

# d2-R

Test of Attention – Revised  
Technical Report

Another Sample  
ID 467-500  
Date 14/04/2016

## OVERVIEW

### Structure of this report

- Narrative
  - Introduction*
  - Verbal interpretation of standardised scores*
  - Results*
- Profile sheet
- Table of scores
- Scale details

Only qualified psychologists or appropriately trained test administrators should interpret psychometric test results. Please follow the relevant guidelines from the appropriate professional body.



## INTRODUCTION

### The test

The online d2-R is the computerised version of the d2 Test of Attention – Revised (Brickenkamp, Schmidt-Atzert & Liepmann, 2016). The test measures the ability to concentrate and sustain attention. The task is to pick out target symbols, from among similar symbols, under pressure of time. The test stands out for its accuracy of measurement, and there is extensive evidence that it does indeed measure the constructs of attention and concentration.

The online version is closely aligned with its paper and pencil counterpart. The test taker is asked to search for and mark certain target symbols on the screen: instances of the letter 'd' with two dashes. The instructions explicitly introduce all three variants of the target (both dashes above, both dashes below, one dash above and one dash below) and they also show the different distractors ('p' with a number of dashes, 'd' with other than two dashes). A symbol is marked by moving the mouse over it and left-clicking (or, on a touchscreen, by tapping the symbol with a finger); this draws a diagonal line through the symbol, as though it had been crossed out with a pencil. Symbols are processed from left to right, one row at a time. The task is first practised without a time limit. At this stage, the test taker is alerted to every error and asked to correct it at once (a wrong mark is removed with a second click or finger tap). The task is then practised with a time limit. Now feedback occurs at the end: all errors are flagged and must be corrected before the test can begin.

The test itself consists of 14 screens in succession, each having 60 symbols laid out in six rows of ten. All instances of 'd' with two dashes are to be marked. The instruction is to work quickly, without making mistakes. Processing time is limited to 20 seconds per screen, with a one-second pause between screens.

Three main variables are computed and then reported as norm-referenced scores:

- Concentration Performance (CP). This score is defined as the number of 'hits' (targets which were marked, PT – EO) minus the number of distractors which were marked (errors of commission, EC). The CP score is a measure of processing speed adjusted for errors made.
- Processed Targets (PT). This is the number of target symbols in the 'processed' portion of the test: up to and including the last response marked on each screen. It equals the number of 'hits' (targets found) plus the number of targets which were overlooked (EO). The PT score is a measure of processing speed without consideration of accuracy.
- Accuracy (E%). The raw score is the 'relative' error rate, determined by dividing the total number of errors (errors of omission and commission, EO + EC) by the number of processed targets (PT), and expressing this fraction as a percentage. This score is then norm-referenced in reverse, so that a high standard score reflects highly accurate responding.

For three further variables, only raw scores are reported:

- Errors of Omission (EO). This is the number of targets that the test taker 'processed' (see above) but omitted to mark. These mistakes are easily made, so they occur often. The raw error rate E% (see above) is usually close to the omission rate, since errors of commission rarely occur.
- Errors of Commission (EC). This counts how often the test taker marked a distractor ('d' with the wrong number of dashes or any instance of 'p'). These errors are generally rare in d2-R test taking. If several of these errors occur, this may indicate that the test taker's approach was not in accordance with the instructions. If a test taker selects symbols arbitrarily, EC will be very large (usually well over 100).
- Errors of Commission of 'Letter' type (ECL). These are the errors of commission in which only the letter was wrong (letter 'p' with two dashes). In general, test takers find 'p' easier to avoid than 'd' with a wrong number of dashes. Elevated ECL scores are particularly indicative of the instructions not being adhered to.

## Validity checks

Certain unusual score patterns may indicate that the participant responded in an uncooperative or non-regulation manner. If such patterns are found, this is flagged up in the 'Table of scores' later in this report. The following patterns are checked for:

- Symbols seemingly marked at random (arbitrarily). In such cases, errors of commission will be extremely frequent ( $EC > 100$  if working quickly) and the CP raw score will generally be negative. This is because the test has considerably more distractors than targets. If symbols are marked at random, errors of commission (EC) almost certainly outnumber correctly processed targets ( $PT - EO$ ), leading to a negative CP raw score ( $CP = PT - EO - EC$ ). Random responding can occur if the instructions were not understood or remembered, or if the test taker was not cooperative.
- Simulation of low performance. Test takers trying to fake low performance usually commit conspicuously many errors of 'letter' type (ECL at least two, rarely more than twenty). The total number of errors of commission (EC) is usually elevated, because some instances of 'd' with the wrong number of dashes are deliberately marked. If the CP raw score is negative, however, this suggests random responding rather than faking.

## Graphical illustration of standardised scores

Standardised scores consider a test taker's performance in the context of a suitable reference group of other people (also known as the norm group). The reference group used in this report was 'UK population, male and female, 18–55 years'.

At the very end of this report (in the section entitled 'Scale details') the three standardised d2-R scores are illustrated graphically. In these graphs, the test performances of the reference group are displayed as so-called normal curves, and the test taker's score is plotted as a red line.

The horizontal axis represents test performance on the T-score scale from 20 to 80. This scale is calibrated such that its midpoint of 50 is the average score for the reference group. The more a performance exceeds this average, the further right along the axis it appears. Performances lower

than average appear to the left.

The height of the curve shows how frequently each score occurred in the reference group. Scores close to average are very common; hence the curve is highest in the middle. Scores become rarer the more they differ from average, so the curve falls away to both sides.

The graph shows at a glance whether the test taker's score (red line) was above or below average, and by how much. It also makes visible what proportion of individuals in the reference group had higher or lower test scores. This is shown by the area under the curve to the left or right of the red line. If the line is in the middle (at 50), then 50 per cent of the reference group have higher test scores and 50 per cent have lower test scores. About 68 per cent of all test scores fall within the range 40 to 60, and about 95 per cent of all scores fall within the range 30 to 70. If a test taker scores 70, only about 2.5 per cent of the reference group will have attained even higher test scores. The area under the curve to the right of 70 makes up approximately 2.5 per cent of the total area.

Brickenkamp, R., Schmidt-Atzert, L. & Liepmann, D. (2016). *The d2 Test of Attention – Revised. A Test of Attention and Concentration*. Oxford: Hogrefe.

## VERBAL INTERPRETATION OF STANDARDISED SCORES

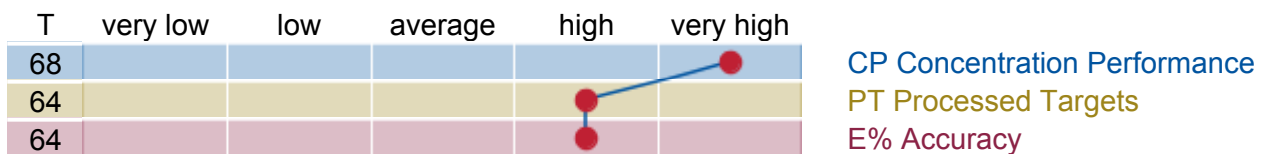
This report follows the suggestions in the d2-R test manual for assigning verbal score bands to standardised scores. Scores within half a standard deviation of the mean score are classified as 'in the average range'. Scores outside this range are considered 'high' or 'low'. Scores that lie more than one and a half standard deviations from the mean are considered 'very high' or 'very low'. When using the T-score scale, this leads to the following classification:

- A T-score below 35 is significantly below average. A performance in this range can be interpreted as 'very low'. Approximately 7 per cent of the reference group obtained scores in this range.
- T-scores between 35 and 44 can be classified as below average. Performances in this range can be referred to as 'low'. About 24 per cent of the reference group obtained scores in this range.
- T-scores between 45 and 55 are classified as 'in the average range'. A performance in this range can be regarded as 'average'. This range comprises about 38 per cent of the reference group.
- T-scores between 56 and 65 can be classified as above average. Performances in this range can be interpreted as 'high'. About 24 per cent of the reference group obtained scores in this range.
- A T-score over 65 is significantly above average. The performance can be described as 'very high'. Approximately 7 per cent of the reference group obtained scores in this range.

## RESULTS

Reference group: 'UK population, male and female, 18–55 years'.

### Principal scores and interpretation



#### CP Concentration Performance

The score achieved on the Concentration Performance scale (CP) can be classified as very high. Compared with the reference group, the test taker's error-corrected pace of work in the d2-R was well above average. The result suggests a very high ability to concentrate when compared with this group.

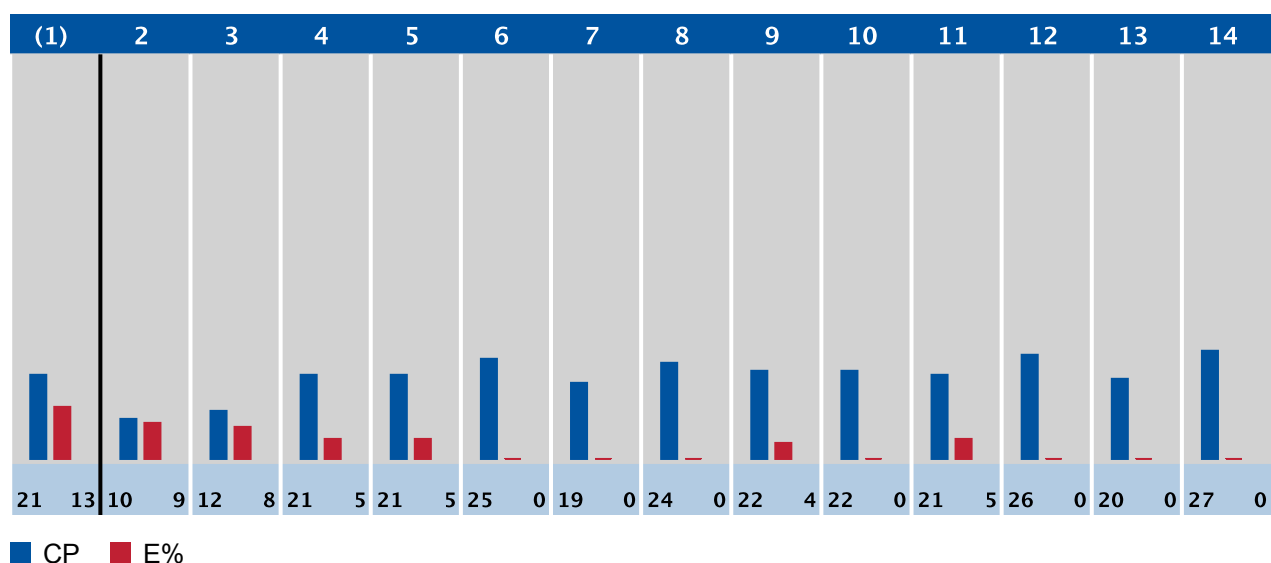
#### PT Processed Targets

The score achieved on the Processed Targets scale (PT) can be classified as high. The number of target symbols processed by the test taker was above average when compared with the reference group. The result suggests a high pace of working.

#### E% Accuracy

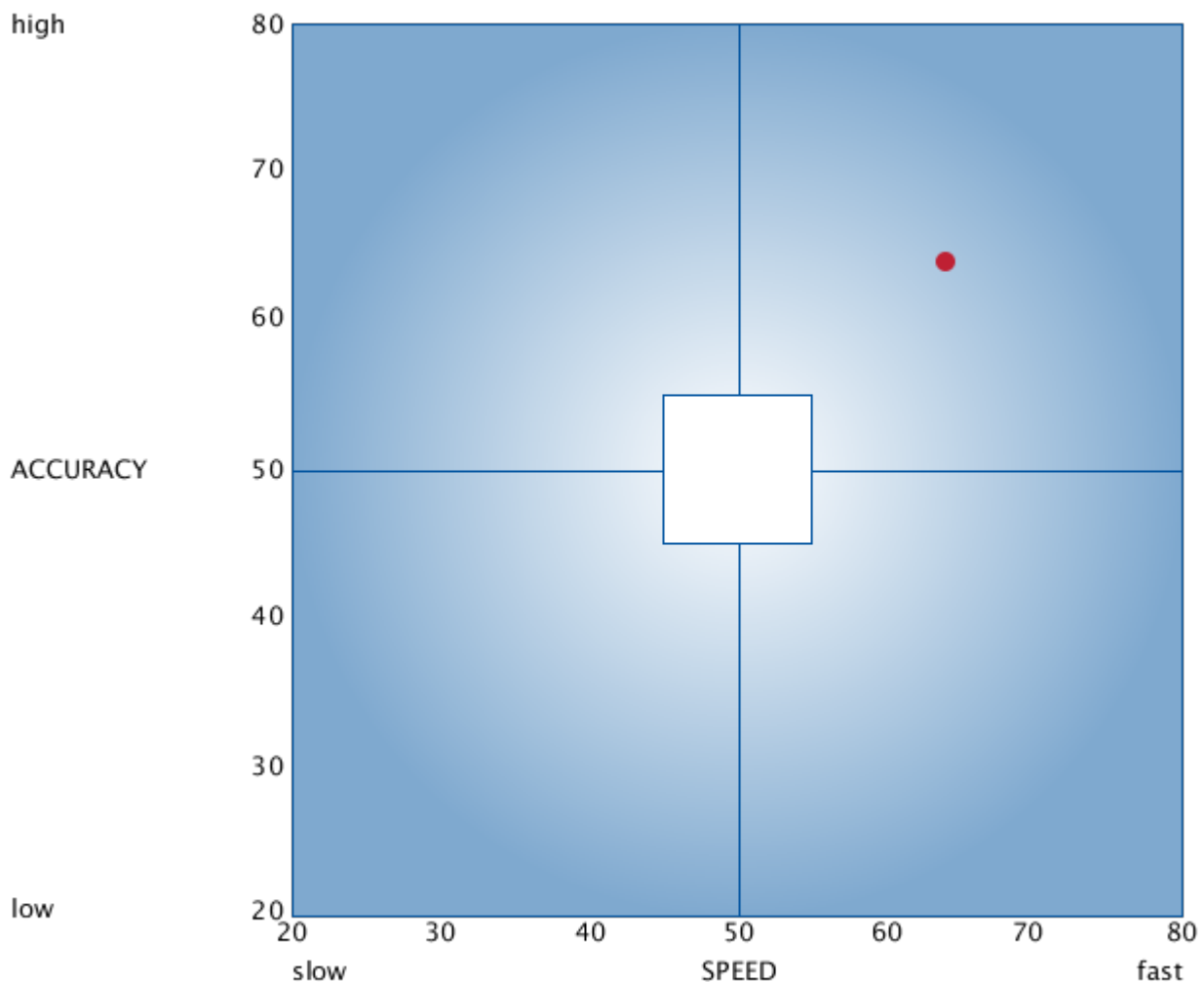
The score achieved on the Accuracy scale (E%) can be classified as high. In other words, compared to people in the reference group, the test taker showed a below-average error rate. The result suggests a high accuracy of working.

### Evolution of CP and E% during the test: raw scores for each screen of symbols



### Accuracy vs Speed (E% in relation to PT)

The working style exhibited by the test taker during the test is summarised in the following diagram. The horizontal axis shows the T-score achieved on the Processed Targets scale (PT), indicating the test taker's working speed compared to the reference group. The vertical axis shows the T-score achieved for Accuracy (E%). The white central square illustrates the average range for the reference group (T-scores from 45 to 55).

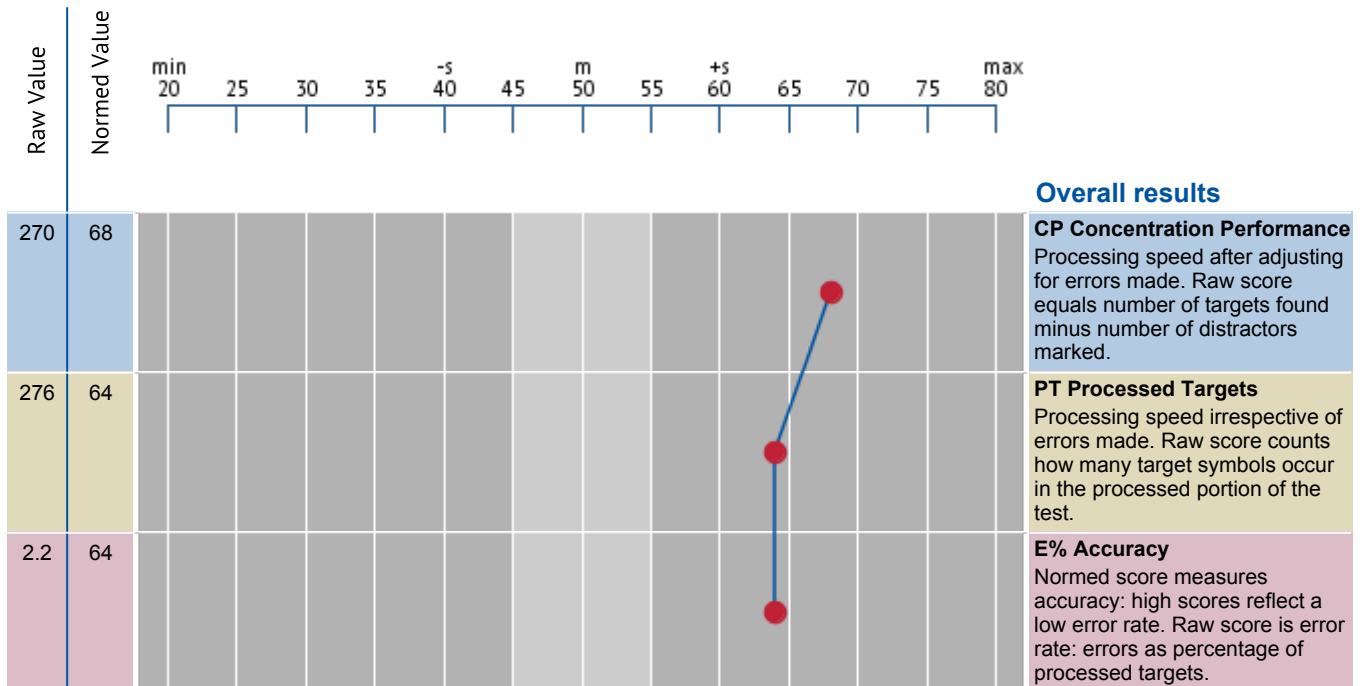


Compared to the reference group, the test taker's working style during the d2-R can be classified as high in both speed and accuracy.

## PROFILE SHEET

d2 Test of Attention – Revised |

UK population, male and female, 18–55 years - T Score (50+10z)



**Another Sample**

Assessment date 14/04/2016 | Age 46;0\* | Gender m



## TABLE OF SCORES

d2 Test of Attention – Revised |  
UK population, male and female, 18–55 years - T Score (50+10z)

Scale	Raw val	Normed val
<b>Overall results</b>		
CP Concentration Performance	270	68
PT Processed Targets	276	64
E% Accuracy	2.2	64
EO Errors of Omission	0	
EC Errors of Commission	6	
ECL Errors of Commission of 'Letter' type	4	
	Raw score suggests simulation of low performance	

d2 Test of Attention – Revised |  
UK population, male and female, 18–55 years - T Score (50+10z)

Scale	Raw val
<b>Screen 1</b>	
01 CP Concentration Performance	21
01 PT Processed Targets	24
01 E% Error Rate	13
01 EO Errors of Omission	1
01 EC Errors of Commission	2
01 ECL Errors of Commission of 'Letter' type	1
<b>Screen 2</b>	
02 CP Concentration Performance	10
02 PT Processed Targets	11
02 E% Error Rate	9
02 EO Errors of Omission	0
02 EC Errors of Commission	1
02 ECL Errors of Commission of 'Letter' type	0

d2 Test of Attention – Revised |  
UK population, male and female, 18–55 years - T Score (50+10z)

Scale	Raw val
<b>Screen 3</b>	
03 CP Concentration Performance	12
03 PT Processed Targets	13
03 E% Error Rate	8
03 EO Errors of Omission	0
03 EC Errors of Commission	1
03 ECL Errors of Commission of 'Letter' type	1
<b>Screen 4</b>	
04 CP Concentration Performance	21
04 PT Processed Targets	22
04 E% Error Rate	5
04 EO Errors of Omission	0
04 EC Errors of Commission	1
04 ECL Errors of Commission of 'Letter' type	1
<b>Screen 5</b>	
05 CP Concentration Performance	21
05 PT Processed Targets	22
05 E% Error Rate	5
05 EO Errors of Omission	0
05 EC Errors of Commission	1
05 ECL Errors of Commission of 'Letter' type	0
<b>Screen 6</b>	
06 CP Concentration Performance	25
06 PT Processed Targets	25
06 E% Error Rate	0
06 EO Errors of Omission	0
06 EC Errors of Commission	0
06 ECL Errors of Commission of 'Letter' type	0

d2 Test of Attention – Revised |  
UK population, male and female, 18–55 years - T Score (50+10z)

Scale	Raw val
<b>Screen 7</b>	
07 CP Concentration Performance	19
07 PT Processed Targets	19
07 E% Error Rate	0
07 EO Errors of Omission	0
07 EC Errors of Commission	0
07 ECL Errors of Commission of 'Letter' type	0
<b>Screen 8</b>	
08 CP Concentration Performance	24
08 PT Processed Targets	24
08 E% Error Rate	0
08 EO Errors of Omission	0
08 EC Errors of Commission	0
08 ECL Errors of Commission of 'Letter' type	0
<b>Screen 9</b>	
09 CP Concentration Performance	22
09 PT Processed Targets	23
09 E% Error Rate	4
09 EO Errors of Omission	0
09 EC Errors of Commission	1
09 ECL Errors of Commission of 'Letter' type	1
<b>Screen 10</b>	
10 CP Concentration Performance	22
10 PT Processed Targets	22
10 E% Error Rate	0
10 EO Errors of Omission	0
10 EC Errors of Commission	0
10 ECL Errors of Commission of 'Letter' type	0

d2 Test of Attention – Revised |  
UK population, male and female, 18–55 years - T Score (50+10z)

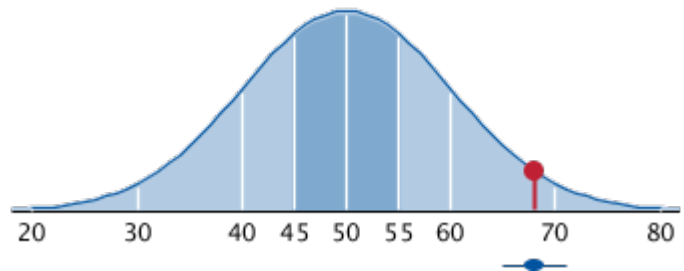
Scale	Raw val
<b>Screen 11</b>	
11 CP Concentration Performance	21
11 PT Processed Targets	22
11 E% Error Rate	5
11 EO Errors of Omission	0
11 EC Errors of Commission	1
11 ECL Errors of Commission of 'Letter' type	1
<b>Screen 12</b>	
12 CP Concentration Performance	26
12 PT Processed Targets	26
12 E% Error Rate	0
12 EO Errors of Omission	0
12 EC Errors of Commission	0
12 ECL Errors of Commission of 'Letter' type	0
<b>Screen 13</b>	
13 CP Concentration Performance	20
13 PT Processed Targets	20
13 E% Error Rate	0
13 EO Errors of Omission	0
13 EC Errors of Commission	0
13 ECL Errors of Commission of 'Letter' type	0
<b>Screen 14</b>	
14 CP Concentration Performance	27
14 PT Processed Targets	27
14 E% Error Rate	0
14 EO Errors of Omission	0
14 EC Errors of Commission	0
14 ECL Errors of Commission of 'Letter' type	0

## SCALE DETAILS

### CP Concentration Performance

UK population, male and female, 18–55 years - T Score (50+10z)

Raw val	270
Normed val	68
Confidence interval	[65 - 71]



This parameter describes the ability to concentrate. It depends on the speed at which the test was processed and, to a lesser extent, on the number of errors. The score is defined as the number of target symbols which were found (PT – EO) minus the number of distractors which were marked (EC). The score cannot be inflated by skipping ahead to later portions of the test, because the resulting increase in PT is exactly cancelled out by the increase in EO; but nor is there a penalty for responding in such a way. The score is also relatively resistant to distortion arising from the varied emphasis that test takers may place on speed versus accuracy.

#### Low Value

Low norm-referenced scores suggest a below-average ability to concentrate.

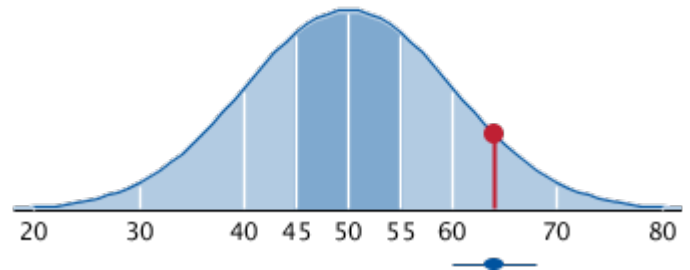
#### High Value

High norm-referenced scores suggest an above-average ability to concentrate.

## PT Processed Targets

UK population, male and female, 18–55 years - T Score (50+10z)

Raw val	276
Normed val	64
Confidence interval	[60 - 68]



This variable captures the speed at which the test was processed. The raw score is the number of target symbols lying in the 'processed' portion of the test: up to and including the last response recorded on each screen. In this portion of test, targets that were found have obviously been processed, and targets that were not found are assumed to have been processed too, just not carefully enough. Thus, PT equals the number of 'hits' (targets found) plus the number of targets which were overlooked (EO). If the test is processed without mistakes, the PT and CP raw scores are the same.

### Low Value

Low norm-referenced scores may indicate that the test taker is comparatively slow at processing simple tasks. However, processing speed is partly influenced by how much emphasis is put on accuracy. For example, a test taker may consciously choose to work especially slowly in order to minimise the number of mistakes.

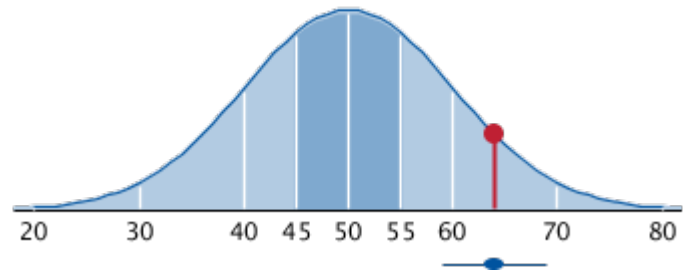
### High Value

High norm-referenced scores may indicate that the test taker can process simple tasks very quickly. However, if such speed came at the cost of incurring a high number of errors, then this trade-off may indicate a processing speed that exceeded the maximum speed at which the test taker can maintain an acceptable standard of accuracy.

## E% Accuracy

UK population, male and female, 18–55 years - T Score (50+10z)

Raw val	2.2
Normed val	64
Confidence interval	[59 - 69]



E% is a measure of the accuracy with which the test was processed. The raw score is the error rate: the total number of errors (errors of omission and errors of commission) divided by the number of processed targets (PT) and then multiplied by 100 to express this ratio as a percentage. The larger the raw score, the less accurate was the processing of the test. For clarity, the norm-referenced scores are reversed: a high normed score reflects a high level of accuracy achieved during the test.

### Low Value

Low norm-referenced scores may indicate that the test taker makes a higher than average number of mistakes when processing simple tasks. However, processing accuracy is partly influenced by how much emphasis is put on speed. Thus, working at an especially fast pace in order to process as many symbols as possible can increase the number of mistakes.

### High Value

High norm-referenced scores may indicate that the test taker performs simple tasks with a high degree of care and accuracy. However, processing accuracy is partly influenced by how much emphasis is put on speed. A low number of mistakes could be the result of processing the test at a deliberately slow pace in order to minimise the error rate.

## EO Errors of Omission

Raw val 0

This is the number of targets ('d' with two dashes) that the test taker passed over and omitted to mark. These errors are relatively easy to make, so they occur comparatively often.

## EC Errors of Commission

Raw val 6

This is the number of distractors ('d' with other than two dashes, 'p' with any number of dashes) that the test taker marked. In general, these errors are comparatively rare.

## ECL Errors of Commission of 'Letter' type

Raw val 4

### Raw score suggests simulation of low performance

This counts how many distractors of the form 'p' with two dashes were marked. In general, these errors are rare. Elevated values may indicate that the test instructions were not being adhered to.