

THE SET TEST: A RAPID TEST OF MENTAL FUNCTION IN OLD PEOPLE

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Summary

The set test is a simple rapid test of mental function which requires the subject to recall items in four different common categories. The test was given to 64 apparently healthy elderly volunteers living in the community. The results of the test correlated closely with those obtained on standard lengthier procedures. The test is recommended as worthy of further trial in clinical and epidemiological settings.

INTRODUCTION

Doctors are accustomed to using, in the preliminary assessment of their patients, simple rapid quantitative tests such as the pulse rate, the respiratory rate, the blood pressure and the erythrocyte sedimentation rate. The results of these tests do not have a single precise significance: thus a slow pulse rate may mean that the subject is an athlete in exemplary health; or else that he suffers from heart block or digitalis overdosage. Yet such tests are firmly established and of undoubted clinical value.

In the examination of mental function in elderly subjects the doctor has an equal need of a rapid quantitative test. However, in this field brevity is suspect. Psychologists maintain that while it is deceptively easy to apply a test which yields a numerical result, it can be grossly misleading to use this number as a measure of mental function. Psychologists do however make use of numerical results obtained from more elaborate tests. Objections to a brief test would be no longer tenable if it could be shown that such a test yielded a score similar to that derived from a more lengthy and accepted standard procedure. Moreover in testing elderly subjects brevity has attractions other than convenience. It avoids fatiguing the patient, a potential source of error in lengthy tests; and it stands some chance of being included in the routine clinical examination of every aged patient. A numerical result is not to be used as a one-dimensional measure of the subject's mental state, any more than the pulse rate defines his cardiological state. Rather the test alerts the clinician to the need for further exploration of the patient's mental function. Such a test is also attractive to the epidemiologist, enabling him to place subjects rapidly in certain broad categories.

In this paper we describe a test of mental function in the elderly which we call the 'set test'. It is a verbal test and thus unsuitable for deaf and aphasic subjects. It is easily and rapidly administered, and yields a simple numerical result. The present study describes the validation of this test in a community sample of old people and its comparison with 'standard' mental tests.

THE TEST

The test is introduced to the subject as a challenge rather than as a threat, the appropriate words being 'Let's see how good your memory is', or some variant of this. The subject is then asked 'I want you to tell me all the colours you can think of'. The examiner may repeat the instructions as often as required, but should offer no other help. There is no time limit, this part of the test being complete when the subject has offered ten different colours, in which case he is awarded a score of ten; or when he cannot think of any more, or begins to repeat himself, in which case his score is the number of different colours he has given. The end-point is usually clear, the subject coming to an abrupt stop with an admission of failure such as 'That's all I can think of', or a defensive rationalization like 'There are lots more'.

The test is then repeated three times more asking in turn for animals, fruit and towns. A maximum of 10 points is awarded for each of the four sets and a maximum of 40 for the total.

The test rarely takes longer than five minutes; often it is complete within two minutes.

PRACTICAL DIFFICULTIES

Few subjects resented the test or accused the doctor of trying to make out that they were senile—an objection which was sometimes raised against other tests. Most seemed to enjoy the challenge. A few subjects, especially the more impaired ones, failed to grasp the instructions and answered anecdotally, for example 'Red is my favourite colour', 'We once kept a dog' etc. An attempt was made to put such subjects back on the track by repeating the instructions, but if this failed they were awarded one point for each item mentioned in the course of the anecdote, and the examiner moved to the next section. Others asked questions, e.g. 'Is Glasgow a town?' This was answered and the instructions were repeated.

The test must be performed in private. Third parties have an uncontrollable urge to 'help' the subject, and must be excluded.

WHAT DOES THE TEST TEST?

In the course of their lives people accumulate a stock of words in each of the four sets, and the test requires them to identify the appropriate stock and retrieve items from it. Individual experience determines the richness and accessibility of the stock, but it seems reasonable to assume that most people have at least ten items in stock for each set. In some subjects the stock of one set proved richer and more accessible than that of the others, for cultural reasons. Thus a woman who performed poorly on the three later items obtained a full score of ten on colours, producing exotic ones like 'peach' and 'heliotrope'. She had worked in the school uniform department of an outfitter's. A man who similarly did poorly on other items produced seven colours rapidly—red, yellow, green, brown, blue, pink, black—reflecting a lifelong interest in snooker. Other similar examples were a fruiterer who did well on fruits, and a commercial traveller on towns. But these cases were exceptional, and most subjects achieved a similar score on each of the four sets, suggesting that in the conditions of the test, retrieval was usually not heavily dependent on the subject's cultural and educational background.

A few subjects experienced difficulty in identifying the members of a set. This was seen most often with towns, when some subjects offered different districts of the same town instead of a set of towns.

The mental qualities involved in retrieval cannot, and perhaps need not, be precisely defined. The process seems to require motivation, alertness, concentration and short-term memory.

In addition to yielding a score the test also affords an opportunity of observing the subject's approach to problem-solving. One observes the careful person, patiently culling items from the less accessible recesses of his failing memory; and, at the other extreme, the impulsive over-confident one rapidly spilling out three or four items before coming to an abrupt halt, then justifying his failure by a rationalization. Analogous patterns of behaviour are encountered in the course of rehabilitation.

The Subjects

For the validation of the set test the subjects were 64 healthy persons aged 65 and over resident in the mining village of Kilsyth in Stirlingshire who were taking part in a survey of the physical, mental and social state of a sample of the elderly population. The methods used in selecting this sample are given in detail elsewhere (Akhtar, Andrews, Caird & Fallon, 1972).

Their age and sex distribution is given in Table I. As part of their assessment they were visited in their own homes by a doctor who, towards the end of an interview and medical examination, administered the following psychological tests:

- (i) The Mill Hill Vocabulary Test.
- (ii) Raven's progressive coloured matrices (Raven, 1956).
- (iii) A slightly modified version of the Crichton memory and intelligence test (Robinson, 1965).
- (iv) The set test.

Table I. The set test: age and sex of subjects

Age group	Number of subjects		
	Male	Female	Total
65-69	11	10	21
70-74	9	11	20
75-79	3	6	9
80-84	6	4	10
85 and over	3	1	4
Total	32	32	64

RESULTS

The distribution of scores in the set test is given in Table II. The mean score of the group was 31.23 and the standard deviation 7.31. Only 2 subjects (3 per cent) scored less than 15.

The mean and standard deviations of each of the four items of the test for males and females separately are given in Table III. The scores on each of the four items did not differ significantly from one another. The mean score on colours for females was higher

Table II. The set test: distribution of scores

Score	No. of subjects		
	Male	Female	Total
0-4	0	0	0
5-9	0	0	0
10-14	1	1	2
15-19	0	3	3
20-24	3	4	7
25-29	9	3	12
30-34	4	8	12
35-39	11	10	21
40	4	3	7
Total	32	32	64

Table III. The set test: mean scores of four items and standard deviations

Set	Males		Females	
	Mean	S.D.	Mean	S.D.
Colours	7.60	2.05	8.09	2.07
Animals	8.28	1.97	7.44	2.58
Fruits	7.19	2.42	6.97	1.89
Towns	8.63	2.23	8.22	2.41
Total	31.69	6.91	30.78	7.77

Table IV. The set test: relationship between score, age and sex

Sex	Age group	Mean score	Standard deviation
Males	65-74	34.3	5.1
	75 and over	27.3	7.6
Females	65-74	32.4	7.7
	75 and over	29.4	8.6

Table V. Comparison of results with various psychological tests

Comparison	r	P
Set test v. Mill Hill	0.4047	0.001
Set test v. Raven's	0.4094	0.001
Set test v. Crichton	0.6363	0.001
Mill Hill v. Raven's	0.3442	0.004
Mill Hill v. Crichton	0.4100	0.001
Raven's v. Crichton	0.5037	0.001

than that for males; while the mean score for males on the other sets was higher than for females; but none of the differences between the sexes was statistically significant.

The relationship between total score and age and sex is given in Table IV. Taking both sexes together there was a significant negative correlation between age and score ($r = -0.529$; $P < 0.001$), i.e. scores fell with increasing age of the subject.

The set test score was compared with the scores obtained on the other psychological tests (see Table V). There was a highly significant correlation between the set test and the scores on the Mill Hill vocabulary scale, Raven's progressive coloured matrices and the Crichton rating scale. These three tests also correlated significantly with one another.

CONCLUSIONS

The set test proved to be a rapid, simple and acceptable test of mental function in the population tested. The results did not appear to be materially disturbed by educational and cultural factors. The test score correlated closely with those obtained by other standard procedures; even although these examined apparently different areas of mental function. One might speculate whether a common group of mental characteristics is measured by these four tests. From a practical viewpoint this study suggests that the substitution of the set test for the lengthier standard procedures would permit the simplification of mental testing in the elderly without loss of validity.

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