

<b>Outcome Measure</b>	<b>Wisconsin Card Sorting Test (WCST)</b>
<b>Sensitivity to Change</b>	Yes
<b>Population</b>	Adult
<b>Domain</b>	Neuropsychological Impairment
<b>Type of Measure</b>	Objective test
<b>ICF-Code/s</b>	b1
<b>Description</b>	<p>The Wisconsin Card Sorting Test (WCST; Heaton et al. 1993) is a neuropsychological test of "set-shifting", i.e. the ability to display flexibility in the face of changing schedules of reinforcement.</p> <p>Initially, a number of stimulus cards are presented to the participant. The participant is told to match the cards, but not how to match; however, he or she is told whether a particular match is right or wrong.</p> <p>Clinically, the test is widely used by neuropsychologists, clinical psychologists, neurologists and psychiatrists in patients with acquired brain injury, neurodegenerative disease, or mental illness such as schizophrenia. It has been considered a measure of executive function because of its reported sensitivity to frontal lobe dysfunction. As such, the WCST allows the clinician to assess the following "frontal" lobe functions: strategic planning, organized searching, utilizing environmental feedback to shift cognitive sets, directing behavior toward achieving a goal, and modulating impulsive responding. The test can be administered to those from 6.5 years to 89 years of age.</p> <p>Although successful completion of the test relies upon a number of intact cognitive functions including attention, working memory, and visual processing, it is loosely termed a "frontal lobe" test on the basis that patients with any sort of frontal lobe lesion generally do poorly at the test.</p> <p>The test takes approximately 12–20 minutes to carry out and generates a number of psychometric scores, including numbers, percentages, and percentiles of: categories achieved, trials, errors, and perseverative errors.</p>
<b>Properties</b>	<p>See Heaton (1993) and Strauss (2006).</p> <p><u>Inter-rater reliability:</u> (Axelrod, 1992) Good in both experienced users (<math>r = .93</math>) and novices (<math>r = .88</math>). The manual (Heaton, Chelune, Talley, Kay &amp; Curtiss, 1993) also indicates good inter-rater reliability for nonperseverative reponses (<math>r = .88</math>) and perseverative responses (<math>r = .93</math>).</p> <p><u>Test-retest reliability:</u> ?</p> <p><u>Practice effects:</u> In one study (Ferland, Ramsay, Engeland &amp; O'Hara, 1998), normal controls only modestly improved their performance on repeat testing. In contrast, using a reliability of change (RC) index, TBI survivors</p>

	<p>demonstrated clinically meaningful gains in performance.</p> <p><u>Construct validity:</u> (Greve, Love &amp; Sherwin et al. 2002) In TBI-patients, a 3-factor solution with 99.1% of the total variance has been demonstrated (cognitive flexibility; problem solving; response maintenance).</p> <p><u>Concurrent validity:</u> (review: Nyhus &amp; Barcelo, 2009) Clinical studies with neurological patients have confirmed that, in its traditional form, the WCST fails to discriminate between frontal and non-frontal lesions. In addition, functional brain imaging studies show rapid and widespread activation across frontal and non-frontal brain regions during WCST performance. The WCST scores may not be considered as either valid or specific markers of prefrontal executive function.</p> <p>There are, however, studies that do indicate that the WCST differentiates TBIs from controls (e.g., Axelrod, Goldman, Tompkins &amp; Jiron, 1994)</p> <p>The shorter WCST-64 does not discriminate TBIs from controls (Merrick, Donders &amp; Wiersum, 2003)</p>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Good normative data available.</li> <li>• Is one of the most distinctive tests of prefrontal function.</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• Is an expensive test to purchase (scoring program kit = \$820; introductory kit = \$375).</li> <li>• Can be lengthy to administer (usually 20-30 mins but perhaps longer in TBI).</li> <li>• Is a difficult test to administer if done manually.</li> <li>• Difficult to score if manually administered.</li> <li>• Construct and anatomical validity has been criticised.</li> <li>• Potentially confusing for clients.</li> </ul>
<b>Additional Information</b>	
<b>Reviewers</b>	Skye McDonald

## References

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