impracticable with such a large battery. If we add to this a commendable desire to choose items which are not too transparent to testee scrutiny we have an ideal situation for items to switch their allegiance to related factors when administered to subjects with a rather different reference frame. That this may be occurring may be often disguised by the

fact that the related factors are already involved in a second-order factor and lack of precision in items merely inflates this when second-order factors are calculated. Refinement of item form and allocation might well reduce the higher-order variance appreciably (p. 3)."

Ngairi V. Adcock (1973) reported the results of a test to assess the reliability of data obtained from a New Zealand student sample using the 16 PF:

"The procedure used was essentially that of comparing the number of significant intracorrelations for the test variables scored for each of the 16 PF traits with the number of significant correlations between such variables and variables relating to other traits. It is argued that, if all intracorrelations were significant, and no intercorrelations with variables from other traits occurred, the test would obviously be ideal, but, if the proportion of significant correlations within the trait cluster were less than that with other variables, the trait concerned would lack any capacity to discriminate."

Using a discrimination index based on this concept produced results which suggested that six of the 16 PF factors showed zero capacity to discriminate. A comparison with results from earlier studies conducted on the same sample led to the conclusion that any attempt to discriminate between university students on an individual basis with regard to the factors N, Q2, Q1, L and M would be highly misleading. A special weakness was found with regard to items relating to the anxiety factors. After noting that in most cases it was not so much the existence of the 16 PF factor which was in doubt but rather the scoring values to be attributed to the variables themselves, the author concluded "a large-sample study could well be expected to provide scoring patterns which would be far more useful for New Zealand subjects."

In view of the close relationship between the 16 PF and the CPQ, these findings confirmed the need for the present study to investigate whether the CPQ items were actually loading on the factors for which they were designed.

Claims regarding Usefulness

With regard to the usefulness of the CPQ in the field of personality measurement Cattell, starting from the axiom that in almost any field of endeavour personality and ability together decide the outcome, proceeded to make comprehensive and even sweeping claims for his personality measures in educational and social analyses:

"The tasks of the school psychologist cover a very wide field. Years ago he was mainly concerned with improvement examinations, predicting achievement (scholarship selection), and analysing the causes of backwardness. With the advent of the child guidance clinic and counseling, his work has come to embrace, in addition, essentially clinical problems and the tasks of vocational guidance, while to this has recently been further added the group dynamics of the classroom. Every one of these can receive help from good personality-source-trait measurement, but much of it is more appropriately studied in the Handbooks for the HSPQ and the CPQ since the 16 PF comes into action only at sixteen or seventeen years of age (Cattell, 1970, p. 229)."

Referring specifically to the CPQ, the Handbook (Porter & Cattell, 1959) listed some of these uses as:

"weighting the scores to get a better prediction of further school performance than could be obtained from abilities alone; similarly predicting special performances, e.g. artistic creativity, leadership; screening classes for children needing attention in a child guidance clinic, e.g. on anxiety level, withdrawal, etc; finding how closely the child's profile resembles certain maladjusted groups, etc; studying changes of personality under various educational influences; conducting research on the importance of various personality factors to various performances and preferences, and so on (p. 39)."

Several reports in addition to those cited in the bibliography of the CPQ Handbook, notably by Porter (1964, 1965), do support the usefulness of the CPQ in differentiating between normal and disturbed children or in identifying differing profiles of talented and under-achieving children.

Werner (1966) used the CPQ to measure the personality dimensions of 87 talented and underachieving boys and girls in elementary school and concluded that the CPQ does indeed discriminate talented from underachieving children, e.g. talented girls scored higher on dependency, conforming and conscientious factors, while underachieving girls scored higher on happy-go-lucky, heedless, and excitable, than the average 8-12 year old girls. Similar findings were reported by Wenning & Smouse (1967) who administered Form A of the CPQ to 5th and 6th grade children and a peer group attending a child guidance clinic and found that the clinic children scored lower on dominant, happy-go-lucky, and higher on restrained, guilt-prone, introverted, neurotic. Similar conclusions were reached by Rosenblast (1967) in his study of the personality dimensions of disadvantaged youth, again using the CPQ.

The closely-related HSPQ was the personality measure used by Barton, Dielman, & Cattell (1971) in their investigation of prediction of school grades from personality and I.Q. measures. They reported that "personality variables in general significantly increase the prediction of school grades over and above that amount of prediction achieved by using intelligence variables alone (p. 325)."

Using the ESPQ, Dielman, Cattell & Lepper (1971, p. 141) reported finding significant relationships between rated behaviour-problem dimensions and three ESPQ dimensions: Assertiveness (positively), Shrewdness (positively), and Intelligence (negatively).

As Adcock et al. (1971, p. 3) remarked of the 16 PF, the fact that the test "has given reasonable results in practice, especially where intercultural differences are at a minimum, can be understood from the evidence that the more important factors are well-attested, and the test can be assumed to be measuring these even if in a rather attenuated form."

Summary

To summarise, this review has looked at Cattell's procedures in arriving at his major personality factors; the downward extension of these factors to the CPQ by utilising items specifically designed to load on the factors already accepted by Cattell as representing the complete personality sphere; the various criticisms regarding such targetting and the methods of packaging and factor analysis employed. Cross-cultural differences have been found in scores on specific factors and even in the factors themselves, nevertheless it appears that the CPQ is in practice capable of differentiating between personality profiles both in the fields of social adjustment and academic achievement, though exactly what factors it is measuring and which items are consistently loaded on these do not appear to be completely clear.

In view of such evidence, the uncritical transposition of the CPQ to the New Zealand setting appeared unjustified without further investigation of three aspects: first, the cross-cultural stability of the factors themselves; secondly, whether the items

were consistently loading on the factors for which they were designed; and thirdly, whether local norms matched the original Table of Norms sufficiently closely to justify the present use of the CPQ for the purposes of the Psychological Service. The present study is a preliminary investigation of the first two aspects of this problem.