

PERSONALITY STRUCTURE IN PSYCHOTICS BY FACTORIZATION  
OF OBJECTIVE CLINICAL TESTS.

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I. AIMS : PERSONALITY TESTS DESIGNED FROM STRUCTURE.

To research workers in personality measurement the advance of routine testing procedures in clinical psychology has seemed peculiarly sluggish. Whereas solid theoretical foundations have been found for an account of the normal personality structure in factor analytic terms (5, 6, 7) and a rich variety of new tests has been created (8, 9, 14), the clinicians have confined themselves to one or two "gadget" tests, conceived with no more explicit relation to personality structure than a patent medicine has to modern physiological principles. The present research aims to bring factor structure measurement in a clinical population into relation with that found in normals and to provide a first, reproducible, test battery covering at least a dozen factors for use in clinics able to give sufficient time for valid and reliable measures of the primary personality dimensions.

No fine finish must be expected in either of these pioneer efforts. For in regard to the meaning of the factors, further work is required to relate the objective test patterns to rating and questionnaire syndromes, as well as to clinical diagnoses. By contrast, in the realm of normal personality, these relations already exist and we can indicate factor measurements corresponding to ego strength, schizothymia, super-ego strength, anxiety level, etc. (12, 14). However, a contemporary article (15), by relating the present factors more fully to those found in normal populations (and one other clinical population) integrates the present factors into that larger realm of meaning with some degree of certainty. As to the test battery itself, it is bound to be more cumbersome than the relatively brief and invalid gadgets now used in clinics, at least until some years of use have shown how to trim its more uncouth features without reducing the essential volume of information which it carries.

The aim of this research is thus a dual one : to determine factor structure in a clinical population by the same personality tests as have been used with normals, thus permitting comparisons ; and to produce a test battery for the unitary dimensions found. Quite apart from the need to use a set of personality tests which can be expected to carry "factor markers" to key the present factors into those in a series of four other interrelated studies (8, 9, 14, 15), the choice of tests has to be dictated also by the compatible aim of representing the whole "personality sphere" (5).

Since the personality sphere rests logically upon a population of ratings (6), i.e., clinical-type observations, the objective tests have been created to test hypotheses about the nature of the functional unities found earlier in ratings (5, 6, 7). Indeed a history of study of the preliminary findings (6) in rating, questionnaire (12) and objective test (5) factors underlies the particular choices of tests and the kind of behaviour responses embodied in new tests. The requirements for the tests invented here are therefore that they shall show great catholicity, comprehensively representing most areas of behaviour and that they shall represent hypotheses about known factors. Only on such a basis can a factor analysis achieve the end of revealing personality structure, i.e., of showing the functionally independent behaviour patterns of greatest relevance in explaining general behaviour. Space precludes presenting here any further discussion of the test designs than can be given in Section 2, below ; but it will be realized from inspection of the tests that the centre of effort in this research has been the creation of a range of new personality tests according to explicit psychological principles.

## 2. DESIGN AND LIST OF TESTS.

The research design consists in giving 102 distinct test measures, as listed below, to an assorted mental hospital population of 100 cases, mostly recorded as psychotics. The tests are then intercorrelated and the matrix is factor analysed. The factors thus found are "blindly" (i.e., without prejudice from earlier interpretations) rotated until a simple structure position is found. This is considered to offer the scientific as distinct from the merely mathematical explanation of the observed correlations. The factors in this unique solution position are then examined for meaning in the light of the pattern of variables which they most strongly load. These steps are now set out in detail.

Beginning with the list of variables used, we indicate them according to two index systems ; on the extreme left the serial number in the present correlation matrix and, in the next column, the "Master Index Number," i.e., the number by which the test can be located in the whole group of researches as organized in this laboratory (8, 9, 14, 15) and by which the test will be referred to in future fuller discussion. Immediately after the title of the test is given the consistency coefficient (split-half reliability) where the test permits it to be calculated.

### *Brief Description of Tests.*

Matrix Number.	Master Index Number.	Test Descriptions.
1	157	<p><i>Number of Jokes Overtly Reacted to as Funny.</i>            The sum of rating points for S—'s laughter reaction to jokes told on a phonograph record : 1 point for negative reaction, 2 points for no response or neutral, 3 points for smile, 4 points for great laughter. Score is total of points. This score in non-psychotic populations was slightly different: subjects' ratings. Hypothesized Factor A (6).</p>
2	2c (171)	<p><i>Hidden Pictures : Lack of Rigidity.</i>            S— instructed to look for " hidden pictures " in standard multiple perception tests (2) of 5 pictures. Any alleged picture accepted (" flexible key ").</p>

Matrix Number.	Master Index Number.	Test Descriptions.
3	158	<i>Increase of Tempo Under Threat.</i> —In myokinesis (drawing 1 inch lines blindfold) time was taken for S— to draw 20 lines (a) normally, (b) under shock if badly estimate. (No. 66 below.) Score is increased speed under shock.
4	153	<i>Cursive Miniature Situation Test : (4) Speed of Decision Group form of test.</i> $R = 0.69$ . Total number of decisions made, i.e., right and wrong decisions in 4 minutes.
5	15	<i>Cursive Miniature Situation Test : Excessive Use of Circles.</i> $R = 0.82$ . Group form of test : Number of circles used in emergencies beyond prescribed six (4). Hypothesized Factor I.
6	154	<i>Cursive Miniature Situation : Slanting Lines.</i> This is a simple count of slanting lines crossed and is a measure of failure to follow instructions. Found previously to be significantly higher in delinquents (4). Hypothesized factors C— and G—.
7	43 (i) (305)	<i>Ratio of Reaction on Mental to Physical Stimuli on P.G.R.</i> $R = 0.72$ . Ratio of mean conductance change for 7 disturbing mental (words, pictures) and 5 disturbing physical stimuli.
8	145	<i>Adaptability of Aspiration Level (in Coding).</i> Eight repeated code substitution tests in which response of A.L. between $n^{\text{th}}$ and $(n+1)^{\text{th}}$ is related to degree of success in $n^{\text{th}}$ . Formula : $\frac{\Sigma(c-a)}{\Sigma(b-a)}$ where $a$ = initial estimate, $b$ = us. completed after estimate $a$ . $c$ = estimate for second trial after doing $b$ . Factor C.
9	100	<i>Optimism Over Doing Good.</i> Presented as test "Judgment of Human Nature" in which S— rates "workableness" of 30 "reforms." Hypothesis that genial optimism on human nature is measured of Factor A+.
10	25	<i>Ratio of Emotional to Non-Emotional Recall.</i> $R = 0.41$ . Immediate memory for sets of phrases, some emotional, some dry. (Modified from words in (9).) S— forewarned. Hypothesized as index of ego strength Factor C.
11	115 (i) (193)	<i>Ego Weakness 1 : R = 0.68. Suggestibility Shift from Unsuccessfuls.</i> As Test 14 in intention and Test 12 in content. S—'s attitudes are measured on a wide array of topics. Later they are re-presented with indications of what "unsuccessful people" choose. Shifts away are measured, i.e., tendency for subjects to lose independence and imitate "successfuls" on retesting. Factors C and G.
12	31 (iv) (184)	<i>Fluctuation of Attitudes : Material 1.</i> This measures a spontaneous, unstable shift of attitude when re-presented after one day. Scored on material of Test 11, by simple, non-algebraic, i.e., directionless addition of shifts. Tests 14, 16 and 18 are similar. Factors A and C— (3).
13	115 (ii) (194)	<i>Ego Weakness 2 : Avoidance of Designated "Neurotics" Responses.</i> $R = 0.69$ . As Test 11 measure on lack of ego strength and independence as shown by number of shifts, on retest, away from responses designated as those of neurotics. (But not actually so.) Factors C and G.

Matrix Number.	Master Index Number.	Test Descriptions.
14	31 (iii) (183)	<i>Fluctuation of Attitudes. Material 2.</i> A similar measure to Tests 12, 16 and 18, but on material of Test 13.
15	34	<i>Immaturity of Opinion. R = 0.77.</i> Change of opinion on re-presentation of same attitude test with new facts. Scored in direction indicated by presented facts, which should have been thought of earlier by a mature person. (As in (9) and (14).)
16	31 (ii) (182)	<i>Fluctuation of Attitudes. Material 3.</i> Similar to Tests 12, 14 and 18, but on Test 15 material.
17	35	<i>Suggestibility to Authority. R = 0.75.</i> As in (9) and (14) (Sl. mod.) change of opinion (sum of shifts on 5 point scale) on re-presentation in direction of intervening "authority opinions." Material was first presented as bare statements and on second day as actual quotations from authorities. Factor E.
18	31 (i) (181)	<i>Fluctuation of Attitudes. Material 4.</i> As Tests 12, 14 and 16, but on Test 17 material.
19	96a (188)	<i>Little Effect of Frustrated Preference on Computing Speed.</i> Subject starts two calculations (one addition, one subtraction) and indicates his preference for continuing one of them. Despite wishes he is given the other. Ratio of computing speed after frustration to previous speed is measured. Intended for frustration tolerance measure. C factor.
20	96a (187)	<i>Effect of Frustrated Preference on Reading Speed.</i> Situation repeated as in previous Test 19 but measured alternatively by two stories and ratio of pre- to post-frustration reading speed.
21	155	<i>Range of Flicker Fusion.</i> —Standard flicker fusion apparatus (strobotac, with opal screen) in darkened room. Difference between highest number at which fusion reported and the lowest, i.e., a range of uncertainty score.
22	5	<i>Ratio of Regularly Warned to Irregularly Warned Reaction Time. R = 0.70.</i> Six runs of 10 reactions each, even runs having a regular two-second warning, odd runs irregular warning interval. In (8) Derivation of Tests 23 and 24 here.
23	4 (175)	<i>Mean Reaction Time with Regular Signal. R = 0.90.</i> In (8) Thurstone's perceptual factor (21). See Test 22.
24	4 (176)	<i>Mean Reaction Time with Irregular Signal. R = 0.90.</i> In (8) Thurstone's perceptual factor (21). See Test 22.
25	30 (134)	<i>Ratio of Criticism of Self to Criticism of Other.</i> As in (9) S— gave "approvals" and "criticisms" (inventive, not selective) of self, home town, art, etc. Approvals neglected; ratio of criticism of self to things not in-self sentiment.
26	156	<i>Lag of Flicker Fusion.</i> —Fusion point was picked up on four downward and four upward runs. This is differences of former and latter—a measure of "lag" in decision.
27	28	<i>Dynamic Momentum.</i> —As in (9) S— works as long as he wishes on anagrams, on increasingly difficult reading, as drawing a house. Time spent on each (instead of switching to new before exhausting old). Factor G hypothesized.

Matrix Number.	Master Index Number.	Test Descriptions.
28	148	. <i>Aspiration for Improvement.</i> $R = 0.91$ . Score is number of coding tasks completed on a page taken from <i>subsequent</i> estimate of his performance for next time. Eight times.
29	147	. <i>Estimated Breadth of Experience and Accomplishments.</i> On 30 questions covering wide range of experiences, hobbies, skills, subject indicates his degree of familiarity and skill. Factor K.
30	26	. <i>Ability to Handle Surprises, Riddles.</i> $R = 0.89$ . As in (8) and (14) score on solving 30 riddles in 5 minutes, as index (negative) of "ideational rigidity" factor (11) and general intelligence (3). Factor B.
31	106	. <i>Unreflective Acceptance of Unqualified Statements.</i> Subject checks out of 39 statements (most somewhat ambiguous or really needing qualification) those he will endorse as "absolutely certain." Presumed Factors F, G-, and K-.
32	7	. <i>Speed of Perceptual Closure.</i> $R = 0.82$ . Twelve uncompleted (Gestalt) pictures and 12 uncompleted words. (Score: number completed in 70 sec.) (cf. Test 33). In (14). Used to represent Thurstone's perceptual factor (21).
33	146	. <i>Accuracy in Perceptual Closure.</i> Same data as Test 32. Number correct divided by number completed. Possibly Factor F.
34	396 (136)	. <i>Ratio of Color to Form in Sorting.</i> $R = 0.45$ . As in (8) and (14) but presented to group by slides (colours consequently not exactly reproduced). Essentially a sorting in which neither colour nor form is an entirely adequate guide.
35	151	. <i>Longer Time for Decisions on Principles than on Particulars.</i> Items in which decision is between generalizations are compared with those of a factual and particular nature. Hypothesis that K+ will do better at former and possible C+.
36	24a (180)	. <i>Ratio of Initial to Later Performance: Reading Backwards.</i> $R = 0.68$ . Scored on 1st to 3rd minute's performance on task of reading sentences printed backwards. Factor G.
37	125	. <i>Ratio of Personal to Institutional Values.</i> Items devised to distinguish adherence to internal conscience values rather than conventions and habits of social group. Factors I and K.
38	152	. <i>Tendency to Agree 1. (Difference Score).</i> $R = 0.80$ . Tendency to agree to propositions regardless of subject matter. (Mainly on attitudes in optimism-pessimism test.) Scored as number of times S- said "agree" minus number of times S- said "disagree."
39	97	. <i>Time Interval Perceived Longer During Ergographic Work.</i> $R = 0.91$ . S- estimate of time while pulling hard on ergograph to exhaustion was divided by the actual time.
40	656 (139)	. <i>Logical Consistency of Attitudes.</i> Three parts of each of number of syllogisms scattered among attitude statements on controversial matters. Improved from (14) but still short of requirements of (1) incontestable logicity and (2) equal chance of scoring. Intended as measure of personality integration and Factor C-. Scored in direction of consistency. (One point for each set of 3 internally consistent.)

Matrix Number.	Master Index Number.	Test Descriptions.
41	—	. <i>Random Variable.</i> A set of random numbers assigned to subjects, to test properties of the factorization, notably the standard error of a loading.
42	—	. <i>Random Variable.</i> A second, independent set of random values.
43	103 (i) (191)	. <i>Low Amount Considered Possible in Given Time for Others.</i> $R = 0.40.$ Subject asked to estimate for people generally how much time required for completing 20 varied tasks (selective answers). Factor G— or F+.
44	13	. <i>Oscillation.</i> $R = 0.62.$ Variation in successive 7 sec. periods of performance on cancellation, checking, etc. (In (8).)
45	103 (ii) 192	. <i>Low Amount Considered Possible in Given Time for Self.</i> $R = 0.42.$ As Test 43, but estimate of time to do things oneself. Presumed Factor E+ and G+.
46	119	. <i>Artistic Taste in Colour-Blending.</i> $R = 0.29.$ Number of right choices on 30 paired choices of good and bad colour combinations (as judged by artists) divided by number of choices made. Factor I and possibly K.
47	108	. <i>Self-Confidence on Untried Performances.</i> $R = 0.89.$ Second part of Test 29 in which subject is asked how well (3 pt. scale), with practice or opportunity, he would expect to master each of a variety of accomplishments he states he has not tried. Factor E or O—.
48	114	. <i>Underestimation Prospective Performance in Unexpectedly Difficult Material.</i> ( <i>Judging lines and dots, answering intelligence and information questions.</i> ) $R = 0.86.$ Number of problems done on a page of material minus the prior estimate of the subject as to how many he would do. Total score is sum of these differences. i.e., discrepancy between estimate and actual performance. Factor E.
49	105	. <i>Tendency to Perceive Threatening Objects.</i> $R = 0.86.$ S— presented with 16 vaguely sketched collections of objects and asked to identify them. Scored on proportion of dangerous objects (weapons, storms, pitfalls, etc.) to benign objects seen.
50	112	. <i>Ratio of Adverse to Favourable Self-Reference in Events.</i> $R = 0.64.$ In a list of world events S— is asked to say which may affect him personally and whether favorably or unfavorably. Ratio of u. to f. in latter. Factor L.
51	109	. <i>Ratio of Pleasant to Unpleasant Associations.</i> Subject lists in four 2 min. periods (a) unpleasant past, (b) pleasant past, (c) unpleasant anticipations, (d) pleasant future anticipations. Score = $b/a + d/c$ . Factor F.
52	110	. <i>Anteversion-retroversion Ratio.</i> Re-arrangement of data for Test 51 as $c/a + d/b$ . Factor F.
53	29 and 133	. <i>Criticalness (Severity) of Judgments.</i> As in (8), judgments of various presented human performances, e.g., drawings that could be graded by S— with varying severity. Presumed part of severity or hostility from Factor A— or E (dominance).

Matrix Number.	Master Index Number.	Test Descriptions.
54 .	116	. <i>Cynicism or Hard-headed Judgment.</i> $R = 0.89$ . Number of items checked on hard-headed versus sentimental social issues, e.g., such as realism about reformability of criminals, "copy book headings" versus "easy idealism." Various evaluated as realism, cynicism, severity, by experimentors. Factor I.
55 .	117	. <i>Fashionable Good Taste in Social Matters.</i> A test of information about upper class or "approved" furnishings, eating, reading, etc., tastes. Intended as measure of K+ factor.
56 .	118	. <i>Sense of Poetic Aptness.</i> A test of ability to choose better completing lines for incomplete poetry (rare, but authentic examples, selective answers). Factors I and possibly K.
57 .	107	. <i>Knowledge of Etiquette.</i> $R = 0.84$ .—Twenty-four multiple choice items on <i>savoir faire</i> on assumption this is K factor.
58 .	104	. <i>High Estimation of Personal Worth.</i> Subject asked to check "self-inventory" containing mixed esteemed and disapproved traits. Scored on high percentage of "desirables" possessed.
59 .	2 (198)	. <i>Lack of Perceptual Rigidity, Hidden Words.</i> In (11). Subject to find word hidden in random order of letters composing the word. Four one-minute series of 10 each.
60 .	99	. <i>Ratio of Verbal to Numerical Ability.</i> $R = 0.68$ . Thurstone measures, summed in Test 61, treated as ratio here. Assumption verbal ability associated Factor N.
61 .	11b (130)	. <i>Intelligence: Verbal and Numerical Ability.</i> On Primary Mental Abilities Test.—As a marker for intelligence factor (B+ in personality series).
62 .	101	. <i>General Deficit of Aspiration Level Relative to Performance, in Coding.</i> Sum of differences between (a) number completed on each of 5 first pages and (b) aspired number for second pages. (a-b)'s added with respect to signs for all 5.
63 .	124b (195)	. <i>Tendency to Agree 2. (Ratio: Optimistic Statement Material.)</i> (Ratio Score.) Same as 38, but scored as ratio instead of difference.
64 .	122	. <i>Static Ataxia.</i> (S. Mod.) Measured by sway (differences of extremes in any direction) as in Test 73 but without suggestions. Factor C-.
65 .	98 and 143	. <i>Cursive Miniature Situation Test: Absolute Number Correct Decisions.</i> As Test 78 but scored absolute number of decisions correct.
66 .	95	. <i>Myokinetic Movement Decrease under Threat.</i> Repetition of Test 3, i.e., Myokinias when told there would be "punishment" for poor estimates by shocking (done anyway on two predetermined lines out of 10). Ratio of 20 normal to 20 threat lengths.
67 .	91	. <i>Autistic Suspicion.</i> Subject under a sheet in room of spectators scored on frequency with which he stated people were pointing at him (being told they would point some of the time). Tried for paranoid Factor L.

Matrix Number.	Master Index Number.	Test Descriptions.
68	38b (135)	. <i>Ratio of Consonant to Dissonant Opinions Recalled.</i> $R = 0.60$ . Ratio, among recalled attitude statements, of those agreed to those disagreed with. Marker for a factor of "rigidity-low energy," presumably H-, as in (8) and (14).
69	41	. <i>Two Hand Co-ordination.</i> $R = 0.91$ . Exactly as in (8) and (9), to mark Thurstone's perceptual factor (21).
70	21	. <i>Absence of Questionable Preferences.</i> $R = 0.89$ . Defined in (8) and slightly modified since by item analysis choice of decent versus trashy reading. Factor G+ or K+.
71	36	. <i>Ability to State Logical Assumptions.</i> $R = 0.40$ . As in (8) and (14), from Watson-Glaser test (23). Factor I.
72	93	. <i>Little Effect of Restraint on Performance.</i> Subject counted number of shapes in complex figures under (a) normal conditions, (b) when clamped in physical restraints. Hypothesis that performance of neurotics (C-) more affected by restraint.
73	42	. <i>Body Sway Suggestibility.</i> As in (8) and (14) and Eysenck (17). Distance between extremities of sway. Marker for Factor C-, presumed general neuroticism (17).
74	94	. <i>Mean Frequency of Flicker Fusion.</i> $R = 0.93$ . Mean of 10 up and down runs, with constant distance and illumination, on strobotac (see Test 21). As measure of rigidity Factor shown in (11).
75	8	. <i>Rate of Alternating (Cube) Perspective.</i> $R = 0.82$ . In (8). Usual design. Not forcing but allowing fluctuation.
76	22 and 131	. <i>Ratio of Chance to Purposeful Observation and Memory.</i> Defined in (9), but slightly modified and scored here in the opposite direction. S- performs task and recalls according to instruction, but is also test on recall of "irrelevant" matters. Factor H+.
77	46 and 137	. <i>Impairment of Unseen Maze Performance by Discomfort and Threat.</i> $R = 0.79$ . Subject had four runs on unseen pencil maze, instructed to get as far as possible in given direction. In the two middle runs he was given electric shock (but not told that the forthcoming shock would be a punishment for poor performance). Score is ratio of distance covered in runs 1 and 4 to runs 2 and 3. Presumed F- and H- factors.
78	98	. <i>Cursive Miniature Situation Test: Correctness of Decision.</i> (R-W.) $R = 0.69$ . As in Test 65 but scored on decisions per minute, right minus wrong.
79	92	. <i>Low Readiness to "Initiate Animal Sounds."</i> Subject instructed in individual test to "make a noise like a cat" and so on. Mean time to respond to instruction, as measure of embarrassment. Factor H.
80	43	. <i>Magnitude of Mean P.G.R. Deflection.</i> $R = 0.74$ . As in (9) and (14), mean percentage conductance to 12 physical and mental stimuli. For Factor H.
81	113	. <i>Little Breakdown of Reality Principle.</i> $R = 0.56$ . Subject checks "time" items in wide range of beliefs scaled to be expressive either of reality function or of artistic thinking (pleasure principle, wishful thinking, irrational fears, ego defence distortions). Factor C-.



Matrix Number.	Master Index Number.	Test Descriptions.
82	83	. <i>Fidgetometer Frequency</i> . $R = 0.88$ . As in (9), best with record of body as well as foot movements. Number per minute during middle (Myakinesis and Distraction) part of individual test session.
83	161	. <i>Ratio of Performance (Cancellation) under Approval to Disapproval</i> . Comparison of speed and accuracy in one period when examiner said "Good, good" with one period when he said "You are doing poorly." Factor E.
84	162	. <i>Ratio of Performance (Cancellation) Normal to Shock</i> . In one period of 30 sec. S— performed at normal top speed and in one other sandwiched between, with shock administered regardless of performance. Factor I.
85	163	. <i>Ratio of Performance (Perceptual Closure) Under Approval to Disapproval</i> . As Test 83 but Test 32 material used. Factor E.
86	164	. <i>Ratio of Performance (Perceptual Closure) Normal to Shock</i> . As Test 84 but with Test 85 type of material. Factor I.
87	165	. <i>Ratio of Performance (Classification) Under Approval to Disapproval</i> . As 83, 85, but on performances picking one work from a group of 5 which does not belong with the general concept in the remaining 4. Factor E.
88	166	. <i>Ratio of Performance (Classification) Normal to Shock</i> . As 84, 86 but on classification. Factor I.
89	150	. <i>Extremity of Viewpoint. Material 2</i> . As in (14). Identical with 98 except for different material (that of Test 90). Ratio of responses "absolutely" agree and "completely" disagree to "partly" agree or disagree. Factor C.
90	150b (196)	. <i>Agreement with Platitudes</i> . $R = 0.91$ . After checking on a set of platitudes (not labelled as such) which remarks seemed so obvious as not to be worth saying, S— was asked how much he agreed with each remark. Score is number of items agreed with or partially agreed with divided by number of items disagreed or partially disagreed with.
91	2 (i) (172)	. <i>Motor Rigidity. (Perseveration)</i> . $R = 0.30$ . Test 1, page 234 in (2) Factor C—. (5.) Letters written with backward movement.
92	2 (iv)	. <i>Motor Rigidity. (Perseveration)</i> . $R = 0.24$ . Test 2, page 235 in (2). Factor C— (5.) Words rewritten doubling letters.
93	2 (ii) (173)	. <i>Motor Rigidity. (Perseveration)</i> . $R = 0.33$ . Test 5, page 239 in (2). Factor C—. (5.) Personal name written backwards.
94	2 (iii) (174)	. <i>Motor Rigidity. (Perseveration)</i> . $R = 0.21$ . Test 6, page 242 in (2). Factor C—. (5.) Numbers written backwards.
95	6 and 177	. <i>Ideo-Motor Speed</i> . Sum of speed scores on parts of 2-hand co-ordination test (with 2-hand co-ordination partialled out) plus sum of five writing speed scores rigidity test (with rigidity ratio eliminated).

Matrix Number.	Master Index Number.	Test Descriptions.
96	120	. <i>Ratio Inaccuracy to Speed.</i> Sum of errors-over-number-done fractions for oscillation (Test 44), mazes (Test 77), closure (Test 32), cancellation (Test 83) and classification (Test 88), and two-hand co-ordination (Test 69).
97	167	. <i>Immediate Memory Efficiency.</i> S—'s recall on a variety of intellectual material was scored by pooling total amount recalled, in immediate reproduction or recognition on subtests, covering attitude statements. Factors J— and perhaps H+.
98	67b (141)	. <i>Extremity of Viewpoint. Material 1.</i> As in (14), ratio of "absolutely true" and "absurd" checks to more moderate alternatives on 100 attitude statements used elsewhere. (Cf. Test 89.)
99	326	. <i>Ratio of Errors to Attempts.</i> In memory test the numbers of items erroneously recalled, divided by the total number of attempted recollections.
100	III (i)	. <i>Amount of Self-Reference in General Events.</i> Score = affect favourably plus affect unfavourably divided by total number of items, in Test 50. Factors E and L hypothesized.
101	126	. <i>Ratio Male to Female Person Choices. R = 0.55.</i> Presented as (a) "artistic" preferences in presented male and female sculptures and (b) "conversation" preferences in male and female portrait comparisons. Scored: Men in (a) and (b). Women in (a) and (b) Masculinity factor (5).
102	62 (138)	. <i>Ratio Emotionally-Interesting to Emotionally-Dry Reading Speed.</i> Ratio of normal reading speed on four passages; two gripping, two dull, when instructed to read quickly. For Factor G—.
103	25c and 132	. <i>Ratio of Emotionally-Interesting to Emotionally-Dry Recall.</i> $R = 0.23$ . Differs from 10 (and has lower reliability) in that four actual stories rather than a word list. Recognition scores for ideas in strongly emotional stories divided by words recognized after emotionally-dry, intellectual, lecture material. Presumed test of Factor G—.
104	3b (127)	. <i>Speed of General Judgment. R = 0.73.</i> Not on intelligence-demanding items but on a variety of opinion statements. Instructed to work quickly. Factor F.

It should be noted that the above 104 variables are actually derived from 76 tests, and that usually when two or three variables derive from one test they do so in a manner which minimizes common error variance (no "apparatus" or "common error" factors are found in the following factorization). More than 76 tests were originally given, but except for variables 103, 109 and the rigidity measures, which claim special psychological interest, tests were dropped which had consistencies below 0.4 or which proved in experiment to be unsatisfactory for any other reason. These included a test of Effect of Fatigue in Increasing Weight Estimate; Motor Speed; Tempo; Willingness to Fight

TABLE I.—Rotated Factor Matrix.

Present Matrix Number of Variable.	Variables.	Master Index Number.	Factors.																		R <sup>2</sup> .
			1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	
1			.28	-.11	.17	-.13	-.00	.11	-.04	-.05	-.00	.21	.00	-.10	.55	.04	-.08	-.07	-.01	.18.	.64
2		157	-.01	.29	-.09	-.08	-.08	.19	-.04	-.08	.01	-.15	-.07	-.10	.02	-.24	-.04	-.01	.22	.00	.33
3		26 (171)	-.07	-.12	-.10	-.08	.08	.11	-.08	.20	.20	.14	-.03	.06	-.05	-.00	.24	-.25	-.09	.03	.36
4		156	.53	.41	-.20	.13	.01	.18	-.08	.01	.21	-.01	-.06	.19	.04	-.10	-.01	-.05	.07	.15	.56
5		153	.25	.77	-.07	.10	.10	.00	.10	.10	-.10	.13	.04	.09	-.16	-.03	-.04	-.18	.11	.02	.98
6		154	.10	.01	-.06	-.31	-.15	.01	.21	-.09	.00	-.13	-.07	.01	-.16	.01	.12	-.14	-.05	.05	.18
7		43 (i)	-.02	.00	.00	-.31	-.15	.01	.21	-.09	.00	-.13	-.07	.01	-.16	.01	-.04	-.01	-.07	-.01	.39
8		145	.20	.00	.13	-.21	-.13	.01	.20	.10	-.07	.11	.18	.09	.19	-.01	.01	.06	.09	.14	.31
9		160	-.04	.21	-.25	-.13	-.09	.11	.12	.05	-.21	.03	.27	.03	.05	-.03	.12	.03	.05	.13	.43
10		115 (i) (103)	-.34	.20	-.23	.40	-.09	.09	.08	.32	.04	.07	.18	-.10	.04	.14	.11	.14	.06	-.05	.52
11		31 (ii)	.01	.06	.22	.22	.12	.58	.15	-.08	.06	.08	.07	.10	.04	.14	.11	.14	.06	-.05	.76
12		31 (iii)	-.10	-.06	.22	.22	.12	.58	.15	-.08	.06	.08	.07	.10	.04	.14	.11	.14	.06	-.05	.76
13		145 (i) (194)	-.07	.07	.03	.10	.03	.62	.04	.03	.02	.15	-.14	.34	.03	.00	.03	.10	.03	.12	.31
14		31 (iii)	-.07	.07	.03	.10	.03	.62	.04	.03	.02	.15	-.14	.34	.03	.00	.03	.10	.03	.12	.31
15		31 (iii)	-.07	.07	.03	.10	.03	.62	.04	.03	.02	.15	-.14	.34	.03	.00	.03	.10	.03	.12	.31
16		31 (iii)	-.07	.07	.03	.10	.03	.62	.04	.03	.02	.15	-.14	.34	.03	.00	.03	.10	.03	.12	.31
17		31 (iii)	-.07	.07	.03	.10	.03	.62	.04	.03	.02	.15	-.14	.34	.03	.00	.03	.10	.03	.12	.31
18		31 (iii)	-.07	.07	.03	.10	.03	.62	.04	.03	.02	.15	-.14	.34	.03	.00	.03	.10	.03	.12	.31
19		96 (188)	-.02	.03	.05	.04	-.14	.11	-.20	.03	.07	.03	.00	.40	-.07	-.06	.12	.07	.04	.13	.53
20		96 (188)	-.02	.03	.05	.04	-.14	.11	-.20	.03	.07	.03	.00	.40	-.07	-.06	.12	.07	.04	.13	.53
21		96 (187)	-.25	.44	.12	.24	-.13	.15	.02	-.15	.08	-.07	.15	-.07	.16	.08	-.02	.10	.16	-.08	.68
22		153	-.20	.09	.00	-.11	.04	.02	-.07	.05	.11	.24	.38	.32	-.33	.48	.12	-.07	.39	.00	.90
23		4 (175)	-.02	.07	.00	-.11	.04	.02	-.07	.05	.11	.24	.38	.32	-.33	.48	.12	-.07	.39	.00	.90
24		4 (176)	-.47	.01	.12	-.09	-.18	.10	-.01	.10	.01	.08	.05	.01	.49	-.00	.03	.00	.05	.38	.02
25		4 (176)	-.47	.01	.12	-.09	-.18	.10	-.01	.10	.01	.08	.05	.01	.49	-.00	.03	.00	.05	.38	.02
26		36 (134)	-.11	-.04	-.01	.08	-.07	-.27	.11	.18	-.33	-.12	-.22	.18	.26	-.07	.01	.23	.03	.12	.53
27		158	-.12	-.06	-.00	.24	.11	.07	.14	-.12	-.08	.03	.25	.30	.36	.16	.12	.12	.14	-.02	.48
28		148	-.27	.09	-.04	-.04	.04	.02	.30	-.10	.01	.39	.07	.13	.06	.36	.15	.05	.24	-.05	.60
29		147	-.54	.18	.03	.63	-.09	-.16	.01	.05	-.03	.34	.03	.13	.05	-.11	-.03	.19	.02	.12	.49
30		147	-.54	.18	.03	.63	-.09	-.16	.01	.05	-.03	.34	.03	.13	.05	-.11	-.03	.19	.02	.12	.49
31		146	.66	.18	.05	.18	.03	.61	.18	.09	.06	.17	.02	.09	.90	.00	.02	.01	-.03	.02	.73
32		160	-.03	.17	-.13	-.19	.01	.10	.18	.25	-.06	.03	-.02	.17	-.04	.12	.04	.09	-.05	-.21	.86
33		116	.21	.17	.21	.14	.08	.21	.38	.19	.05	.08	.19	.25	.04	.12	.04	.09	-.05	-.21	.86
34		396 (136)	-.01	.27	.07	.15	.28	.19	.14	.43	-.06	.08	.12	.21	.15	.18	-.09	.20	-.14	-.08	.55
35		131	-.39	.30	.09	-.23	.08	.22	.17	.21	-.11	.09	.12	.16	-.01	.19	.17	-.16	.00	-.13	.54
36		244	.04	.01	-.11	.09	-.01	.15	.09	.09	-.04	-.10	-.20	.08	-.12	.07	.13	.05	.30	-.04	.38
37		125	-.10	.00	-.27	-.24	.01	-.13	.05	.02	.06	.21	.12	.19	.10	.16	.17	.10	.21	.14	.43
38		152	.23	.15	.19	.02	.17	.08	.00	.06	.06	.04	.35	.04	.04	.03	.06	.03	.03	.18	.57
39		37	-.06	.00	.07	.10	.39	-.09	.05	.05	.30	.06	.51	.40	-.02	.02	.09	.11	.07	.20	.51
40		636	-.08	.14	.15	.04	-.33	.25	.05	.22	-.29	.06	.08	.08	-.07	.09	-.03	.04	.01	-.06	.37
41			-.08	.00	.07	.09	.10	.05	.10	.32	-.29	.06	.08	.08	-.07	.09	-.03	.04	.01	-.06	.37
42		103 (i) (191)	-.08	.03	.29	.19	-.07	.12	.03	.06	.30	.21	.19	.05	.02	.08	-.08	.40	-.10	.11	.60
43		103 (ii) (191)	.47	.15	-.06	.27	.05	.18	.03	.06	.19	.10	.17	.04	.04	.14	.06	.04	.14	.22	.52
44		103 (iii) (192)	.21	.10	.44	.17	.15	.40	.09	.07	.10	.22	.07	.02	.38	.04	.41	.02	.10	.01	.60
45		108	-.00	.01	-.10	-.16	-.06	.05	.02	.03	.00	.45	.27	.37	-.06	.09	.04	.08	-.04	-.08	.96
46		108	-.00	.01	-.10	-.16	-.06	.05	.02	.03	.00	.45	.27	.37	-.06	.09	.04	.08	-.04	-.08	.96
47		108	.03	.18	-.01	-.16	-.13	.15	.11	.12	.10	.14	.07	.21	.21	.01	-.03	.14	.19	.22	.23
48		114	.03	.18	-.01	-.16	-.13	.15	.11	.12	.10	.14	.07	.21	.21	.01	-.03	.14	.19	.22	.23
49		105	.22	-.03	-.03	-.14	.09	-.05	-.03	.40	.07	-.04	-.10	-.14	-.15	-.07	.18	-.02	-.04	.07	.41

50	112	06	03	34	18	19	38	08	08	11	00	86
51	109	22	03	14	07	01	45	04	04	25	08	65
52	110	33	14	16	01	05	06	33	07	05	07	46
53	29 and 133	44	15	16	01	05	06	33	07	05	04	04
54	116	11	33	07	33	03	13	14	10	11	22	51
55	117	30	06	05	00	04	20	01	48	21	03	81
56	118	31	10	23	19	12	04	03	21	04	18	48
57	107	34	01	02	06	07	14	12	15	13	09	62
58	104	12	29	19	16	01	06	15	11	02	06	32
59	2	44	24	06	04	01	02	07	06	15	02	04
60	99	09	03	31	09	08	03	09	06	15	02	04
61	116 (130)	57	25	03	10	04	10	04	10	02	05	17
62	101	14	07	06	10	04	10	04	10	02	05	17
63	1246 (195)	01	40	04	10	08	02	05	39	10	03	29
64	122	09	02	01	21	01	01	12	04	04	05	91
65	98 and 143	53	19	30	16	09	12	08	01	05	35	42
66	95	07	23	16	09	01	01	09	18	03	01	38
67	91	03	03	06	17	12	05	08	00	05	12	47
68	386 (135)	01	05	04	16	13	15	02	08	03	01	49
69	41	18	09	05	10	11	21	10	10	16	01	49
70	21	05	08	15	10	11	21	10	10	16	01	49
71	36	30	22	06	17	22	03	01	05	05	09	32
72	93	12	01	15	00	03	00	06	48	00	03	54
73	42	11	19	11	24	29	10	12	09	00	03	54
74	94	01	31	00	09	03	05	01	04	30	03	80
75	8	27	17	16	03	16	09	13	04	10	05	42
76	22 and 131	38	05	29	34	18	00	04	18	08	05	42
77	46 and 137	03	05	29	34	18	00	04	18	08	05	42
78	98	25	02	12	09	18	10	09	01	01	01	45
79	92	01	19	07	18	08	08	04	31	02	07	28
80	43	09	08	14	03	04	12	14	15	00	03	18
81	113	07	03	11	23	02	25	21	00	12	02	32
82	83	02	03	11	23	02	25	21	00	12	02	32
83	161	03	21	12	34	20	10	21	06	12	02	48
84	162	01	08	14	12	10	13	14	15	04	05	44
85	163	00	24	07	22	07	13	14	15	04	05	44
86	164	12	18	25	07	21	05	01	16	02	01	31
87	165	22	14	01	27	31	18	02	01	04	03	38
88	166	40	09	31	21	02	39	10	02	02	03	72
89	150	13	13	36	14	00	10	22	07	35	04	72
90	1306 (196)	06	02	09	01	16	02	20	07	02	06	62
91	2 (i) (172)	25	01	14	12	08	13	13	12	01	02	25
92	2 (iv)	69	13	05	04	18	12	20	01	03	03	66
93	2 (ii) (173)	17	12	66	12	03	23	20	01	03	09	66
94	2 (iii) (174)	14	03	44	14	03	23	20	17	13	08	53
95	6 and 177	53	30	28	08	00	18	17	13	13	04	74
96	120	20	03	17	05	06	08	29	50	07	05	86
97	167	48	02	23	22	05	02	01	47	10	07	86
98	676 (141)	02	01	36	11	07	40	42	03	01	10	83
99	111 (i)	07	06	07	08	20	28	37	15	09	02	58
100	111 (i)	26	40	12	23	03	04	02	06	11	06	58
101	126	20	09	01	02	05	20	01	30	18	22	51
102	62 (138)	19	04	01	20	13	08	09	28	10	08	30
103	25c and 132	01	04	00	19	10	32	01	03	05	02	54
104	36 (127)	48	32	15	19	20	02	10	05	16	02	54
	Number in $\pm 10$ hyperplane	46	56	51	52	60	51	63	58	63	60	73

for One's Values ; Indecisiveness ; Pessimism over doing good ; Criticism of Obvious Remarks ; and Restraint in Judgment.

### 3. THE EXPERIMENT AND THE FACTOR ANALYSIS.

The above tests consist of an individual battery of 15 tests and a group battery of 61 tests. The latter was administered in four 2-hour sessions over two successive days. (Test periods were shorter and rest periods longer than for the normal group. Attendants removed one or two subjects who became unco-operative.) In the individual testing, lasting three hours, rest pauses and a change were given at the end of each hour and tests which were likely to put stress on the subject were left to the end of the period.

For comparability with the normal group having essentially the same battery (14), as well as for easy test procedure, the educational level was kept as high as was compatible with getting 100 subjects from four mental hospitals. Even so, it had to be set down to a mean education level of 11.5 years. Thus 5 had only an elementary school education ; 80 had high school education and 15 had been to a university. The group is thus educationally somewhat poorer than our average normal group (8, 9, 14, 15). The mean age was 26.9, with a sigma of 4.6 and a median of 28 years. Since most of our normal groups have been men this also was kept a male population.

Psychiatrically the group included 76 schizophrenics, 4 severe psychoneurotics, 1 manic, 12 unclassified and 7 psychopaths. Naturally, cases proving too disturbed for testing, in the trial run undivided testing, which was first in the series, were not included in the group testing ; nor did we include cases undergoing shock therapy at the time. Consequently we lost 25 cases as incomplete, leaving 100.

The statistical treatment may be summarized as follows : The raw scores were rescaled to a 19 point range and normalized at the same time. From these a correlation matrix was calculated (product moment) on the 64 most important variables and a multi-group factorization yielding fifteen factors was carried out. While the rotation was in process certain errors were discovered in the scoring formulae for eight tests. At the cost of two years' delay we scrapped the analysis and decided to begin again (with revised test scores) and with a matrix now of 104 tests. (Previously we had planned to bring in the extra 40 tests as a matrix extension after factorization ; but improvements in I.B.M. methods during this time encouraged us to try a  $104 \times 104$  matrix with 5,356 correlation coefficients). The ruins of the first factorization provided us with one advantage : a knowledge of those groups to be used for the multi-group extraction which would yield factors roughly at the true rotation positions.

The final multi-group factorization now yielded approximately these factors, plus three others—18 in all. It was rotated for simple structure, with the help of the new Electronic Rotator, designed by Carroll and Gaylord, at the Personnel Research Section, Adjutant General's Office, Washington, D.C., which shortened the process by two months and for which the experimenters wish to express their gratitude. A definite structure was obtained after 18 rotations, but it is

not quite as good, judged by percentage in hyperplanes, as in the normal groups.

To save printing costs the unrotated and the transformation matrices have been stored on microfilm and may be obtained for two dollars from the Library of Congress, Auxiliary Publication Section, on application. The rotated matrix is presented here in Table I and the angles among the reference vectors in Table II. It will be seen that the factors are for all practical purposes orthogonal, being notably less correlated than those in ratings and questionnaires.

TABLE II.—C. *Cosines of Angles Among Reference Vectors.*

Factor.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2	.03	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3	-.16	-.02	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4	.02	-.10	.06	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5	.07	.11	.07	-.04	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6	.15	.08	-.31	-.07	-.20	..	..	..	..	..	..	..	..	..	..	..	..	..
7	-.03	-.09	.16	-.03	-.01	-.19	..	..	..	..	..	..	..	..	..	..	..	..
8	.05	-.11	-.05	-.08	.03	.00	-.12	..	..	..	..	..	..	..	..	..	..	..
9	.02	.20	-.33	-.02	-.07	.00	.08	.00	..	..	..	..	..	..	..	..	..	..
10	-.09	-.07	.15	-.10	.00	.01	.13	.04	-.01	..	..	..	..	..	..	..	..	..
11	.08	-.11	.06	.03	.14	-.05	-.08	-.01	-.15	-.06	..	..	..	..	..	..	..	..
12	.07	.06	-.21	.08	.00	.21	-.01	-.04	.17	.11	-.12	..	..	..	..	..	..	..
13	-.01	.04	.18	-.08	.05	.06	.02	-.01	-.01	.01	-.06	-.06	..	..	..	..	..	..
14	.10	.01	-.04	-.01	.13	-.15	.03	-.02	-.04	-.03	.05	-.10	-.05	..	..	..	..	..
15	-.04	-.10	.02	-.02	.05	.10	-.02	-.01	.03	.00	.08	.25	.01	-.03	..	..	..	..
16	.10	.05	.04	-.19	.11	-.06	.05	.10	.14	.01	.05	-.09	.03	.14	.00	..	..	..
17	-.02	-.04	.00	-.03	-.01	-.01	-.14	.14	.02	-.03	.02	-.18	.03	.02	-.03	.07	..	..
18	.13	.01	.02	.01	-.02	-.11	-.01	-.01	-.05	.04	-.04	.20	-.03	.04	-.15	.08	-.01	..

4. THE NATURE OF THE FACTORS.

Our attempt to get a first interpretation of the factors will, as usual, be based upon an examination of that selected 10 per cent. (or less) of the variables which are most highly loaded in each factor studied. At this juncture in research progress, with the simultaneous publication of four analyses on parallel batteries with normal subjects (8, 9, 14, 15), it would also be possible to enter on more discursive interpretation, involving detailed cross references to these other populations and factor findings. Both space limitations, and the desirability of independence in initial interpretations in each field, persuade us, however, to keep this discussion of wider interpretations and identifications at a minimum. The reader may rest assured that the meaning and use of these hard-won factor measures will not ultimately be left at the level of the restricted initial statement presented here, but will be developed in further articles (10).

In setting out of factors the usual course (8, 9, 14, 15) will be followed of putting the Matrix Number on the extreme left, followed by the Master Index, and then the loading on the extreme right. The title of the test will be corrected to "High" or "Low," etc., to agree with the sign of the loading. The cut-off point in proceedings to list variables of lower loading will be made at a natural break, as near as possible to the limit of 5 per cent. significance of loadings. In terms of original correlations this would fall here at about 0.13; but we have made our cuts at at least twice this figure. However, where a variable loads no factor at a very significant level it is included, in parenthesis, in the factor which it loads *most highly*.

*Factor 1. General Intelligence.*

Matrix Number.	Master Index.	Test.	Loading.
92 .	2 (iv)	Low Motor Rigidity. Test 2 . . . . .	-69
61 .	11b (130)	High Intelligence: Verbal and Numerical . . . . .	57
28 .	148	Much Aspiration for Improvement (Coding) . . . . .	-54
65 .	98 (143)	C.M.S. Many Decisions Correct . . . . .	53
4 .	153	C.M.S. High Speed of Making Decisions . . . . .	53
95 .	6 (177)	High Ideo-motor Speed . . . . .	53
30 .	26	High Ability to Handle Surprises (Riddles) . . . . .	50
97 .	167	High Efficiency of Immediate Memory . . . . .	48
104 .	3b (127)	High Speed of General Judgment . . . . .	48

This factor has all the characteristic markers—intelligence test, memory, speed of judgment, low rigidity—of the general ability factor. (Found in F6 in (1), F2 in (2), F3 in (3), F2 in (4), F8 in (5)). One particular rigidity measure has strayed unduly high, but the mean of four of them is about right. Typically this also has the poorest hyperplane (44 per cent.) of any factor, due to intelligence influencing so many facets of behaviour.

*Factor 2. Manic Tendency.*

Matrix Number.	Master Index.	Test.	Loading.
5 .	15	C.M.S. Unrestrained Use of Circles . . . . .	77
47 .	108	Much Self-Confidence in Untried Performances . . . . .	45
4 .	153	C.M.S. High Speed of Decision . . . . .	41
63 .	124b (195)	Tendency to Disagree. 2 . . . . .	40
100 .	111 (i)	Much Self Reference in General Events . . . . .	40
38 .	152	Tendency to Disagree. 1 . . . . .	-33
54 .	116	Much Cynicism or Hard-headed Judgment . . . . .	33
19 .	96a (188)	Much Effect of Frustrated Pref. on Comp.-ut. Speed . . . . .	32
104 .	3b (127)	High Speed of General Judgment . . . . .	32
74 .	94	Low Mean Frequency of Flicker Fusion . . . . .	-31

In the two rapid C.M.S. performances, the high confidence claimed and breadth of experience, and in high oscillation (not high enough, however, to be in the top eight) this factor closely resembles, though not necessarily enough for an unquestionable match, the earlier factors F10 in (3) and F13 in (6). The psychological consistency is very good and we shall hypothesize that this is a dimension of "manic tendency," governing rapid and rash action (Variables 4, 5, 104), egotism (Variables 38, 63 and 100), high self-confidence (Variables 47, 58), and resentment at minor frustration (Variables 19, 38, 63). This hypothesis will be checked in the ensuing breakdown of factor measures by syndrome groups.

*Factor 3. Stoicism.*

Matrix Number.	Master Index.	Test.	Loading.
93 .	2 (ii) (173)	Low Motor Rigidity. 5 . . . . .	-66
45 .	103 (ii) (192)	Little Considered Possible in Given Time for Self . . . . .	44
94 .	2 (iii) (174)	Low Motor Rigidity. 6 . . . . .	-44
50 .	112	High Ratio Adverse to Favourable Self Reference in Events . . . . .	38
89 .	150	Little Extremity of Viewpoint . . . . .	-36
98 .	67b (141)	Little Extremity of Viewpoint . . . . .	-36
88 .	166	Low Ratio of Normal to Shock Performance (Class.) . . . . .	-31
7 .	43 (i)	Low Ratio of Reaction on Mental to Physical S. in P.G.R. . . . .	-31
60 .	99	High Ratio of Verbal to Numerical Ability . . . . .	30

Although this factor is rotated to the best hyperplane we have been able to find, the pattern is puzzling, in two respects. First it resembles, in low rigidity and low ratio of normal to shock performance, the previously found series of factors F9 in (1), F11 in (2), F2 in (3), and F3(-) in (6), but so also does factor 13 below. Both lack the clear involvement with slow reaction times which these have. Secondly, it shares (when reversed), with factor 7 in the present series, a resemblance to Eysenck's (17) neuroticism factor. Factor 7 has the slow reaction times. Either Eysenck's factor is really two factors or else some new factor rotation has eventually to be found between the present 3 and 7. Contingently the term "Stoicism" perhaps best suggests its general character, for the person is little perturbed by shock, and takes a coldly realistic view of events.

*Factor 4. Novel Pattern No. 1.*

Matrix Number.	Master Index.	Variable Title.	Loading.
19	96 (a) (188)	Little Effect Frustr. Preference on Comp. Speed	-71
10	25	High Ratio Emotional to Non-Emotional Recall	40
11	115 (i) (193)	Ego Strength 1. Little Shift from Unsuccessuls	-39
82	83	Low Fidgetometer Frequency	-36
77	46 (137)	Much Impairment Unseen Maze P. by Discomfort	34
83	161	High Ratio of Performance (Cancel.) Approval to Disapproval	34

This factor resembles no previously known pattern and justifies no discussion until confirmed in other populations.

*Factor 5. Insecure Contra-Suggestibility.*

Matrix Number.	Master Index.	Variable Title.	Loading.
63	124 (b) (195)	Tendency to Disagree (Ratio Score: Optimism-Pessimism Material)	-68
31	106	Little Unreflective Acceptance of Unqualified Statements	-61
38	152	Little Tendency to Disagree (Diff. Score Largely Opt.-Pess. Material)	-39
68	38b (135)	Low Ratio Consonant to Dissonant Opinions Recalled	-39
18	31 (i)	Little Fluctuation of Attitudes. Material 4	-34
40	65b	Low Logical Consistency of Attitudes	-33
103	25c (132)	High Ratio of Emotionally Interesting to Emotionally Dry Recall	32
87	165	High Ratio of (Classification) Performance under Approval to Disapproval	31

The combination of "Disagreeing" with "Low ratio of recall of consonant to dissonant opinions" has been found before in F5(-) in (1), F6 in (4), F3(-) in (5) and F4 in (6), but has there had more emphasis than here on the attitude shift measures. (A pattern found here more clearly in Factor 7.) However, the loadings, though lower, are consonant, showing ego weakness (Variables 11, 13) and immaturity (Variable 15) associated with the present pattern. The whole strongly indicates a preoccupation with independence and relation to authority, together with a basic insecurity and suggestibility, such as occurs in extreme forms in schizophrenia.



*Factor 6. Cyclothymia (Reversed).*

Matrix Number.	Master Index.	Variable Title.	Loading.
14 .	31 (iii)	Low Fluctuation of Attitudes. Material 3 . . .	-62
12 .	31 (iv)	Low Fluctuation of Attitudes. Material 4 . . .	-58
16 .	31 (ii)	Low Fluctuation of Attitudes. Material 2 . . .	-57
98 .	67b (141)	Little Extremity of Viewpoint . . . . .	-40
45 .	103 (ii) 192	High Amount Considered Possible in Given Time for Self . . . . .	-40
88 .	166	High Ratio of Performance Normal to Shock . . . . .	39
40 .	656	Low Logical Consistency of Attitudes . . . . .	-25
81 .	113	Much Breakdown of Reality Principle . . . . .	-25
69 .	41	Little Two Hand Co-ordination . . . . .	-24

The pattern of low attitude fluctuation, little extremity of viewpoint, and breakdown of reality thinking (as opposed to pleasure principle) occurs, exactly as here, in previous factors F9 in (2) and F1 in (3). Earlier still (3) attitude fluctuation had been shown to be associated with cyclothymia and with general instability. Our hypothesis is that the present factor is the cyclothymia factor and Factor 7 the general instability factor, for 7 is the only other factor with systematic relationships to fluctuation measures. Since this population is selected for instability it is not surprising that here, in contrast to a normal population, the decidedly larger fraction of fluctuation variance falls in the cyclothymia factor.

*Factor 7. Emotional Stability vs. Neuroticism.*

Matrix Number.	Master Index.	Variable Title.	Loading.
84 .	162	High Ratio Perform. (Cancel.) Normal to Shock . . . . .	46
48 .	114	Little Underestimation Pros. Perf. in Unex. Dif. Mat. . . . .	-43
98 .	67b	Little Extremity of Viewpoint. 1 . . . . .	-42
32 .	7	High Speed of Perceptual Closure . . . . .	38
69 .	41	Good Two Hand Co-ordination . . . . .	37
99 .	326	Low Ratio of Errors to Attempts . . . . .	-36
27 .	28	High Dynamic Momentum . . . . .	36
50 .	112	Low Ratio Adverse to Tav. Self Ref. in Events . . . . .	-35
13 .	115 (ii) (194)	Ego Weakness. 2. Avoidance of Designated Neurotic's Response . . . . .	32
96 .	120	High Ratio of Inaccuracy to Speed . . . . .	29

It should be noted that the rigidity measures (Variables 91, 92, 93 and 94)—important markers in personality research—have systematic relations to four factors in this study: 3, 1, the present factor, and 10, in that descending order. The long history of research (2, 5, 11, 19, 20, 22) associating rigidity with emotional instability should not blind us to the possibility that its association with other personality factors *might* be still higher. Indeed, the studies from this laboratory have repeatedly (8, 9, 11, 14, 15) shown its variance to be distributed among four factors, one being intelligence (F1 here), one instability or neuroticisms (as in Eysenck's findings (17) and the two other being factors of which we are only just beginning to get a clear view (3 and 10 here).

Although Eysenck has made rigidity and sway suggestibility (or ataxia) central to measurement of the neuroticism factor as he defines it, we have con-

sistently found these variables present but of low loading (as here), compared to other available tests, in the same factor as it appears in our rotations. From the present and other studies we are suggesting that a battery for the measurement of neuroticism should add to these two tests (with equal or greater weight), measures of Extremity of Viewpoint, Ratio of Inaccuracy to Speed, High Aspiration Level (except in unusually difficult material, as above), Inability to State Assumptions, Preference for Form over Colour (in Pictures), Slow Speed of Judgment, and Poor Two Hand Co-ordination. (As defined in the studies concerned.) The present factor indicates possibilities also for Low Dynamic Momentum, Slowness and Inaccuracy of Perceptual Closure, and Much Acceleration of Cancellation Performance by Electric Shock. The present factor can be matched with F10 in (1), F7 in (3) and F5( - ) in (6).

*Factor 8. Inhibition by Social Standards.*

Matrix Number.	Master Index.	Variable Title.	Loading.
67	91	Little Artistic Suspicion	-53
96	120	Low Ratio Inaccuracy to Speed	-50
72	93	Little Effect of Restraint on Performance	48
49	105	Much Tendency to Perceive Threatening Objects	40
63	124b (195)	Tendency to Disagree. 2	-39
50	112	High Ratio Adverse to Favourable Self Ref. in Events	34
79	92	Slowness to Imitate Animal Sounds	31

This matches, notably on Seeing Threatening Objects, Tendency to Disagree, Good Knowledge of Social Etiquette, Large Mean P.G.R. Response and Much Impairment of Maze Performance by Shock, the previously matched F2 in (1), F4 in (2), F11 in (3) and F14 in (6). However, the two last variables, and Absence of Questionable Preferences, also agree in pattern with the present factors 12 and 16. The total pattern and its meaning, nevertheless fits best here, as a factor of inhibition and diffidence, combined with high social and general standards and a tendency to suppressed hostility. Our hypothesis is that this corresponds to an acquired general inhibition derived from a more exacting social environment.

*Factor 9. Novel Pattern No. 2.*

Matrix Number.	Master Index.	Variable Title.	Loading.
78	98	C.M.S. Many Decisions Correct (R-W)	45
65	143 (98)	C.M.S. Large Absolute No. Decisions Correct	45
51	109	Low Ratio of Pleasant to Unpleasant Associations	-38
25	30 (134)	Low Ratio Criticism of Self to Criticism of Others	-35
50	112	Low Ratio of Adverse to Favourable Self-Reference in Events	-35
75	8	Low Rate of Alternating (Cube) Perspective	-34
54	116	Marked Cynicism or Hard Headed Judgment	33
39	97	Time Interval Perceived Longer During Work	30
74	94	Low Mean Frequency of Flicker Fusion	29

No *single loading* is high enough here to give a clear lead on the meaning of the factor, and since the *pattern* has not been previously encountered it would seem best to await its confirmation in later studies.

*Factor 10. Novel Pattern No. 3. Sensitive Self Regard.*

Matrix Number.	Master Index.	Variable Title.	Loading.
87 .	165 .	High Ratio of Performance (Classif.) Under Approval to Disapproval . . . . .	53
103 .	25c (132) .	High Ratio of Emotionally Interesting to Emotionally Dry Recall . . . . .	53
45 .	103 (ii) (195) .	Much Considered Possible in Given Time for Self . . . . .	-45
77 .	46 (137) .	Little Impairment Unseen Maze Performance by Discomfort . . . . .	-40
27 .	28 .	High Dynamic Momentum . . . . .	39
28 .	148 .	Little Aspiration for Improvement . . . . .	34
94 .	2 (iii) (174) .	Low Motor Rigidity. Test 6 . . . . .	-30
50 .	112 .	High Ratio Adverse to Favourable Self Reference in Events . . . . .	28

The person high in this factor is not upset by difficulties or discomforts and shows good control, as evidenced by low rigidity (which follows through in the remaining rigidity tests), but he is deterred by disapproval, takes a realistic or pessimistic view of how things will affect him and does not set an unrealistically high aspiration level.

The pattern suggests the sensitive but tenacious outlook of the schizothyme factor A —, found in ratings.

*Factor 11. Socialized Maturity.*

Matrix Number.	Master Index.	Variable Title.	Loading.
39 .	97 .	Time Interval Not Perceived Longer During Work . . . . .	-52
54 .	116 .	Lack of Cynicism in Judgment . . . . .	-47
21 .	155 .	Small Range of Flicker Fusion . . . . .	-39
100 .	111 (i) .	Much Self Reference in General Events . . . . .	38
38 .	152 .	Tendency to Agree. I . . . . .	36
17 .	35 .	Little Suggestibility to Authority . . . . .	-35
45 .	103 (ii) 192 .	Low Amount Considered Possible in Given Time for S. . . . .	28
57 .	107 .	Good Knowledge of Etiquette . . . . .	28

In variables 39, 38, 17 and 45, as shown, this factor resembles F5(—) in (4), F11(—) in (5) and F8(—) in (6), and it does so also in the lower, but out-of-hyperplane loadings for low speed of perceptual closure, low estimate of time required for tasks by others, little extremity of viewpoint, and little shift toward successfuls, i.e., ego strength. But the match is not really good on account of sign inconsistencies.

The pattern shows both maturity, e.g., in time estimate, insuggestibility, etc., and a marked awareness of social relations (Variables 54, 100, 57) and is therefore perhaps best described by the given label.

*Factor 12. Novel Pattern No. 4: Nervous Exhaustion.*

Matrix Number.	Master Index.	Variable Title.	Loading.
24 .	4 (176) .	Long Mean Reaction Time; Irregular signals . . . . .	57
23 .	4 (175) .	Regular . . . . .	53
59 .	2 .	High Perceptual Rigidity; Hidden Words . . . . .	-52
45 .	103 (ii) (192) .	Much Considered Possible in Given Time, for Self . . . . .	-50
30 .	26 .	Little Ability to Handle Surprises. Riddles . . . . .	-49
57 .	107 .	Poor Knowledge of Etiquette . . . . .	-47
18 .	31 (i) .	High Fluctuation of Attitudes. Material 1 . . . . .	44
16 .	31 (ii) .	High Fluctuation of Attitudes. Material 2 . . . . .	43

This factor may represent a fatigue state rather than a more permanent personality dimension. There is a consistent lack of alertness and of capacity to cope with unusual situation (Riddles, Perceptual Rigidity) as well as a marked fluctuation of attitude, which is also characteristic of central fatigue. This pattern would repay study as a basis for the measurement of nervous exhaustion.

*Factor 13. Novel Pattern No. 5: Surgency v. Desurgency.*

Matrix Number.	Master Index.	Variable Title.	Loading.
1	157	Many Jokes Overtly Reacted to as Funny	54
89	150	Little Extremity of Viewpoint. Material 2	-54
26	156	Little Lag of Flicker Fusion	-40
21	155	Little Range of Flicker Fusion Speeds	-39
85	163	Low Ratio of Performance (Perceptual Closure) under Approval to Disapproval	-36
44	13	High Oscillation	35
86	164	Low Ratio of Performance (Perceptual Closure) Normal to Shock	-32
53	29 (133)	Low Criticalness (Severity) of Judgment	-26

In the imperviousness to shock and disapproval, as well as in the oscillation, criticalness and humour this resembles the already matched set F9 in (1), F11 in (2), F2 in (3) and F3( - ) in (6) which have been stated above to have a rival resemblance to the present Factor 3. Further examination must solve this point, but meanwhile the present factor clearly represents a pattern of happy-go-lucky attitudes and disregard for punishment suggesting the surgency-desurgency factor found in ratings (2, 5, 6, 7). Why precision of awareness of flicker fusion thresholds should associate with surgency cannot be answered at present.

*Factor 14. Novel Pattern No. 6.*

Matrix Number.	Master Index.	Variable Title.	Loading.
51	112	Low Ratio of Pleasant to Unpleasant Associations	-45
21	155	Large Range of Flicker Fusion Speeds	44
50	112	Low Ratio of Adverse to Favourable Self Reference in Events	-38
27	28	High Dynamic Momentum	37
65	98 (143)	C.M.S. Few Decisions Correct	-37
52	110	Low Anteversion-Retroversion Association Ratio	-33
74	94	High Mean Frequency of Flicker Fusion	31
78	98	C.M.S. Few Decisions Correct (R - W)	-31

It happens that few of the variables coming together here have been used in any one previous study, so a match is in any case unlikely. There is an intriguing relationship in that though the rational, conscious outlook tends to more favorable than adverse conclusions, the "free association" gives more unpleasant than pleasant associations and the individual looks to the past rather than the future. Together with the plodding concentration of Variable 27, this perhaps suggests a punishing super-ego and melancholic trends—an hypothesis that can be taken up in the syndrome analyses.

*Factor 15. Decisiveness.*

Matrix Number.	Master Index.	Variable Title.	Loading.
15 .	34 .	Maturity of Opinion . . . . .	-61
97 .	167 .	High Efficiency of Immediate Memory . . . . .	46
44 .	13 .	High Oscillation . . . . .	40
17 .	35 .	Little Suggestibility to Authority . . . . .	-33
72 .	93 .	Marked Effect of Restraint on Performance . . . . .	-31
29 .	147 .	Small Estimated Breadth of Experience and Accomplishments . . . . .	-27
32 .	7 .	Low Speed of Perceptual Closure . . . . .	-25
76 .	22 (131) .	High Ratio of Chance to Purposeful Observation* . . . . .	24

\* Highest loading here except in intelligence factor, where it is reversed.

This factor can readily be matched—by the combination of high maturity, low authority suggestibility, good memory, high speed of judgment (only 0.12 here, however), low speed of perceptual closure, and modesty of self appraisal—with a pattern which has manifested itself through six distinct researches (F8 in (1), F7 in (2), F4 in (3), F3 in (4), F1 in (5) and F10(—) in (6).

It is temporarily labelled "Decisiveness," but the other studies indicate decided physiological associations which require a search for an underlying explanation in temperament.

*Factor 16. Masculinity v. Femininity.*

Matrix Number.	Master Index.	Variable Title.	Loading.
55 .	117 .	Lack of Fashionable Good Taste in Social Matters . . . . .	-49
87 .	165 .	High Ratio of Performance (Classification) Under Approval to Disapproval . . . . .	41
60 .	99 .	Low Ratio of Verbal to Numerical Primary Ability . . . . .	-35
10 .	25 .	Low Ratio of Emotional to Non-Emotional Recall . . . . .	-25
3 .	158 .	Little Increase of Tempo under Threat . . . . .	-25
25 .	30 (134) .	Low Ratio Criticism of Self to Criticism of Others . . . . .	-24
68 .	386 .	Low Ratio of Consonant to Dissonant Opinions Recalled . . . . .	-24
70 .	21 .	Pressure of Questionable Preferences . . . . .	-24

The recording has been pursued to lower and less significant loadings than usual, largely because (except for 10, 25 and 68) the latter happen to be practically the highest loadings anywhere for the given variables. There is also some doubt on this factor's rotation because random variable 42 has a substantial loading on it. (Only on Factors 11 and 13 do the random variables otherwise exceed loadings of 23). However, the pattern is a tolerable match for F3(—) in (1), F1(—) in (2), F10(—) in (4), and F12(—) in (5), combining lack of highbrow taste, low criticism, questionable reading preferences, few C.M.S. errors and low ratio of consonant to dissonant opinions. This factor has such an appreciable correlation with sex difference that it has been called previously "Masculinity-Femininity" (14) and to this we adhere in the present title.

*Factor 17. Novel Pattern No. 7.*

Matrix Number.	Master Index.	Variable Title.	Loading.
74 .	94 .	High Mean Frequency of Flicker Fusion . . . . .	51
72 .	93 .	Little Effect of Restraint on Performance . . . . .	41
82 .	83 .	High Fidgetometer Frequency . . . . .	41
22 .	5 .	High Ratio Reg. to Irreg. Warned Reaction Time . . . . .	38
66 .	95 .	Much Myokinetic Movement Decrease under Threat . . . . .	37
21 .	155 .	Large Range of Flicker Fusion . . . . .	35
88 .	166 .	Low Ratio Performance (Class) Normal to Shock . . . . .	-33
35 .	151 .	Shorter Time for Decision Principle than Partic. . . . .	-32

Though resemblances are noticeable in past findings none is clear enough for a match, and the pattern is best left as novel ; with the comment only that it suggests a generally "high strung," tense, concentrated person, as quick on unwarned as warned reaction time and whose concentration is not reduced by shock.

*Factor 18. Novel Pattern No. 8.*

Matrix Number.	Master Index.	Variable Title.	Loading.
73 .	42	. High Body Sway Suggestibility . . . . .	66
7 .	43 (i)	. Low Ratio Mental to Physical Stim. React. on P.G.R. . . . .	-39
64 .	122	. High Static Ataxia (Simple Body Sway) . . . . .	35
1 .	157	. Few Jokes overtly Reacted to as Funny . . . . .	-29
62 .	101	. Lack of Excess of Aspiration Level over Performance (Coding) . . . . .	-28
37 .	125	. High Ratio of Personal to Institutional Values . . . . .	25
49 .	105	. Little Tendency to Perceive Threatening Objects . . . . .	-25
46 .	119	. Lack of Artistic Taste in Colour Blending . . . . .	-22

This factor of smallest variance has appreciable loadings only in the sway tests and in reacting more to physical than mental threats. It has not been found in other populations and does not justify discussion until confirmed.

5. SUMMARY.

(1) One hundred and two objective personality measures (from 76 tests), devised in relation to hypotheses already emerging from several personality factor studies, were administered to 100 adult male psychotics. The test battery, consisting of group and individual tests, was designed also to have about 80 per cent. overlap of measures with those used on normal adult groups in six other researches.

(2) Intercorrelation and factor analysis (rotated to simple structure) yielded eighteen factors, ten of which could be contingently matched, in terms of common variables having similar patterns of loadings, with factors found in the other studies.

(3) An initial interpretation has been attempted for these ten factors, but the remaining eight are simply recorded, waiting to be confirmed or modified by other researches.

(4) The conclusion may be drawn that the majority of personality dimensions in objective tests are the same for psychotics as for normals, though the follow-up research on absolute levels may show that they are possessed in very different degrees.

(5) As far as applied psychology is concerned the way has been prepared for constructing personality factor measures of greater factor saturation than those employed in this exploratory study. For now that initial batteries are available to distinguish each factor, new, lengthened tests can be simply validated by "item analysis" against any one factor pool, without the necessity for experimenting with a hundred or more tests, or for the more complex processes of rotated factor analysis.

The above tables should suffice for researchers wishing to construct test batteries for individual factors. However, for greater comparability they may perhaps better use the mimeographed, twelve-factor battery which is currently

being prepared for distribution by the Institute for Personality and Ability Testing, 1608, Coronado Drive, Champaign, Ill., U.S.A. This initial standard battery of objective personality tests is put forward now in the hope that interested researchers may (1) seek by "item analysis" (including use of new test designs) to arrive at more saturated measures, and (2) test the predictive value of the factor measures, i.e., their social validation, in terms of diagnosis and prognosis, and their value in plotting changes occurring under therapy.

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