A SHORT BATTERY OF SIMPLE TESTS FOR MEASURING OVERINCLUSIVE THINKING

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INTRODUCTION

OVERINCLUSIVE thinking has been regarded by some authorities as an important aspect of the thought disorder found in schizophrenic patients (8). Norman Cameron (2, 3, 4, 5), who performed the pioneer studies in this field, defined overinclusive thinking as the inability to preserve conceptual boundaries, as a result of which distantly associated and even irrelevant ideas come to be regarded as essential parts of a concept. This abnormality necessarily makes thought more abstract and less precise. Furthermore, it can lead to overlapping concepts which share elements in common, when, normally, they should be mutually exclusive, a situation which allows the thought-disordered person to entertain two mutually incompatible ideas at the same time without recognizing the contradiction.

Payne, Matussek and George (13) have suggested that overinclusive thinking might be regarded as one aspect of a more general attention defect. They hypothesize that it is the breakdown of some cerebral filter mechanism, the function of which is to exclude from consciousness irrelevant stimuli and irrelevant associations (internal thoughts) in order to allow the most efficient processing of incoming information. In a recent review of the literature (8) Payne suggests that the studies so far performed suggest the following conclusions:

1. Various tests of overinclusion have been shown to intercorrelate significantly, and yield a common factor when factor-analysed.

2. Overinclusion is relatively independent of the generalized retardation which characterizes most psychotic patients.

3. Overinclusive thinking is confined to patients diagnosed as schizophrenic. It has not been reported in neurotic or depressive patients.

4. Only about half of those patients diagnosed as schizophrenic are abnormally overinclusive. The remainder, like most depressed patients, appear instead to be grossly retarded in their speed of functioning.

More recent studies suggest the following additional conclusions:

1. There is a significant tendency for overinclusive thinking to be associated with delusions (11). Overinclusive thinking may thus be a factor in the development of this symptom. This finding complements that of Harris and Metcalfe (7) that abnormal slowness in schizophrenia on the other hand is associated with inappropriate affect and a poor prognosis.

2. Chronic schizophrenic patients do not appear to be abnormally overinclusive (9). This finding is also consistent with the idea that overinclusive

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thinking may be a relatively good long-term prognostic indication in schizophrenic patients.

3. Overinclusive thinking is not a permanent characteristic of some individuals who periodically develop a schizophrenic illness. Rather it appears to be symptomatic of the illness, since after remission schizophrenic patients, both those who have been deluded and those who have not, are not abnormally overinclusive (10).

The Tests of Overinclusive Thinking

(*a*) *The Object Classification Test*

This test of overinclusive thinking was originally developed as a measure of "concreteness" (13). The details of the administration and scoring have been given elsewhere (12). It consists of 12 small objects, 4 squares, 4 circles, and 4 triangles of different sizes and thicknesses, made of different materials, and painted in colours which differ in both hue and saturation, so that there are intended to be 10 different ways of grouping the objects, each according to a different principle. The subjects are asked to sort the objects into groups in as many different ways as they can. The ten correct ways have been classified as "A" sortings. All the other ways of sorting the objects, including repeating an A sorting, are scored "Non-A". Normal people disregard such things as unintentional scratches on the objects, the shadows cast by the objects, their personal associations to the objects and so on as being irrelevant to the task. Overinclusive subjects on the other hand, it was predicted, would not "screen out" these aspects and would therefore have many more data on which to base sortings. Accordingly they should produce more sortings than normal people, including both the usual A sortings, and a number of unusual or Non-A sortings randomly interspersed. Previous studies (12, 13) have shown this to be the case. In addition to discriminating between acute schizophrenics and all other patients, the Non-A score was found to have one of the highest loadings on the factor of "overinclusion" in a recent study by Payne and Hewlett (12), suggesting that it is fairly representative of a group of overinclusive tests. Payne and Hewlett also found it relatively independent of intelligence.

(*b*) *The Proverbs Test*

This measure of overinclusive thinking is derived from Benjamin's Proverbs Test (1). The details of the standard administration procedure are given elsewhere (12). Subjects are asked to interpret the 14 proverbs in the usual way. The main departure from the usual procedure is that the subjects are asked to give a positive indication that they have completed their explanation (the next proverb is not presented until they have done so, although they may have to be reminded of this occasionally). The answers are recorded with a tape recorder and later transcribed. This has been shown to be necessary in earlier studies, where it was found nearly impossible to avoid paraphrasing and condensing answers when they were copied down in longhand.

The overinclusion score used is merely the average number of words required to explain each proverb (proverbs which the subject says he does not know are excluded). The rationale is that an overinclusive individual should be unable to exclude from his answers associations to the proverb (including concrete examples) which are unnecessary for its explanation. In addition, the proverb itself should illustrate a more complex and extensive concept for such sub-

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jects, and thus require a more extensive explanation. Both factors should increase the number of words needed. Payne and Hewlett (12) found that this score had the highest loading on their factor of "overinclusion", and that it discriminated well between schizophrenic subjects and all others. They also found it to be completely independent of their factor of intelligence.

(*c*) *The Goldstein Object Sorting Test*

The third measure of overinclusive thinking is derived from Goldstein and Scheerer's Object Sorting test (6). Goldstein and Scheerer's administration procedure is followed. However, only the "handing over" section of the test is used. The "male" set of objects are spread at random on a table (for all subjects, regardless of sex). The subject is asked to name them all, and then to select any object ("point of departure") and hand it to the examiner. He is then asked to hand over all the objects which he thinks could be grouped together with this object for any reason at all. As each object (including the "point of departure") is handed over, it is placed out of sight. When the subject has selected all his objects, his group is presented to him, and he is asked to explain why he sorted them together. The experiment is then repeated three more times, using as the "point of departure" the red plate, the box of matches and the bicycle bell in that order. The overinclusion score is the average number of objects chosen in each group (excluding the "point of departure"). The rationale is simply that overinclusive subjects will tend to build up a more overinclusive concept around the "point of departure", thus selecting more objects. This score had the second highest factor saturation on the factor of overinclusion in Payne and Hewlett's (12) study, and a very low loading on the factor of intelligence.

The Combined Overinclusion Score

These three tests have been selected because they were the three best measures of overinclusion in Payne and Hewlett's study. They had the three highest loadings on the factor of overinclusion, and relatively low loadings on the factors of "retardation" and "intelligence". A combined score should thus produce a more reliable measure of overinclusion than the score on any single test, although this small group of tests is still sufficiently quick and easy to administer to be a practical clinical technique.

In order to give each test a roughly equal weighting, Payne and Hewlett's transformed scores were used, the combined score being the sum of the three transformed scores. These transformations are shown in Table I.

The Subjects

The data presented in the present paper were derived from a re-analysis of Payne and Hewlett's findings. The details of the four groups of subjects tested by Payne and Hewlett are given elsewhere (12). The subjects were twenty acute schizophrenics, twenty endogenous depressives, twenty neurotics and twenty normals. The groups were very carefully matched for age, vocabulary (to assess pre-illness intellectual level), years of education, and occupation. The subjects were of average intelligence and heterogeneity on the Mill Hill Vocabulary scale (14). Their ages ranged from 18 to 65, the average age being approximately 33. As a group they had a wide and fairly representative range of education and occupations.

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TABLE I

Transformations used with Raw Scores

	Raw Score	Transformed Score
Object Classification Test: Number of "non-A" responses	0 – 2	0
	3 – 5	1
	6 – 8	2
	9 – 11	3
	12 – 14	4
	15 – 17	5
	18 – 20	6
	21+	7
Goldstein - Scheerer Object Sorting Test: Average number of objects "handed-over"	2·23 – 2·91	0
	2·92 – 3·69	1
	3·70 – 4·92	2
	4·93 – 6·39	3
	6·40 – 8·31	4
	8·32 – 10·81	5
	10·82 – 14·06	6
	14·07 – 18·28	7
	18·29 – 23·76	8
	23·77+	9
Benjamin's Proverbs Test: Average number of words per proverb ..	3·98 – 5·62	0
	5·63 – 7·94	1
	7·95 – 11·22	2
	11·23 – 15·84	3
	15·85 – 22·39	4
	22·40 – 31·62	5
	31·63 – 44·67	6
	44·68 – 63·10	7
	63·11 – 89·13	8
	89·14+	9

THE RESULTS FOR THE COMBINED OVERINCLUSION SCORE

Tables II and III and Figure 1 show the results obtained. As can be seen,

TABLE II

Combined Overinclusion Scores in the Four Groups

N	Group	Mean	Standard Deviation	Range
20	Normals	4·80	1·47	2— 7
20	Neurotics	6·55	1·85	3—10
20	Depressives	5·65	1·66	3—10
60	Combined Non-Schizophrenic Group	5·66	1·78	2—10
20	Schizophrenics	10·25	5·00	1—21

TABLE III

Significance of Difference Between Groups for Combined Overinclusion Score

Groups	Significance
Normals versus Neurotics	$t=3\cdot314$ $p<\cdot01$
Normals versus Depressives	$t=1\cdot710$ N.S.
Normals versus Schizophrenics ..	$t=4\cdot674$ $p<\cdot01$
Neurotics versus Schizophrenics ..	$t=3\cdot101$ $p<\cdot01$
Combined Non-Schizophrenic Group versus Schizophrenics ..	$t=3\cdot496$ $p<\cdot01$

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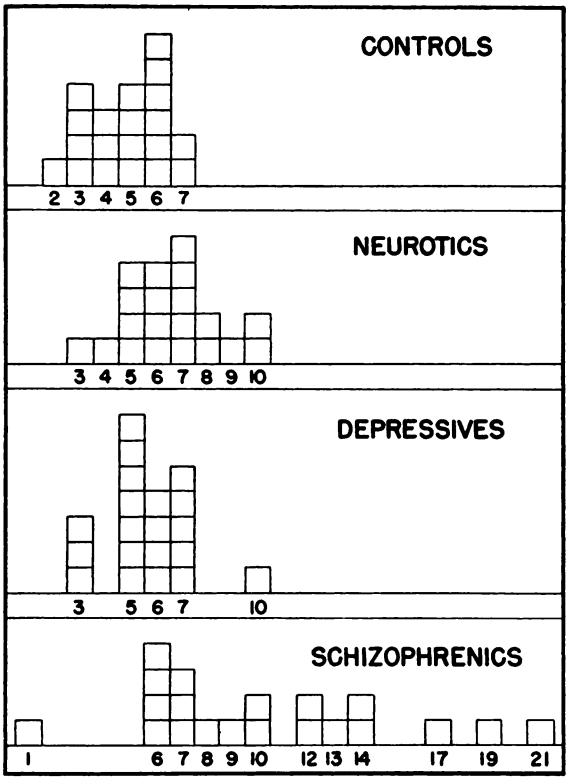


FIG. 1.

the schizophrenics are significantly more overinclusive on the combined score than the normals. The neurotic group is also significantly more overinclusive than the normals at the 1 per cent. level. The mean difference is, however, relatively small and the schizophrenics are significantly more overinclusive than both the neurotics alone, and all the other groups combined. These results are characteristic of the general trend of Payne and Hewlett's findings. Figure 1 shows the histograms obtained, and suggests that for all practical purposes a score of 10 represents the limit of the normal (and neurotic and depressive) range of performance. Any score larger than this suggests an abnormal degree of over-inclusive thinking.

SUMMARY

The three best measures of overinclusive thinking in Payne and Hewlett's (12) battery, those which had the highest saturations on the factor of over-inclusion, were the Non-A score from the Object Classification test, the average number of words used in explaining the Benjamin proverbs, and the average number of objects per group selected during the "handing over" experiment in the Goldstein Object Sorting test.

A combined score of these three measures has been suggested, and Payne and Hewlett's data re-worked to show the positions of their groups of 20 normals, 20 neurotics, 20 endogenous depressives and 20 acute schizophrenics on this combined overinclusion score. The results are representative of Payne

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and Hewlett's data insofar as the schizophrenics are significantly more overinclusive than all the other groups. This short battery of three objective tests is simple enough to be of practical clinical value.

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