A PAIRED-ASSOCIATE LEARNING TEST FOR USE WITH ELDERLY PSYCHIATRIC PATIENTS

By

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IN his examination of elderly patients the psychiatrist is commonly concerned to obtain some indication of the individual's "memory function". When the psychologist is asked to help in such assessment there are at least two factors which may handicap his ability to do so. Firstly, the conception of "memory". as popularly used, even in the clinic, is rather narrow in its connotation, having come to refer almost exclusively to the *reproduction* of learned material. It would seem more satisfactory, from the psychologist's point of view, to substitute instead the notion of "learning ability" since this expression has a wider meaning. It admits of the discussion of separate aspects and takes into account, for example, the two broad phases of "acquisition" and "retention". Secondly, those tests which the psychologist may have by him which purport to assess "memory" usually suffer from a number of disadvantages. For example, as Williams (12) has recently pointed out, they are seldom so constructed as to ensure that every subject has a standard opportunity to acquire what the test requires him to reproduce; in any case few of the tests available have ever been given to elderly people, so that "normal" performance in such age groups is unknown. A more important, and less often emphasized, disadvantage, however, is that performance on such tests is commonly closely related to performance on intelligence tests, so that although the ostensible content of the material used seems to be related to "memory", in the popular sense, what the psychologist in fact gets from them is another measure of general intellectual ability. A study by Hall (1) has shown that, for a young population at least (mean age 29.11, sd 2.77), the results of the Wechsler Memory Scale (10) correlate with results on the Wechsler Bellevue Intelligence Scale (9) almost to the degree ($r=0.77$) to which the intelligence measure correlates with itself ($r=0.94$).

Following a series of experiments designed to investigate "memory function" in elderly psychiatric patients the present author and his colleagues (Shapiro, Post, Lofving, and Inglis (8), Inglis (2)), have attempted to construct a test which would be (a) sensitive to memory impairment, and (b) as independent as possible of intellectual functioning. This paper will describe a test which has been evolved with these ends in view and will present some of the data which have been collected. It should be pointed out that, so far, the test cannot be regarded as a standardized test of memory in the sense that it could be used to order individuals along a continuum of memory ability in the same way that an intelligence test may be used to order individuals in terms of intellectual status. It can be shown, however, that it is a test of the "acquisition" phase of learning which is quite sensitive to *impairment of memory* in the elderly; and even this simple use may be of some service in the geriatric

https://doi.org/10.1192/bjp.105.439.440 Published online by Cambridge University Press

clinic, for example, in the objective description of a patient's symptoms, in the assessment of the effects of treatment, and possibly even in prognosis.

Test Material· The test itself is of the ordinary paired-associate learning type, employing verbal presentation and the simple recall form of reproduction. Two alternative sets of stimulus-response material (whose statistical equivalence has been demonstrated (Inglis (3)) have been used, as follows:

	Form A		*Form B*	
	Stimulus	*Response*	*Stimulus*	*Response*
(a)	Cabbage	Pen	Flower	Spark
(b)	Knife	Chimney	Table	River
(c)	Sponge	Trumpet	Bottle	Comb

The patient is given instructions much like those for the Paired Associate item of the Wechsler Memory Scale (10). He is told, "I am going to read you a list of words two at a time. Listen carefully because after I finish I shall expect you to remember the words that go together. For example, if the words were 'East—West', 'Gold—Silver', then when I said the word 'East' I should expect you to answer 'West', and when I said the word 'Gold' you would, of course, answer (pause) . . . 'Silver'. Do you understand? Now listen carefully to the list as I read it."

The examiner allows an interval of about 5 seconds between the pairs of words when reading the list. After the presentation of the list another 5-second interval is allowed. The stimulus words are then presented one by one in random order. Thus, the examiner asks, "What went with 'Flower'?" The patient is then allowed about 10 seconds to reply and if his answer is correct the examiner says "That's right". If the reply is wrong he says "No", and supplies the correct association. If no reply is given by the patient within about 10 seconds the correct response is again supplied by the examiner.

The material is presented in this way until the patient gets 3 consecutive correct responses for each stimulus word or until each stimulus word has been presented 30 times, whichever is sooner. The examiner stops presenting each stimulus as its criterion is reached. Supposing that one pair is learned to the criterion before the other two then the appropriate stimulus word is dropped out and the remaining pair are simply alternated.

The score on this test is the sum of the number of times the stimulus words are presented before the criterion is reached; for example, the score of the following patient would be 11.

	Initial presentation	*1*	*2*	*3*	*4*	*5*	*6*	.....	*30*
a.	−	−	+	−	+	+	+		
b.	−	+	−	+	+	+			
c.	−	−	+	−	+	+	+		

It can be seen that, with this method of scoring, the minimum (i.e. the "best" score) is 3, and the maximum (or the "worst") score is 93.

Patients: The test has been given to 36 patients. These comprised an experimental group of 18 elderly persons clinically estimated to be suffering from undoubted memory disorder. This estimate was made by the consultant psychiatrist in charge of the Maudsley and Bethlem Royal Hospitals Geriatric Unit, Dr. Felix Post, on the basis of a full psychiatric investigation of each

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patient. The main considerations entering into his judgment were, (i) that evidence emerged during the doctor's examination that the patient's memory was impaired, and (ii) that the patient's relatives complained about his memory.

A control group of another 18 patients without memory disorder was also tested. Each of these was matched as closely as possible with a member of the experimental group in terms of chronological age and also in terms of the Verbal Scale Weighted Score (VSWS) as obtained from either the Wechsler-Bellevue Scale (9) or the Wechsler Adult Intelligence Scale (11). There were 7 men and 11 women in each group. The age range of the experimental group was 56 to 82, the age range of the control group was 58 to 81.

Results. The differences between the groups on the relevant variables (i.e. Age, VSWS, and the Auditory Recall (AR) score) were estimated by Sandler's A-test (7); the results secured are shown in Table 1.

TABLE I

Means, standard deviations, and the significance of the differences between the means of the criterion groups on Age, VSWS, and AR scores.

	Experimental Group		*Control Group*		*A*	*p*
	m	*sd*	*m*	*sd*		
Age	68·56	7·16	69·61	6·41	·507	NS
VSWS	33·50	8·73	32·83	7·10	4·500	NS
AR	59·00	25·06	13·00	6·16	·070	<·001

Since the distribution of scores on the learning test was not normal in both groups a histogrammatic representation of the scores obtained by members of these groups provides a more convenient description of the facts for clinical purposes (see Fig. 1).

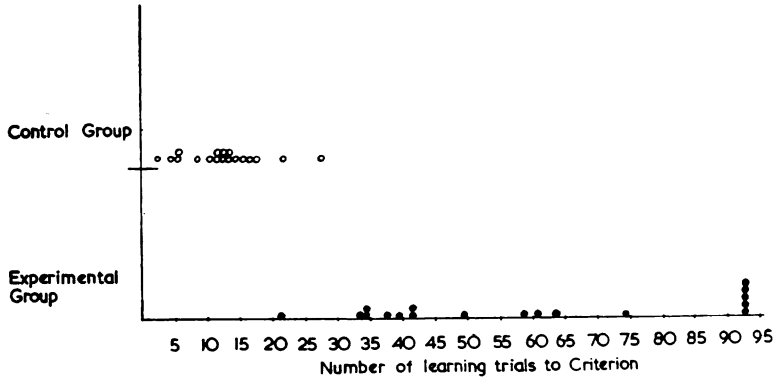


FIG. 1.—Raw data on the paired-associate learning test (AR) for both experimental and control groups.

It has already been pointed out that one disadvantage of many of the so-called "memory tests" currently available is that performance on them is closely related to performance on intelligence tests. To examine this aspect of the present test, rank-difference correlations (McNemar (6)) were run between the VSWS measure and the AR results, and also Age scores and AR results for both groups, the results being as follows:

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Experimental Group:	VSWS × AR rho = −0·34	Age × AR rho = 0·08
Control Group	VSWS × AR rho = −0·03	Age × AR rho = 0·09

None of these correlations approach an acceptable level of significance and we may therefore conclude that the AR test is testing something other than general intellectual ability, at least as far as this is measured by the Wechsler Verbal Scale.

The Auditory Recall test is currently being further assessed in:

(i) An experiment designed to secure a cross-validation of the effects of the vitamin preparation "Parentrovite" on memory function in elderly patients (Krawiecki, Couper and Walton (4)).

(ii) In a prognostic study of elderly psychiatric patients with "doubtful" memory disorder. In the latter study cases whose memory status is not clearcut are being tested and will be followed up psychiatrically, after an appropriate interval, in order to find out if the test has predictive as well as descriptive value.

(iii) It is also being used in an investigation to examine the claim that "unilateral ECT" (Lancaster, Steinert and Frost (5)) may produce less mental impairment than bilaterally induced seizures.

SUMMARY

A paired-associate learning test for use with elderly psychiatric patients has been outlined. The test has been shown to be of some value descriptively, and other aspects of its possible clinical usefulness are currently being tested.

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https://doi.org/10.1192/bjp.105.439.440 Published online by Cambridge University Press