

S & M Test -- Information (May 1979)

Introduction

The S & M Test is a quick test of mental rotation ability based on the task devised by Shepard and Metzler (1971). A similar test has been constructed by Vandenberg and Kuse (1978). The S & M is a speed test, whereas Vandenberg and Kuse's test measures only accuracy.

Construction

A pilot version was given to 179 police cadets and it correlated significantly with their ability to interpret relief maps ($r = .41$) (Audley, Bickmore and Phillips, 1974). On the basis of error data, a number of items were changed to produce the present version of the test. The norms given below come largely from university admission candidates.

Instructions and Scoring

These spoken instructions should be read slowly.

"Please look at the first example on the front page. There are two pictures of the same, rather odd-looking object. You can see they are the same because you only have to turn one object a little way to make it look like the other one. But in the second example, the one on the right, the objects are different. You can see that however much you rotated one of the objects, it would never look like the other one.

"When I tell you to start, you should work through the booklet looking at each pair of pictures and decide whether they are two pictures of the same object, or two different objects, putting a tick against 'same' or 'different'. The pictures are numbered from one to twenty. Work through in this order as fast as you can without making mistakes. If you find you are stuck on a very difficult one, leave it out and go on to the next one, but you must try them in the numbered order.

"You will have just two minutes to do as many as possible. Please turn over and start."

Begin timing 2 minutes from the word "start".

Scoring: Count the number of correct items, and subtract the number incorrect. Negative scores are possible, but rare. The answers are (s = same, d = different): 1d, 2s, 3s, 4s, 5d, 6s, 7d, 8d, 9d, 10s, 11s, 12d, 13d, 14s, 15d, 16s, 17d, 18d, 19s, 20s.

Norms and Reliability

Test/Retest Correlation over 9 months with university students: .63 (n = 85).

Norms for admission candidates to the Psychology Department, University College London. Age range 17-20 years,

including United Kingdom residents only.

	Men	Women
N	59	138
Mean	12.1	8.5
S.D.	4.0	4.4
Lower Quartile	10.1	6.9
Median	12.8	9.0
Upper Quartile	15.6	11.9

A large sex difference is evident. According to Bock (1973), O'Connor's law states, "About a quarter of women score above the median score of men on spatial ability." With the S & M test, only 17 per cent of women were above the men's median, and this deviates significantly from the 25 per cent predicted by O'Connor's law (χ^2 , $p < .05$, two tail).

Some correlations with the S & M test given below are from university admission candidates and include United Kingdom residents only.

Mill Hill Vocabulary test. $r = .02$, $n = 243$.

Eysenck Personality Inventory. Extraversion $r = -.07$,
neuroticism $r = -.17$, $n = 109$.

General Classification Test Part I. A type of embedded figures test. $r = .45$, $n = 109$.

Cube Cutting. A spatial test with no speed component (see Richardson, 1977). $r = .31, n = 94.$

Picture Memory. Recognition memory for twenty Bewick woodcuts. $r = .32, n = 94.$

Comparison with Vandenberg and Kuse's Test

The S & M test is less reliable than Vandenberg & Kuse's (1978) test but is considerably quicker to administer. The S & M test has a time limit of 2 minutes whereas Vandenberg and Kuse's test takes an average of 10 minutes and in group testing, where the slowest must be allowed to finish, it takes about 15 minutes. These figures do not include the time taken to give instructions which are shorter on the S & M. Correlation data from 106 admission candidates is given below where the S & M test is compared with Vandenberg and Kuse's test (VAN) and the Colorado Perceptual Speed test (COL). On the two latter tests the score was the number correct on both parts. The time taken to complete Vandenberg and Kuse's test is also shown (VTI).

	S&M	VAN	VTI	COL	SEX	AGE
S&M	-	64	01	09	-29	-19
VAN	64	-	20	-01	-16	-13
VTI	01	20	-	-28	21	12
COL	09	-01	-28	-	-06	-03
SEX	-29	-16	21	-06	-	01
AGE	-19	-13	12	-03	01	-

Availability

At present, copies of the test are available from ~~Richard J. Phillips~~ or Richard E. Rawles, Department of Psychology, University College London, Gower Street, London WC1E 6BT

References

Audley, R. J., Bickmore, D. P. & Phillips, R. J. Legibility criteria for the efficient use of maps. Final report to the United Kingdom Social Science Research Council for project HR2167, 1974.

Bock, R. D. Word and image: sources of verbal and spatial factors in mental test scores. Psychometrika, 1973, 38, 437-457.

Richardson, A. The meaning and measurement of memory imagery. British Journal of Psychology, 1977, 68, 29-43.

Shepard, R. N. & Metzler, J. Mental rotation of three-dimensional objects. Science, 1971, 171, 701-703.

Vandenberg, S. G. & Kuse, A. R. Mental Rotations, a group test of three-dimensional spatial visualisation. Perceptual and Motor Skills, 1978, 47, 599-604.

Note: Please cite the test and these notes as Rawles and Phillips (1979).

Important.
Do not open this
booklet until you
are told.

Name.

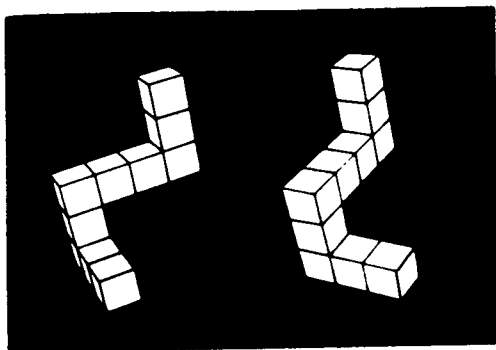
Sex.

Age.

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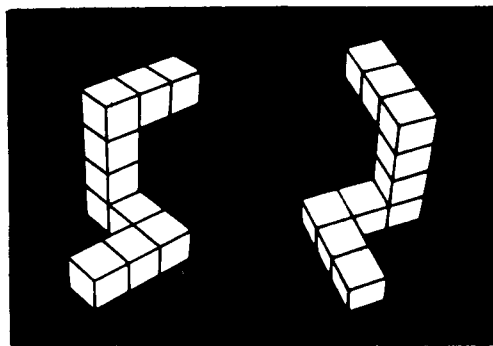
Look at each pair of pictures and decide whether they are two pictures of the same object, or two different objects. Put a tick against the appropriate word. Work as fast as you can without making mistakes.

Example.



Same

Different



Same

Different