



Rookwood Driving Battery (RDB)

Overview

Driving a vehicle in traffic requires multiple cognitive, physical and behavioural skills. It also carries an inherent risk, so accidents do occur on a regular basis and mostly because of driver error or misjudgement.

Beyond the learning phase of driving, most of the skills involved in manoeuvring a car in space and driving in traffic are relegated to automatic processes beyond conscious awareness, many of which rely on intact neuropsychological systems. The Rookwood Driving Battery (RDB) is a simple screen for the core neuropsychological skills needed to drive and was designed specifically to assess fitness to drive in the neurological population.

The battery is well suited for use in driving assessment centres. It has also been developed for use as a screening tool in community and hospital settings to decide whether to refer to a specialist driving assessment centre. The battery is particularly suitable for use by psychologists and occupational therapists in older adult and neurological settings.

Description of subtests and indices

The subtests used in the battery were chosen not only for their suitability in terms of simplicity and the function tested but for their proven clinical effectiveness in everyday assessment and rehabilitation practice.

Visual perception

Four subtests are designed to assess visual perception. The first three of these were taken from the Visual Object and Spatial Perception battery (VOSP; Warrington & James, 1991):

- **Incomplete Letters:** The Incomplete Letters test contains 20 test items and requires examinees to name the letter of the alphabet that is represented by a degraded black and white illustration.
- **Position Discrimination:** Examinees are shown two squares with a dot inside each and asked to determine which dot is placed in the exact centre of the square.
- **Cube Analysis:** The Cube Analysis task requires examinees to determine how many bricks have been used to create a 3D arrangement, represented by a two-dimensional line drawing.
- **Es and Fs:** The Es and Fs test is a simple letter cancellation task and was originally used to screen for visual neglect. Examinees are given 100 seconds to find and mark target items within a larger array of distracter letters.

Praxis Skills

Five subtests are included to assess praxis skills. These tests examine two main aspects of motor production:

Cultural or Symbolic Movement

The first part examines the basic ability to produce cultural or symbolic movement beyond locomotor movement and contains three subtests.

- **Copying Hand Movements:** The subject is asked to copy a set of six simple hand movements demonstrated by the examiner.
- **Gestures:** Involves the examinee being asked to perform a gesture from a verbal description or name.
- **Use of Objects:** A more complex set of actions involving the mimed use of an object in response to a verbal cue is demanded.

Rule-bound Action

The second part of praxis screening taps the executive level of rule-bound action. This consists of two subtests.

- **Tapping:** This test requires the individual to produce a simple movement (one or two taps) in response to the tapping produced by the examiner. Apart from remembering the simple rule, it requires the individual to inhibit the more basic urge to copy the examiner's tap and instead do the opposite to the examiner.
- **Sequencing:** Here the individual has to learn a simple sequence of three hand movements, learnt by modeling the movements as carried out by the examiner over several trials.

Executive Functioning

Five tests are included to assess executive functioning, three of which were chosen from the Behavioural Assessment of the Dysexecutive Syndrome Battery (BADS) Wilson, Alderman et al (1996). Other subtests include a sorting test and divided attention task.

Rule Shift Cards Test, Action Programme Test and Key Search Test:

Taken from the BADS were the Rule Shift Cards Test which relies on predominantly verbal executive skill, the Action Programme Test which relies on predominantly non-verbal executive skill and the Key Search Test.

Divided Attention Task:

The Divided Attention task combines a retest of the Es and Fs test with an audio presentation of a pre-recorded story. Again, the individual must cancel the letters while also marking on the sheet every time the speaker mentions the word "three".

The Sorting Test:

The Sorting Test requires the recognition of colour and shape as dimensions for grouping a set of 12 stimuli.

Comprehension:

The Comprehension Test makes use of the stimuli of the Sorting Test and the individual is asked to move the stimuli according to instructions.

Scoring

The order of subtest administration is important and was determined during the pilot stage of data collection. Following this order of administration ensures that the tests which were found to be the least threatening are given first, and those that could provoke anxiety given last.

Raw scores on each subtest are converted into scaled scores of 0 (pass), 1 (borderline), and 2 (fail) with the exception of the tests of visual attention and divided attention which convert to a score of 0 (pass) or 1 (fail). Thus, the overall battery score on the 12 tests can range from 0 to 22. Any overall score greater than 10 is considered a fail and corresponds to a 90 per cent chance of failing an on-road test; a strong indication that the individual is not safe to drive.

Studies

Two standardisation studies and two validation studies were completed.

The first standardisation study consisted of 195 volunteers less than 70 years of age (mean age of 42.5, sd.13.8, age range 20-69). All were regular drivers; 106 were female and 88 were male. The group had a mean IQ of 104.4 (sd 10.7) measured using the National Adult Reading Test (NART). There was no correlation between age and battery score (Spearman's coefficient rho .130, sign. .069) and a weak but significant correlation between IQ and battery score (Spearman's coefficient -.160, $p < .05$).

In the second standardisation study of 202 older adult volunteers, 161 were deemed to be cognitively intact. This sample had an age range 70-96 (mean age 81.1, sd 5.5) and 123 were female and 37 were male. The mean NART IQ was 105.7, SD 11.9 (N = 157).

Two on-road validation studies directly compared performance on the RDB with on-road driving performance. These were conducted on 142 individuals and later on 543 individuals. Of the 543 individuals in the second study, 449 were men and 94 were women. All individuals had a diagnosis which implicated cerebral pathology. In both studies a score >10 proved the best fit positive predictive value and indicates a highly likely fail on the road.

References

- Coughlan A.K. & Warrington, E.K. (1978). Word comprehension and word retrieval in patients with localised cerebral lesions. *Brain*, 101, 163-185.
- Warrington, E. K., & James, M. (1991). *The Visual Object and Space Perception battery (VOSP)*. London: Pearson Assessment.
- Wilson, B. A., Alderman, N., Burgess, P. W., Emslie, H., & Evans, J. J. (1996). *Behavioural Assessment of the Dysexecutive Syndrome (BADs)*. London: Pearson Assessment.

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