

manual of the

**EYSENCK
PERSONALITY
INVENTORY**

H. J. Eysenck & Sybil B. G. Eysenck



HODDER AND STOUGHTON

MANUAL OF THE EYSENCK PERSONALITY INVENTORY

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E.P.I. MICROCOMPUTER DISK

The E.P.I. (Forms A and B) is now available for administration, scoring and data storage in microcomputer disk versions. See page 23 for further details.

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1. INTRODUCTION

The Eysenck Personality Inventory (E.P.I.) is a development of The Maudsley Personality Inventory (M.P.I.—Eysenck, 1959a; Knapp, 1962). Like the parent instrument, it sets out to measure two major dimensions of personality, extraversion and neuroticism. It is sufficiently similar to the M.P.I., and correlates sufficiently highly with it, to make it almost certain that the experimental findings reported for the older instrument will also apply to the newer; nevertheless, the improvements incorporated in the E.P.I. make it more useful from many practical points of view. These advantages are as follows:

1. The E.P.I. consists of two parallel forms, thus making possible retesting after experimental treatment without interference from memory factors.

2. The E.P.I. items have been carefully reworded so as to make them understandable even by subjects of low intelligence and/or education; the M.P.I. items were found to be rather too difficult with subjects of this type.

3. The correlation between Extraversion and Neuroticism on the M.P.I. was small but nevertheless marginally significant; suitable item selection has caused it to disappear in the E.P.I.

4. The E.P.I. contains a Lie Scale which may be used to eliminate subjects showing "desirability response set"; no such scale was contained in the published form of the M.P.I.

5. The retest reliability of the E.P.I. is somewhat higher than that of the M.P.I.; even after periods of several months it is still in excess of 0.85.

6. Direct evidence is available of the validity of the E.P.I. as a descriptive instrument of the behaviour manifestations of personality.

2. GENERAL BACKGROUND

The importance of describing the major patterns of behaviour in human subjects has always been recognized by psychologists, and the search for the main dimensions of personality has been pursued by many well-known figures. A review of the literature by Eysenck (1960a) has disclosed strong support for a view which recognizes the existence of two very clearly marked and outstandingly important dimensions; these have been called, respectively, Extraversion-Introversion, and Neuroticism, emotionality or stability-instability

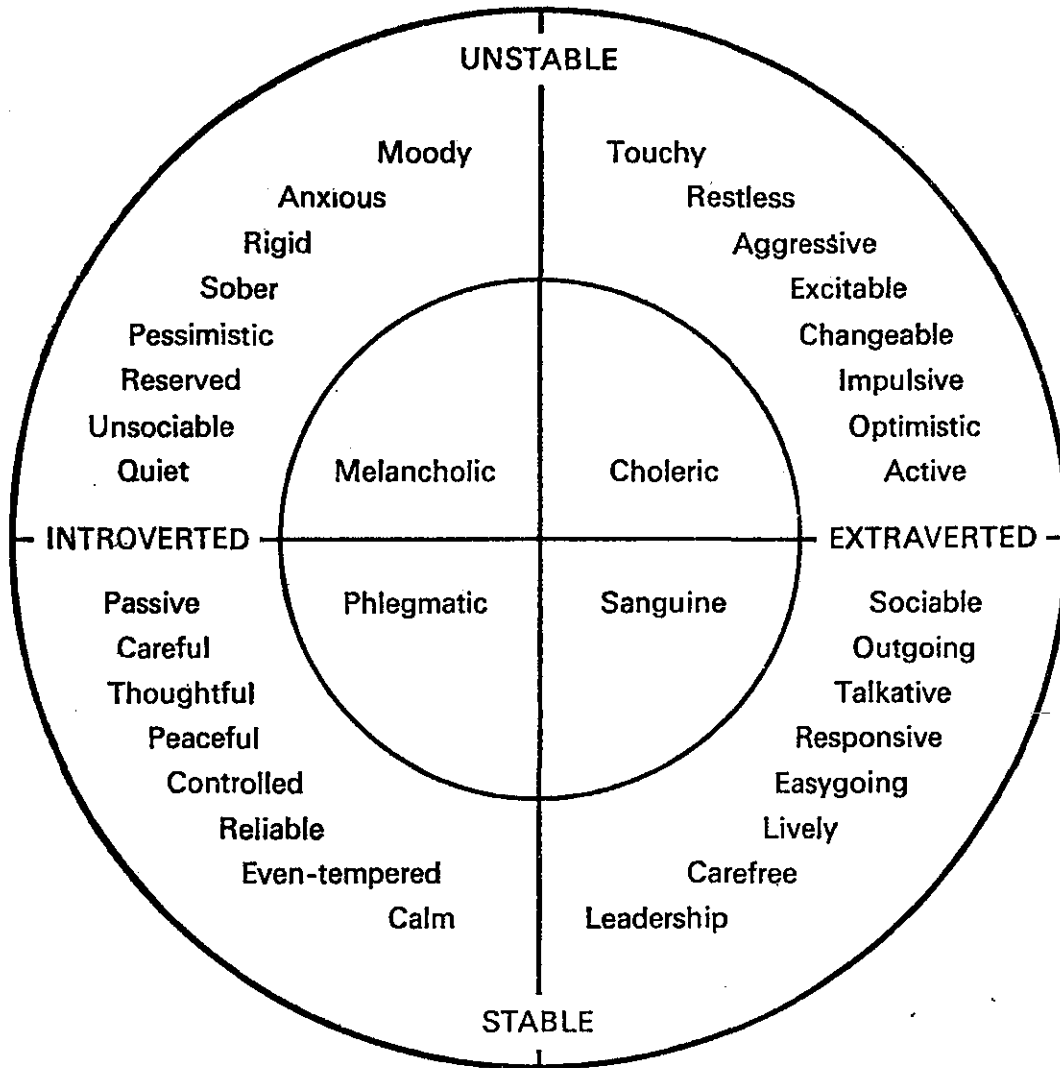


Fig. 1. Relationship of Extraversion/Introversion and Neuroticism/Stability to earlier personality schemes

Fig. 1 shows the relationship between these two factors or dimensions and the ancient Galen-Kant-Wundt scheme of the four temperaments. The traits shown on the outer rim of this figure represent in diagrammatic form the results of large numbers of factor-analytic attempts to discover the interrelations of various of these traits in many different human populations; it is an empirical fact that a large proportion of the total common variance produced by the observed correlations between these traits (and many others which could not be included for lack of space) can be accounted for in terms of these two factors. When Eysenck (1947) originally put forward this hypothesis there was much argument about the efficacy of this scheme, but now the major alternative scheme, namely that of Cattell, has been found to give rise to essentially very similar results (Cattell and Scheier, 1961), and Guilford's personality studies, too, have resulted in second-order factors which closely

resemble those here postulated. While not wishing to deny the existence and importance of factors additional to E and N, we believe that these two factors contribute more to a description of personality than any other set of two factors outside the cognitive field.

3. PERSONALITY AND EXPERIMENTAL PSYCHOLOGY

It is one of the basic postulates in our work that factor analysis is a necessary but not a sufficient method for isolating the main dimensions of personality, and for constructing instruments for their measurement. Correlational analyses are important, but they are merely permissive, not compelling; as Thurstone once put it, "a correlation is a confession of ignorance". It would be possible to represent the observed relationships between traits in countless different ways, all mathematically equivalent to each other, although very different from the psychological point of view. This makes it essential to go beyond the merely statistical approach, and to try to link up personality dimensions with the main body of experimental and theoretical psychology (Eysenck, 1957). Such work as has been done along these lines has tended on the whole to support the view that the N factor is closely related to the inherited degree of lability of the autonomic nervous system, while the E factor is closely related to the degree of excitation and inhibition prevalent in the central nervous system (Eysenck, 1960a); this balance, too, is presumably largely inherited, and may be mediated by the ascending reticular formation (Eysenck, 1963a). The strong influence of heredity on E and N has been shown in several studies, but clearest perhaps by Shields (1962), who found that identical twins brought up separately correlated very highly in both extraversion and neuroticism. Another link with biological science is the demonstration that a person's position on the extraversion-introversion dimension can be shifted by drugs; stimulant drugs are introverting, depressant drugs are extraverting (Eysenck, 1963a). A detailed list of references to empirical studies of the relation between personality and experimental psychology is given in the manual to the M.P.I.

Following this line of thought, deductions have been made from general and experimental psychology regarding the expected behaviour of extraverted and introverted subjects on a great variety of laboratory experimental investigations. Relations have been postulated and discovered between extraversion and conditioning, level of aspiration, figural after-effects, masking, reminiscence, vigilance, sedation threshold, rotating spiral after-effects, constancy

phenomena, the occurrence of time error, verbal conditioning, time judgment, pain and sensory deprivation tolerance, and many others (Eysenck, 1960b). The theoretical relation between these *experimental* definitions of extraversion and the *behavioural* ones given by the E.P I. is discussed in the next section.

4. NATURE OF E AND N

Descriptively, the factorial studies of E have resulted in a picture which may resemble, but is certainly not identical with that given by Jung. Below is given a brief account of the "typical" extravert and of the "typical" introvert; these may be regarded as idealized end-points of a continuum to which real people may approach to a greater or lesser degree.

"The typical extravert is sociable, likes parties, has many friends, needs to have people to talk to, and does not like reading or studying by himself. He craves excitement, takes chances, often sticks his neck out, acts on the spur of the moment, and is generally an impulsive individual. He is fond of practical jokes, always has a ready answer, and generally likes change; he is carefree, easy-going, optimistic, and likes to 'laugh and be merry'. He prefers to keep moving and doing things, tends to be aggressive and lose his temper quickly; altogether his feelings are not kept under tight control, and he is not always a reliable person.

"The typical introvert is a quiet, retiring sort of person, introspective, fond of books rather than people; he is reserved and distant except to intimate friends. He tends to plan ahead, 'looks before he leaps', and distrusts the impulse of the moment. He does not like excitement, takes matters of everyday life with proper seriousness, and likes a well-ordered mode of life. He keeps his feelings under close control, seldom behaves in an aggressive manner, and does not lose his temper easily. He is reliable, somewhat pessimistic, and places great value on ethical standards" (Eysenck and Eysenck, 1963a).

As regards N, no such account is perhaps required as our description would be very similar to those given by countless other writers since Woodworth published his Personal Data Sheet and Taylor her Manifest Anxiety Scale.

These descriptive patterns, it should be emphasized, refer to personality in its *phenotypic* aspect, while the experimental tests mentioned in the last section refer more to personality in its *genotypic* aspect. This difference between *behavioural* and *constitutional* aspects of personality has been discussed in detail elsewhere (Eysenck, 1960c). Fig. 2 is reproduced from that paper to illustrate the re-

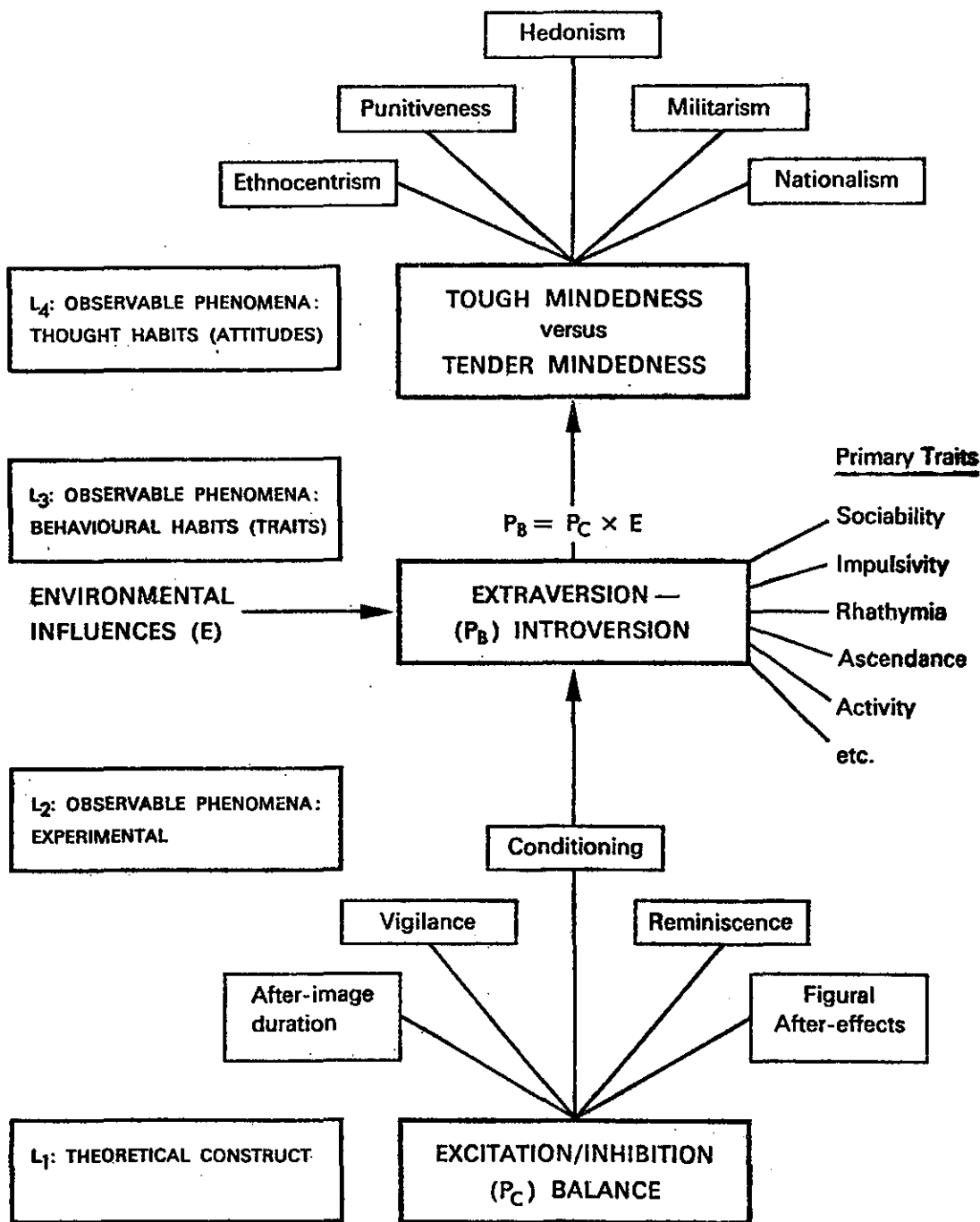


Fig. 2. Relationship between Constitutional and behavioural aspects of Extraversion

lations involved, and deals with the E variable only. In this diagram, the subscripts "C" and "B" refer to *constitution* and *behaviour* respectively; "E" refers to environmental influences. It will be seen that at the most fundamental level we have the constitutional concept of the excitation/inhibition balance, which may be tilted in one direction or the other to give rise to constitutional, genotypic differences in extraversion-introversion; these may with some degree

of accuracy be measured in terms of conditionability, vigilance, figural after-effects, and other laboratory phenomena. Observable behaviour is a function of these constitutional differences in interaction with the environment; this interaction gives rise to descriptive, phenotypic differences in extraversion-introversion, which can best be measured in terms of questionnaires such as the E.P.I. This differentiation between laboratory tests and questionnaires as being more closely related to genotypic and phenotypic aspects of personality respectively is not of course an absolute one, but it may nevertheless be useful in thinking about the meaning of the results achieved with the use of the different types of measuring instruments.

5. CONSTRUCTION OF THE SCALES

The first scales constructed on the basis of this set of theories were The Maudsley Medical Questionnaire (Eysenck, 1953) and The Maudsley Personality Inventory; both were based on lengthy and repeated factor analyses of various different sets of items. In addition, much attention was paid to published analyses by other authors, most of which have been reviewed in *The Structure of Human Personality* (Eysenck, 1960a). For the purpose of constructing the E.P.I., about a dozen further factor analytic studies were carried out, one of which resulted in a matrix of 128² entries, which included all the items in forms A and B, as well as a set of substitute items. Subjects of these investigations were more widely representative than is customary in such studies; apart from University students, use was made of various middle-class and working-class groups, varying in age and sex composition, as well as of representative samples of the whole population, interviewed by experienced representatives of a leading firm of market research consultants. In some studies subjects filled in forms, in others they answered questions put by interviewers (S.B.G. Eysenck, 1960; Eysenck and Eysenck, 1962). The total numbers involved in all this work are in excess of 30,000, and those reports which have been published in the psychological literature are cited in the Bibliography given at the end of this Manual; it is hoped to publish further reports in the next few years. It is believed that this is the only Inventory in existence which has included only questions, all of which formed part of one single factor analysis; there are reasons for treating with considerable caution claims for inventories built up on a more piecemeal fashion (Eysenck, 1956). However this may be, the care taken in the construction of an Inventory must be reflected in its reliability and validity if it is to be used at all widely, and we must now turn to a consideration of these factors.

6. RELIABILITY OF THE SCALES

There are two forms of reliability which determine the excellence of a scale: repeat reliability (test-retest) and split-half reliability (consistency). The former is the more important; it was studied on two groups of normal subjects, to be called Group X and Group Y. The time elapsing between test and retest was approximately 1 year for the former, and 9 months for the latter. The results are given in Table 1.

Table 1

	Number	E _A	E _B	E	N _A	N _B	N
Group X	92	0.82	0.85	0.88	0.84	0.81	0.84
Group Y	27	0.97	0.80	0.94	0.88	0.91	0.92

It will be seen that the retest reliabilities are quite satisfactory, running between 0.84 and 0.94 for the complete test and between 0.80 and 0.97 for the separate forms. Considering the long time elapsed between test and retest, this is encouragingly high. (The subscripts "A" and "B" in this and all other tables refer to the two forms of each scale; when "E" and "N" are given without subscripts, they refer to the combined forms, i.e. A + B.)

Table 2 gives the split-half reliabilities, i.e. A *vs* B, for 1,655 normals, 210 neurotics and 90 psychotics. Also given are the reliabilities for the whole scales (A + B), obtained by using the Spearman-Brown prophecy formula. The figures are lower than those for retest reliabilities, which is an unusual but not an undesirable finding. For the combined scales they run from 0.85 to 0.95; for the separate scales they run from 0.74 to 0.91. If individual decisions are to be made on the basis of the Inventory, clearly both forms should be used; for experimental studies one form alone may be sufficient.

Table 2

	<i>n</i> =2,000 Normals	<i>n</i> =210 Neurotics	<i>n</i> =90 Psychotics
E _A <i>vs</i> E _B	0.757 (0.862)	0.750 (0.857)	0.741 (0.851)
N _A <i>vs</i> N _B	0.811 (0.896)	0.873 (0.932)	0.906 (0.951)

7. RELATION BETWEEN THE SCALES

Although E and N are conceptualized as being orthogonal vectors, i.e. uncorrelated and independent dimensions of personality, small negative correlations have usually been found with the M.P.I.

Typically these correlations would be between -0.1 and -0.2 for normal groups, ranging up to -0.4 with neurotic groups. This has sometimes been interpreted as evidence against the independence of the two factors, but such an argument is clearly mistaken. Consideration of Fig. 1 will show that observed correlations between E and N will reflect the choice of questions; if more questions are taken from the "melancholic" quadrant, then E and N will show a negative correlation, whereas a bias in favour of questions from the "choleric" quadrant will result in a positive correlation between E and N. The M.P.I. clearly showed the former bias, and an attempt was made to correct this as far as possible by selecting equal numbers of questions from both quadrants. The success of this attempt is shown in Table 3; the correlation between E and N is -0.062 in the normal group, and -0.091 and -0.090 in the neurotic and psychotic groups respectively. These values are near enough to zero to make the scales for all practical purposes independent.

Table 3.

	$n=2,000$ Normals	$n=210$ Neurotics	$n=90$ Psychotics
E vs N	-0.062	-0.091	-0.090
E_A vs N_A	-0.013	-0.040	0.047
E_B vs N_B	-0.116	-0.157	-0.217

The success of this procedure should not of course be interpreted as *proving* the independence of E and N. This would imply a reification of these two conceptual entities which would be entirely inappropriate. All that can be said is that the data are *compatible* with the hypothesis of two orthogonal factors.

8. VALIDITY OF THE SCALES

The concept of validity is a vexed one in relation to personality; the notion of "agreement with a criterion" is clearly inapplicable, as no agreed criterion exists in the usual case. One possible criterion of validity which is in line with procedure in the more exact sciences is that the tests should fit in with predictions made from a more general theory. This type of validation exists in profusion in relation to the M.P.I. (Knapp, 1962); in virtue of the close similarity of the E.P.I. scales to those of the M.P.I. it seems reasonable to argue that this proof would also apply to the new scales. Independent proof would, of course, be required in due course, but is not yet available.

An alternative type of proof, however, is available. Using the method of nominated groups, S. B. G. Eysenck (1962) and Eysenck and Eysenck (1963a) have several times shown that when independent judges are asked to nominate extraverted and introverted, or stable and unstable subjects, and when these nominees are then asked to fill in the E.P.I., or sets of items taken from the E.P.I., there are clear and predictable differences on the scales between the respective extreme groups. In other words, individuals who impress others as showing introverted or extraverted behaviour patterns, or as being stable or unstable in their everyday behaviour, answer the E.P.I. in a corresponding manner. There is some evidence that where there is lack of agreement, it is the judges who are at fault, rather than the inventory answers. On the whole, there seems little doubt that questionnaire responses given under the usual conditions give a reasonably valid picture of the subject's habitual behaviour patterns.

9. RESPONSE SETS

It is well known that questionnaires of all kinds are subject to response sets, i.e. to the tendency of subjects to prefer certain kinds of answers (such as "Yes") irrespective of the content of the question. One such response set—the tendency to endorse many "?" responses (Eysenck, 1962)—has been eliminated by eliminating this alternative; Bendig has shown that this has little influence on the answer pattern or reliability of the M.P.I. (1959). Another response set—tendency to endorse extreme answers (Eysenck, 1962)—does not arise in inventories employing a simple "Yes—No" dichotomy. Acquiescence response set has been investigated rather intensely in relation to the M.P.I. (Eysenck, 1962) and the E.P.I. (Eysenck and Eysenck, 1963b, 1964), and it has been found to play a very small and unimportant role only. It is not completely absent, however, and may require to be borne in mind with certain groups of subjects.

"Desirability response set", i.e. the tendency to answer questions according to the favourable light which the answer would throw on the subject, has also been investigated with some care, but has not been found to play an important part under ordinary conditions (Eysenck and Eysenck, 1963c). An exception is the use of the inventory for selection purposes; when this is done considerable falsification has been shown to take place (Eysenck, 1964). However this may be, desirability response set can be detected by the use of the Lie scale, which forms part of the Inventory; this will be discussed in a separate section.

10. LIE SCALE¹

An 18-item Lie scale (L) has been included in the E.P.I. This scale, the rationale for which originated in the famous Hartshorne and May Character Education Enquiry, was later on modified and used in the M.M.P.I. The M.M.P.I. "L" scale was again re-written and adapted for use with the M.P.I., and extensive item analyses and factor analyses were carried out over the years; one or two only of these have been published (Eysenck, 1959b; Gibson, 1962). These studies showed the scale to be valid, reliable, and useful in detecting individuals "faking good"; accordingly, it has been included in the present Inventory. No absolute guidance can be given for its use, as different groups differ from each other, but in general it may be said that there is considerable evidence to show that a score of 10 or above on the scale shows that "faking good" is likely to have occurred, and that the E and particularly the N scores should be regarded with considerable scepticism. If only scale A or scale B is employed, an "L" score of 4 or 5 would be considered to constitute the cutting point where inventory answers ceased to be acceptable. Tendency to have high L scores may in itself be an interesting personality trait (Eysenck and Eysenck, 1963c). The scale has not been used very much in conjunction with the E.P.I., and little in the way of documentation can therefore be offered at this stage.

The mean score of a group of 651 subjects on Form A was 2.263, with a standard deviation of 1.572; the mean score of a group of 329 subjects on Form B was 1.383, with a standard deviation of 1.354. Mean L score for the latter group (A & B) was 3.565 ± 2.475 . In addition, data are available of a group of 482 apprentices who were tested under conditions which made them believe that the inventory was given as part of a selection procedure; this presumably caused many of them to "fake good". Under these conditions the mean on Form A was 4.529, with a standard deviation of 1.803 (Form B was not given to this group).

The test-retest correlation for Form A was 0.776, that of Form B 1.736 and that of the combined forms 0.810 ($n = 50$). Correlations between Forms A and B were calculated for four separate groups totalling 329 subjects; the average 0.54. Retest reliability on a group of 50 subjects was 0.81 for the total L scales, and 0.78 and 0.74 for L_A and L_B .

¹ Some items in the Lie scale have been reproduced and adapted, by permission, from The Minnesota Multiphasic Personality Inventory: Copyright 1943, The University of Minnesota, and published by the Psychological Corporation, New York (all rights reserved).

11. NORMAL STANDARDIZATION SAMPLE

Table 4 shows the make-up of the normal standardization group, constituting a sample of 2,000 people. The most extraverted groups, not unexpectedly, are engineering apprentices (whose high extraversion has already been noted on the M.P.I.—Eysenck, 1963), salesmen and student occupational therapists. The most introverted groups are clerks, teachers and students. The most stable groups are the professional and managerial ones, with skilled working class subjects the least stable. Student teachers and student nurses also were relatively unstable. The total mean score of all these groups may perhaps be acceptable as a good approximation to a national mean; the detailed examination of the data does not suggest any gross departure from good sampling practices.

12. ABNORMAL STANDARDIZATION

Table 5 shows the mean values of the various groups making up our abnormal standardization group. It will be seen that neurotics as a group have much higher N scores than do normals; this finding may, of course, be regarded as part of the validation required for this score. Psychotics are intermediate between normals and neurotics, with depressives nearer the neurotic mean and schizophrenics nearer the normal mean. This difference may represent nothing more than the diagnostic failure to distinguish properly between endogenous and reactive depression. As regards the neurotic groups, they are differentiated only with respect to the E scores, with the dysthymic groups (anxiety states, obsessionals) having high introversion scores, undifferentiated neurotics intermediate E scores, and hysterics the highest extraversion scores of the neurotic groups proper (although still a little less extraverted than the normal groups). Most extraverted of all are a group of female prisoners, whose N scores place them squarely with the neurotic groups; from their case papers and files one would probably be justified in considering them as examples of psychopathic personality. This differentiation of the various neurotic groups with respect to E might also be regarded as constituting part of the validation of the test; Eysenck (1947) postulated that introverts would develop dysthymic symptoms upon neurotic breakdown, while extraverts would develop hysterical and psychopathic symptoms. A detailed discussion of this prediction and the evidence for it is given by Eysenck and Claridge (1962).

Table 4

Normal Groups	Age		E _A		E _B		E	
	M	σ	M	σ	M	σ	M	σ
1. Working class	38.647	14.466	11.212	4.440	13.976	3.888	25.188	7.803
2. Clerks	35.100	12.349	10.814	4.595	13.086	4.221	23.900	8.303
3. Professionals	35.483	14.078	11.397	4.906	13.517	3.997	24.914	8.390
4. Housewives	42.167	12.517	12.167	4.752	13.917	4.221	26.083	8.556
5. Nurses	25.892	12.299	12.649	4.118	14.730	3.372	27.378	7.009
6. Student teachers	20.394	6.381	12.371	4.461	14.515	3.843	26.886	7.787
7. GPO postmen	32.993	11.103	11.507	4.035	14.125	3.416	25.632	6.734
8. GPO telephonists	27.279	9.281	11.310	4.071	13.473	4.043	24.783	7.548
9. Civil servants	35.176	11.097	11.824	4.172	14.765	4.146	26.588	7.867
10. Salesmen	32.933	13.248	13.633	3.760	15.133	3.766	28.767	6.954
11. Managerial	43.952	11.267	10.976	4.643	13.723	3.807	24.699	7.785
12. Skilled working class	36.429	11.113	12.500	4.485	13.429	3.917	25.929	7.790
13. Lab. technicians	20.423	2.901	12.885	5.172	14.462	4.860	27.346	9.666
14. Students	20.937	4.860	11.095	4.543	13.438	4.198	24.533	8.267
15. Apprentices	17.864	0.979	13.697	4.000	15.591	3.832	29.288	7.406
16. Medical students	20.846	4.356	10.769	3.700	13.615	3.664	24.385	6.983
17. O.T. students	19.927	3.718	13.427	4.292	15.366	3.379	28.793	7.123
18. Student nurses	20.382	1.101	12.441	3.145	14.824	2.833	27.265	5.632
19. Secretaries	29.937	12.453	12.234	3.919	14.234	3.284	26.469	6.588
20. K.C.H.	43.054	18.214	11.446	4.188	12.608	3.980	24.054	7.497
21. Teachers	33.476	10.684	10.762	4.206	13.268	4.112	24.048	7.950
22. Army	24.979	7.595	13.179	4.034	14.716	3.674	27.894	7.191

Table 5

Group	Age		E _A		E _B		E	
	M	σ	M	σ	M	σ	M	σ
Normal population	27.453	12.000	12.070	4.370	14.148	3.920	26.218	7.771
<i>Neurotic groups</i>								
Anxiety	35.046	10.919	9.454	4.040	11.241	4.130	20.695	7.699
Obsessional	36.131	10.261	8.696	4.306	10.783	4.260	19.479	7.952
Hysteric	29.628	11.942	11.744	4.351	12.791	4.039	24.535	7.719
Mixed neurotic	33.426	12.585	9.951	4.345	12.164	4.026	22.115	7.847
Female prisoners	22.573	7.444	13.777	4.332	14.408	3.524	28.184	7.348
<i>Psychotic groups</i>								
Depressive	46.707	16.134	10.732	4.247	12.585	3.666	23.317	7.405
Schizophrenic	40.303	12.090	9.629	3.838	12.236	3.255	21.865	6.526
Hospitalized alcoholic group	48.267	11.738	10.200	5.003	12.400	4.453	22.600	9.171

Table 4 (continued)

Normal Groups	N _A		N _B		N		n	m	
	M	σ	M	σ	M	σ			
1. Working class	7.765	4.753	9.965	4.905	17.729	9.138	85	56	29
2. Clerks	8.729	4.367	9.786	4.475	18.514	8.359	70	15	55
3. Professionals	7.948	5.107	8.690	4.362	16.638	9.113	58	35	23
4. Housewives	7.958	5.393	9.417	5.191	17.375	10.107	24	0	24
5. Nurses	10.595	3.926	10.568	3.920	21.162	7.437	37	0	37
6. Student teachers	10.720	4.338	11.833	4.268	22.553	8.091	132	3	129
7. GPO postmen	7.963	4.484	8.956	4.649	16.919	8.586	136	136	0
8. GPO telephonists	8.388	4.912	10.550	4.677	18.938	9.115	129	108	21
9. Civil servants	8.706	5.687	8.824	5.604	17.529	10.984	17	8	9
10. Salesmen	8.383	4.723	10.300	4.979	18.683	9.188	60	23	37
11. Managerial	8.060	4.825	8.241	4.380	16.301	8.925	83	36	47
12. Skilled working class	10.929	4.446	11.786	4.209	22.714	7.660	14	10	4
13. Lab. technicians	10.231	4.719	10.731	4.721	20.962	9.110	26	11	15
14. Students	10.006	5.006	11.037	4.821	21.044	9.478	347	158	189
15. Apprentices	7.508	3.928	9.879	4.094	17.386	7.417	132	132	0
16. Medical students	9.231	3.833	9.077	3.616	18.308	7.052	13	8	5
17. O.T. students	9.561	4.560	10.854	4.269	20.415	8.315	82	1	81
18. Student nurses	10.500	4.107	11.206	3.953	21.706	7.626	34	0	34
19. Secretaries	8.562	4.774	9.984	5.060	18.547	9.332	64	4	60
20. K.C.H.	9.702	5.043	10.392	5.109	20.094	9.826	74	44	30
21. Teachers	9.904	4.232	9.642	4.011	19.548	8.034	42	12	30
22. Army	9.094	4.882	11.718	4.724	20.812	9.187	341	297	44

Table 5 (continued)

Group	N _A		N _B		N		n	m	
	M	σ	M	σ	M	σ			
Normal population	9.065	4.783	10.523	4.708	19.588	9.031	2,000	1,097	903
<i>Neurotic groups</i>									
Anxiety	15.796	5.062	16.491	5.223	32.287	9.974	108	59	49
Obsessional	15.174	5.268	16.696	4.335	31.870	9.380	23	10	13
Hysteric	15.163	4.370	15.768	4.758	30.930	8.728	43	24	19
Mixed neurotic	14.410	5.475	14.869	5.557	29.279	10.806	61	31	30
Female prisoners	13.680	4.738	16.408	3.909	30.087	8.250	103	0	103
<i>Psychotic groups</i>									
Depressive	13.268	6.304	14.244	5.685	27.512	11.788	41	19	22
Schizophrenic	10.349	5.826	10.494	6.022	20.843	11.533	89	46	43
Hospitalized alcoholic group	14.000	5.169	14.400	5.275	28.400	10.162	15	14	1

13. THE EFFECTS OF AGE, SEX AND SOCIAL CLASS

Correlations between E and N on the one hand, and age on the other, are given in Table 6. There is a significant trend for N and E to decline with advancing age. The reasons for this are speculative, but for comparative purposes these trends should be borne in mind by research workers. When larger standardization groups are available it will be useful to furnish separate data for different age groups; the data available at the moment are not sufficient to allow this to be done.

Table 6

	Normals	Neurotics	Psychotics
E _A	-0.240	-0.176	-0.153
E _B	-0.209	-0.052	0.016
N _A	-0.136	-0.108	-0.206
N _B	-0.173	-0.130	-0.201
E	-0.241	-0.125	-0.079
N	-0.163	-0.123	-0.209

Correlations between age and personality

Correlations with sex are not large, because items giving large sex differences were eliminated during the construction of the inventory. Nevertheless, women tend to score higher than men on N and lower on E. As regards social class, there has been a general tendency for working class groups to be characterized by higher N scores than middle class groups; no differences were observed with respect to E. Urban samples are higher on N and E. These data were collected with earlier versions of the E.P.I., attaining significance levels in excess of $p = 0.01$. (Some published studies are Eysenck, 1958, and S. B. G. Eysenck, 1960.)

14. APPLICATIONS OF THE E.P.I.

The areas of application of the E.P.I. are, of course, similar to those of the M.P.I.

(A) *Fundamental research.* Personality has been found to interact strongly with many experimental phenomena, from conditioning to figural after-effects, and from vigilance to level of aspiration (Eysenck, 1957; 1960). It would seem that much new information could be gained, and the area of error variance reduced, if all subjects taking part in experimental investigations were to be administered E.P.I.s routinely. Better still, investigations should be

planned with individual differences in mind, so that the best use could be made from the beginning of the accumulating knowledge regarding the determination of experimental reactions by E and N differences.

(B) *Applied research.* An enormous amount of applied work has been done in the area of market research with the M.P.I. and the E.P.I. in an attempt to discover personality correlates of consumption of different articles and brands of articles, of readership of different papers and journals, of participation in T.V., cinema going, and many other activities. The general finding has been that in almost every case where they have been looked for, these postulated personality differences have in fact been found. Thus T.V. viewing shows a strong, monotonic relationship with N, and a curvilinear one with E; both are stronger than relationships with intelligence. This whole area has been very much neglected in motivation research, where unreliable and invalid "projective techniques" have found more favour.

(C) *Psychiatric and medical research.* There has been an increasing tendency in the United Kingdom for M.P.I. or E.P.I. to be associated with general enquiries into various forms of mental or physical illness; the findings have often been of considerable interest and importance. Thus very significant and suggestive relationships have been discovered between cancer and E, extraverted individuals being more prone to this disorder. Other investigations have shown dysthymic behaviour patterns in individuals suffering from psychosomatic disorders. Several other illnesses are being investigated along similar lines, and it seems reasonable to suggest that the small addition in cost and time which is involved in the administration of the E.P.I. will be amply repaid by the additional information gained in any psychiatric or medical investigation carried out on a sufficiently large scale. Indeed, wherever large bodies of data are being gathered the inclusion of the E.P.I. seems indicated; the routine determination of blood groups, for instance, could become an exciting research adventure by the addition of the E.P.I., there being some suggestive evidence for the existence of relations between personality and blood grouping.

(D) *Individual testing.* For purposes of diagnosis and treatment, the E.P.I. should be administered routinely; this follows from the general theory linking personality and aetiology, and personality and treatment (Eysenck, 1960, 1963). Examples of the usefulness of knowledge gained in this way for the determination of a proper course of treatment are given in these books; there is no space here to give detailed expositions of this matter.

What all these recommendations boil down to is essentially this. There is now available a short, reliable and valid measure of the two most important dimensions of personality; such a measure is of use in any study where it may be suspected that personality and individual differences are likely to play a part. It is difficult to think of many investigations where neglect of these factors is likely to be justified.

15. ADMINISTRATION OF THE E.P.I.

Instructions for literate subjects are printed on each copy of the E.P.I.; these should be read aloud to groups of subjects, or be read silently by subjects tested individually. They should not be amplified or altered in any way. When the questionnaires are collected after completion, care should be taken to check that all questions have been answered; where answers are missing, subjects should have their attention drawn to the omissions. With illiterate or blind subjects, the questions may be read aloud, and the answers recorded. This should never be done when anyone but the subject is present, and on no account must the examiner change the wording of the question, amplify or interpret it, or give advice to the subject on how to answer it.

Scoring is accomplished by aligning the scoring keys furnished with the Manual, counting one point for each underlined answer uncovered by the holes in the key.

16. COMPUTER PROGRAMME FOR SCORING THE E.P.I. (*prepared by Alan Hendrickson*)

For the convenience of investigators who have large numbers of E.P.I.s to score, a scoring computer programme written in FORTRAN is included in the Manual. This particular version was written for the I.B.M. 1401 but could easily be adapted for any computer having a FORTRAN compiler. For those persons having access to an I.B.M. 1401 machine, the programme assumes an 8,000-character memory, no tape units, and the 1403 printer. The programme will read the individual items after they have been punched on IBM cards and compute the E, N and L scores for an individual. These three scores, together with a 10 digit identification code, are printed on line. The sums, sums of squares and sums of cross-products of the scores are computed and held internally for further computation. If sense switch 2 is on, the identification code for the individual and the three scores will be punched into a card as well as being printed on line. The 10-digit I.D. code is divided internally into two 5-digit codes. Before the scores are computed for

a given individual, the programme inspects in the first 5 digits of the I.D. code to see if they are 99999. If they are, the programme assumes that it is not to do any scoring for this card, but that it has read a "control card" marking the end of a group. The programme then computes means, standard deviations, variances and correlation coefficients between E, N and L for the group consisting of the observations scored before the control card was read. After these statistics are printed out, the programme reads the second 5 digits of the same control card. If they are 99999 (making a total of ten 9's punched on the card), the programme assumes that another group follows and proceeds to score them. If there is any other value in the second 5 digits of the I.D. field, the programme will stop with the one line message `END OF PROGRAMME`.

The cards on which the E.P.I. should be punched assume the following format:

- (a) *Columns 01 to 10 inclusive.* Identification (I.D.) field. Any of the 10 integers 0 to 1 can be put here as well as blanks. The entire 10-digit field is printed on line to identify the individual scores. If the digits 99999 are punched in columns 01 to 05, the programme assumes that it has just finished a group. If 9999999999 is punched in columns 01 to 10, the programme assumes that it has just finished a group and further assumes that another group is to follow.
- (b) *Columns 11 to 67.* The 57 items of the E.P.I. are punched here. A "yes" response is punched as a 1 and a "no" response is punched as a 2. This scheme results in very fast punching, even for untrained operators. If trained key-punchers are used, an operator should be expected to punch from 150 to 200 forms per hour. Verification of the forms would take approximately the same time, but if a drum card is used in the punching, verification is probably superfluous for most applications.

See page 23 for details of microcomputer administration and scoring of the E.P.I.

COMMENT EYSENCK PERSONALITY SCORING PROGRAMME

```

DIMENSION I(57), NAME(2)
100 PRINT 101
101 FORMAT (1H1, 17HINDIVIDUAL SCORES)
    SUME - 0.0
    SUMN - 0.0
    SUML - 0.0
    SUMSQE - 0.0
    SUMSQN - 0.0
    SUMSQL - 0.0
    XEN - 0.0
    XEL - 0.0
    XLN - 0.0
    N - 0
1 READ 2, NAME, I
2 FORMAT (2I5,57I1)
    IF (NAME(1) - 99999) 03, 07, 03
3 IE - (30 - (I(1)+I(3)+I(8)+I(10)+I(13)+I(17)+I(22)+I(25)+I(27)+
1 I(39)+I(44)+I(46)+I(49)+I(53)+I(56))) + I(5)+I(15)+I(20)+I(29)+
2 I(32)+I(34)+I(37)+I(41)+I(51) - 9
    IN - (48 - (I(2)+I(4)+I(7)+I(9)+I(11)+I(14)+I(16)+I(19)+I(21)+
1 I(23)+I(26)+I(28)+I(31)+I(33)+I(35)+I(38)+I(40)+I(43)+I(45)+
2 I(47)+I(50)+I(52)+I(55)+I(57)))
    IL - (6 - (I(6)+I(24)+I(36))) + I(12)+I(18)+I(30)+I(42)+I(48)+
1 I(54) - 6
    FE - FLOATF(IE)
    FN - FLOATF(IN)
    FL - FLOATF(IL)
    SUME = SUME + FE
    SUMN = SUMN + FN
    SUML = SUML + FL
    SUMSQE = SUMSQE + FE**2
    SUMSQN = SUMSQN + FN**2
    SUMSQL = SUMSQL + FL**2
    XEN = XEN + FE * FN
    XEL = XEL + FE * FL
    XLN = XLN + FL * FN
    PRINT 04, NAME, IE, IN, IL
4 FORMAT(1H0,2I5,2X2HE-I3,5X2HN-I3,5X2HL-I3)
    N = N + 1
    IF (SENSE SWITCH 2) 05, 01
5 PUNCH 06, NAME, IE, IN, IL
6 FORMAT(5I5)
    GO TO 01
7 FN = FLOATF(N)
    XBARE = SUME / FN
    XBARN = SUMN / FN
    XBARL = SUML / FN
    DEVE = SUMSQE - SUME**2/FN
    DEVN = SUMSQN - SUMN**2/FN
    DEVL = SUMSQL - SUML**2/FN
    VARE = DEVE / (FN - 1.0)
    VARN = DEVN / (FN - 1.0)
    VARL = DEVL / (FN - 1.0)
    SDE = SQRTF(VARE)
    SDN = SQRTF(VARN)
    SDL = SQRTF(VARL)
    REN = (XEN - SUME*SUMN/FN)/SQRTF(DEVE * DEVN)
    REL = (XEL - SUME*SUML/FN)/SQRTF(DEVE * DEVL)
    RLN = (XLN - SUML*SUMN/FN)/SQRTF(DEVL * DEVN)
    PRINT 08, XBARE, XBARN, XBARL, VARE, VARN, VARL, SDE, SDN, SDL, SUME, SUMN,
1SUML, SUMSQE, SUMSQN, SUMSQL, REN, REL, RLN
8 FORMAT(1H1, 18HSUMMARY STATISTICS/1H0, 15X1HE9X1HN9X1HL/1H0, 5HMEANS, EPI063
15X3F10.5,/1H0, 8HVARIANCE, 2X3F10.5,/1H0, 7HSTD DEV, 3X3F10.5,/1H0, 4HSEPI064
2UMS, 6X3F10.0,/1H0, 9HSUMS SQRS, 1X3F10.0,/1H0, 12HCORRELATIONS,/1H0, EPI065
38HE WITH N, F9.4,/1H0, 8HE WITH L, F9.4,/1H0, 8HN WITH L, F9.4,)
    IF (NAME(2) - 99999) 09, 100, 09
9 PRINT 10
10 FORMAT (1H1, 14HEND OF PROGRAMME)
    STOP
    END

```

EPI001
EPI002
EPI003
EPI004
EPI005
EPI006
EPI007
EPI008
EPI009
EPI010
EPI011
EPI012
EPI013
EPI014
EPI015
EPI016
EPI017
EPI018
EPI019
EPI020
EPI021
EPI022
EPI023
EPI024
EPI025
EPI026
EPI027
EPI028
EPI029
EPI030
EPI031
EPI032
EPI033
EPI034
EPI035
EPI036
EPI037
EPI038
EPI039
EPI040
EPI041
EPI042
EPI043
EPI044
EPI045
EPI046
EPI047
EPI048
EPI049
EPI050
EPI051
EPI052
EPI053
EPI054
EPI055
EPI056
EPI057
EPI058
EPI059
EPI060
EPI061
EPI062
EPI063
EPI064
EPI065
EPI066
EPI067
EPI068
EPI069
EPI070
EPI071

17. MICROCOMPUTER DISK VERSIONS OF THE E.P.I.

The E.P.I. (Forms A and B) is now available in disk form suitable for administration using a Commodore PET microcomputer and an Alphatronic light pen.

The disk version enables the questionnaire to be administered and scored 250 times. If desired, the results can then be retained on a disk file, creating the user's own databank of scores. The disk can present the user with the scores on the four scales, and individual item responses and latencies, as well as comparative data, which can be retained as a print-out. A further program on the disk enables the user to build up local normative data and compare groups of subjects according to age group, sex and occupation.

Simple instructions for its operation accompany the disk, but it should always be used in conjunction with this Manual. The number of administrations is limited to 250; after this the program can only be used to rescore existing test files. A release code enabling a further 250 administrations is then available from the publisher.

Further details and an order form are available from the Test Department, Hodder and Stoughton Educational.

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