TESTING FOR INTELLECTUAL IMPAIRMENT—SOME COMMENTS ON THE TESTS AND THE TESTERS*

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INTRODUCTION

PSYCHOLOGISTS are frequently asked to say whether, in the case of a particular patient, there is evidence of organic dementia. At first sight this would not appear to be an unreasonable request. A considerable amount is known about the performance of normal people on tests of cognitive function and it might be supposed that people who work with tests of human ability should be able to modify their procedures to the purpose of diagnosing intellectual deterioration when this is not obvious on routine neurological or psychiatric examination. Moreover, it might seem that the frequent presence of independent criteria of brain damage provided by neurological and neurosurgical investigations should facilitate the development of competent diagnostic clinical psychology in the neurological field.

Nevertheless, the reaction to this practical challenge has in some psychological circles been pessimistic. Thus, in a Critique of Psychological Approaches to Brain Damage, Meyer (1957) writes: "It would appear that the clinical psychologist's contribution to the problems of the neurosurgeon and the psychiatrist is of little value owing to the lack of proper diagnostic tools."

This "lack of proper diagnostic tools" was extensively reviewed by Yates in a paper entitled "The Validity of some Psychological Tests of Brain Damage" (1954). He came to the conclusion, not only that no adequate test of brain damage existed, but also that none was likely to be devised as long as the approach was a purely empirical one.

And yet, intellectual impairment resulting from cerebral lesions is often gross and so obvious as to render psychological tests of deterioration superfluous. Moreover, there may be every degree of impairment, from obviously pathological dementia to defects which are so slight that they can be inferred only with hesitation. What then are the difficulties which prevent us from testing for what might be called sub-clinical dementia?

THE INADEQUACY OF CURRENT TESTS

The criticisms that have been made by Yates are representative of the position of a number of British clinical psychologists. Firstly, most standardized tests result in too many misclassifications to be regarded as adequate diagnostic instruments. This is an objection with which few people would quarrel. A test may discriminate between brain-damaged and other groups statistically at a high level of confidence but nevertheless not give a clear-cut answer in the individual case. Valid and reliable cutting scores are notoriously difficult

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to devise in this field and one would do well to enquire why this should be the case.

Part of the answer is supplied by another objection: there are very good reasons for supposing that the effects of cerebral lesions on intellectual function are not of a unitary nature. This is a point to which it will be necessary to return but it may be pointed out at once that any single test which purports to measure the effects of brain damage, irrespective of the site and nature of the lesion, assumes a unitary theory of cerebral dysfunction.

Another objection is that, in the validation of these tests, important variables such as age, intelligence and sex have not been controlled. One may add to the list of uncontrolled variables by mentioning such things as concurrent emotional disturbance (which may be of various kinds), and motivational anomalies which may affect test performance.

A fourth criticism, one which is most popularly levelled at the Rorschach test and the Goldstein-Scheerer tests, is that some tests allow of subjective methods of scoring.

Fifthly, Yates suggests that no test of brain damage is likely to be satisfactory unless it is based on an adequate theory of brain function.

The aim of test designers who are aware of these difficulties would appear to be to devise a test of brain damage which is administered, scored and interpreted in a standardized manner, which takes into account all relevant variables, which is based on an acceptable theory of cerebral function and which, when rigorously applied, results in a minimal number of misclassifications. Such an aim would be admirable if it were realistic.

It is important to bear in mind that the problem is a practical not a theoretical one and that the requirements of diagnostic practice are not identical with those of fundamental research. Thus, for research purposes, we may suspend judgment as to how the brain works for a very long time indeed. It is not however appropriate to suspend judgment indefinitely on diagnostic problems, solely on theoretical grounds.

It is suggested therefore that the conception of tests of brain damage outlined above is an inappropriate one. In particular it is submitted that, for practical purposes, some kinds of evidence are better assessed by a human brain than by a standardized psychological test. In examining for brain damage, is it appropriate for the clinical psychologist to identify himself with his tests? That is to say, should the tests be regarded as, if not fool-proof, then at least psychologist-proof?

There are indeed those who, aware of the limitations of tests applied to abnormal people, suggest that the clinical psychologist should limit himself to purely experimental work either in fundamental research or else in protracted studies of individual cases. This point of view was expressed by R. W. Payne (1957). In accordance with the approach recommended by Shapiro in 1951, he advocated the application of controlled scientific method to the study of symptoms exhibited by individual patients. Symptoms should be carefully defined, hypotheses put forward to explain them, deductions drawn from the hypotheses and experiments carried out to verify or refute the hypotheses. From the practical point of view, two main criticisms of this approach may be made. Firstly, as is generally admitted, such a procedure is extremely time consuming; secondly, the method makes no provision for eliciting symptoms as opposed to analysing symptoms which are known to be present. However, Payne expressed the view that this is the only thing we can usefully do.

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Implications of Administering a Standardized Test of Intellectual Impairment

The present writer believes that there is an alternative approach and this may be introduced by first considering some of the implications of administering standardized tests to brain-injured patients.

The greatest difficulty is probably that, in testing brain-injured patients, one is dealing with an extremely heterogeneous population. It is well known that if a test is given to a random group of brain-injured patients the test results are skewed, some performances being indistinguishable from the normal, others being more or less abnormal. It is of course possible that some unitary and measurable intellectual change is involved in all cases of brain damage but it can be said with confidence that, whether or not this is the case, the existence of different syndromes of disability is much more obvious. This is particularly apparent if one considers extreme cases such as obvious dysphasias, apraxias, agnosias or organic amnesic states. These and other syndromes vary, however, not only in their degree, but also in the constellation of symptoms present in any one patient. Although it may be possible to describe a comparatively small number of typical syndromes of intellectual disability associated with brain damage, any individual patient may show, not only mixtures or fragments of these syndromes, but also anomalous disabilities resulting from an interaction between them. It is very difficult to see how a practicable test battery could be devised which accurately identified the presence and nature of disability resulting from a cerebral lesion, and at the same time met the requirement of the more extreme psychometricians that the diagnosis should be rigidly proscribed by the test scores.

These considerations alone cause one to wonder whether such a test battery is a practical proposition. But in addition one has to take into account other factors which would distort test results. One of these is the emotional disturbance which frequently accompanies cerebral damage. How is one to deal with the catastrophic reaction to failure described by Goldstein (1942)? And what of the impulsive unselfcritical performance that is sometimes observed in cases of frontal lobe lesions? Similarly, in many organic patients, fatigue develops rapidly and misleadingly after a comparatively short spell of testing. Others are distractible if the rules of test administration are followed rigidly, although their attention may be held if the procedure is modified in a manner appropriate to the individual case.

One of the most important disadvantages of any standardized test of brain damage is that much information tends to be missed that otherwise might be utilized. The type of information most likely to be missed is that which is frequently referred to as the "qualitative" aspects of test performance. This common-sense distinction between qualitative and quantitative is of course artificial in the present context and the distinction may be reduced to a difference in the ease of quantifying the different types of response to a test.

Firstly, the nature of the failure which results in a low score is usually not apparent from the score alone. Thus, on a test of rote verbal learning, one patient may be impaired as a result of a slight but strongly perseverative error whereas errors produced by another patient obtaining an identical score may be extremely variable. The distinction is not trivial since the latter is more typical of dysphasia and is thus of localizing value. Similarly, failure on the Kohs blocks type of test may be due either to failure in principle or to an inability to cope with a particular detail. If a mild constructional apraxia is to

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be recognized, it is essential that differences of this type should not pass unnoticed by the tester. Again, if on this type of test the trial is discontinued as soon as the conventional time limit is exceeded, the opportunity to distinguish between depressive and organic intellectual impairment may well be lost.

Secondly, in the usual standardized test situation it is often not possible to make allowance for irrelevant causes of failure. Poor co-operation is an obvious example of this and, in fact, there are probably few psychologists who do not attempt to assess co-operation and utilize this assessment in interpreting the test results. Nevertheless, it is worth pointing out that the procedure for such an assessment is never standardized, and could not readily be standardized. It seems right to enquire whether, in the case of testing for dementia, there are not other equally important variables which cannot readily be standardized but which must be allowed for if a valid assessment is to be made.

Inadequate comprehension of standardized instructions is by no means uncommon in psychiatric and neurological patients and may result in artifactually low scores on the test involved. A constant effect of instructions, in terms of "task set", is clearly more important than constant wording of instructions, and indeed the former may be regarded as the aim of the latter. In a population as heterogeneous as that under consideration, constant wording is often insufficient to ensure constant effect of instructions.

A third defect of the standardized psychological test for brain damage is that anomalous responses, produced by the patient but not specifically tested for, are likely to be ignored. An amnesia for words as names may sometimes emerge on a picture completion test athough not on the type of naming test usually employed by the neurologist or psychiatrist. Similarly, diagnostically important inconsistencies in performance are frequently not reflected in test scores. Thus the interpretation placed on the ability to repeat 7 digits forwards and 5 backwards should be quite different from that placed on the ability to repeat only 5 digits forwards but 7 backwards. This particular inconsistency could readily be allowed for in the standardization but it must be emphasized that the number of possible inconsistencies on a fairly small battery of tests such as the Wechsler Bellevue Scale is exceedingly high. These can be recognized by an experienced examiner when they occur but cannot readily be catered for in advance in the standardization. Nor will the same interpretation be placed on all inconsistencies. Thus the example already cited may reflect emotional interference; but inconsistency in the sense of success when tested verbally but failure when tested in the visual modality, may point to a perceptual disability of localizing value.

Fourthly, a practicable standardized test can allow very little latitude for the examiner to ask supplementary questions which are dictated by the patient's previous response. Such a procedure may however be extremely valuable when testing people who are organically or emotionally impaired. Thus the approximate and unreflective answers which may be given by a euphoric patient on a vocabulary test can result in a score which grossly underestimates the patient's ability. Carefully chosen supplementary questions, however, may do much to reveal ability which would otherwise be masked by the effect of the test taking attitude. Supplementary questions and special promptings aimed at testing the limits of a particular disability are frequently called for when anomalous responses are produced by neurological or psychiatric patients and these supplementary procedures tend to be dictated by the previous response of the testee.

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We are faced therefore with the following difficulty. The effects of brain damage on intellectual performance are various and are often complicated by and difficult to disentangle from the various effects of emotional disturbance. Nevertheless, particular syndromes of disability, when present in an extreme form, can be identified without the need for psychological tests. How should psychological tests be constructed and used in order to make possible the identification of organic intellectual deficit when this is not obvious to the psychiatrist or neurologist?

The Gap between Theory and Practice

Now it might *in theory* be possible to devise a battery of tests standardized as to administration, scoring and interpretation, which would accommodate the complexity of test procedure necessary to identify most cases of organic intellectual impairment. It must be stressed, however, that in most cases of mild intellectual impairment the logical structure of any thorough assessment of the evidence is extremely complex, and if formalized would result in a test battery incorporating a formidable decision procedure for administering successive tests. This decision procedure would be of prohibitive complexity and, in addition, there would be a need for an extremely complex system of weightings if the various possible combinations of response patterns are to be recognized and assessed within the framework of the scoring system. All this might, in theory, be done but only in the same sense that it is possible to formulate a decision procedure for playing the perfect game of chess.

The theory of finite games is of some relevance here. In theory, both noughts and crosses and chess are amenable to methods of analysis which would yield an infallible decision procedure for play. In the case of noughts and crosses this is not only possible in theory but is a practicable proposition, and human skill at noughts and crosses then becomes unnecessary. In the case of chess, although the appropriate methods of analysis are available, the total number of possible outcomes associated with each of the large number of possible moves for any one of the extremely numerous possible dispositions of pieces on the board, prohibits the formulation of an invincible decision procedure as a *practicable* enterprise. In practice, chess players treat chess as an infinite game, and experienced and skilled players can defeat opponents guided *solely* by any available formal rules of procedure. The reason for this is fairly obvious but is worth stating if the relevance of this example to testing for deterioration is to be made clear. The reason is that the human brain is the best available instrument for assessing some types of evidence.

Although a completely standardized procedure is less fallible than human judgment where all relevant parameters can be accommodated in the standardization, the reverse is often the case when the problem exceeds a certain level of complexity. At this level, it seems essential to relegate a certain proportion of the responsibility for assessing evidence to a human agent. Since the validity of standardized tests of intellectual deterioration is generally acknowledged to be low, this proportion should be considerable in the case of the psychological test procedure under discussion. Human error must be tolerated if other sources of error are greater.

A Comparison with Medical Diagnosis

At this point it is useful to compare the problems of diagnostic clinical psychology with those of clinical medicine. The diagnostic problems encoun-

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tered in medicine are comparable in complexity with those encountered by the psychologist who attempts to assess intellectual impairment. It is by no means unusual in medicine to encounter diagnostic problems where there is no single objective test available which will give a yes or no answer as to the presence of a particular disease. Often the interpretation of "qualitative" evidence is essential, as in the diagnosis of early Parkinsonism and as in the interpretation of X-ray photographs. Often also it is necessary to assess various lines of evidence in arriving at a diagnosis, as in diagnosing some atypical cases of appendicitis.

If only fully standardized tests should be trusted in clinical psychology, this should apply *a fortiori* in medicine since bad doctors are clearly more dangerous than bad psychologists. And yet, in medicine "clinical judgment" is highly esteemed. Having regard to the complexity of the problem, it is the writer's view that this state of affairs is appropriate. It would seem also to be appropriate that clinical judgment, in the sense of the rational assessment of unique evidence, should be valued in testing for intellectual impairment, since the manifestations of cerebral dysfunction are multiform and subject to considerable influence from uncontrollable variables such as emotional disturbance.

Among some of the more articulate British clinical psychologists, however, there is an unreasonable tendency to regard the exercise of human judgment in diagnostic work as something to be avoided even when it is useful. Writing of what he describes as the "art of psychology" (and by this he means any diagnostic psychological procedure which is not either a fully standardized test or a scientifically watertight experiment) Payne states: "This method of work also depends on the capacity of the individual doing it and there would seem to be no way of establishing this without conducting an elaborate investigation into the validity of each individual psychologist as an oracle."

If this principle were applied to general medicine, many diagnoses which should be and are made, never could be made. Clinical psychologists are able to insist upon being indecisive only because other people are available who are more willing to take decisions and less able to avoid taking decisions. Nevertheless, careful but flexible psychological testing by an examiner with extensive experience of psychiatric and neurological patients fairly certainly provides the most trustworthy opinion available as to the degree and nature of intellectual impairment in a particular patient. The fact that the examiner who is best equipped to do this has not been validated as an oracle is no adequate reason for his declining the task especially if, failing him, an even more Delphic pronouncement on the case will be made by somebody else.

The Identification of Syndromes

A more satisfactory orientation towards this problem could perhaps be achieved if clinical psychologists took as their reference points not, as is usually the case, the normal performance on particular tests but the performance on these tests of patients who exhibit easily recognizable syndromes of intellectual disability. Schooled in the theory of normal individual differences, many psychologists tend to use significant departure from the norm as the essential criterion for recognizing intellectual deterioration, and implicitly assume that the same test measures the same thing in all types of abnormal people, including those with grossly and variously modified nervous systems.

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This could be defended if there were only one possible type of abnormality which could produce an inferior score on any given test, but this is indisputably not the case.

An alternative procedure is to examine test results with respect to their degree of approximation to known syndromes of intellectual disability. This procedure will assume that the tester is familiar with these easily recognizable syndromes in the test situation and that, when he is confronted with more difficult cases, he will be more concerned with identifying the behaviour he elicits on the tests with one or more of these syndromes than with recognizing the behaviour as deviating from the norm.

Clearly, much remains to be done in identifying the less obvious syndromes of intellectual disability and it must also be admitted that the method of extreme cases which is advocated here is bound to have its limitations. However, that which is known about gross and typical syndromes of disability should not be neglected in diagnostic work simply because no general theory of brain function is available (Yates, 1954) or because there is no test available which does not call for judgment on the part of the tester as well as for the ability to say whether a particular score is above or below a cutting score (Payne, 1957).

In conclusion, it should be said that the position outlined above refers solely to diagnostic work and is not intended to detract in any way from the necessity for the most careful application of scientific method in research in this field. It is however suggested that diagnostic clinical work and research in clinical psychology have different aims and call for different procedures.

SUMMARY

The assessment of organic impairment of intellect is a task which might be expected to be within the competence of a clinical psychologist. Nevertheless, recent literature on the subject contains statements by psychologists disclaiming their ability to do this with an adequate degree of validity. The difficulty appears to resolve into the problem of finding a foolproof standardized test. It is suggested here that these disclaimers are based on an inappropriate rationalization of the problem and that the assessment of intellectual deterioration calls, not for a single valid standardized test, but rather for a flexible test procedure and awareness of the relevant syndromes. This view is justified by a consideration of the multiform effects on intellectual performance of focal and diffuse cerebral lesions and also by a consideration of the focal disturbances of intellectual function already recognized by neurologists and utilized in diagnosis.

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