

Three Forms of the Clinical Tests of the Sensorium and their Reliability

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INTRODUCTION

Although the clinical tests of the sensorium (CTS) recommended in some standard psychiatric textbooks (Slater and Roth, 1969) are in common use, and although there have been studies using most of the constituent tests, there have been few investigations into the entire collection of tests.

This study attempts to evaluate the CTS. Is their administration worthwhile? What do the tests test? Do they discriminate?

The present paper concerns reliability, and its sequel deals with some of the variables affecting scores.

METHOD

Three similar forms of the CTS, including instructions, were tried out on 24 adult hospital in-patients. There were 13 women and 11 men, 8 in medical wards and 16 in psychiatric wards, and their mean age was 48 years. Forms A, B and C were used in a randomized order within a balanced design, allowing at least three days between tests. Most of the subtests seemed equivalent when analysis of variance was carried out (data available on request). Two subtests and the scoring system of another subtest showed discrepancies between the forms, and so modified versions were tried out on a further 24 subjects (12 male, 12 female, mean age 44 years). The amended forms seemed acceptable with no significant differences between them ('t' tests).

Form A comprised most of the commonly-used tests i.e. Orientation, Days of the Week Reversed, Serial Sevens, Recall of an Address and Telephone Number, the Babcock Sentence, Logical Memory Test, General Information, Digit Span and Story Recall ('Cowboy'). Forms B and C closely followed A (see Appendix).

Recall periods were controlled and one was taken up by the Digit Copying Test (Kendrick, 1965).

The subjects for the main study were 108 consecutive psychiatric patients (57 male, 51 female) who were able to complete the three tests during their stay in hospital for investigation and treatment. Their principal diagnoses were, according to the A.M.A. standard nomenclature of diseases then in use: affective disorders 32, psychoneurotic disorders 31, psychophysiological disorders 17, brain syndromes 12, schizophrenia 8, and personality disorders 8. Their mean age was 36 years, SD 16, and their mean Wechsler IQ was 110, SD 14. The first two tests were carried out within the first week of the patient's stay in hospital and the third when he was judged clinically to have reached his optimal state. The tests were administered by a junior psychiatrist or by the psychologist according to a balanced Latin Square Design. The data were analysed with the aid of the University of London Atlas MVC programme.

RESULTS

This paper deals with the main results (the data are available for inspection). Table I gives the results from the 108 psychiatric patients. The mean scores and standard deviations (SDs) for Form A are the sum of means and SDs obtained on Form A, when administered on the first, second and third occasions of testing. As the 108 patients did all three tests, the differences in mental state and clinical change should largely 'randomize out' over the group. In fact, the means and SDs for the three forms are very similar.

As check, Table II presents data from first tests of a more homogeneous group selected from

TABLE I

Sum of mean scores and standard deviations from three occasions of testing 108 psychiatric patients with forms A, B and C

	Form A		Form B		Form C	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Orientation	25.3	2.57	25.3	2.57	25.3	2.58
Reversed days of weeks	20.6	2.33	20.6	2.33	20.6	2.34
Serial 7s:	36.5	7.14	36.5	7.14	36.5	7.18
Time in seconds	244.1	180.17	244.1	180.17	244.3	181.01
Address: Immediate	19.8	2.22	19.8	2.22	19.8	2.23
Delayed	14.5	4.93	14.5	4.93	14.4	4.94
Telephone no.: Immediate	5.6	0.79	5.6	0.79	5.6	0.79
Delayed	3.0	1.34	3.0	1.34	3.0	1.34
Sentence	14.5	6.98	14.5	6.98	14.5	6.99
Logical memory: Immediate	30.2	9.93	30.2	9.93	30.2	9.98
Delayed	27.4	11.69	27.4	11.69	27.4	11.74
Digit Span: Forward	20.6	3.46	20.6	3.46	20.6	3.48
Backward	14.3	3.26	14.3	3.26	14.3	3.27
Story:	19.8	4.48	19.8	4.48	19.8	4.49
Point	10.6	3.48	10.6	3.48	10.6	3.49
General information	38.4	7.71	38.4	7.71	38.3	7.71

TABLE II

*Mean scores and standard deviations obtained on first testing of 88 adult psychiatric patients without any brain lesion (*difference from Form A significant at 5 per cent level by 't' test)*

	Form A		Form B		Form C	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Orientation	8.5	0.88	8.6	0.83	8.4	0.72
Reversed days of week	6.8	0.61	7.0	0.00	6.9	0.36
Serial 7s:	12.5	1.47	11.9	2.66	11.0*	2.87
Time in seconds	84.8	62.3	78.4	65.4	141.1*	97.2
Address: Immediate	6.5	0.69	6.9*	0.41	6.4	0.89
Delayed	5.0	1.83	4.5	2.28	4.2	1.97
Telephone No: Immediate	1.9	0.31	1.9	0.29	2.0	0.18
Delayed	0.9	0.63	0.9	0.58	1.0	0.56
Sentence	5.5	2.44	4.2	2.74	4.8	2.79
Logical memory: Immediate	9.0	2.37	8.7	3.99	9.0	4.03
Delayed	8.2	2.69	8.1	4.02	7.5	4.98
Digit span: Forward	7.3	1.67	6.6	1.09	6.8	1.29
Backward	5.1	1.25	4.5	1.09	4.4	1.10
Story:	6.5	1.45	6.4	2.12	6.0	2.41
Point	3.4	1.45	3.3	1.78	3.4	1.54
General information	13.0	1.93	13.2	2.29	12.2	2.96
Number of subjects	27		32		29	
Age	35.6	13.0	34.4	13.6	39.6	14.7
WAIS: Full scale IQ	111.0	10.1	112.2	10.0	110.8	15.4

TABLE III

Correlations between first and second occasions and second and third occasions of testing 51 female and 61 male psychiatric patients

(All correlations significant at 0.1 per cent level except * at 5 per cent)

	Female		Male	
	1st & 2nd	2nd & 3rd	1st & 2nd	2nd & 3rd
Orientation .. .. .	.70	.66	.63	.47
Reversed days of week .. .. .	.99	.96	.50	.81
Serial 7s: .. .. .	.64	.62	.72	.77
Time .. .. .	.66	.52	.77	.80
Sentence .. .. .	.68	.73	.58	.55
Logical memory: Immediate .. .. .	.54	.54	.64	.60
Delayed .. .. .	.65	.43	.70	.66
Digits: Forward .. .. .	.65	.72	.49	.47
Backward .. .. .	.67	.49	.49	.55
Story: .. .. .	.61	.44	.67	.35*
Point .. .. .	.65	.44	.40*	.26*
General information .. .. .	.82	.79	.70	.67

the original 108. This group of 88 subjects excludes any patients under 16 years or any with a diagnosis which included a brain lesion. The means for each corresponding subtest in Forms A, B and C were numerically close except for statistically significant differences at the 5 per cent level ('t' test) in Form C on Serial Sevens and in Form B on Immediate Recall of an Address. Chance reasons probably accounted for these differences, as they did not emerge in other analyses.

Table III gives the correlations between scores on the first, second and third occasions of testing this group of psychiatric patients. Male and female groups were considered separately (the results from an additional 4 men were included). The correlations between the first and second occasions were all significant at least at the 0.1 per cent level of probability and were of the order of .5 to .8 or more. The correlations between the second and third occasions, which were separated by a longer period during which many patients improved, were lower but still statistically highly significant.

DISCUSSION AND CONCLUSION

These data give support to the reliability of these simple, brief clinical tests of the efficiency of mental functioning. The three

forms used in our study gave similar results and probably are equivalent; they may have some practical clinical value for re-testing patients. Consistent results were obtained whoever tested the patients, so that the instructions for administration and scoring appear adequate. It should be noted, however, that the group of psychiatric subjects was a little unusual in that they were relatively young and that their mean level of intelligence was high.

Our next paper sets out to examine some of the variables which affect the CTS. Even if these tests are reliable they could be of little value.

SUMMARY

Three parallel forms of the clinical tests of the sensorium were devised, tried out and modified on two groups of 24 subjects.

The final versions were further assessed by using each form in turn with 108 psychiatric patients. The three forms of tests gave scores with very similar means and standard deviations. They correlated moderately well when repeated.

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 KENDRICK, D. C. (1965). 'Speed and learning in the diagnosis of diffuse brain damage in elderly subjects.' *British Journal of Social and Clinical Psychology*, 4, 141-8.
 SLATER, E., and ROTH, M. (1969). *Clinical Psychiatry*. London.

APPENDIX

TESTS OF THE SENSORIUM—FORM A

- | | |
|---|--|
| <p>N.B. 1. Unless instructed otherwise, record subject's answers verbatim.
 2. Record any comments (e.g. on subject's behaviour) on the test record.
 3. Fill in date and time after 'Orientation' has been administered.
 4. Score during or immediately after the session. Maximum possible scores are shown in brackets in the scoring column.</p> | <p>Patient's Name</p> <p>Date</p> <p>Tester.....</p> |
|---|--|

Test material

INTRODUCTION

Score

Say: I am going to give you a few short tests which we give routinely to all patients. The tests are varied—some you may find easier than others—but we should like you to do your best in all of them.

ORIENTATION

- | | |
|--|--|
| <p>Say: We start with some questions:
 1. Please will you give me your full name?
 2. What is the name of this place?
 3. What is the address?
 4. Can you give me to-day's date in full?
 (If necessary specify day of the week, date, month and year)
 5. Can you, without looking, tell me what time it is?</p> | <p>1. { 1 for surname and
 1 for Christian name (2)
 2. 1 for name of hospital (1)
 3. 1 for London, W.1, etc. (1)
 4. 1 for each item (4)
 5. Allow ½ hr. deviation (1)</p> |
|--|--|

ATTENTION AND CONCENTRATION

- | | |
|--|---|
| <p>6. Please say the days of the week backwards, starting from Tuesday.
 7. Take 7 from 100 and keep on taking 7 away. Ready?
 Start timing. Record total time for Serial 7's.</p> | <p>6. Subtract the number of errors from 7 (7)
 7. Subtract the number of errors from 14 (14)</p> |
|--|---|

MEMORY

Say:

I am going to give you an address and a telephone number. I shall read each of them once. You are to repeat them immediately and after 2 minutes. Ready?

8. Mr. Percy White, 14 East Drive, Bath. Will you repeat that?
9. And the telephone number is Birmingham 4891.

8. 1 for each correct word (7)

9. 1 for town and 1 for number (2)

(Instructions for a test of copying digits inserted here; until:)

At the end of the 2 minute period say:

10. Can you remember the address?

10. 1 for each word (7)

11. And the telephone number?

11. 1 for town and 1 for number (2)

Here is a sentence which I should like you to repeat, word for word, after I have finished:

12. One thing a nation must have to become rich and great is a large, secure supply of wood

12. Subtract number of attempts from 9 (8)

If subject makes a mistake, ask him to listen again. Repeat the sentence, if necessary, 8 times.

Say:

I am going to read you a short passage. Afterwards you are to repeat as much of it as you can. I shall ask you twice. Ready?

13. A fire/last night/burnt/several houses/near the centre/of the city./It took some time/to put it out./The loss/was five thousand/pounds/and seventeen/families/lost their homes./In saving/a girl/who was asleep/in bed,/a fireman/was burnt/on the hands./ All right. Now tell me all you can remember.

13. 1 for each idea (21)

Start timing 5 mins. (when subject will be retested). Fill in the period by asking as many of the following questions as is convenient.

GENERAL INFORMATION

Say:

Here are some general questions:

14. Who is on the throne at the moment?

14. In 'General Information' score 1 for all questions except 22 (1)

(If subject answers 'Elizabeth'

Say: Elizabeth the ?)

15. Who was before her?

15. (1)

16. And before that?

16. (1)

17. What is the capital of the United States?

17. (1)

18. And what is the capital of France?

18. (1)

19. And the capital of Scotland?

19. (1)

20. And the capital of Belgium?

20. (1)

21. And what is the capital of Jugoslavia?

21. (1)

22. Name five large English towns.

22. (5)

23. How many pence are there in two shillings and threepence?

23. (1)

24. How many fourpences are there in two shillings?

24. (1)

25. How many pence are there in thirteen shillings?

25. (1)

I am going to name some famous people. You are to tell me for what they are known. Ready? They are:

26. Beethoven.

26. (1)

27. Keats.

27. (1)

28. Constable.

28. (1)

(Instructions giving additional names and tests for meanings of proverbs; until:)

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MEMORY

5 mins. after reading the short passage (13) say:

29. Will you once more repeat the short passage about the fire which you told me before? (21)

Say:

I am going to say some numbers. Listen carefully because, when I have finished, you are to say them after me. Ready?

Read digits evenly, 1 per second. If subject fails any series, give the second of the pair. Discontinue when he fails both series in any pair. Record the number of the longest series at which he succeeds.

- | | | | |
|---------------------|---------------------|------|---------------------------------|
| 30. 8 6 | 3 1 | (2) | 30. Number of digits in longest |
| 1 4 2 | 5 8 3 | (3) | correct series |
| 7 5 3 6 | 9 7 2 5 | (4) | (10) |
| 4 9 1 3 8 | 2 4 7 5 9 | (5) | |
| 6 2 7 1 8 4 | 9 4 8 5 7 1 | (6) | |
| 3 6 5 8 7 4 2 | 8 2 5 9 4 1 7 | (7) | |
| 5 1 4 6 2 7 9 3 | 1 8 5 9 2 7 3 6 | (8) | |
| 9 4 8 3 6 2 7 5 1 | 6 3 1 7 5 9 2 8 4 | (9) | |
| 2 5 1 6 9 3 8 1 4 7 | 4 2 7 9 6 1 4 3 5 8 | (10) | |

Say:

I am going to say some more numbers but, this time when I stop, you are to say them backwards. For example, if I said 674 you would say 476. Ready?

- | | | | |
|---------------------|---------------------|------|---------------------------------|
| 31. 6 7 | 9 1 | (2) | 31. Number of digits in longest |
| 2 6 9 | 6 3 8 | (3) | correct series |
| 4 2 5 8 | 2 7 4 9 | (4) | (10) |
| 1 7 3 9 4 | 8 4 1 5 2 | (5) | |
| 7 4 8 6 1 3 | 1 5 9 6 4 7 | (6) | |
| 5 8 3 7 2 1 6 | 3 6 8 4 2 9 5 | (7) | |
| 8 2 4 7 9 5 3 1 | 4 1 2 9 3 5 9 6 | (8) | |
| 3 6 9 5 7 1 8 4 2 | 8 1 4 6 5 2 9 7 3 | (9) | |
| 9 4 2 1 7 3 6 8 3 5 | 7 2 6 9 3 6 8 5 7 4 | (10) | |

Now I am going to read a short story. Afterwards I shall ask you to tell it in your own words. Ready?

32. A cowboy went to San Francisco with his dog, which he left at a friend's while he went to buy a new suit of clothes. Dressed in his grand new suit, he came back to the dog, whistled to it, called it by name and patted it. But the dog would have nothing to do with him in his new hat and coat and gave a mournful howl. Coaxing was of no avail, so the cowboy went away and put on his old suit, and then the dog immediately showed its wild joy on seeing its master as it thought he ought to be.
32. 1 each for following ideas: (8)
 Cowboy;
 went to buy new clothes;
 left dog behind;
 he came back wearing new clothes, unrecognized by dog;
 He changed into old clothes;
 dog greeted master;
 pleased to see him as it thought he ought to be.
33. What do you consider was the point of the story?
 33. Rate 0-5.

In forms B and C the instructions and scoring methods are unchanged but the following questions are substituted.

FORM B

6. Please say the days of the week backwards starting from Wednesday.
7. Take 7 from 103 and . . .
8. Miss Agnes Green, 18 North Street, Wells.
9. . . . Gloucester 6247.
12. One thing an empire must have to achieve power and wealth is a fine, stable system of laws.
13. Last winter/a storm/blew up/over the moors/near here./It lasted for some hours./Sleet/and snow/fell down/and 15/sheep/were buried/in a snow drift/9 feet deep./In saving/a lamb,/which had been trapped/beneath a fallen tree,/a shepherd/injured/his arm./
14. Who is President of United States at the moment?
17. What is the capital of Russia?
18. What is the capital of Wales?
19. What is the capital of Spain?
20. What is the capital of Canada?
21. What is the capital of Poland?
22. Name 5 counties.
23. . . . pence in one shilling and eightpence?
24. . . . threepences in one shilling and sixpence?
25. . . . pence in fourteen shillings?
26. Shelley.
27. Bach.
28. Rembrandt.
30.

7 5	2 9
9 3 1	4 7 2
6 4 2 5	8 6 1 4
3 8 9 2 7	1 3 6 4 8
5 1 6 9 7 3	8 3 7 4 6 9
2 3 4 7 6 3 1	7 1 4 8 3 9 6
4 9 3 5 1 6 8 2	8 7 4 8 1 6 2 5
8 3 7 2 5 1 6 4 9	5 2 9 6 4 8 1 7 3
1 4 9 5 8 2 7 9 3 6	3 1 8 6 5 9 3 2 4 7
31.

7 8	1 2
3 8 1	7 3 9
5 3 6 9	3 7 5 1
2 8 4 1 5	9 5 2 6 3
8 5 9 7 2 4	2 6 1 7 5 8
6 9 4 8 3 2 7	3 7 9 8 3 1 5
9 3 5 8 1 6 4 2	5 2 3 1 4 6 9 7
4 7 1 6 8 2 9 5 3	9 1 5 7 6 3 1 8 4
1 5 3 2 8 4 7 9 4 6	8 3 7 1 4 7 9 6 8 5
32. A donkey, loaded with salt, had to wade a stream. He fell down and for a few minutes lay comfortably in the cool water. When he got up, he felt relieved of a great part of his burden, because

the salt had melted in the water. Long-ears noted this advantage and at once applied it the following day when, loaded with sponges, he again went through the same stream. This time he fell purposely but was grossly deceived. The sponges had soaked up the water and were considerably heavier than before. The burden was so great that he fell and could not go on.

1 for each of following ideas:

- A donkey,
- carrying salt,
- fell into stream,
- salt melted and burden relieved;
- next carrying sponges,
- fell again purposely,
- sponges absorbed water,
- donkey deceived and burden too great.

FORM C

6. Please say the days of the week backwards starting from Thursday.
7. Take 7 from 102 and . . .
8. Mrs. Elsie Brown, 13 South Road, Deal.
9. Manchester 5036.
12. One thing an army must have to attain strength and fame is a long, thorough training in drill.
13. Last week/a river/overflowed/in a town/ten miles/from here./Water covered/the streets/and entered the houses./Fourteen people/were drowned,/six-hundred people/became ill/because of the dampness/and cold weather./In saving/a boy,/who was under a bridge,/a man/cut/his hand.
14. Who is the Prime Minister at the moment?
17. . . . capital of Italy.
18. . . . Southern Ireland.
19. . . . Germany.
20. . . . Hungary.
21. . . . Australia.
22. Name five rivers.
23. . . . pence in two shillings and sixpence.
24. . . . sixpences in three shillings and sixpence.
25. . . . pence in fifteen shillings.
26. Gainsborough.
27. Tennyson.
28. Brahms
30.

9 7	4 2
2 5 3	6 9 4
8 6 4 7	1 8 3 6
5 1 2 4 9	3 5 8 6 1
7 3 8 2 9 5	1 5 9 6 8 2
4 7 6 9 8 5 3	9 3 6 1 5 2 8
6 2 5 7 3 8 1 4	2 9 6 1 3 8 4 7
1 5 9 4 7 3 8 6 2	7 4 2 8 6 1 3 9 5
3 6 2 7 1 4 9 2 5 8	5 3 8 1 7 2 5 4 6 9

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31. 5 6 8 9
 1 5 8 5 2 7
 3 1 4 7 1 5 3 8
 9 6 2 8 3 7 3 9 4 1
 6 3 7 5 9 2 9 4 8 5 3 6
 4 7 2 6 1 9 5 2 5 7 3 1 8 4
 7 1 3 6 8 4 2 9 3 9 1 8 2 4 7 5
 2 5 8 4 6 9 7 3 1 7 9 3 5 4 1 8 6 2
 8 3 1 9 6 2 5 7 2 4 6 1 5 8 2 5 7 4 6 3

32. A labourer worked along a stream. His axe fell in and, as he could not get it out, he sat on the bank and bemoaned his fate. Neptune took pity on the man's poverty, dived and brought up a golden axe. The labourer said it was not his. Neptune dived again and

appeared with a silver axe. The labourer made no claim. Again the god dived and brought up the right iron axe with the wooden handle. 'That is it!', the labourer exclaimed. 'I wanted to test you', replied Neptune, 'I am glad you are as honest as you are poor. Take all the three axes.'

1 for each of following ideas:
 Labourer worked by stream,
 axe fell in,
 Neptune offered gold axe,
 then silver one,
 then iron one,
 labourer claimed iron one,
 Neptune rewarded him,
 testing his honesty.

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