Carrus manual

Rationale

The Carrus was developed as a quick and efficient screener of underlying abilities. Academic research suggests that ability tests are excellent tools for assessing for and predicting job success. This enables organisations to select the right candidates for a role.

The Carrus assessment suite includes tests of non verbal ability, verbal ability, numerical ability, and mechanical reasoning. These are skills which predict successful performance in a wide range of roles. Specifically, non verbal reasoning is a strong predictor of analytical and reasoning skills across a range of occupational contexts and is a good proxy of global underlying ability. The fact that the Carrus test suite also does not require much time to administer means subtests can be used at many stages of the recruitment process and can be used in conjunction with other tests of ability or personality.

Development

Academic research investigating the constructs that underlie ability was used to direct the development of this assessment battery. Subsequently, pilot studies using school leavers as participants were used to design and refine items chosen for the four subtests. As well as assisting with item selection, these studies helped evaluate any cultural bias and were used to evaluate administration guidelines.

After the initial test was developed, items were reviewed by experts to minimise the impact of gender, race, ethnicity and English as an additional language on test performance. Improvements were then made to items to minimise any adverse impact.

The responses of over 250 UK 16–25-year-olds were used to standardise items in the Carrus suite. Tests within the Carrus suite have been designed to be used by people from all educational backgrounds within the above age range (i.e., 16-25).

Non verbal reasoning

This is an abstract test which assesses the respondent's ability to see patterns and trends in organisational data and to make strategic decisions. Items involve incomplete patterns that need to analysed. Respondents then complete patterns by selecting one of several options. This test is particularly useful for roles that require abstract reasoning or fault finding.

Verbal reasoning

The verbal reasoning test measures how well an individual will cope in a role that requires analysing and making judgements about complex written information, such as information contained in letters, reports and emails. Respondents read passages of text and are required to answer comprehension questions based on the same. This assesses their reading and comprehension skills.

Numerical reasoning

This test measures respondents ability to correctly interpret numerical information and perform basic calculations. It also assesses an individual's ability to make logical inferences using numerical information. Again, numerical or financial information is presented, followed by questions about the information.

Mechanical reasoning

This test measures a respondent's ability to correctly apply physical and mechanical laws to a range of processes. Mechanical systems are presented pictographically and respondents are required to select diagrams that best represent the forces in action. This test is particularly suited to applicants for mechanical or technical roles.

Reliability and validity

Reliability

Tests need to have good levels of reliability for us to know that they are accurate. Measures of consistency (internal reliability) indicate how well items within a scale correlate with one another; while measures of stability (test re-test reliability) indicate whether individuals with the same underlying abilities tend to get the same score each time they take the test. Both of these measures help us determine how accurate a measure is.

Reliability coefficients have been calculated for the Carrus and the results are outlined below:

Internal reliability		**Stability (test re-test reliability)**	
Test	**Coefficient**	**Test**	**Coefficient**
Non verbal reasoning	0.76	Non verbal reasoning	0.81
Verbal reasoning	0.81	Verbal reasoning	0.69
Numerical reasoning	0.69	Numerical reasoning	0.70
Mechanical reasoning	0.77	Mechanical reasoning	0.79

Validity

The validity of a test uses research to assess how well the test will predict occupational success. An analysis of validation studies yields the following coefficients: non verbal reasoning, 0.24; verbal reasoning, 0.2; numerical reasoning, 0.19; mechanical reasoning, 0.28. These coefficients suggest the measures predict work success significantly better than chance.

Equal opportunities

Adverse impact

When individuals from certain groups (e.g., gender, age or ethnicity) tend to achieve lower scores on a certain test, this test is said to have an adverse impact on the group. Organisations will need to show that the construct or psychological skill they are testing for is relevant to the job role, otherwise, by not accepting these applicants, they are committing unlawful discrimination.

Group differences

Even when tests are used correctly, performance differences between groups are sometimes observed. For example, those who speak English as an additional language are likely to have more difficulty with verbal reasoning assessments.

Administration and scoring

The Carrus is administered and scored electronically. All relevant information is provided in the test portal.

Norm group

The Carrus norm group is a single pool of individuals representing UK 18–25-year-olds. The average age of the group is 20.5 years, whilst 55% of the group is male and 45% female. The educational background of the group ranges from no formal qualifications up to degree level. Most of the norm group has reached GCSE level, whilst 10% hold a degree. The group consists of approximately 89% white European individuals.

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Summary statistics

The summary statistics for the Carrus norm group working in specific industry sectors are outlined below:

Human resources

	NVR	VR	MR	NR
Mean	23.14	14.16	21.73	18.41
SD	4.22	3.1	4.63	3.4

Call centre operations

	NVR	VR	MR	NR
Mean	21.6	15.12	22.1	18.66
SD	3.2	3.65	3.96	3.2

Sales

	NVR	VR	MR	NR
Mean	22.65	14.81	21.23	18.42
SD	4.3	3.1	4.4	3.37

Research and development

	NVR	VR	MR	NR
Mean	24.2	14.62	22.1	20.26
SD	3.97	2.98	4.36	2.4

Norming

Norming is undertaken automatically by the system. The system produces STEN scores.

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