APPENDIX

Name Age No.

Diagnosis

Personality. In particular is patient an hysterical (e.g. egocentric, histrionic, emotionally shallow, etc.), and/or anxious, and/or obsessional type?

What does he/she complain of?

Does patient experience feelings of anxiety, insecurity, etc., to a pathological degree?

Does patient experience feelings of depression to a pathological degree?

Any autonomic manifestations associated with abnormal anxiety; tachycardia, sweating, vasomotor lability, etc.?

Any skeletal signs of anxiety, tremor, strained expression, fidgeting, etc.?

Any psychosomatic symptoms; dyspepsia, constipation, diarrhoea, amenorrhoea, etc.?

Any classical hysterical symptoms; paralyses, anaesthesias, fugues, amnesia, globus, etc.?

Any other physical symptoms?

Any compulsive symptoms?

Attitude towards illness or symptoms; 'belle indifférence', dramatization, exaggeration, apprehension, fear, etc.?

Any precipitating factors?

Any motivating factors?

Any history of relevant physical illness or injury?

Any evidence of relevant physical illness or injury now?

PRINCIPLES AND METHODS OF PERSONALITY DESCRIPTION, CLASSIFICATION AND DIAGNOSIS

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Classification is an absolutely fundamental part of the scientific study of human personality; a satisfactory typology is as necessary in psychology as was Mendeleev's table of the elements in physics (Eysenck, 1954*c*). This has, of course, always been recognized, and almost everyone is acquainted with the famous typological classification into melancholics, cholerics, sanguines and phlegmatics dating back to Galen and even earlier. As this system still has much to teach us, I shall present it as Fig. 1; the outer ring in this figure shows the results of a large number of factor analytic studies of questionnaires and ratings (Eysenck, 1960*a*). As is customary in these diagrams, the correlation between any two traits is equal to their scalar product, that is to say, in this case, the cosine of their angle of separation.

Fig. 1 immediately confronts us with some of the main problems of classification. The first of these may be phrased in terms of the question: 'Categorical or dimensional?' Kant, to whom this system owes much of its popularity during the last two hundred years, was quite specific in maintaining the categorical point of view, i.e. the notion that every person could be assigned to a particular category; he was a melancholic, or a phlegmatic, or a sanguine or a choleric, but any mixtures or admix-

tures were inadmissible. This notion of categories is, of course, similar to the psychiatric notion of disease entities and their corresponding diagnoses; hysteria, anxiety state, paranoia, obsessional illness, and so on, are often treated as categorical entities in this sense.

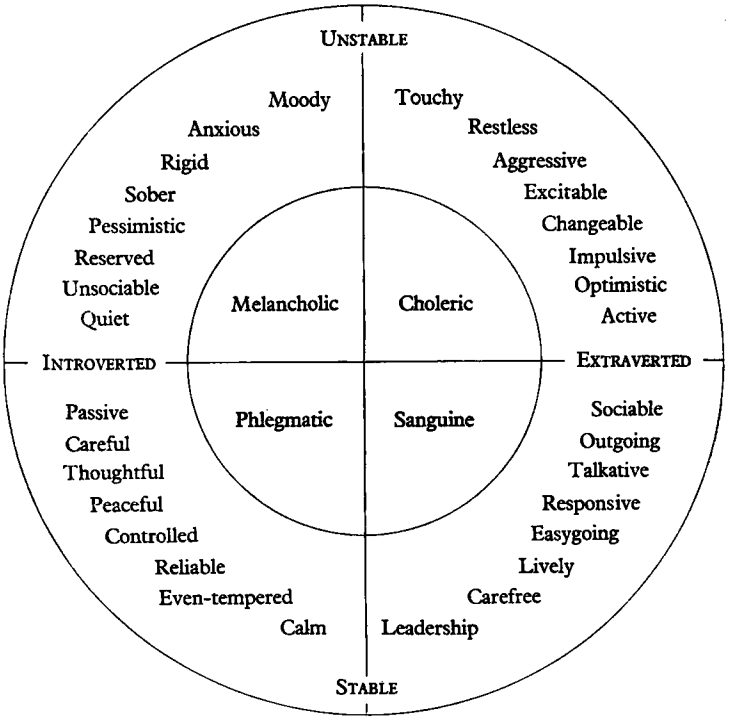

Fig. 1. Diagram showing relation between the classical four temperaments and results of modern factor analytic methods of personality description.

Opposed to this notion we have the view that any particular position in this two-dimensional framework is due to a combination of quantitative variations along the two continua labelled 'introversion–extraversion' and 'stable–unstable'. Wundt (1903), who is the most notable proponent of Galen's system in modern times, favours the dimensional view; he labelled the one axis 'slow–quick' instead of 'introversion–extraversion', and the other 'strong–weak' instead of unstable and stable.

It may be interesting to quote Wundt's very modern-sounding discussion:

> The ancient differentiation into four temperaments... arose from acute psychological observations of individual differences between people.... The fourfold division can be justified if we agree to postulate two principles in the individual reactivity of the affects: one of these refers to the *strength*, the other to the *speed of change* of a person's feelings. Cholerics and melancholics are inclined to strong affects, while sanguinics and phlegmatics are characterized by weak ones. A high rate of change is found in sanguinics and cholerics, a slow rate in melancholics and phlegmatics.
>
> It is well known that the strong temperaments... are predestined towards the *Unluststimmungen*, while the weak ones show a happier ability to enjoy life.... The two quickly changeable temperaments... are more susceptible to the impressions of the present; their mobility makes them respond to each new idea. The two slower temperaments, on the other hand, are more concerned with the future; failing to respond to each chance impression, they take time to pursue their own ideas. (Pp. 637, 638.)

There is no reason to believe that the notion of a *typology* presupposes a categorical system; both Jung and Kretschmer, who were probably the best known typologists of the inter-war period, postulated a dimensional rather than the categorical system. The widespread notion that typologists imply discontinuities, bimodal distributions, and the like, does not accurately represent the writings and views of modern typologists.

Most writers on the subject of personality come down in favour of either the categorical or the dimensional point of view without basing themselves on any experimental demonstration. I have always felt that this is unwise and that it should not be impossible to devise experimental and statistical means for verifying the one and falsifying the other hypothesis. I have tried to do this in terms of the method of *criterion analysis*, which relies on separate factor analyses of intercorrelations between tests administered to two or more criterion groups (say normals and psychotics), and the comparison of the factors emerging with a criterion column derived by serial correlation between the tests and the criterion (Eysenck, 1950). The results of this method have in every instance supported the doctrine of continuity, and failed to support the doctrine of categorization, even when the latter seemed most firmly entrenched, as in the case of psychosis (Eysenck, 1952*b*).

Assuming for the moment, therefore, the doctrine of dimensionality, we are required to build up on an experimental and statistical basis a quantitative system of personality description (Eysenck, Eysenck & Claridge, 1960). The most widely used tool for this purpose is, of course, factor analysis, and the main results of the application of this tool are shown in Fig. 1. It is notable that for many years factor analysis has been criticized because, so it was said, there was no agreement between factor analysts. Whatever may have been true twenty or thirty years ago, there can be no doubt that nowadays there is comparatively little disagreement between investigators in this field. Cattell's most recent book (Cattell & Scheier, 1961) shows him in firm agreement with the system I first put forward in 1947 (Eysenck, 1947), and Guilford, too, now appears to recognize the existence of these two main factors in personality description which I have used as the major axes in Fig. 1. Vernon (1953, p. 13) also puts forward a similar scheme. Equally we are all agreed that each of these factors is what Thurstone called a 'second-order factor', i.e. is extracted from the intercorrelations between 'first-order factors' or traits. It is with respect to these traits that much research is still needed before any final agreement is reached. Nevertheless, the major outlines of the picture are certainly beginning to appear, and it is notable that this agreement has been reached between workers using different premises, different factor analytic methods, different subjects, different tests and questionnaires, and different methods of rotation.

If we accept the principle of continuity, then we should be able to find a place for the major psychiatric classification of neurotic disorders within our Fig. 1. The theory has been put forward that neurotics suffering from anxiety, reactive depression, obsessions, phobias, and so on, would be found in the 'melancholic' quadrant, while hysterics and psychopaths would be found in the 'choleric' quadrant; psychotics would lie on an axis orthogonal to both E and N (Eysenck, 1952*a*). Descriptively there seems little doubt about the truth of this hypothesis at least as regards the neurotic groups; it is only necessary to look at the traits characterizing people in these two quadrants to realize that they might almost have been quoted from a

psychiatric text-book, rather than being the result of factor analytic studies of normal people. Nevertheless, more experimental support would seem to be required. Such support, in so far as it is based purely on descriptive measures, does not remove us from some of the difficulties implied in the use of the factor analytic method. It has often been shown, as for instance in the literature deriving from the Maudsley Personality Inventory (Knapp, 1962), that hysterics, psychopaths and various dysthymic groups are in fact all high on neuroticism or emotionality, but are differentiated very significantly with respect to extraversion and introversion.

However, on a more fundamental level we may still be bothered by what is in fact the second major problem posed by our Fig. 1. This problem relates to the exact position of the axes. Mathematicians and statisticians would agree that it is perfectly legitimate to use scalar products to indicate the relative position of two traits in the dimensional space indicated in Fig. 1, and they would also agree that the position of the traits can be legitimately referred to any two arbitrary axes drawn at right-angles in the plane. They would not, however, agree with the claim sometimes made that the position of these axes can be determined in any but an arbitrary or trivial sense by statistical or mathematical considerations *alone*, as is suggested by many psychologists, particularly in the United States. I have always agreed with this criticism and have tried to argue that by retaining purely statistical criteria of axes psychologists have got themselves separated off from the main body of experimental psychology, and have remained cocooned within a small tail-chasing system incapable of generating hypotheses that could be falsified (Eysenck, 1952*c*, 1953, 1954*a*, *b*, 1956*a*). What then is the answer to this problem?

My suggestion would be that a purely descriptive system in science inevitably must carry the burden of subjectivity, and that it is because they have only been interested in *description* that factor analysts have failed to make a major impact on psychology. What is required, so I would maintain, is a set of theories linking the major aspects of the descriptive system to *causal* theories which would be capable of falsification (Eysenck, 1957). As an example of what I have in mind I may perhaps mention the set of theories relating introversion to heightened cortical excitation and lowered cortical inhibition, and extraversion with lowered cortical excitation and heightened cortical inhibition. This enables us to make large numbers of predictions of an experimental nature which are unlikely to be verified unless both the descriptive and the causal systems, and the relations specified to exist between them, are in fact in some degree related to reality. Many such predictions have in fact been made, and the great majority have been verified; I may refer in this connexion to hypotheses such as that extraverts, as compared with introverts, would be more difficult to condition, have larger reminiscence scores, have greater pain tolerance but less tolerance for sensory deprivation, are more subject to satiation, have lower sedation thresholds, have greater alpha frequency and amplitude on the EEG, more involuntary rest pauses during massed practice, have poorer vigilance, have greater speed/accuracy ratios, shorter after-images, and so forth.

This differentiation between *descriptive* and *causal* is of course related to that between *phenotypic* and *genotypic*, first made in the personality field by Pavlov on the basis of some of his animal experiments. (For a discussion of Pavlov's views and their development, Teplov's very interesting account may be consulted with advantage;

it is available in English together with a detailed evaluation of recent Russian work in the personality field (in Gray, 1964).) I have tried to indicate the difference, from the point of view of personality structure, in Fig. 2; a detailed discussion of this point is given elsewhere (Eysenck, 1960*b*). 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

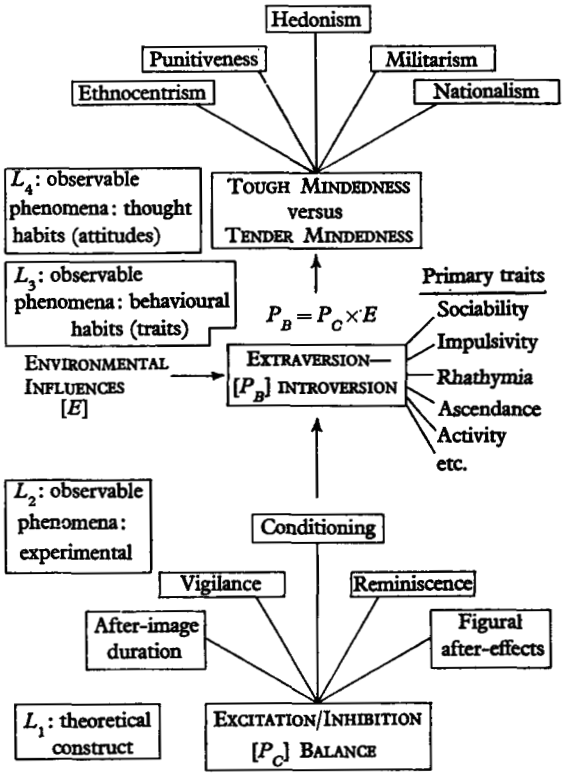

Fig. 2. Diagram showing genotypic and phenotypic aspects of personality.

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 M.P.I.*

* It seems reasonable to suppose that genotypic differences will ultimately be linked up with observable structural differences by physiologists and neurologists; an attempt to frame certain hypotheses of a testable character along these lines has been made by Eysenck (1963*a*), who suggests that different parts of the ascending reticular formation may be implicated in the precise balance of the excitation/inhibition system. The effects of stimulant and depressant drugs on personality (Eysenck, 1963*b*) can also be brought into line by the assumption that the ascending reticular formation is concerned most intimately with the psychological constructs of excitation and inhibition.

We can now make deductions from these various postulates which enable us to perform critical experiments taking us out of the narrow circle of factor analysis altogether, and make possible the use of the much more powerful techniques of multiple discriminant function analysis. Consider the following experiment in which sixteen normal subjects, sixteen dysthymics and sixteen hysterics were given a battery of six tests, selected on the basis of the causal theory outlined above (Eysenck & Claridge, 1962). We can predict, of course, how each group shall score as compared with the others, but we can go further than that. Our theory predicts that, if we carry out a discriminant function analysis, this should give us two significant latent roots; it can further be predicted that if we derive variate scores for the forty-eight subjects of our experiment, they should be situated in a prescribed manner in a two-dimensional plane generated by the two significant variates. To put this prediction in its simplest form we may say that the mean variate scores for the three groups should lie at the corners of an equilateral triangle.

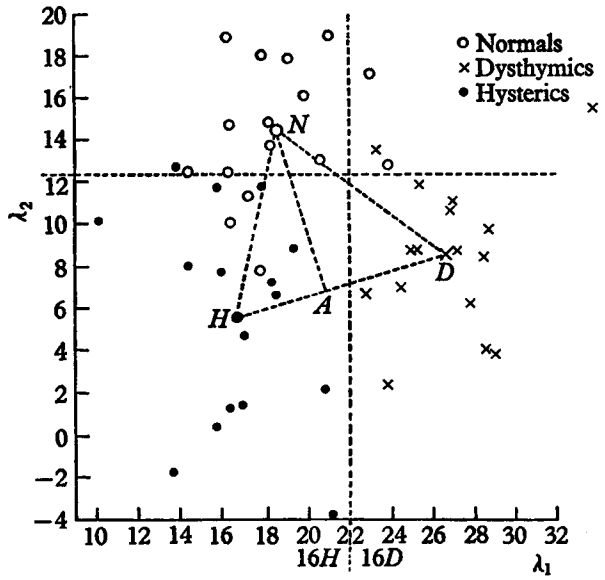

Fig. 3. Position of 16 normal, 16 dysthymic and 16 hysteric subjects in two-dimensional space generated by multiple discriminant function analysis.

Fig. 3 shows the outcome of the experiment. It will be seen that the prediction is verified, and that the first variate discriminates completely between the dysthymics and the hysterics. The second variate, with only slight overlap, discriminates between the normal group on the one hand, and the two neurotic groups on the other.

Even where a causal hypothesis is not available it is often possible to use discriminant function analysis to decide between two hypotheses regarding the description of personality. Consider two hypotheses very frequently advanced regarding the neurotic and psychotic disorders (Eysenck, 1955). Psychoanalysts often advocate the one-dimensional hypothesis; most psychiatrists, however, nowadays favour a two-dimensional hypothesis. A crucial test can, therefore, be devised involving the dimensionality of the performance of the three groups on a battery of

tests selected on the basis of some hypothesis regarding their relevance to neurotic and psychotic disorder (Eysenck, 1955). In the actual experiment 20 normal controls, 20 neurotics and 20 psychotics were tested on four objective laboratory tests. Multiple discriminant function analysis disclosed two significant latent roots, thus rendering impossible the assumption that one dimension was sufficient to incorporate the results. Fig. 4 shows the actual positions of the members of the three groups; the correlation ratio between the three groups and the two variates was 0·84, which indicates a refreshingly high validity for the tests used in predicting these psychiatric criteria. That this figure is not higher is probably due to lack of reliability of the criteria; it will be seen in Fig. 4 that two of the neurotics, labelled *A* and *B*, were grouped with the psychotics by the tests. Both were readmitted later and diagnosed as psychotic.*

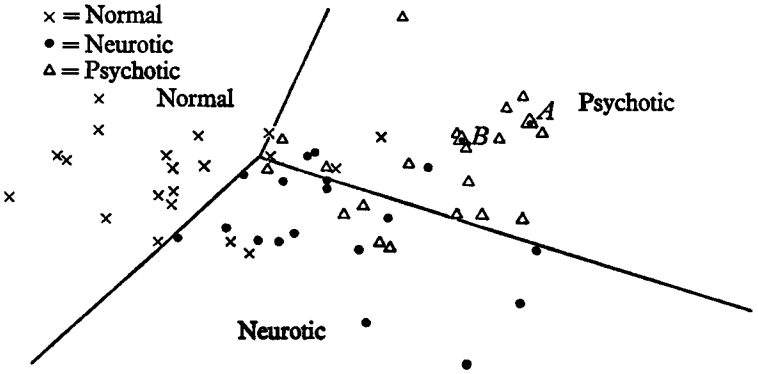

Fig. 4. Diagram showing position of 20 normal, 20 neurotic and 20 psychotic subjects in two-dimensional space generated by multiple discriminant function analysis.

There are other ways in which theories of this type can be tested. One of these is the *genetic* method. If it is true that psychotic and neurotic disorders are orthogonal to each other, then we would expect that the children of psychotic parents should not show any greater degree of neuroticism than would the children of normal parents. This very interesting hypothesis was tested by Cowie (1961), and her results leave no doubt that the genetic implication of neuroticism in the children of psychotic parents is non-existent; if anything they tended to be less neurotic! This finding may also serve as a warning to those who would overstress the importance of environment in giving rise to neurotic disorders; it is difficult to imagine a more severe stress to a child than having psychotic parents. In line with a generally hereditary view of the main dimensions of personality are also the results of a recent study of identical twins brought up in separation; in this work Shields (1962) found high correlations between the two twins for both extraversion and neuroticism; he also found that these correlations were, if anything, higher than corresponding ones for identical twins brought up together! This type of proof, which agrees well with previous studies by Eysenck & Prell (1951), Wilde (1962), Lienert & Reisse (1961), and many

* It is interesting that cultural differences do not seem to affect the applicability of method or conclusion to any considerable extent. Devadasan (1963) has duplicated many of the details of S. B. G. Eysenck's (1956) study in this field on an Indian population in Kerala (Trivandrum) with almost identical results.

others, is relevant for the following reason. If we locate our axes in a random fashion, or according to some erroneous hypothesis, then we would not expect measures based on these placements to achieve any kind of biological reality. However, it has been amply demonstrated that extraversion, neuroticism, and psychoticism show a powerful, independent hereditary determination; it would seem to follow that the location of our axes cannot be random but must be at least to some degree in the right direction.

The last type of argument and proof, which I would suggest as appropriate, relates to the working out of aetiological models, and the design of methods of treatment related to these. It is a basic principle of behaviour therapy that neurotic disorders are simply maladaptive habits, acquired through a process of conditioning; or alternatively socially desirable habits which have failed to be acquired (Eysenck, 1960*c*, 1963*c*). This hypothesis has led to much work relating dysthymic disorders to overquick conditionability of patients, and hysteric and psychopathic disorders to chronic underconditionability of patients. (It will be remembered that overconditionability and underconditionability, respectively, are related to introversion and extraversion.) Support has already been brought forward to sustain these hypotheses, but I would be the last to claim that the case has, in any definitive sense, been proven; many points remain to be clarified and settled. The theory has, nevertheless, succeeded in giving rise to a method of treatment—behaviour therapy—which has been outstandingly successful as compared with previous methods. Again I will not claim too much for these new methods, and I will not go into the large and growing literature in any great detail, except to point out that success of treatment, if this is based on a definite theory, must to some degree strengthen the claim of that theory to be taken seriously. I would suggest, therefore, that aetiology and treatment must be taken into account in arriving at a final view of the adequacy of any principles of psychiatric classification claiming to be taken seriously.

The main points to emerge from this discussion are perhaps these. Factor analysis, principal component analysis, or some such technique, is necessary but not sufficient for the elaboration of a proper system of personality classification. The results achieved are inevitably subject to a large degree of subjectivity, and it is *in principle* impossible to avoid this subjectivity by statistical or mathematical manipulations. *The descriptive results of factor analysis require to be integrated with causal theories relating to the factors tentatively established or indicated.* It is only when these causal theories are tested and verified that the descriptive scheme can be accepted as forming part of the large body of data which make up experimental psychology.

There are, of course, many types of causal hypotheses which can be put forward in different situations, and there are many different types of deductions which can be made. It has been our task in this paper to touch in passing on several such causal hypotheses and deductions, and to show that the resulting picture is a reasonably congruent one which integrates observations, data, theories and experiments from a great variety of sources. There is, of course, no single proof of a theory such as the one here advocated, and no possibility of a crucial experiment; the burden of proof must lie in the general strength of the nomological network, linking together all these factors. It is believed that in this way psychiatric classification can be made much more reliable, valid and useful than it has been in the past when it relied exclusively

on subjective observation, non-quantitative argument and non-experimental demonstration. Obviously the procedure of making our typologies more scientific has only just begun, and still has a long way to go before we can hope to achieve a satisfactory level of accuracy, reliability, and validity; nevertheless, the success which has attended our first faltering steps does suggest that the method followed is the correct one and will in due course lead to a better understanding as well as to a better description of human behaviour and personality.

REFERENCES

ANDERSON, H. H. (1939). Domination and integration in the behaviour of kindergarten children and teachers. *Genet. Psychol. Monogr.* **21**, no. 3.

BARTLETT, F. C. (1932). *Remembering.* Cambridge University Press.

BARTLETT, M. S. (1948). Internal and external factor analysis. *Brit. J. Stat. Psychol.* **1**, 73–81.

BARTLETT, M. S. (1950). Tests of significance in factor analysis. *Brit. J. Stat. Psychol.* **3**, 77–85.

BERNARD, C. (1878). *Leçons sur les phénomènes de la vie communs aux animaux et aux végétaux.* Paris: Baillière.

BINDRA, D. & SPINNER, N. (1958). Response to different degrees of novelty; the incidence of various activities. *J. Exp. Anal. Behaviour*, **1**, 341–50.

BROWN, F. W. (1942). Heredity in the psychoneuroses. *Proc. R. Soc. Med.* **35**, 785–90.

CATTELL, R. B. (1952). *Factor Analysis.* New York: Harper.

CATTELL, R. B. & SCHEIER, I. H. (1961). *The Meaning and Measurement of Neuroticism and Anxiety.* New York: Ronald.

CLARIDGE, G. S. (1960). The excitation-inhibition balance in neurotics. In *Experiments in Personality*, vol. II. Edited by H. J. Eysenck. London: Routledge and Kegan Paul.

CLARIDGE, G. S. (1961). Arousal and inhibition as determinants of the performance of neurotics. *Brit. J. Psychol.* **52**, 53–63.

CLARIDGE, G. S. & HERRINGTON, R. N. (1960). Sedation threshold, personality, and the theory of neurosis. *J. Ment. Sci.* **106**, 1568–83.

COHEN, M. E. (1951). The high familial prevalence of neurocirculatory asthenia (anxiety neurosis, effort syndrome). *Amer. J. Hum. Genet.* **3**, 126–58.

COWIE, V. (1961). The incidence of neurosis in the children of psychotics. *Acta Psychiat. Scand.* **37**, 37–87.

DENCKER, S. J. (1958). *A Follow-up Study of* 128 *Closed Head Injuries in Twins Using Co-twins as Controls.* Copenhagen: Munksgaard.

DEVADASAN, K. (1963). Personality dimensions: a critical study. Ph.D. Thesis. University of Kerala, India.

EHRENBERG, A. S. C. (1962). Some questions about factor analysis. *The Statistician*, **12**, 191–208.

EYSENCK, H. J. (1947). *Dimensions of Personality.* London: Routledge and Kegan Paul.

EYSENCK, H. J. (1950). Criterion analysis—an application of the hypothetico-deductive method to factor analysis. *Psychol. Rev.* **57**, 38–53.

EYSENCK, H. J. (1952*a*). *The Scientific Study of Personality.* London: Routledge and Kegan Paul.

EYSENCK, H. J. (1952*b*). Schizothymia-cyclothymia as a dimension of personality. II. Experimental. *J. Personality*, **20**, 345–84.

EYSENCK, H. J. (1952*c*). Uses and abuses of factor analysis. *Appl. Statistics*, **1**, 45–9.

EYSENCK, H. J. (1953). The logical basis of factor analysis. *Amer. Psychologist*, **8**, 105–14.

EYSENCK, H. J. (1954*a*). A psychological approach to the problem of non-uniqueness in multivariate solutions. *Proc. Conference on Multi-Dimensional Analysis*, 24–7. Ann Arbor: University of Michigan Press.

EYSENCK, H. J. (1954*b*). Zur Theorie der Persönlichkeitsmessung. *Z. diag. Psychol. Persönlichkeitsf.* **2**, 87–101, 171–87.

EYSENCK, H. J. (1954*c*). Abord statistique et experimental du problème typologique dans la personalité neurotique, psychotique et normale. *L' Evolution psychiatrique*, **3**, 377–404.

EYSENCK, H. J. (1955). Psychiatric diagnosis as a psychological and statistical problem. *Psychol. Rep.* **1**, 3–17.

EYSENCK, H. J. (1956*a*). L'analyse factorielle et le problème de la validité. *Colloques int. Cent. nat. Rech. sci., Paris*, **58**, 237–52.

EYSENCK, H. J. (1956*b*). The questionnaire measurement of neuroticism and extraversion. *Riv. Psicol.* **50**, 113–140.

EYSENCK, H. J. (1957). *The Dynamics of Anxiety and Hysteria*. London: Routledge and Kegan Paul.

EYSENCK, H. J. (1959). *Manual of the Maudsley Personality Inventory*. London: University of London Press.

EYSENCK, H. J. (1960*a*). *The Structure of Human Personality*. London: Methuen.

EYSENCK, H. J. (1960*b*). Levels of personality, constitutional factors, and social influences: an experimental approach. *Int. J. Soc. Psychiat.* **6**, 12–24.

EYSENCK, H. J. (1960*c*). *Behaviour Therapy and the Neuroses*. Oxford: Pergamon.

EYSENCK, H. J. (1960*d*). *Experiments in Personality*. Edited by H. J. Eysenck. London: Routledge and Kegan Paul.

EYSENCK, H. J. (1960*e*). Classification and the problem of diagnosis. In *Handbook of Abnormal Psychology*. Edited by H. J. Eysenck. London: Pitman Medical.

EYSENCK, H. J. (1961). Personality and social attitudes. *J. Soc. Psychol.* **53**, 243–8.

EYSENCK, H. J. (1962). Correspondence. *Brit. J. Psychol.* **53**, 455–6.

EYSENCK, H. J. (1963*a*). Biological basis of personality. *Nature, Lond.*, **199**, 1031–4.

EYSENCK, H. J. (1963*b*). *Experiments with Drugs*. Edited by H. J. Eysenck. Oxford: Pergamon.

EYSENCK, H. J. (1963*c*). *Experiments in Behaviour Therapy*. Edited by H. J. Eysenck. Oxford: Pergamon.

EYSENCK, H. J. & CLARIDGE, G. (1962). The position of hysterics and dysthymics in a two-dimensional framework of personality description. *J. Abnorm. Soc. Psychol.* **69**, 46–55.

EYSENCK & PRELL, P. (1951). The inheritance of neuroticism; an experimental study. *J. Ment. Sci.* **97**, 441–65.

EYSENCK, S. B. G. (1956). Neurosis and psychosis: an experimental analysis. *J. Ment. Sci.* **102**, 517–29.

EYSENCK, S. B. G., EYSENCK, H. J. & CLARIDGE, G. (1960). Dimensional personality, psychiatric syndromes, and mathematical models. *J. Ment. Sci.* **106**, 581–9.

FOULDS, G. A. (1961). The logical impossibility of using hysterics and dysthymics as criterion groups in the study of introversion and extraversion. *Brit. J. Psychol.* **52**, 385–7.

FOULDS, G. A. (1962*a*). A quantification of diagnostic differentia. *J. Ment. Sci.* **108**, 389–405.

FOULDS, G. A. (1962*b*). Correspondence. *Brit. J. Psychol.* **53**, 456–7.

FRANKS, C. M., SOUIEFF, M. I. & MAXWELL, A. E. (1960). A factorial study of certain scales from the MMPI and the STDCR. *Acta Psychol.* **17**, 407–16.

GRAY, J. (1964). *Pavlov's Typology: Recent Theoretic and Experimental Works from the Laboratory of B. M. Teplov*. Edited by J. Gray. Oxford: Pergamon.

HALLGREN, B. (1950). *Specific Dyslexia. A Clinical and Genetic Study*. Stockholm: Esselte aktiebolag.

HALLGREN, B. (1957). *Enuresis. A Clinical and Genetic Study*. Stockholm: Esselte aktiebolag.

HILDEBRAND, H. P. (1958). A factorial study of introversion-extraversion. *Brit. J. Psychol.* **49**, 1–11.

HOPE, K. (1963). The structure of hostility in a sample of normal and neurotic persons. Ph.D. thesis, University of London.

INGHAM, J. G. (1962). Correspondence. *Brit. J. Psychol.* **53**, 458–9.

JEFFERS, J. N. R. (1962). Principal component analysis of designed experiment. *The Statistician*, **12**, 230–42.

KAIJ, L. (1960). *Alcoholism in Twins. Studies on the Etiology and Sequels of Abuse of Alcohol*. Stockholm: Almqvist and Wiksell.

KENDALL, M. G. (1950). Factor analysis as a statistical technique. *J. Roy. Stat. Soc.*, Vol. 12, Series B, 60–73.

KENDALL, M. G. (1957). *A Course in Multivariate Analysis*. London: Griffin.

KESTELMAN, H. (1952). The fundamental equation of factor analysis. *Brit. J. Stat. Psychol.* **5**, 1–6.

KNAPP, R. R. (1962). *The Maudsley Personality Inventory: Manual.* San Diego, California: Educational and Industrial Testing Service.

KRAULIS, W. (1931). Zur Vererbung der hysterischen Reaktionsweise. *Z. ges. Neurol. Psychiat.* **136**, 174–258.

KSHIRSAGAR, A. M. (1961). The goodness of fit of a single non-isotropic hypothetical principal component. *Biometrika*, **48**, 397–407.

LAWLEY, D. N. & MAXWELL, A. E. (1962). Factor analysis as a statistical method. *The Statistician*, **12**, 209–29.

LEWIS, A. (1935). Problems of obsessional illness. *Proc. R. Soc. Med.* **29**, 325–36.

LEWIS, A. J. & MAPOTHER, E. (1941). In *Price's Textbook of the Practice of Medicine.* London: Oxford University Press.

LIENERT, G. & REISSE, H. (1961). Ein korrelativer-analytischer Beitrag zur genetischen Determination des Neurotismus. *Psychol. Beiträge*, **7**, 121–30.

LJUNGBERG, L. (1957). Hysteria. A clinical, prognostic and genetic study. *Acta psychiat. neurol. Scand.*, Suppl. 112.

LUXENBURGER, H. (1930). Heredität und Familientypus der Zwangsneurotiker. *Arch. Psychiat.* **91**, 590–4.

MCCLELLAND, D. C. (1951). *Personality.* New York: Sloane.

MCGUIRE, R. J., MOWBRAY, R. M. & VALLANCE, R. C. (1963). The Maudsley Personality Inventory used with psychiatric inpatients. *Brit. J. Psychol.* **54**, 157–66.

MCINNES, R. G. (1937). Observations on heredity in neurosis. *Proc. R. Soc. Med.* **30**, 895–904.

MARTIN, D. V. & CAINE, T. M. (1963). Personality change in the treatment of chronic neurosis in a therapeutic community. *Brit. J. Psychiat.* **109**, 267–72.

RÜDIN, E. (1953). Ein Beitrag zur Frage der Zwangskrankheit, insbesondere ihrer hereditären Beziehungen. *Arch. Psychiat.* **191**, 14–54.

SHAGASS, C. & NAIMAN, J. (1956). The sedation threshold as an objective index of manifest anxiety in psychoneurosis. *J. Psychosom. Res.* **1**, 49–57.

SHIELDS, J. (1954). Personality differences and neurotic traits in normal twin shool children. *Eugen. Rev.* **45**, 213–45.

SHIELDS, J. (1962). Monozygotic twins brought up apart and brought up together. *An Investigation into the Genetic and Environmental Causes of Variation in Personality.* London: Oxford University Press.

SIGAL, J. J., STAR, K. H. & FRANKS, C. M. (1958). Hysterics and dysthymics as criterion groups in the study of introversion-extraversion. *J. Abnorm. Soc. Psychol.* **57**, 143–8.

SLATER, E. (1943). The neurotic constitution. *J. Neurol. Psychiat.* **163**, 1–16.

SLATER, E. (1961). Hysteria 311. *J. Ment. Sci.* **107**, 359–81.

SLATER, E. & SLATER, P. (1944). A heuristic theory of neurosis. *J. Neurol. Neurosurg. Psychiat.* **7**, 49–55.

SLATER, P. (1944). *The Selective Vocabulary Test.* London: Harrap.

SLATER, P. (1953). The factor analysis of matrices of negative correlations. *Brit. J. Stat. Psychol.* **6**, 101–6.

SLATER, P. (1960*a*). The reliability of some methods of multiple comparison in psychological experiments. Ph.D. thesis, University of London.

SLATER, P. (1960*b*). The analysis of personal preferences. *Brit. J. Stat. Psychol.* **13**, 119–35.

SPEARMAN, C. (1923). *The Nature of Intelligence and the Principles of Cognition.* London: Macmillan.

THOMSON, G. H. (1951). *The Factorial Analysis of Human Ability*, 5th ed. London: University Press.

THURSTONE, L. L. (1947). *Multiple Factor Analysis.* Chicago: University Press.

VERNON, P. E. (1953). *Personality Tests and Assessments.* London: Methuen.

WARBURTON, F. W. (1954). The full factor analysis. *Brit. J. Stat. Psychol.* **7**, 101–6.

WILDE, G. J. S. (1962). *Neurotische Labiliteit gemeten volgens de Vragenlijstmethode.* Amsterdam: Uitg. F. van Rossen.

WUNDT, W. (1903). *Grundzüge der physiologischen Psychologie*, 5th ed. vol. 3. Leipzig: W. Engelmann.

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