

Outcome Measure	Behavioural Assessment of the Dysexecutive Syndrome (BADS)
Sensitivity to Change	Yes
Population	Adult
Domain	Neuropsychological Impairment
Type of Measure	Objective test
ICF-Code/s	b1
Description	<p>The BADS (Wilson et al., 1996) is a battery of tests designed to assess the effects of dysexecutive syndrome, a cluster of impairments generally associated with damage to the frontal lobes of the brain. These impairments include difficulties with high-level tasks such as planning, organising, initiating, monitoring and adapting behaviour. The tests were developed in response to concerns over the low ecological validity of neuropsychological measures.</p> <p>The BADS is a battery of six tests and two questionnaires (takes around 40 mins to administer entire battery). The tests require participants to plan, initiate, monitor and adjust behaviour in response to the explicit and implicit demands of a series of tasks. A profile score, ranging from 0–4, is calculated for each test and an overall profile score is produced as a sum of individual test scores. Profile scores can be converted to standard scores with a mean of 100 and a standard deviation of 15, enabling comparisons to be made with WAIS and WMS scores. This makes it possible to identify discrepancies between expected and achieved BADS scores and to classify performance in a similar qualitative manner, from impaired to very superior. The authors recommend that all six tests are administered but state that the final score can be prorated based on five. The questionnaire scores are not standardised and do not contribute to the final score. The tests are as follows:</p> <ol style="list-style-type: none"> (1) Rule Shift Cards (RS) – This test purports to identify perseverative tendencies and its obverse, mental flexibility. It requires participants to respond to stimuli (red or black playing cards) according to one of two rules that are presented consecutively. Performance is scored according to how successfully the respondent shifts from applying the first to the second rule. A penalty is imposed for lack of speed. (2) Action Programme (AP) – This test was designed to assess ability to devise and implement a solution to a practical problem (getting a cork out of a narrow plastic tube) while not contravening a set of rules. The score is based on the number of steps completed without assistance. Penalties are imposed for rule breaks. (3) Key Search (KS) – It is claimed that this test assesses ability to plan a strategy to solve a problem (finding a key lost in a field). The score is based on a number of criteria, including whether the rater believes the strategy to be systematic, efficient and likely to be effective. A penalty is imposed for lack of speed. (4) Temporal Judgement (TJ) – It is not made clear what this test has been designed to assess. It appears to involve judgement and abstract thinking based on common knowledge, as the respondent is required to estimate times for everyday events, such as the life span of a dog. The score is based on the accuracy of the estimate.

	<p>(5) Zoo Map (ZM) – This is a test to assess ability independently to formulate and implement a plan (high demand condition) and to follow a pre-formulated plan (low demand condition). It involves plotting or following a route through a map that does not contravene a set of rules. The score is based on the successful implementation of the plan. Penalties are imposed for rule breaks and lack of speed.</p> <p>(6) Modified Six Elements (6E) – This test was designed to assess the ability to time-manage. It involves dividing the available time between a number of simple tasks (picture naming, arithmetic and dictation) while not contravening a set of rules. The score is based on the number of tasks attempted. Penalties are imposed for rule breaks and for sharing time unequally between tasks.</p> <p>(7) Dysexecutive Questionnaire (DEX) – This is a 20-item questionnaire describing behaviour associated with dysexecutive syndrome. Ratings of the frequency with which the particular behaviour occurs are made on a Likert-type scale (from ‘never’ to ‘often’). There is one version for the respondent to use and a second version for a family member, colleague or carer to rate the respondent.</p>
<p>Properties</p>	<p><u>Inter-rater reliability</u>: two raters scored the performance of a small sample from the control group were 0.88–1.00, some of the lower correlations being for timings. (Wilson et al., 1996)</p> <p><u>Internal consistency</u>: .70 for total profile score (not calculated for individual subtests) (Wilson et al., 1996)</p> <p><u>Test-retest reliability and practice effects</u>: Re-testing in controls 6–12 months after the first session indicated substantial practice effect. Correlations between scores ranging between –0.08 and 0.71 and only three correlations were significant (AP, KS, TJ). The authors attribute the poorest correlations to the effects of outliers in the small sample. (Wilson et al., 1996) Reliability for the brain-injured participants was not reported in manual (given that memory difficulties might attenuate the practice effect, this would have been a useful addition). <i>(Wilson et al., 1998) Key search 0.71 p < 0.001, Zoo map 0.34 p =.034</i></p> <p><u>Construct validity</u>: (Norris & Tate, 2000) Total profile score, Action and Rule Shift had small to moderate correlations with other executive tasks (WCST, TMTB, Porteus Mazes, Rey Copy Strategy, Cognitive Estimation Test, COWAT). The TJ did not correlate well with any executive test. The Zoo Map and Key Search were correlated with Porteus Mazes (.41 and .28). Most precise was 6E, which correlated moderately, but significantly with only the tests purporting to measure the same abilities. AP correlated with all the established tests and RS correlated significantly with all but the most relevant (the WCST). <i>(Wood & Lioffi, 2006) Zoo map correlated with Key search (.63), WAIS-III FSIQ (.37), VIQ (.33) and PIQ (.35). Key search correlated with WAIS-III FSIQ (.32) and PIQ (.30).</i> <i>(Norris & Tate, 2000) Key Search and Zoo Map only correlated significantly with the Porteus Mazes (.28 and .41 respectively). Notably, this was the only other measure of EF that tapped planning.</i></p> <p><u>Ecological validity</u>: Correlations between other’s ratings on the DEX and profile</p>

	<p>scores were moderate but significant negative ($r = -0.62$ overall profile scores) - more severe the significant other ratings, the worse the respondent performed on the tests (Wilson et al., 1996). At the subtest level, the Zoo Map test was correlated with the DEX other (in the opposite direction), however, significant positive correlations were found between BADS scores and the Role Functioning Scale in a brain injured group (AP, ZM, 6E predicted 16.2% of variance in ratings (Norris & Tate, 2000). DEX ratings by OTs and Neuropsychs correlated with total BADS (-.39 and -.37) (Bennett, Ong & Ponsford, 2005)</p> <p><u>Concurrent validity:</u> The brain injured group achieved significantly lower scores on the test than did the control group (Wilson et al., 1996). A further small-scale study between neurological and control participants confirmed this, finding significant group differences on AP, ZM and 6E (Norris and Tate, 2000). This study, however, showed that the test had low sensitivity (.64) and reasonable specificity (.84). <i>(Norris & Tate, 2000) Significant differences between ABI and non-brain injured subjects for Zoo Map but not Key Search)</i></p>
Advantages	<ul style="list-style-type: none"> • Is an ecologically valid test. • Can be administered by an allied health or special education professional (not just a psychologist)
Disadvantages	<ul style="list-style-type: none"> • Test-retest reliability for some subtests is not good. • Lacks strong psychometric properties (no information on internal reliability at subtest level). Better properties if overall BADS score is used. • Some tests lack face-validity. For example, items in the temporal judgement test is based on life in the UK (small dogs, small houses etc). Correct responses are not necessarily applicable to Australian context. • Ceiling effects are common. • Is not a commonly used test (compared to the WAIS-IV). • Is an expensive test (\$995 for the complete starter kit). • Some normative information is lacking, eg. Aged-based norms. • No work has actually been done to identify the actual abilities underlying each of the subtests, thus making tests scores difficult to interpret and the types of real life tasks that might prove difficult.
Reviewers	Skye McDonald

References

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