CONCEPTUAL IMPAIRMENT IN DEPRESSIVE AND ORGANIC PATIENTS OF THE PRE-SENILE AGE GROUP.

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THE problem of differentiating, in patients of the pre-senile age group, the degree and quality of intellectual impairment that is due to depression from that which is brought about by some organic, cerebral deterioration is one of some practical importance. It is, in fact, as Henderson and Gillespie (1950) stress, an important point to determine with regard to the prognosis of depressive cases of this age " whether or not there is any complicating organic process causing a failure of memory and efficiency. If such is present then the prognosis must be viewed much more gravely than would otherwise be indicated."

There seems, however, to be considerable difficulty in achieving this differentiation on the basis of test findings, and, clinically, the problem appears very complex, as judged, for instance, by White's (1935) inclusion of the involutional psychoses in the pre-senile group.

With regard to the pre-senile psychoses, Alzheimer's and Pick's disease, Goldstein and Katz (1937), from a careful study of a case of Pick's disease, maintain that, on the basis of psychological changes, it is possible to distinguish such a case in its early stages from involutional melancholia. Apart from the later and more specific psychological symptoms, the authors suggest that one outstanding feature is the extreme " concreteness " of the patient's attitude, as inferred from her performance on a simple task of copying with matches designs exposed tachistoscopically. The only designs which this patient was said to be able to recall and reproduce accurately were those which she was able to name, as where an inverted " V " was called a roof. However, such a naming reaction, with perceptual material of this kind, is so common even in normal people that the value of this sort of uncontrolled observation is very dubious. Certainly there seems little use in describing such a reaction as pathologically concrete, and, as Hebb (1945) points out, one would be more inclined to describe naming an inverted " V " a roof as involving some process of abstraction. This patient was of low intelligence, so that the observations can be of little general value in aiding the discrimination of pre-senile dementia from involutional melancholia. Stengel (1943), in a study of the symptomatology and differential diagnosis of Alzheimer's and Pick's disease, suggests, in fact, that " further research may reveal that there exists a more than superficial relationship between Alzheimer's disease and the deteriorating type of involutional melancholia."

We find, then, that the problem of clinical differentiation of organic from depressive, particularly involutional, syndromes within this age-group is often a matter of some difficulty and uncertainty. This suggested close relationship between some of the syndromes makes the likelihood of differentiating them at all clearly by test results rather problematic.

There appear to be few psychometric studies of impairment in patients of this age-group. Jones and Kaplan (1945), in reviewing the literature, point out that " the pre-senile psychoses have been almost untouched by formal psychological inquiry, and involutional melancholia has not been extensively investigated by psychological methods." The writers believe that standard tests, designed specifically for younger people, are not wholly valid with patients of this age, and suggest, with regard to the involutional melancholic, that " since there are no demonstrable brain lesions, with adequate co-operation, one would expect no important changes (as compared with normals) except the general slowing down of reactions, characteristic of this psychosis."

Psychometric investigations, such as those of Rapaport (1945), using the Wechsler scale, and the findings of Wechsler himself (1944) on intellectual deterioration, have produced various test patterns, signs and ratios of some indirect but uncertain relevance to our present problem, but little, if any, adequate investigation

has been made of the more specific differentiation of depressive impairment from organic deterioration. It seems doubtful, in fact, whether the available quantitative measures of deterioration are at all helpful in this respect. We can therefore summarize what seems to be the present position, regarding both the clinical problem of differentiation and the mental test contribution to this problem, as follows:

1. Clinically, the weighting of depressive and organic features in the symptomatology of some patients of this age-group may be very hard to discern, as there is much apparent continuity and overlap from one syndrome to another.

2. Mental test results, using standard intelligence scales or batteries, may provide quantitative estimates of deterioration, but interpretation of the nature of the deterioration still must depend upon clinical skill and impression in picking on distinctive qualities of failure. Qualitative results, such as those of Goldstein and Katz, lack precision and adequate control.

The main object of the present investigation has therefore been to try and discover, first, how useful one of the standard tests is in differentiating the depressive from the organic aspects of impairment, and secondly, to devise a short set of conceptual tests which might, according to Goldstein's general hypothesis, more clearly bring out the organic features where these are present.

Method and Test Materials.

For this study the age range of the patients was fixed as from 41 to 65 inclusive. So as to try and differentiate those aspects of impairment due to depression from those primarily due to organic brain change, patients were rated psychiatrically as falling into one of three groups:

Group I: Cases showing a clear depressive symptomatology, with no evidence of a complicating organic process.

Group II: Cases showing clear evidence clinically, from physical examination, C.S.F., air encephalography, or E.E.G., of some primarily organic syndrome, such as early senile dementia, cerebral arteriosclerosis, or pre-senile dementia.

Group III: Cases where the presence or absence of organic features is clinically uncertain.

The total number of patients studied was 70. The distribution according to clinical group and sex is as follows:

Group.	Male.	Female.	Total.
I	6	20	26
II	18	10	28
III	7	9	16
Total	31	39	70

The patients were referred psychiatrically on admission in the usual way, with a request for report on intelligence level and any deterioration present.

The tests used were as follows:

I. *Wechsler Adult Intelligence Scale.*

1. *Vocabulary Level.*

The Vocabulary test of the Wechsler adult intelligence scale was used to give some criterion of prepsychotic attainment level.

2. *Wechsler "Hold" and "Don't Hold" Tests.*

Six of the Wechsler subtests (3 verbal, 3 performance) were given in order to obtain a present I.Q. level and a measure of intellectual deterioration. Scores on 3 of the subtests (Vocabulary, Picture Completion and Object Assembly) are classed as holding up with age, the remaining 3 (Digit Span, Block Designs and Digit Symbol) being "don't hold" tests. Deterioration ratios are calculated in the usual way (Wechsler *op. cit.*, chapter vi), the normal age correction being made. Some patients, however, showed no *positive* deterioration (i.e., no percentage loss beyond that to be expected at the patient's age), and it was decided to calculate, in these cases, how much *negative* deterioration they showed (i.e., how much, relative to age, they were *better* on the "don't hold" tests than on the "hold").

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II. *Conceptual Tests.*

1. *Quality of Vocabulary Definition.*

The usual vocabulary score that is used for assessing prepsychotic attainment level takes little account of the level of definition that the subject employs. Scoring criteria are not rigorous, and the score obtained may be said to represent more the number of correct recognitions that the subject makes than the use to which he is able to put the words. Yacorzynski (1941) asserts that vocabulary scores may be maintained in later maturity chiefly because there are many different, acceptable ways of defining words. He points out that deterioration may have eliminated some of the more difficult definitions or more elaborate contextual meanings, without disturbing the obtained scores.

The first of the conceptual tests was therefore devised in order to find out the patient's preferred level of definition for 10 common words. Each word was printed on a separate card, and opposite it were printed 6 short sentence-definitions of the word's meaning, each having some degree of relevance to it, but varying approximately from a conventionally acceptable general definition down to one that was inessential and irrelevant. Order of arrangement of the sentences was varied from card to card.

The 10 words used were: ship, cupboard, dog, newspaper, water, flower, apple, pencil, coal, hat.

The 6 sentences for the word " apple " will give an idea of the task involved. These are:

Apple.

You make cider from it.
You eat it.
It's round and hard.
It has a skin or peel.
It's a fruit.
It's good for you.

The patient was told to read all the sentences on the card, and then to choose the one which he thought gave the best general meaning for the word. Further explanation was given, if the patient was hesitant and doubtful about the task. No example of a " correct " answer was given, because it seemed that the spontaneous choice of the patient would be the more revealing of his general attitude and level of comprehension.

Scoring: + 1 was given for each " correct " choice (total + 10). — 1 was given where a patient chose one of the " least relevant " definitions, or where he " spoiled " his response by indeterminate reference to several definitions (total — 10)

2. *Sorting Test.*

This test has already been described fully elsewhere by the present writer (Hall, 1951). Briefly, it consists of 12 counters, having 2 different colours, 3 different shapes, 4 different numbers of black squares, and 6 different numbers of blue dots. Sorting can therefore be carried out by progressive stages into 2, 3, 4 or 6 groups, according to the instructions given, there being only one correct method of solution at each stage, except for the 6 grouping, which allows of 2 alternatives. Standard instructions are given carefully and repeatedly if necessary.

Scoring: No time limit or time credits are used in the present scoring system, + 1 being given for each correct solution. In addition, *minus* marks are given where any of the following incorrect and negative aspects of performance occur:

(i) " Patterning " the pieces by fitting them closely together.
(ii) More than two repetitions of the original instructions required.
(iii) An irrelevant non-conceptual solution other than (1) above.
(iv) Marked perseveration from one stage to the next.
(v) " Patterning " at stage 2 after being shown correct solution for Stage 1.

By this system some of the qualitative signs of failure, together with the degree of their persistence, are embodied in the final score.

3. *Wechsler Similarities.*

This test was used, with scoring modifications, in order to find out something more about the " giving differences " tendency that was early on observed to be common in some patients of this age group. In the present system the usual

correct responses, according to Wechsler's criteria, are scored + 1 or 2, but any deviant and irrelevant response, such as, for the orange-banana similarity, " Well, an orange is round, a banana is long, so they're different," is scored — 1. The examiner then prompts the patient that a likeness or similarity is required, and, if the patient persists in this kind of answer, a second minus score is given. It is therefore possible to score + 2 for an answer, but, at the same time, to score a minus as well owing to the " spoiling " of the response by irrelevancy or difference.

4. *Picture Conception.*

The test material consists of pictures of 3, 4 or 5 everyday objects taken from the Binet material, and pasted in groups on cards in such a way that all the objects in a group have some common function or belong to the same general catagory. The task then is to describe what each group has in common. For demonstration, the patient is shown a card with pictures of a pen-knife,a pair of scissors, and a table knife on it. It is then clearly explained that the examiner does not require the patient to name or specify each individual object, but only to say that, in this instance, they are all means of cutting. The remaining 4 cards of the test are shown with repetition of the instructions.

Scoring: Scoring is much the same as for Similarities and Sorting. + 2 is given for each " correct " answer, or + 1 if a correct answer is only given after prompting or where the answer is not adequate for the + 2 criteria (total + 8).

— 1 is given if individual naming of the objects takes place or if a " difference " remark is made. A second — 1 is given if such a tendency persists after further prompting (total — 8).

In general, therefore, the + and — system used for these 4 tests has been devised to try and take into account the " deviant verbalizations," and the irrelevancies in the conceptual approach of some of the patients. In this way, it was hoped that the score might represent more accurately the *degree of persistence* of the conceptual failure, which, it was supposed, might distinguish the organic from the depressive.

Results.

1. *Clinical Material.*

The clinical categories into which the 70 patients tested in this study fall are shown in Table I below, together with the frequency with which they occur in the male patients (M) and female (F).

Table I.

Organic group.				Depressive group.			
Clinical category.	M.	F.	Total.	Clinical category.	M.	F.	Total.
Presenile dementia	1	2	3	Involutional depression	2	8	10
Huntington's chorea	1	–	1	Recurrent depression	2	8	10
Treated G.P.I.	2	–	2	Mixed depressive states	2	4	6
Organic epilepsy	3	–	3	Total	6	20	26
Disseminated sclerosis	1	–	1	Doubtful group.			
Cerebral arteriosclerosis	5	2	7	? Presenile dementia depression	1	1	2
Post-encephalitic Parkinsonism.	1	–	1	Remainder all show some variety of depressive syndrome together with possibility of early dementia of organic change due to vascular disorder	6	8	14
Toxic states	3	1	4	Total	7	9	16
Depressive or paranoid states with early dementia	1	5	6				
Total	18	10	28				

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2. *Age, I.Q. and Vocabulary Scores for the 3 Groups.*

Average, Range and Standard Deviation for age, I.Q. and Wechsler Vocabulary raw scores for the three groups are given in Table II.

TABLE II.

		Organics.	Doubtful.	Depressives.
Age	Average	55·8	57·6	54·0
	Range	42–65	41–65	40–64
	S.D.	6·867	5·613	6·585
I.Q.	Average	99	104	105
	Range	76–130	77–118	80–128
	S.D.	14·865	11·060	12·265
Vocabulary raw score	Average	22·5	22·1	25·2
	Range	9–35	16–25·5	14–37·5
	S.D.	6·988	3·720	5·502

Age distributions for the three groups are similar, although there is rather less scatter in the doubtful group, in which there is only one patient below age 50. Wechsler I.Q. distributions show a considerable range, with the organic group average somewhat lower and the S.D. greater than in the other two groups. The Wechsler Vocabulary raw scores show the depressives to have a rather higher average, while the lower range in the organic group includes three patients who score only 9 on vocabulary.

3. *Wechsler Deterioration Ratios and Verbal-performance Scores.*

In Fig. 1 are shown the distributions of deterioration ratios, both positive and negative, for the three groups of patients. Total N is 65, as 5 of the 70 cases were not given the full set of Wechsler tests.

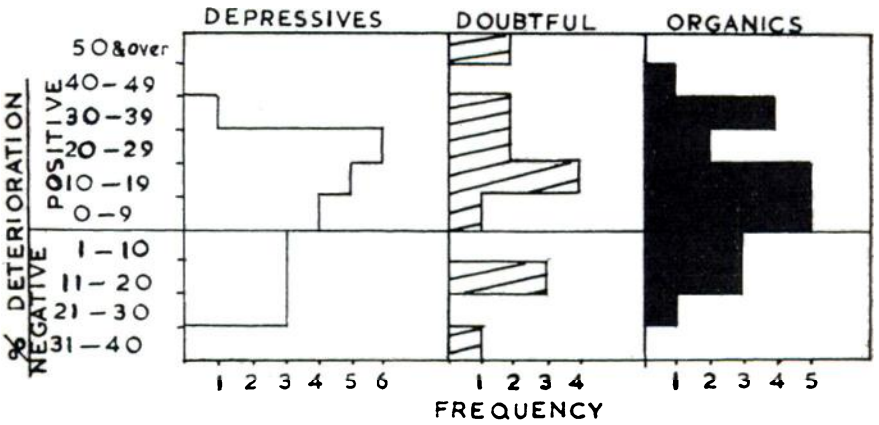

FIG. 1.—Distributions of positive and negative deterioration percentages for 65 patients on the Wechsler scale.

The histograms show that the distribution of deterioration percentages is very little different in the depressive and organic groups. The difference between the means (depressives + 5·3, organics + 7·7) is not significant. The conclusion would seem to be that the deterioration percentage is of little, if any, use in helping to discriminate organic deterioration from depressive impairment. This confirms previous work by Botwinick and Birren (1951) on senile psychoses, in which it was found that the ratio did not differentiate reliably a senile group from a normal group of comparable age. The high proportion of negative percentages is perhaps surprising (9 out of 25 in the depressive group, 7 out of 25 in the organic, and 5 out of 15 in the doubtful group). This is sometimes due to the fact that tests like Picture Completion and Object Assembly do not hold up, or, as occurred in two of the toxic organic cases, Memory for Digits has the highest score.

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Secondly, Wechsler's contention that discrepancy between verbal and performance I.Q. may have some diagnostic significance in that " organic brain cases, with few exceptions, do consistently better on verbal than on performance tests " (*op. cit.*, p. 153) is not supported by our present findings. Although, in the writer's experience, this relationship may hold good in some organic syndromes, for example G.P.I., it is certainly not generally true of organic psychoses of this age-group, as is clear from the histograms of Fig. 2. Neither does our present data seem to give any general support to Rapaport's (1945) finding that performance scores tend to be reduced more than verbal in depressive syndromes. While again this relationship may hold good in some cases, it is scarcely a reliable diagnostic aid.

The histograms of Fig. 2 show that there is no general tendency for patients of these 3 groups to have higher verbal than performance I.Q's., only 13 out of

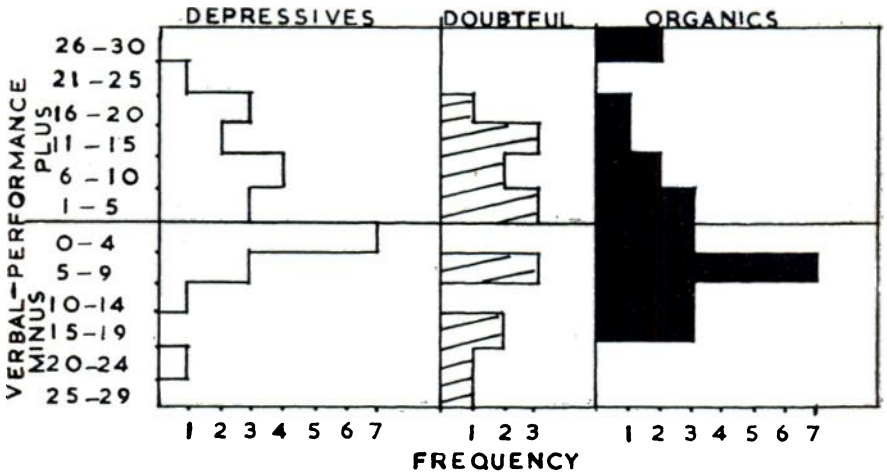

FIG. 2.—Distributions of verbal-performance discrepancies for 66 patients.

25 depressives, 9 out of 16 doubtful, and 12 out of 25 organics showing this pattern. In the organic group there is actually an opposite tendency for the patients to have higher performance than verbal I.Q's. (the mean verbal-performance discrepancy for this group is $-0{\cdot}72$, as compared with $+3{\cdot}16$ for the depressives).

There is one further point about these distributions that should be noted. It is the possibility that there may be some sex difference contributing to the difference between the verbal-performance distributions for depressives and organics, as the proportion of M : F is 18 : 10 in the latter group and 6 : 20 in the former. Although Wechsler does not seem to have found any such difference in his normal population, it does not seem possible to discount this factor.

With regard, then, to the value of the Wechsler scale in differentiating depressive from organic features in patients of this age-group, we must conclude that neither the deterioration ratio nor the verbal-performance relationship is of any reliable discriminative value. In case material of this kind, where very few even of the organic patients are described clinically as more than moderately deteriorated, even the more incidental qualitative signs, such as poor digits backwards in relation to forward span, and conspicuous " symbolic " failure on block designs, are comparatively rare.

4. *Conceptual Test Results.*

On the basis of the plus and minus scoring system already described, there is a far clearer differentiation between organic and depressive than any apparent patterns on the Wechsler scale can produce. The histograms of Fig. 3 show the distributions of the plus and minus score discrepancies for each of the three groups.

The difference between the means for the depressive and organic groups ($+16{\cdot}73$ and $+0{\cdot}75$ respectively) is highly significant ($t = 4{\cdot}459$, giving a probability of

chance occurrence of considerably less than ·01) although there is, as one would expect with such clinical material, quite a lot of overlap. The organics tend to have a greater proportion of minus signs than the depressives. Although the latter may show minus tendencies, such as giving differences on Similarities, and even the " patterning " behaviour on the Sorting test, they tend not to *persist* in these tendencies when prompted and when the nature of the conceptual task is

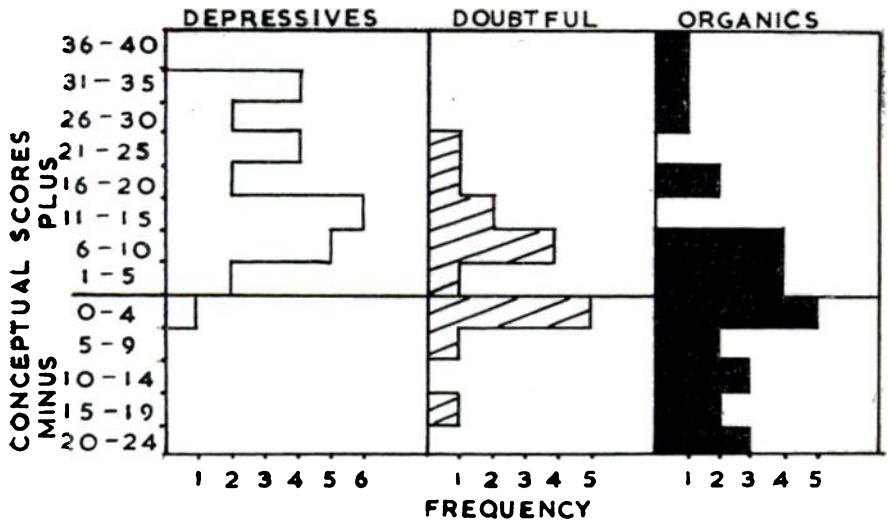

FIG. 3.—Distributions of conceptual plus-minus discrepancies for 70 patients.

again explained. There is, one might say, especially with reference to the involutional type of depression, little to differentiate some of the " borderline " depressives from the organics except the greater degree of adherence to non-conceptual responses. The " doubtful " cases tend to fall more within the organic distribution than the depressive.

The average plus and minus scores on the 4 conceptual tests are given in Table III.

TABLE III.

		Organics.	Doubtful.	Depressives.
1. Qualitative Vocabulary .	+	5·0	5·6	6·3
	−	4·5	4·1	3·2
2. Sorting test . . .	+	0·9	0·9	2·6
	−	3·0	2·9	1·0
3. Similarities . . .	+	7·2	7·8	12·5
	−	5·0	4·6	2·4
4. Picture Conception .	+	3·5	4·6	6·2
	−	3·4	2·9	0·7
Total . . .	+	16·6	18·9	27·6
	−	15·9	14·5	7·3

As the histograms of Fig. 3 have shown, there is little to differentiate the doubtful cases from the organics, while there is a consistent and marked difference between organics and depressives.

Within the depressive group there is some evidence that those patients classified as involutional depression come nearer to the organic group in plus-minus conceptual scores than do the other kinds of depression. Whereas only 1 out of 10 involutional depressives has a conceptual discrepancy score of above plus 15, 11 out of the 16 other depressive patients score above plus 15. There is a highly significant difference between the mean scores for these two sub-types of the depressive group ($t = 3{\cdot}732$, with probability of chance occurrence less than ·01).

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The average vocabulary scores for the two subgroups are very similar (Involutionals 24·8, other depressives 25·4), while the non-involutional group has an average age 5 years greater than that of the involutional. This observation is in keeping with the clinical rating which tends to place the involutionals alongside the cerebral arteriosclerotics on the deterioration scale. This is further confirmed by analysis of the organic group, which shows that all the 7 arteriosclerotic cases overlap with the depressives, 6 of them falling within the middle of the total distribution of discrepancy scores. These differences within the depressive and organic groups are shown in Fig. 4, in which the distribution of conceptual discrepancy scores for each of the 4 subgroups is given.

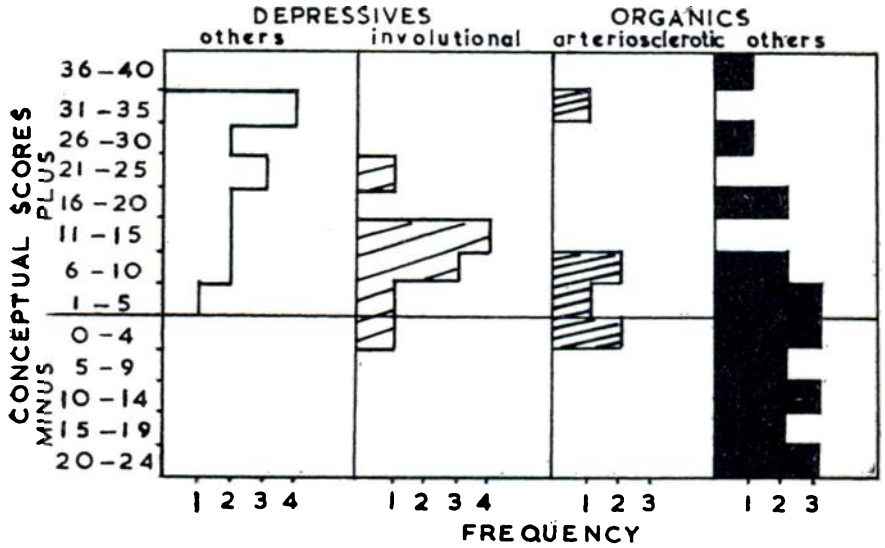

FIG. 4.—Distributions of plus-minus conceptual scores within the depressive and organic groups.

SUMMARY AND CONCLUSIONS.

The problem was set of trying to discern, by means of mental tests, whether impairment was due primarily to some early organic brain change or to the degree of affective disturbance in patients of the pre-senile age-group. Seventy patients, male and female, within the age range 41–65, who were clinically rated as falling into one of three groups (definitely organic, definitely depressive, and doubtful), were studied with subtests of the Wechsler adult intelligence scale and also with 4 short conceptual tests. Results showed that gross indicators of deterioration on the Wechsler, such as " hold "—" don't hold " ratios and verbal-performance discrepancies, were unreliable in differentiating the organic from the depressive patient. On the other hand, the conceptual tests, scored with a plus and minus system, differentiated quite clearly between patients of the two groups, although there were exceptional cases who did not conform to the group pattern. Involutional depressives and cerebral arteriosclerotics did not differ markedly from one another on the conceptual scores, tending to come towards the middle of the distribution.

In conclusion, the set of conceptual tests used is short and easy to administer. The scoring of the *persistence* of such tendencies as giving irrelevancies, differences, and so on, although the system and the criteria are not perhaps as yet sufficiently refined, seems to differentiate the organic from the depressive performance with reasonable accuracy. In diagnostic psychological testing, selection of tests which will give the essential information within a reasonably short time is often a consideration of some practical importance for the tester. It would seem that short conceptual tests of this kind together, perhaps, with a short learning and memory assessment, would provide the essential diagnostic data for this particular problem, both reliably and economically.

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