OCCUPATIONAL THERAPY COGNITIVE ASSESSMENT INVENTORY – v. 2: April 2014 update

Purpose: This inventory was developed to complement the algorithm entitled “An OT Approach to Evaluation of Cognition/Perception”. This is an inventory of cognitive (but not perceptual) assessment tools identified by OTs within VCH and PHC. These tools are not meant to be used in isolation during the process of cognitive assessment but, instead, during Steps 4 & 5 of the assessment process (as per the algorithm). Although this inventory provides a comprehensive list of standardized tools available to OTs to measure cognition, it is not an exhaustive list. **Note: a fairly comprehensive source of Perceptual Assessments (and many of the Cognitive Assessments) can be found on Strokengine (http://strokengine.ca/assess/).**

**Category of Assessment:** adopted from “An OT Approach to Evaluation of Cognition/Perception”, Vancouver Coastal Health, April 2011 (revised March 2013)

<table>
<thead>
<tr>
<th>Screening assessment</th>
<th>In-depth assessment</th>
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<tbody>
<tr>
<td><strong>Level of task performance</strong>&lt;br&gt;(ICF: activity &amp; participation)&lt;br&gt;• Provides screening assessment in context of occupation (e.g. Cognitive Performance Test, Kettle Test)&lt;br&gt;• May provide higher ecological &amp; predictive validity than impairment-based screening</td>
<td><strong>In-depth understanding of the impact of cognitive deficits on occupation (e.g. AMPS, EFPT, ILS)</strong>&lt;br&gt;• May provide higher ecological &amp; predictive validity than in-depth assessment at level of impairment</td>
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<tr>
<td><strong>Level of Impairment</strong>&lt;br&gt;(ICF: body-structure)&lt;br&gt;• To augment screening at level of task performance (e.g. SMMSE, MoCa, Cognistat)&lt;br&gt;• Be aware of limitations (e.g. predictive validity, depth of assessment)</td>
<td><strong>To provide some in-depth understanding of specific cognitive components such as memory, attention. (e.g. Rivermead Behavioural Memory Test, Test of Everyday Attention)</strong></td>
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<table>
<thead>
<tr>
<th>Reliability</th>
<th>Internal consistency (Chronbach’s α or split-half statistics)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>≥ 0.80</td>
</tr>
<tr>
<td>Adequate</td>
<td>0.70-0.79</td>
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<tr>
<td>Poor</td>
<td>&lt; 0.70</td>
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<table>
<thead>
<tr>
<th>Reliability</th>
<th>Test-re-test or Inter-rater reliability (ICC or kappa statistics)</th>
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<tbody>
<tr>
<td>Excellent</td>
<td>≥ 0.75</td>
</tr>
<tr>
<td>Adequate</td>
<td>0.40-0.74</td>
</tr>
<tr>
<td>Poor</td>
<td>&lt; 0.40</td>
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<table>
<thead>
<tr>
<th>Validity</th>
<th>Concurrent and construct/convergent correlations</th>
</tr>
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<tbody>
<tr>
<td>Excellent</td>
<td>≥ 0.60</td>
</tr>
<tr>
<td>Adequate</td>
<td>0.31-0.59</td>
</tr>
<tr>
<td>Poor</td>
<td>≤ 0.3</td>
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**Definitions:** **In deciding whether or not an assessment tool is precise, it is important to consider both reliability and validity.**

**Reliability:** “Does the test provide a consistent measure?”

*Internal consistency* = the extent to which the items of a test measure various aspects of a common characteristic (e.g., “memory”). Do the items/subtests of the measure consistently measure the same aspect of cognition as each other?

*Test-retest reliability* = the extent to which the measure consistently provides the same results when used a second time (re-test). *Parallel-form reliability* would involve 2 different/alternate versions of the same test.

*Inter-rater reliability* = the extent to which two or more raters (assessors) obtain the same result when using the same instrument – do they produce consistent results?

**Validity:** “Does the test measure what it is supposed to measure?”

*Criterion validity* = the extent to which a new measure is consistent with a gold standard criterion (i.e., a previously validated measure). For *concurrent validity*, the measures are administered at approximately the same time. For *predictive validity*, typically one measure is administered at some time prior to the criterion measure (to examine whether the measure can predict, or correlate with, the outcome of a subsequent criterion event). *Note*: poor concurrent validity would suggest that the tests being compared measure different constructs; adequate concurrent validity suggests some shared variance in the constructs being measured; and excellent concurrent validity suggests that the tests measure very similar constructs. If 2 tests are highly correlated with each other, then one would want to question the need for having both tests – you would then want to determine other ways in which one test might be more superior than the other (for example, one takes less time to administer).

*Construct validity* = the extent to which a test can be shown to measure a construct, e.g. “memory” or “cognition for everyday function”. The construct validation process may be used when a gold standard (previously validated criterion) does not exist, thus, when one cannot test for concurrent validity. *Convergent validity* is the extent to which a test agrees with another test (or test) believed to be measuring the same attribute. *Discriminant validity* is the extent to which tests that are supposed to be unrelated are, in fact, unrelated (i.e., measure different things). *Group differences* refers to: “Does the measure allow you to differentiate between 2 or more populations?” for example as determined by analyzing for statistically significant differences between the groups on the measure. *Ecological validity* refers to: “Does the measure reflect behaviours/function that actually occur in natural/everyday settings?”

Vancouver Coastal Health and Providence Health Care, Occupational Therapy Practice:
Occupational Therapy Cognitive Assessment Inventory & References, v. 2 (April 2014)
### AMPS: Assessment of Motor and Process Skills

**In-depth assessment;** Task performance level  
**Population:** age > 2 years  
**Reliability:** age > 2 years  
**AMPS:** Assessment of Motor and Process Skills  
**http://www.ampsintl.com/AMPS/**:

<table>
<thead>
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<th>Overview</th>
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| A standardized, performance-based, observational assessment to measure the quality of a person’s ability for ADL and IADL tasks by rating the effort, efficiency, safety and independence in chosen, familiar, and life-relevant ADL tasks. The assessor selects 2-3 tasks from a list of 87 tasks within 13 major groups (from “very easy ADL tasks” including eating a snack with a utensil, to “much harder than average ADL tasks” including making Spanish omelette with added ingredients). Other tasks include raking grass, cleaning a bathroom, ironing a shirt, upper body grooming, shopping, etc.). Task is selected according to level of difficulty and meaning to person being assessed.  
**Time to administer:** varies with activity chosen  
**Scoring:** 16 motor and 20 process skill items are rated on a 4-point scale (from 1-deficit, to 4-competent), generating a Process score and a Motor score. Cut-off scores have been developed between “needs assistance” and “independent”. Once an OT has successfully calibrated as a reliable and valid AMPS evaluator, s/he is able to use a personal copy of the AMPS computer-scoring software to generate a Graphic Report and a Results and Interpretation Report.  
**Minimal Clinical Difference (MCD): not determined to date.** |

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<tr>
<th>Psychometrics – Reliability &amp; Validity</th>
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| **Reliability:** A number of studies have been conducted showing excellent internal consistency, test-retest reliability and inter-rater reliability (Douglas et al., 2008). Some examples from the literature:  
- Excellent test-retest reliability (elderly adults)  
- The “severity calibrations” (using ‘many faceted Rasch analyses’) were stable over time for ≥ 92.5% of ratings for a group of 40 trained raters.  
**Predictive Validity:**  
- Excellent validity (Process score) for predicting safety 2-weeks post-discharge home (acute psychiatry)  
- Process score is stronger than Motor score in predicting need for level of assistance to live in the community, although raw (2010) cut-off scores have only fair to good discrimination power using “ROC analysis”  
**Group Differences:** (no literature reviewed to date)  
**Other Aspects of Validity:**  
- Adequate to excellent concurrent validity compared to tests of cognition & function e.g. FIM & MMSE (mild memory impairment or dementia)  
- Predictive validity in comparing AMPS Process score (measure of task) and the Large Allen Cognitive Level Test (measure of impairment) (stroke)  
- Adequate concurrent validity between AMPS Process score and level of employment (schizophrenia) |

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<th>Pros &amp; Cons</th>
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| **Pros:**  
- Provides for a standardized ADL analysis  
- Identifies between difficulties with process (cognitive) & motor (physical) tasks  
- Some cultural sensitivity (e.g. client plans own meal, task performance tests such as ILS)  
- Useful in mental health & physical disability settings  
- Easy to convert data to a written report (a program does this for you; also provide graphics)  
- May be more appropriate than using the assessment activities offered by other task/performance tests such as ILS  
- Based on MOHO  
- Is recommended for assessment of executive functions in a published inventory of tests of executive function for stroke (Poulin et al, 2013) |

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<th>Cons:</th>
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| - OT needs specific training to administer  
- Expensive training: 5-day course (and must follow-up training by testing 10 people within 3 months and submitting results to become “calibrated”).  
- Not specifically designed to evaluate for presence of cognitive impairments – but Process score can represent cognitive limitations  
- Research recommends assessing client in home instead of clinic because environmental factors may influence performance in particular Process score (Park 1994)  
- Limitations for use on its own to predict level of assistance or predict employment (see psychometrics) |

### Behavioural Assessment of Dysexecutive Syndrome (BADS)  
(a version is also available for children: BADS-C. However, no information is contained here about it)  
In-depth assessment; Impairment level:  
**Population:**  
- adults with:  
  - schizophrenia  
  - traumatic brain injury, including more so than traditional neuropsych measures of executive function – although the predictive validity is improved if multiple modes of assessment are used (e.g. BADS + neuropsych tests + observations)  
- In addition to providing numerical scores, the BADS can provide useful qualitative (observational) information, e.g. in terms of the efficiency or effectiveness of strategies a person uses (or not) to complete subtests  
- DEX appears to be a good measure of executive function if administered by a clinician (but not by the client or a relative)  
- If time is limited, then the DEX (or similar questionnaire) is likely the best measure of |

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| The BADS aims to assess “everyday executive impairment”. There are 6 subtests (rule shift cards, action program, key search, temporal judgment, zoo map, & modified 6 elements). The test kit also provides a questionnaire, the DEX (Dysexecutive Questionnaire), which is scored separately.  
**Time to administer:** approx. 40 minutes assuming OT is familiar with the test; plus extra time to score (including conversion from raw to profile to standardized scores).  
**Scoring:** For each BADS subtest, the raw scores are converted to profile scores (0-4), which are then summed to produce an overall total score (battery profile score, 0-24, which in turn gets converted to a standardized score with a mean of 100). The DEX is not included in the BADS total score; it is scored separately, by adding up the individual items.  
**Reliability:**  
- Excellent inter-rater reliability (r=0.88-1.00 for subtests) (adults with brain injury)  
- Test-retest reliability is not expected to be high, considering that a critical aspect of the test is novelty. However, it has been found to range from poor to excellent (at 3 weeks) for a group of adults with schizophrenia, and poor to adequate (at 6 to 12 mos) for a group of adults with brain injury.  
- Note: for both groups, participants tended to obtain higher scores on re-administration (may be a practice effect including that the test was not so novel the second time; or could possibly show improved function over time)  
- Adequate internal consistency (α= 0.73) (schizophrenia)  
**Predictive Validity:**  
- Chronic schizophrenia: BADS found to be a predictor of IADLs (beyond outcomes accounted for by basic cognitive skills) |
<table>
<thead>
<tr>
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<th>Psychometrics – Reliability &amp; Validity</th>
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</tr>
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- chronic alcoholism, substance dependence, Korsakoff’s
  • maybe useful for:
  - Parkinson’s disease
  - multiple sclerosis

**Norms:** Based on 216 UK healthy controls age 16-87 (details in manual).


**Using the BADS standardized score, follow the manual to allow for an age-controlled classification of executive function performance (based on the normative sample): impaired, borderline, low average, average, high average, superior. **Interpret with caution, because a person may fall into “average” even though they did badly on 1 or 2 tests.**

**Minimal Clinical Difference (MCD):** not identified (and not likely to be determined, because there are problems with test-retest for the BADS – see reliability findings).**

**traumatic brain injury (TBI): some ability of BADS (total score) to predict executive function for everyday activity (as measured by the DEX), but only if the DEX is administered to a clinician (OT or neuropsych) and not to a family member or client; also, the predictive validity increases if BADS is used together with multiple other neuropsych tests, but still only 46% of variance predicted**

**for adults with “higher brain dysfunction” from acquired brain injury: BADS does not predict capacity for competitive employability**

**older adults with dementia: in combination with 5 other cognitive tests the BADS has some predictive validity (67% accuracy all tests combined) in determining safety for driving,**

**for chronic alcoholics, BADS was statistically significant in predicting work outcome (whereas 11 other neuropsych tests were not); and for substance dependent adults, predicted everyday problems related to executive dysfunction (whereas Wisconsin Card Sort did not)**

**Group Differences:**

- differentiates between healthy controls and:
  - schizophrenia (acute & chronic)
  - mod-sev brain injury
  - mild Alzheimer’s disease (but mixed results in studies involving mild cognitive impairment - MCI)
  - chronic alcoholics
  - substance dependency

- for early Alzheimer’s disease and non-demented Parkinson’s disease, group differences between healthy controls did not show up for all subtests, but showed for total BADS score

- differentiates between MCI and early Alzheimer’s; and between chronic alcoholics and Korsokoff’s (thus, sensitive to progression of cognitive impairment)

- one study indicated that the BADS does not do a good job at differentiating between younger and older adults; but another study (in manual) shows significantly poorer performance overall for subjects older than 65.

**Other Validity:**

- for schizophrenia: some studies show normal performance for some subtests (thus, all subtests should be administered, resulting in the full battery profile score)

- BADS appears to best assess planning and problem solving aspects of executive impairment (chronic schizophrenia; moderate-severe brain injury)

- mixed results in terms of showing a correlation between BADS subtests and other neuropsych tests of executive function (e.g., Tower of London - TOL, and Modified Card Sorting Test; with TOL showing the least sensitivity to executive deficits in at least 2 studies)

- convergent validity: adequate convergence

**executive functioning instead of trying to do BADS subtests (but only if filled in by a clinician)**

**Cons:**

- Expensive (about $435.00)

- Even though BADS is comprehensive, on its own it still does not provide a full picture of executive functions (at least for dementia and TBI); instead, multiple ways of assessment (i.e., battery of tests + qualitative information) need to be performed

- Avoid saving time by doing just some of the BADS subtests (although the manual suggests that 5/6 tests could be done, then prorate the total score). The full BADS test score is needed for validity findings to apply. (Although, as per above, the DEX may be useful on its own, if administered by a clinician who knows the client – and not just filled in by the client.)

- Based on test-retest reliability data, this test is not very suitable for using as a measure of change over time (because there may be a practice effect including that the test is not so novel the second time).

- Socio-cultural background may have some influence on results (no influence comparing Japanese with British adults with schizophrenia; but differences between different American cultural/language groups for healthy controls.)
<table>
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</tr>
<tr>
<td>Butt Non-Verbal Reasoning Test (BNVR)</td>
<td>In-depth assessment; Impairment level</td>
<td>- Good test-retest and inter-rater reliability (27 participants with CVA aged 52-90 (19 male, 8 female)</td>
<td>- discriminates between healthy controls and people with CVA</td>
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<tr>
<td></td>
<td>Population: adults with aphasia related to stroke</td>
<td>Predictive Validity:</td>
<td>appears sensitive to change</td>
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<td>Norms: based on 84 community living (UK) healthy controls and 93 people with CVA with difficulties initiating communication, ages 34-95. <a href="http://www.speechmark.net/shop/bnvr-butt-non-verbal-reasoning-test">http://www.speechmark.net/shop/bnvr-butt-non-verbal-reasoning-test</a></td>
<td></td>
<td>quick to administer and score</td>
</tr>
<tr>
<td></td>
<td>Time to administer: not stated in manual but approximately 15 minutes.</td>
<td>Group Differences:</td>
<td>aimed at stroke patients with aphasia</td>
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<td></td>
<td>Scoring: scored out of a possible 10 correct responses. Three error responses can be obtained to identify visual errors, semantic errors and unrelated errors which can inform further assessment and intervention.</td>
<td>Other Aspects of Validity:</td>
<td>may guide further assessment and intervention</td>
</tr>
<tr>
<td></td>
<td>Minimal Clinical Difference (MCD): not determined to date.</td>
<td>Reliability:</td>
<td>cost is not too prohibitive (approx. $150.00)</td>
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<td>A standardized measure of problem-solving (reasoning) ability for individuals with aphasia post stroke. It is suggested to be most useful in the acute (&lt;6 months post CVA) stage to inform strategy use and interventions.</td>
<td>- Good test-retest and inter-rater reliability</td>
<td>- No further research yet on this test, including correlating test results to functional measures</td>
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<td>First, a screening test component is administered to ensure the person has the perceptual skills needed to complete the test. Then the individual solves 10 everyday problems presented in photographic format. The photos are comprised of the stimulus, target response, visual distracter, semantic distracter and unrelated distracter to help identify the type of error(s) made, if any.</td>
<td>Predictive Validity:</td>
<td>- Testing for cultural sensitivity needed</td>
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<tr>
<td></td>
<td>Time to administer: not stated in manual but approximately 15 minutes.</td>
<td>Group Differences:</td>
<td>- No MCD available (thus it's difficult to measure if there is a significant clinical change over time on re-test)</td>
</tr>
<tr>
<td></td>
<td>Scoring: scored out of a possible 10 correct responses. Three error responses can be obtained to identify visual errors, semantic errors and unrelated errors which can inform further assessment and intervention.</td>
<td>Other Aspects of Validity:</td>
<td>- Broader profile than SMMSE or MoCA, more sensitive than MMSE</td>
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<tr>
<td></td>
<td>Minimal Clinical Difference (MCD): not determined to date.</td>
<td>Reliability:</td>
<td>- Has been found to identify presence of cognitive impairment in TBI (reliably classifies individuals in acute &amp; post-acute settings into the Cognistat impairment categories)</td>
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<td></td>
<td>The Cognistat has 11 subtests which screen for 3 general factors (consciousness, attention and orientation) and 5 major ability areas (language, construction, memory, calculation, &amp; reasoning).</td>
<td>- Excellent inter-rater reliability (psychiatry)</td>
<td>- Broader profile than SMMSE or MoCA, more sensitive than MMSE</td>
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<td><strong>There is now a “Cognistat Five” available, for</strong></td>
<td>- Adequate to excellent test-retest reliability (psychiatry)</td>
<td>- Has been found to identify presence of cognitive impairment in TBI (reliably classifies individuals in acute &amp; post-acute settings into the Cognistat impairment categories)</td>
</tr>
<tr>
<td></td>
<td>Cognistat (Neurobehavioural Cognitive Status Examination)</td>
<td>(no reliability studies were found for geriatrics or acquired brain injury)</td>
<td>- Broader profile than SMMSE or MoCA, more sensitive than MMSE</td>
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**Vancouver Coastal Health and Providence Health Care, Occupational Therapy Practice:**

**Occupational Therapy Cognitive Assessment Inventory & References, v. 2 (April 2014)**
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<th>Assessment Name</th>
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<th>Pros &amp; Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Impairment level (global)</strong></td>
<td>an even faster screening tool (measuring orientation, memory and construction) – reported to provide an “MCI” index as a risk assessment algorithm for MCI and dementia.</td>
<td><strong>Predictive Validity:</strong> • Poor validity for predicting FIM self-care scores using discharge from acute care, and adequate validity for predicting FIM cognitive scores (Chinese adults with stroke) • Cognistat’s comprehension and repetition subscales were found to be useful in predicting (accounts for 64.4% of the regression model) functional independence as measured by the Barthel Index for persons recovering from stroke. • Cognistat’s comprehension and similarities subscales were found to be useful in predicting functional performance as measured by the FIM for persons recovering from stroke.</td>
<td>• Is predictive of function (BI or FIM) for persons with stroke • When used with the Rivermead Behavioural Memory Test can detect MCI and mild dementia • The new MCI Index might be helpful for OTs working in programs/clinics involving clients with MCI and dementia</td>
</tr>
<tr>
<td><strong>Population:</strong> Adolescents to over 65 years</td>
<td><strong>Group Differences:</strong> • differentiates between healthy controls and: - dementia - neurosurgical groups - stroke - individuals on an outpatient geriatric mental health team</td>
<td><strong>Cons:</strong> • Individuals with frontal lobe lesions may not perform in the impaired range on this test • Significant difficulties in reading, writing and spelling will not be detected • Poor performance may reflect a long-term learning disability (rather than new, acquired cognitive impairment) • Although may help to determine specific cognitive impairments, evidence varies to support concurrent/predictive validity of function. Scoring is a profile (not a single numerical score) – although some researchers create a composite score for purposes of their research, e.g. Drane et al., 2003; and there is now the new MCI Index score.</td>
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<tr>
<td><strong>Normative Data:</strong> Based on 4 groups, each with about 30 subjects: age 20-30, age 40-66, and age 70-92.</td>
<td><strong>Minimal Clinical Difference (MCD): not determined to date.</strong></td>
<td></td>
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<tr>
<td><strong>Time to administer:</strong> approx 45 minutes.</td>
<td><strong>Other Aspects of Validity:</strong> • Adequate to excellent concurrent validity with “parallel” neuropsych tests (range of neurological &amp; psychiatric diagnoses, including traumatic brain injury) • Poor to adequate concurrent validity with an IADL measure, the Observed Tasks of Daily Living-Revised (persistent schizophrenia) • Lacks correlation with the BADS (i.e., basic cognition vs. executive function) (schizophrenia) • Non-significant correlations with a measure of functional outcome (Routine Task Inventory), thus lacking ecological validity (schizophrenia) • Moderate validity of using both the Cognistat and the Rivermead Behavioural Memory Test together to detect MCI and mild dementia.</td>
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The Cognitive Assessment of Minnesota (CAM)

**Screening assessment:** Impairment level (global)

**Population:** adults with a brain injury or CVA and at Level IV and above on the Rancho Los Amigos Cognitive Scale.

**Normative data:** sample of 200 healthy adults, age 18-70 years.

The CAM is a hierarchical approach to screening a range of cognitive skills to identify general areas of cognitive impairment and to guide treatment activities. It can be used as a baseline and to measure change, and to indicate areas for in-depth investigation.

The 17 subtests (with total of 29 items) range from simple to complex and cover: attention, memory, visual neglect, math, ability to follow directions, and judgment. These are grouped into 4 categories: fund of acquired information or store of knowledge (18 items); manipulation of old knowledge, calculation or problem solving (9 items); social awareness & judgment (1 item); and abstract thinking (1 item).

<table>
<thead>
<tr>
<th>Reliability:</th>
<th><strong>Predictive Validity:</strong></th>
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<tbody>
<tr>
<td>Excellent internal consistency (residents of long term care facilities with acquired brain injury)</td>
<td>• No validity for predicting functional status 3 months later using FIM + FAM (acute care inpatients up to 3 months post acquired brain injury)</td>
<td><strong>Pros:</strong></td>
<td>Easy to administer allowing a quick and inclusive assessment of significant areas of cognition. Evaluates a variety of cognitive skills in a short time. Utilizes materials that are easily accessible and inexpensive. Uses familiar tasks and gives clear directions and guidelines.</td>
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<tr>
<td>Excellent inter-rater reliability (acquired brain injury)</td>
<td>Excellent test-retest reliability (acquired brain injury + healthy controls)</td>
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<tr>
<td>Excellent test-retest reliability (acquired brain injury + healthy controls)</td>
<td></td>
<td><strong>Cons:</strong></td>
<td>May not pick up on subtle/mild cognitive deficits Not appropriate for individuals with severe visual-perceptual motor or visual acuity deficits, or aphasia. Not a complete test battery or in-depth cognitive</td>
</tr>
</tbody>
</table>

**Scoring:** is a profile (not a single numerical score) – although some researchers create a composite score for purposes of their research, e.g. Drane et al., 2003; and there is now the new MCI Index score. “Screening” score (of original version) produces high false positive (so it is recommended to use total score)

**Cautions in interpreting results if presence of frontal lobe lesion, pain, medications, sleep deprivation, sensory deficits, language deficits** may not be sensitive to mild impairment. For example, the Cognistat detected only 60-80% of cognitive deficits diagnosed by a skilled neuropsychologist (Nokleby et al., 2008) (stroke). It may be too simple for post-acute, high functioning TBI. Not recommended by researchers to use with TBI for planning rehab & community reintegration (because not sensitive enough to residual cognitive deficits across different stages of recovery)

One study found a gender bias in the judgment subtype; females more often score 1 rather than 2 as compared to males.

http://www.cognistat.com/
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<tr>
<td>Cognitive Competency Test (CCT)</td>
<td>The CCT has 12 subtests of cognitive skills including: orientation to personal information, social intelligence, memory, reading, financial management, safety, judgment and spatial orientation.</td>
<td><strong>Reliability:</strong></td>
<td><strong>Pros:</strong></td>
</tr>
<tr>
<td>Screening assessment; Impairment level (global)</td>
<td>Time to administer: 60 minutes. Can be administered in sections.</td>
<td>• Cited by Douglas et al. 2008 as having “adequate” test-retest reliability.</td>
<td>• Commonly used by OTs to predict function for discharge planning</td>
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<tr>
<td>Population: older adults</td>
<td>Scoring: per subtest and as a total. An Average Total Score (ATS) below 76% indicates some assistance will be required for ADLs.</td>
<td><strong>Predictive Validity:</strong></td>
<td><strong>Cons:</strong></td>
</tr>
<tr>
<td><strong>Minimal Clinical Difference (MCD): not determined to date.</strong></td>
<td></td>
<td>• Can be helpful when distinguishing between a recommendation for long-term care and a recommendation for retirement home (assisted living residence) or return home with supports</td>
<td>• It may be difficult to find a manual.</td>
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<td><strong>Cognitive Performance Test (CPT)</strong></td>
<td>The CPT is a performance test based on the Allen Cognitive Disability theory. There are 6 original tasks: dressing, shopping, telephone, toast preparation, washing, and traveling. Later, 7th task was added: “medbox”.</td>
<td><strong>Group Differences:</strong></td>
<td>• Some items are dated, e.g. money management and sequencing</td>
</tr>
<tr>
<td>Screening assessment; Task performance level</td>
<td><strong>Reliability:</strong></td>
<td>• Pilot study showed the CCT to differentiate between a dependent group and an independent group; subsequent study showed discrimination between normal aging group and CVA &amp; dementia groups (dementia)</td>
<td>• Note the poor concurrent validity with functional measures (for dementia)</td>
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<td>Population: Developed primarily for use with older adults (focus=dementia).</td>
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<td><strong>Other Aspects of Validity:</strong></td>
<td>• Does not measure insight, judgment, or awareness</td>
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<td>*Populations researched: first developed for persons with Alzheimer’s Disease (AD); website states that it</td>
<td><strong>Differentiated between 3 groups of cognitive impairment (mild, moderate, severe) which had been determined by clinician ratings.</strong></td>
<td>• Adequate concurrent validity with 2 impairment-based tests: MMSE and Porteus Maze Test Quotient (acquired brain injury)</td>
<td>• ++caution in use for individuals other than dementia, because of the lack of psychometric studies for other populations</td>
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<td>determined to date.**</td>
<td><strong>Predictive Validity:</strong></td>
<td></td>
<td>• More research on reliability and validity is needed</td>
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<td></td>
<td>• Excellent internal consistency (dementia);</td>
<td><strong>Pros:</strong></td>
<td>• Caution using subtests for prediction</td>
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<td>adequate internal consistency (geriatric rehab unit patients)</td>
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<td>• It is a unidimensional outcome measure</td>
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<td>Excellent inter-rater and test-retest reliability (Alzheimer’s disease; outpatients with dementia)</td>
<td><strong>Cons:</strong></td>
<td>• Requires significant materials (provided with purchase of the test) and designated space.</td>
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<td>Predictive Validity:**</td>
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<td>• Dressing and travel subtasks are not portable so cannot be assessed if you see client in their home, although there is an alternate now for dressing (gloves).</td>
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<td></td>
<td>May have some predictive validity of risk of institutionalization over time (over a 4-year follow-up period (dementia))</td>
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<td>• Researchers suggest: avoid administering only</td>
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<td><strong>Group Differences:</strong></td>
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<td>evaluation and is best used as a screen of abilities and deficits. Identifies problem areas to further evaluate.</td>
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<td></td>
<td>• Differentiates between healthy elderly and</td>
<td></td>
<td>• No alternate version available for re-test.</td>
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<td></td>
<td>• For acute care inpatients with acquired brain injury, no value in predicting function for 3 months later</td>
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<tr>
<td>Assessment Name</td>
<td>Overview</td>
<td>Psychometrics – Reliability &amp; Validity</td>
<td>Pros &amp; Cons</td>
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</table>
| Contextual Memory Test (CMT) | In-depth assessment; Impairment level (memory) | Reliability:  
- Adequate to excellent reliability for parallel form (brain injury)  
- Adequate to excellent test-retest, using immediate recall and delayed recall scores (healthy adults, brain injury)  
Predictive Validity:  
- (not determined to date)  
Group Differences:  
- Differentiates between healthy controls and:  
  - Alzheimer’s disease  
  - brain injury  
Other Aspects of Validity:  
- Excellent concurrent validity with the Rivermead Behavioral Memory Test (brain injury). | Pros:  
- Asks about strategies thus aids in planning intervention  
- Option of contextual prompt  
- Flexible testing procedures – recall vs recognition  
- Uses pictures of everyday objects  
- Easy to transport  
Cons:  
- Scoring is confusing and lengthy  
- Not appropriate for individuals with moderate or severe aphasia or visual perceptual deficits  
- Ceiling effect – may not identify clients with subtle memory deficits.  
- Normative data focused on Caucasian, highly educated young population (although results were replicated for the most part with an Israeli population). |
| Dynamic Assessment of Categorization (Toglia Category Assessment) – | Examines the ability to establish categories and switch conceptual set and deductive reasoning. Emphasizes qualitative aspects of performance, and is based on Toglia’s dynamic | Reliability:  
- Adequate to excellent internal consistency (stroke, traumatic brain injury, inpatients with schizophrenia) | Pros:  
- Portable; can be used at bedside  
- Short time to administer  
- Uses familiar items (i.e., objects to be categorized) |

has been researched with other elderly, dementia, and neuro groups (although it’s unclear re: details on CVA and TBI populations).  


Additional resources:  
- http://www.ot-innovations.com/content/view/22/46/  
- YouTube video on mock administration of this test: http://www.youtube.com/watch?v=b7zZhf6Klps  

Cognitive levels). The lower the score, the more monitoring/assistance required for functional tasks.  

Minimal Clinical Difference (MCD): not determined to date.  

outpatients with dementia  
- Differentiates between unimpaired adults and those impaired who are on a geriatric rehab unit  

Other Aspects of Validity:  
- Excellent concurrent validity with MMSE (normal elderly controls, Alzheimer’s disease, and outpatients with dementia); and adequate concurrent validity with SMMSE (older adults on geriatric rehab unit)  
- Excellent concurrent validity with the Routine Task Inventory (a cognitive functional scale that uses non-structured observation of daily tasks) (outpatients with dementia)  
- Adequate concurrent validity with AMPS and FIM (older adults on geriatric rehab unit) – which makes sense because AMPS and FIM scores include motor and process/cognitive elements  
- Adequate to excellent concurrent validity with 2 measures of caregiver-rated ADL (normal elderly controls, Alzheimer’s disease)  

Further validity results are discussed on website, but specific details were not found in peer-reviewed literature.  

The CMT assesses awareness of memory capacity, use of strategy, and recall in adults with memory dysfunction. It can be used as a screen to determine the need for further evaluation or to indicate how responsive the individual is to memory cues to recommend compensatory or remedial treatment.  

There are 2 parallel forms: Morning version and Restaurant version.  

Time to administer: Requires 5-10 minutes, in addition to the 15-20 minute delayed task.  

Scoring: The test yields three recall scores (immediate, delayed, and total), and scores for cued recall, recognition, awareness and strategy use. Scores are compared to the norms and then analyzed for patterns using the Summary of Findings worksheet. Recall scores are classified into categories of WNL, suspect, mild, moderate or severe deficit.  

Minimal Clinical Difference (MCD): not determined to date.  

Contextual Memory Test (CMT)  
Population: Adults 18+ who have neurological or organic memory impairment which include head trauma, CVA, dementia, MS, Parkinson’s, brain tumour, AIDS, epilepsy, or chronic alcohol abuse, and are able to follow 2-step commands. May be useful with older children and adolescents.  

Norms: 3 age groups, based on 375 healthy adults aged 17-86.  
(There is also a Contextual memory Test for school-age children)  


Pros:  
- Asks about strategies thus aids in planning intervention  
- Option of contextual prompt  
- Flexible testing procedures – recall vs recognition  
- Uses pictures of everyday objects  
- Easy to transport  

Cons:  
- Scoring is confusing and lengthy  
- Not appropriate for individuals with moderate or severe aphasia or visual perceptual deficits  
- Ceiling effect – may not identify clients with subtle memory deficits.  
- Normative data focused on Caucasian, highly educated young population (although results were replicated for the most part with an Israeli population).  

Reliability:  
- Adequate to excellent reliability for parallel form (brain injury)  
- Adequate to excellent test-retest, using immediate recall and delayed recall scores (healthy adults, brain injury)  

Group Differences:  
- Differentiates between healthy controls and:  
  - Alzheimer’s disease  
  - brain injury  

Other Aspects of Validity:  
- Excellent concurrent validity with the Rivermead Behavioral Memory Test (brain injury).  

The Dynamic Assessment of Categorization examines the ability to establish categories and switch conceptual set and deductive reasoning. Emphasizes qualitative aspects of performance, and is based on Toglia’s dynamic |
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<td>In-depth assessment; Impairment level (cognitive flexibility, develop strategies)</td>
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<td><strong>Population:</strong> age 18-86, with brain injury or chronic schizophrenia (with negative symptoms).</td>
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<td>Interaction principles of testing. The evaluatee needs to be able to follow two step directions, discriminate between size, color and form, and attend to a task for a minimum of 15 minutes.</td>
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<td><strong>Time to administer:</strong> 10-30 minutes</td>
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<td><strong>Scoring:</strong> Standardized test score sheet is used. Scores range from 0-100 (unable to sort after reduction of amount) to 11 (independent sort, no cues given). Provides a total score plus 3 sub-test scores: sort by colour, type, and size.</td>
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<td><strong>Scoring:</strong> Based on the amount of cueing provided. A score can be calculated for each of the 5 executive function components (max 20 points each), or each of the 4 tasks (max 25 points per task), or total score (max 100 points) – this is simplified by a scoring grid developed by VCH. The higher the score, the more cueing/assistance is required.</td>
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Vancouver Coastal Health and Providence Health Care, Occupational Therapy Practice: Occupational Therapy Cognitive Assessment Inventory & References, v. 2 (April 2014)
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</table>
| Traumatic brain injury or mild cognitive impairment; no normative data to date | o Error detection  
o Error correction  
o On-task behaviour (the higher the score, the fewer the difficulties)  
- clinician can also record potential contributing problems evaluated e.g. visual/perceptual; and overall independence is evaluated | - mild cognitive impairment (MCI)  
Other Aspects of Validity:  
- Adequate concurrent validity with some neuropsych tests (verbal comprehension, perceptual organization, flexibility of hypothesis testing), and no correlation with test of speed of information processing (traumatic brain injury)  
- Adequate concurrent validity with 1 of 2 subtests of the EFPT – with “bill payment” but not “telephone use”. (older adults with mild cognitive impairment)  
- Adequate concurrent validity with another measure of “everyday cognition” (RBMT) and non-significant correlations with more impairment-based measures (MMSE, block design, vocabulary scores) (older adults, some with mild to moderate dementia) | • Need to plan ahead for the route that you will be using for each client (cannot necessarily be the same route for every client) |
| Executive Secretarial Task | In-depth assessment;  
Task performance level (high level executive functions)  
**Population:** adults with brain injury. No normative data so far (although a research article provides a possible cut-off score of 34-35/45)  
Provides an in-depth assessment of executive function. A job assessment procedure is simulated, involving simple secretarial assignments. A new assessment which, to date, has been used mostly for research.  
**Time to administer:** very lengthy, 3 hours. Must administer full test.  
**Scoring:** A score form is filled out (available in Lamberts et al., 2010), with the various tasks scored in terms of initiative, prospective memory, execution of task; and various topics in terms of overall impressions (of planning, effort etc.) – maximum score of 46 (higher scores reflect higher level of function). Client also rates own performance in terms of 5 questions asked at end of task. The authors have developed a possible cut-off score of 34 or 35 (in comparing normal healthy controls with brain injury).  
**Minimal Clinical Difference (MCD):** not determined to date. | **Reliability:**  
- Test-retest and inter-rater reliability not yet tested – limited by lack of a parallel test.  
**Predictive Validity:**  
- Poor validity predicting changes in life roles in correlating this test with the Role Resumption List (a structured interview) (brain injury).  
**Group Differences:**  
- differentiates between healthy controls and:  
- brain injury  
Other Aspects of Validity:  
- Poor to adequate concurrent validity with measures of executive function (BADS, Dysexecutive Questionnaire, Executive Observation Scale) (brain injury). | **Pros:**  
- No cost involved. Information available in Lamberts et al. (2010), including tasks, score form  
- Ecological validity  
- Challenges high-level cognitive and executive functions and therefore may be of benefit in an outpatient or return-to-work assessment setting  
**Cons:**  
- Very lengthy test, may not be useful in most areas of clinical practice  
- Takes extra time to set up for each client; various materials are required (quiet room with desk, phonebook, calculator, telephone, office supplies, day agenda, envelopes, etc.) |
| EXIT-25 (The Executive Interview) | Screening assessment;  
Impairment level  
**Population:** Persons with dementia, Alzheimer’s Disease (AD), dementia of major depression (DMD), schizophrenia (dementia praecox), and vascular dementia without cortical features  
The EXIT-25 was developed as a “bedside screen” of executive dysfunction. It provides a standardized clinical assessment (screen) of executive function. The 25 items assess perseveration, intrusions, apathy, disinhibition, verbal fluency, design fluency, frontal release signs, motor/impulse control, imitation behavior, and other clinical signs associated with frontal system dysfunction.  
**Time to administer:** approximately 15 minutes  
**Scoring:** EXIT-25 scores range from 0 to 50, with high scores indicating impairment. Scores ≥ 15/50 suggest clinically significant EF impairment in young and elderly populations. | **Reliability:**  
- Excellent interrater reliability (dementia).  
- Excellent internal consistency (dementia).  
**Predictive Validity:**  
- Adequate predictive validity of change scores of EXIT25 on change scores in an IADL measure – over time for individuals (whereas NO correlation between change scores in EXIT25 and change scores in MMSE). (elderly retirees age 70+ at non-institutional levels of care, evaluated a 3 points over 3 years).  
**Group Differences:**  
- differentiates between healthy controls and:  
- individuals with dementia  
- one study indicated EXIT25 does NOT differentiate | **Pros:**  
- The EXIT-25 and information about scoring is readily available on internet (no cost involved)  
- Quick to administer  
- Adds important information about executive functioning when screening for cognitive impairment (to add to information from other cognitive screens which do not screen well for executive dysfunction, such as the MMSE) – for individuals with dementia, and also in psychiatry (Royall et al., 2000; Schillerstrom et al, 2003), but unclear how useful it is for outpatients with TBI (and with mild/moderate disability).  
- For individuals with dementia, it links well to information from other cognitive screens which do not screen well for executive dysfunction, such as the MMSE) – for individuals with dementia, and also in psychiatry (Royall et al., 2000; Schillerstrom et al, 2003), but unclear how useful it is for outpatients with TBI (and with mild/moderate disability).  
- For individuals with dementia, it links well to function.  
- Has also been shown to have utility for individuals with psychiatric diagnoses. |


(Normal range for young adults ≤ 5/50; normal range for elderly adults ≤ 10/50.)

"There have been some attempts to create an even shorter/quicker version, such as the "Quick EXIT": Larson et al, 2010) – but not yet well researched.

**Minimal Clinical Difference (MCD): not determined to date.**

- **Other Aspects of Validity:**
  - There is concurrent validity of the EXIT25 and MRI findings that show frontal lobe pathology, as analysed by comparing individuals above and below a cut-off score of 15/50 and the effect of various frontal lesions (analysis does not use correlational analysis) (individuals seen at a dementia assessment clinic).
  - Excellent concurrent validity with MMSE (individuals seen at a dementia assessment clinic)
  - Excellent concurrent validity with MMSE, 3MS, and cognitive score of FIM (traumatic brain injury [TBI] inpatients).
  - Marked ceiling effects when used with TBI outpatients.
  - Excellent concurrent validity with BADS, but non-significant correlation with 2 neuropsych measures of executive function (Stroop & Trail Making) (TBI outpatients).
  - Excellent concurrent validity with the Direct Assessment of Functional Status-Revised test (DAFS-R) (normal controls and also people with dementia); and adequate concurrent validity for persons with mild cognitive impairment (likely because of higher variance in scores for the MCI group).
  - Excellent concurrent validity with MMSE (at a geriatric memory clinic).
  - Adequate concurrent validity with an IADL score (from the Physical Self-Maintenance Scale and Instrumental Activities of Daily Living Scale) (at a geriatric memory clinic)
  - Excellent concurrent validity with another screen of executive functions/frontal lobe dysfunction (the Frontal Assessment Battery) (at a geriatric memory clinic).
  - Adequate to excellent concurrent validity with neuropsychiatric tests measures that aim to assess executive functioning including: Wisconsin Card Sorting Test (r=0.54), Lezak’s Tinker Toy Test (r=0.57), Test of Sustained Attention (time, r=0.82; errors, r= 0.83), and Trail Making Part B (r=0.64). (older adults assessed for dementia)

- **Pros:**
  - Includes performance-based testing (with scenario-based questions and actual tasks for the person to do, related to function at home), thus enhancing ecological validity
  - Fairly good psychometric properties for use with individuals with schizophrenia and dementia – there is some initial research with other populations (as per manual, 1996), but lack of further studies with these other groups
  - Appears to reflect cognitive aspects of performance (but may not reflect emotional influence e.g. depression; positive & negative

- **Cons:**
  - Practice is needed to administer and score appropriately
  - May not be able to detect MCI, or cognitive impairment in TBI outpatients.
  - Moderately influenced by age and education
  - Research findings advise that there was NO clear cut-off score found for presence of dementia; and advise that other testing is required to confirm dementia (Moorhouse et al, 2009)

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**Independent Living Scales (ILS)**

(Loeb 1996; not to be confused with the "Independent Living Scale" developed for brain injury)

- **In-depth assessment; Task performance level**
- **Population:** The most recent psychometric data
- **Time to administer:** about 45 minutes but varies. The manual recommends giving the entire test in one session.

**Reliability:**

- Adequate to excellent internal consistency ('non-clinical cases')
- Excellent test-retest reliability ('non-clinical cases'; schizophrenia)
- Excellent inter-rater reliability ('non-clinical cases')

**Predictive Validity:**

- No studies to date

**Group Differences:**

- Differentiates between healthy controls and:
  - schizophrenia
<table>
<thead>
<tr>
<th>Assessment Name</th>
<th>Overview</th>
<th>Psychometrics – Reliability &amp; Validity</th>
<th>Pros &amp; Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kohlman Evaluation of Living Skills (KELS) (3rd Edition) <strong>as of early 2014, the 4th Edition is being developed.</strong></td>
<td>A fairly quick and simple evaluation of an individual’s ability to perform basic living skills to determine degree of independence for return to community living. The KELS tests knowledge, not actual task performance. Includes 17 items in 5 categories: Self Care, Safety and Health, Money Management, Transportation and Telephone, and Work and Leisure. Time to administer: 30-45 minutes Scoring: Each item is scored as independent (0), or rated assistance (1 ½ or 1 point). Total score ranges from 0 to 17; a person with a score of &gt;6 is considered capable of living independently. Minimal Clinical Difference (MCD): not determined to date.</td>
<td>Reliability: Excellent inter-rater reliability (acute psychiatry, and older adults) Predictive Validity: (no studies to date) Group Differences: differentiates between healthy controls and individuals with schizophrenia Differentiated between 3 groups of elderly (living in community, living in sheltered housing, attending day care); and more sensitive than the FIM in differentiating these groups Other Aspects of Validity: Excellent concurrent validity with Global Assessment Scale and with BaFPE Excellent concurrent validity with FIM and with an IADL measure (older adults). Excellent concurrent validity with MMSE (older adults).</td>
<td>Pros: Helpful for many settings (inpatient, outpatient, acute care). Research has focused on use with schizophrenia and older adults. Useful for quickly obtaining information regarding the ability of a person to perform basic living skills Provides information to help clinician suggest appropriate living situations that will maximize independence – although needs to be augmented with performance-based assessment Cost: $55.00 for manual through CAOT (member price) (also available through AOTA) Cons: Not performance-based. Based on urban lifestyles. Some items must be scored ‘not applicable’ in rural areas. Additional performance-based testing should be done to supplement the KELS as it tests knowledge rather than the actual performance of living skills.</td>
</tr>
<tr>
<td><em><strong>Kohlsman Evaluation of Living Skills</strong></em> (KELS) Edition)</td>
<td>Focuses on dementia and schizophrenia. The norms provided in manual (1996) are for various diagnostic groups: mental retardation, traumatic brain injury, dementia, ‘chronic psychiatric disturbance’, major depression, and schizophrenia. <a href="http://www.pearsonclinical.com/therapy/products/100000781/independent-living-scales-ils--.html">http://www.pearsonclinical.com/therapy/products/100000781/independent-living-scales-ils--.html</a></td>
<td>- severe brain injury - does not differentiate between healthy controls and mild or moderate brain injury (but could be because of small sample sizes in the study); - differentiates between these 3 groups: adults with chronic psychiatric disorders who have high vs. moderate vs. low Global Assessment of Functioning (GAF) scores - differentiates between 3 levels of functional outcome – minimum, moderate and maximum supervision – better than the GAF did (for inpt and outpatient schizophrenia). Other Aspects of Validity: Excellent concurrent validity with some tests of cognition (WAIS-R, MicroCog) (‘non-clinical cases’) Adequate to excellent concurrent validity with various executive function neuropsych tests (dementia) Adequate concurrent validity with the “MATRICS consensus cognitive battery” (schizophrenia) Excellent concurrent validity with the personal self-maintenance scale and the IADL scale of the Philadelphia Geriatric Centre Multilevel Assessment Instrument (‘non-clinical cases’). Excellent concurrent validity with the shorter (21 item) performance-based Test of Everyday Functional Ability - TEFA (dementia) Excellent concurrent validity with the Dementia Rating Scale; poor concurrent validity with the Geriatric Depression Scale (dementia) Poor to adequate concurrent validity with the Hopemont Capacity Assessment Interview (healthy elders) Poor concurrent validity with a negative &amp; positive symptom scale and with a quality of life scale – suggesting that ILS does not measure impact of these areas on independent living skills (schizophrenia)</td>
<td>Cons: May not be sensitive enough to identify individuals with mild cognitive impairment. Quiet room (private setting) recommended. Cheque-writing and phonebook tasks are not relevant to many clients. Map-based way-finding task seems to be more of a memory and attention task than measuring the person’s ability to way-find Cost: about $329 for initial kit, and then $62.00 for each set of 25 replacement forms. OT must obtain additional materials: telephone, telephone book, various denominations of money, and stop-watch. OTs working with dementia clients may want to explore use of TEFA (sold as the Texas Functional Living Scale, TFLS) instead of ILS. The TEFA (TFLS) is a shorter measure with excellent correlation with ILS (r=0.872), although lower correlation between memory subscales (r=0.425) (Weiner, 2006); and cost is less for manual/kit</td>
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<td>psychometric studies to support use with these populations. <a href="https://www.caot.ca/store/detail.aspx?id=PBZP-M04">https://www.caot.ca/store/detail.aspx?id=PBZP-M04</a> YouTube video showing KELS: <a href="http://www.youtube.com/watch?v=30FOxT2ubU4">http://www.youtube.com/watch?v=30FOxT2ubU4</a></td>
<td>Aims to evaluate the ability for independent community living of people with identified or suspected cognitive disabilities. Screens for many different cognitive areas (including memory, executive functions) – but score is based on cueing required, not specific cognitive performance. The client prepares 2 cups of hot beverage, one for self and one for clinician. The clinician requests a drink that differs in 2 ingredients from the client’s selection.</td>
<td>Reliability: Excellent inter-rater reliability (geriatric stroke)</td>
<td>Pros: Ecological validity, portable, assesses functional performance</td>
</tr>
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<td>Kettle Test</td>
<td>Scoring: Score the cueing required for each of 13 steps of the task. Total score = 0-52, with higher score representing higher need for cueing (more problems in performance). Information from the authors also allows the client’s performance to be categorized as independent, mild assist required, or significant assist required.</td>
<td>Predictive Validity: When used together with the MoCA test, there is an improved prediction of whether or not a person needs supervision or not upon discharge, as compared to using MoCA test alone (but still fairly low predictive value even using these tests together) (stroke &amp; TBI)</td>
<td>Cons: No cost to order a kit or score sheets, but the OT needs to purchase and assemble all materials (kettle, drink items etc.) ahead of time; and replace some materials just prior to assessing client (e.g., milk)</td>
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<tr>
<td>Lowenstein Occupational Therapy Cognitive Assessment Battery (LOTCA, LOTCA-II, and LOTCA-G)</td>
<td>Assesses basic cognitive skills. Used for treatment planning and to measure change. The original LOTCA has 20 subtests. The LOTCA-II, with 26 items, was developed to replace the original version, and provides more reliable and diverse set of testing methods, and allows for a shorter administration time. The DLOTCA has 28 subs tests (in the areas of orientation, awareness, spatial perception, visual perception, visuomotor construction, praxis and thinking operations). The DLOTCA’s addition of a new component aims to assess a client’s “learning potential and thinking strategies which are important in choosing the best therapeutic approaches to elicit optimal patient responses…”</td>
<td>Reliability: Excellent internal consistency for LOTCA (stroke, traumatic brain injury, healthy controls, schizophrenia). Excellent inter-rater reliability for LOTCA (stroke, traumatic brain injury, healthy controls)</td>
<td>Pros: A performance test with minimal verbal requirements Procedures are included for use of LOTCA with clients with aphasia Can be used to evaluate change over time (i.e., to re-test clients). There is also a version available for geriatric population (LOTCA-G) Provides a more detailed cognitive profile than the MMSE, and may be stronger than MMSE in predicting function (as measured by FIM).</td>
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<td>*2014: newest versions are the Dynamic LOTCA (DLOTCA) and Dynamic LOTCA-G (DLOTCA-G)</td>
<td>Screening assessment (extended); Impairment level (global)</td>
<td>Predictive Validity: (not established to date)</td>
<td>Cons: No memory subtests in the LOTCA (but present in the LOTCA-G) Can be long and difficult to administer.</td>
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<td>Population: adults with neurological deficits (stroke, traumatic brain injury), dementia, mental illness. For LOTCA: norms are provided (norm group = 20-70) with</td>
<td>Group Differences: differentiates between healthy controls and stroke, brain injury (LOTCA-G)</td>
<td>Other Aspects of Validity:</td>
<td>One study found a substantial ceiling effect for a sample of adults with schizophrenia – therefore, may not be useful with this population (and perhaps also may not be useful with adults with mild cognitive impairment).</td>
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<td><strong>Middlesex Elderly Assessment of Mental State (MEAMS)</strong>&lt;br&gt;Screening assessment; Impairment level (global)&lt;br&gt;Population: Developed for use with elderly, dementia. Also researched with acquired brain injury.</td>
<td>Designed to detect (screen) gross impairment of cognitive skills in the elderly. 12 subtests: orientation, memory, new learning, naming, comprehension, arithmetic, visuo-spatial skills, perception, fluency, motor perseveration. Two of the sub-tests are taken from the Rivermead Behavioural Memory Test (RBMT). Two parallel versions (A and B) allow for test-retest.</td>
<td><strong>Reliability:</strong>&lt;br&gt;• Adequate to excellent internal consistency (hospitalized elderly, acquired brain injury)&lt;br&gt;• Excellent parallel form reliability between Version A and B (community living older adults with depression or dementia)&lt;br&gt;• Adequate parallel form reliability (hospitalized elderly)&lt;br&gt;• Excellent test-retest reliability (dementia)&lt;br&gt;• Excellent inter-rater reliability (older adults with dementia or depression)&lt;br&gt;<strong>Predictive Validity:</strong>&lt;br&gt;• (no research to date)&lt;br&gt;<strong>Group Differences:</strong>&lt;br&gt;• Differentiated between older adults with dementia vs. depression.&lt;br&gt;<strong>Other Aspects of Validity:</strong>&lt;br&gt;• Construct validity: found to be more sensitive than MMSE in detecting mild cognitive impairment (elderly acute psychiatry)&lt;br&gt;• Construct validity: questionable as a cognitive screen by findings of one study in that the MEAMS, as compared to a detailed neuropsych battery, had an unacceptable high false negative rate – i.e., not a very sensitive screen for overall cognitive impairment (or specifically for memory, language, perception or executive problems) (stroke)&lt;br&gt;• Adequate to excellent concurrent validity with MMSE and Clock-drawing (hospitalized elderly)&lt;br&gt;• Adequate concurrent validity with FIM (hospitalized elderly, acquired brain injury)</td>
<td><strong>Pros</strong>&lt;br&gt;• Quick to administer&lt;br&gt;• The test “manuals” provide very clear guidance for all questions to be asked.&lt;br&gt;• Two parallel forms allow for test-retest (although only adequate parallel version reliability in one study)&lt;br&gt;<strong>Cons:</strong>&lt;br&gt;• Developed only for use with elderly&lt;br&gt;• Not suitable for those with severe receptive language problems (i.e., unable to follow simple instructions)&lt;br&gt;• Cost (approx $200.00) for the manual, plus extra for score sheets&lt;br&gt;• Questionable in some research as a cognitive screen (not very sensitive to cognitive impairment)&lt;br&gt;• Adequate but low correlations with function as measured by FIM</td>
</tr>
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| Israeli norms found to be suitable for US population. The DLOTCA is valid for age 18-69 years. Psychometrics and norms also available for children age 6-12 (DOTCA-Ch).<br><br>http://www.lotca.com/ | Time to administer: 30-90 minutes for LOTCA; 30-45 minutes for LOTCA-G. (No specific details available to date re: other versions.)<br>**Scoring:** Most subtests are scored 1-4 (from ‘fails to perform’ to ‘demonstrates good performance’), some are scored 1-5 or 1-8. Total score for LOTCA-II ranges 26-115. Results provide a cognitive profile, with higher scores = less cognitive impairment. Authors caution that use of a total score impacts ability to identify aptitude for each cognitive area. Scoring for the DLOTCA-G has some inaccuracies (including: there are directions to score up to a 2, but the sheet only goes as high as a 1). | **Construct validity supported for LOTCA using factor analysis**<br>**Adequate concurrent validity with LOTCA and MMSE (stroke)**<br>**Construct validity of the DLOTCA-G matches with the LOTCA-G and DLOTCA**<br>**Adequate concurrent validity with LOTCA and FIM-cognitive; lower correlations between LOTCA and FIM-total (but higher correlation than between MMSE and FIM-total) (stroke)**<br>**Adequate concurrent validity with LOTCA-G and MMSE, with strongest correlations between MMSE and with LOTCA-G categories of orientation, visuomotor organization, thinking operations, and memory (dementia).** | **Scoring for the DLOTCA-G has been found to be hard to understand and some of the administration instructions difficult to follow, and with apparent inaccuracies on the score sheet. Pay close attention.** |
### Mini-Mental State Examination (MMSE) (aka Folstein MMSE; Standardized MMSE – SMMSE)

*See also Modified MMSE (3MS) – next item.*

*Note: do not confuse with use of “SMMSE” in the literature to refer to a different test, the “Short form MMSE.”*

**Screening assessment:**
Impairment level (global)

**Population:**
older adults, stroke, may not be useful for individuals with mild cognitive impairment (see Pros and Cons).

*be aware of interpretation with individuals with low education, and influences of age, language, culture, presence of depression.

**MMSE:**
- Developed as a brief, objective assessment to detect dementia.
- To improve reliability, the SMMSE was developed, to provide strict guidelines for administration and scoring.
- In an attempt to improve the MMSE, the 3MS was developed – see below.

**Time to administer:**
10 minutes

**Scoring** (out of 30):
- 26-30 = could be normal
- 20-25 = mild cog impairment
- 10-20 = mod cog impairment
- 0-9 = severe cog impairment

*some researchers suggest ≤24 as ‘suggesting dementia’ or cognitive impairment (e.g. Godefroy et al., 2011)*

*different researchers have created cut-off and percentile tables to allow interpretation of results in context of different ages and levels of education, but nothing has become a standard yet for interpretation.

**Minimal Clinical Difference (MCD): not determined to date.**

**Reliability:**
- Poor internal consistency (older adults without cognitive impairment); excellent internal consistency (older adults with Alzheimer’s Disease)
- Adequate inter-rater reliability for MMSE and excellent for SMMSE (i.e., with stricter administration and scoring guidelines).

**Predictive Validity:**
- Poor predictive validity of MMSE in predicting discharge FIM motor scores (geriatric rehabilitation; subacute stroke).
- Poor predictive validity of cognitive sequelae at 6 months post discharge of survivors of critical illness.

**Group Differences:**
- differentiates between community vs. facility dwelling older adults
- In some studies, MMSE failed to differentiate between mild dementia and healthy adults. In one study, MMSE did differentiate, but with less accuracy than a combination of cognitive/neuropsych tests.
- SMMSE stronger at identifying dementia than MMSE.
- MMSE unable to identify psychiatric inpatients who had significant deficits on a neuropsych battery (thus suggesting that MMSE may seriously underestimate cognitive impairment in this population).

**Other Aspects of Validity:**
- Adequate concurrent validity with FIM+FAM (inpatient rehab acquired brain injury)
- Excellent concurrent validity between MMSE and a measure of daily function (“Direct Assessment of Functional Status”) (MMSE score mean=23.8, but range 0 to 30/30) – strongest correlation was between MMSE ‘orientation’ and DAFS ‘time orientation’ (dementia).
- Poor convergent validity with the Mini-Cog Screen

**Pros:**
- Quick screen
- Available in many languages (but for a cost)
- SMMSE recommended by BC Ministry of Health (specifically in assisting in identification of cognitive impairment of elderly) & endorsed by VCH and PHA for this purpose
- Some research has supported MMSE as a useful screen in community-based health care to capture early cognitive impairment

**Cons:**
- Lack of psychometric studies involving younger adults and adults with acquired brain injury.
- Not recommended for inpatient psychiatric population.
- Age & level of education may affect score (i.e., “age and education bias”) – thus may have a “false positive” for individuals with low education.
- Not suitable to be given through an interpreter, or to person with aphasia
- Not sensitive enough for very mild cognitive changes (in which case the MoCA or Cognistat might be recommended as a screen)
- Although some evidence of convergent validity with function, one study shows poor predictive validity of function.
- Recent study cautions against using MMSE as stand-alone tool in determining decision-making capacity (Pachet et al. 2010)

**Modified Mini-Mental State Exam (3MS)**

**Screening assessment:**
Impairment level (global)

**Population:**
same as MMSE

**Pros:**
- Can obtain an MMSE score & 3MS score from same test

**Cons:**
- Takes a little longer than MMSE or MoCA
- No psychometric studies involving younger adults or adults with acquired brain injury or mental illness.
- Lacks sensitivity to mild cognitive impairment.
- Similar issues as MMSE in terms of interpretation
### Assessment Name Overview

<table>
<thead>
<tr>
<th>Assessment Name</th>
<th>Overview</th>
<th>Psychometrics – Reliability &amp; Validity</th>
<th>Pros &amp; Cons</th>
</tr>
</thead>
</table>
| Montreal Cognitive Assessment (MoCA) | A screen designed to “…to assist first-time physicians in detection of mild cognitive impairment…” (Nasreddine 2005, p. 695). Includes screen for visuospatial/executive, naming, memory (recall), attention, language, abstraction, orientation domains. | Reliability:  
- Excellent internal consistency (normal elderly, mild cognitive impairment & mild Alzheimer’s Disease)  
- Excellent test-retest reliability (normal elderly, mild cognitive impairment & mild Alzheimer’s Disease)  
Predictive Validity:  
- Adequate predictive validity of functional status as measured by FIM motor scale, with highest correlation between MoCA visuo-executive items and FIM-motor scores (subacute stroke)  
- Poor predictor of an individual’s supervision needs (independent vs. needing supervision) upon discharge – needs to be combined with a functional assessment to increase predictive value of the overall evaluation of the client (stroke & TBI)  
- Poor predictor of functional outcomes (for 1-year post aneurysmal subarachnoid hemorrhage in Hong Kong Chinese patients)  
Group Differences:  
- Differentiates between healthy controls and numerous populations | Free score sheets, instructions, and lots of information on web site  
- Alzscreen  
- More sensitive than SMMSE in identifying mild cognitive impairment  
- For English version: allows retest via 3 versions  
- Single version in many other languages  
- Recommended by BC Ministry of Health to assist in diagnosis for cognitive impairment of elderly & endorsed by VCH and PHA  
- Capable of detecting change over time (**but beware that there may need to be a decline of >2 or improvement of >4 points to be a reliable measure of change, as per recent ABI study) |
| Multiple Errands Test | The MET is a complex shopping task performed in a shopping mall or hospital | Reliability:  
- Adequate to excellent inter-rater reliability (normal  
Minimal Clinical Difference (MCD): for an ABI study (stroke and TBI) it was determined that the reliable change interval for a confidence interval of 80% is -2 to +4. | No cost for test materials |

**Note:** This is simply a screen for mild cognitive impairment; it is not otherwise a measure of degree of cognitive impairment. On its own, the MoCA is a good predictor of function (must combine with functional testing). Conventional use of the MoCA as a screening tool to detect MCI may be problematic in cultures different from that in which the cut-off score was determined. Need to use caution when applying cut-off score in lower education or ethnically diverse populations.

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The additional items to the MMSE cover: long term memory, verbal fluency, abstract thinking, and recall of 3 words an additional time.

**Time to administer:** 15 minutes.

**Scoring:** Maximum score of 100. A score ≤77 may indicate cognitive impairment, in particular if education is 9+ years and age <80 years.

As with the MMSE, it is important to take into consideration influence of age, education and culture – although one study found that corrected cut-off scores did not improve accuracy in screening for cognitive impairment or dementia (O’Connell et al., 2004).

A clinically meaningful change (in measuring cognitive decline) is considered ≥5 points, although some researchers suggest 10 points.

**Minimal Clinical Difference (MCD): not determined to date.**

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The additional items to the MMSE cover: long term memory, verbal fluency, abstract thinking, and recall of 3 words an additional time.

**Time to administer:** 15 minutes.

**Scoring:** Measured by a semi-structured interview conducted with an informant, assessing a person’s difficulties performing various ADLs for non-physical reasons (adults with probable dementia) (Zahodne et al., 2013).

**Group Differences:**
- For older adults with low education, 3MS may be better than the MMSE in differentiating between healthy adults and those with Alzheimer’s disease.

**Other Aspects of Validity:**
- Excellent concurrent validity with MMSE, Blessed Dementia Scale, Camdex Cognitive scale (CAMCOG) (various studies, dementia and elderly).
- Adequate to excellent convergent validity with various neuropsych tests such as theBoston Naming Test, Controlled Word Association Test, Logical Memory test.
- Adequate concurrent validity with FIM (whereas same study showed poor concurrent validity of the MMSE and FIM) (geriatric stroke)

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Montreal Cognitive Assessment (MoCA)

**Screening assessment; Impairment level (global)**

**Population:** Many groups as per reference list on web site, including Alzheimer’s Disease, Huntington’s Disease, Multiple Sclerosis, Parkinson’s Disease, stroke, brain tumour.

*Note: No psychometric studies yet for traumatic brain injury.*

[www.mocatest.org](http://www.mocatest.org)

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### MET

**Overview**
- In-depth assessment; Task performance level (high level cognitive/executive functions)

**Population**
- For high level clients. Developed for individuals with cognitive deficits who are independently mobile, verbal, & able to read/follow instructions. No norms available.

**Environment**
- Includes completion of a variety of tasks, rules to adhere to, and a specific time frame. The assessor observes the client (follows client) while client carries out errands in a shopping centre or hospital.

**MET-HV** = MET hospital version.

**MET-R** = MET-Revised (revised scoring format, including to make scoring more objective, remove possible double-counting e.g. of task failure also being scored as a rule break; and some new scoring)

**Time to administer**
- 20-60 minutes or longer (depends on tasks involved, client performance) plus travel time (if required)

**Scoring**
- a. self-evaluation (ratings)
- b. errors (scores for task failures, inefficiencies, rule breaks)
- c. observational (qualitative) information optional but can be very useful (behavioural observations, strategies used)

**Interpretation of score**
- The VCH form provides a general guideline for cut-off values for normal expected performance based on info in literature to date. One article proposes a cut-off of 7 errors total.

**Minimal Clinical Difference (MCD)**
- not determined to date.

**Predictive Validity**
- Adequate predictive validity of MET-HV, administered on discharge from inpatient rehab, in predicting Participation Index (M2PI) score administered 3 months later (acquired brain injury)

**Group Differences**
- Differentiates between healthy controls and:
  - inpatients/outpatients with acquired brain injury
  - individuals with mild CVA (community dwelling)

**Other Aspects of Validity**
- Adequate concurrent validity with other measures of executive dysfunction (including BADS, Wisconsin Card Sorting Test) (healthy controls, inpatients/outpatients and community dwelling acquired brain injury).

**Ecological (construct) validity**
- the MET is more sensitive than traditional neuropsych measures of executive function in differentiating between healthy controls and inpatients/ outpatients with acquired brain injury – i.e., individuals with ABI may do well on traditional tests but still present with dysexecutive syndrome as assessed by real-world shopping task.

**Pros**
- If information is required about attentional processing and working memory, then this may provide a fairly quick screen.
- The PASAT stimuli have been translated into 27 languages (but the scoring manual is in English).

**Cons**
- Need to develop your own MET (i.e., for your own setting/shopping mall) – but a template available from VCH
- Need to provide client with some money

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### PASAT

**Overview**
- The PASAT is frequently used by neuropsychologists in assessment of attentional processing and working memory. It is generally accepted as one of the more sensitive measures of how traumatic brain injury affects speed of information processing. The individual is presented with a series of single digit numbers and has to add the 2 most recent digits. There are different rates of presentation.

**Reliability**
- Excellent internal consistency (many studies).
- Excellent test-retest reliability (many studies).

**Predictive Validity**
- *

**Group Differences**
- Differentiates between healthy controls and:
  - traumatic brain injury
  - multiple sclerosis

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Vancouver Coastal Health and Providence Health Care, Occupational Therapy Practice: Occupational Therapy Cognitive Assessment Inventory & References, v. 2 (April 2014)  page 16 of 35
### Assessment Name: The Perceive: Recall: Plan: Perform (PRPP) System of task analysis

- **Overview**: The PRPP is a standardised, 2-stage, criterion-referenced assessed. In a general sense, it provides a framework to enhance observational assessment of a client’s information processing (cognitive function) during routines, tasks and sub-tasks that are meaningful and relevant to the client. Performance is analysed from a cognitive processing perspective in terms of Perceive (attention and sensory perception), Recall (memory), Plan and Performance (self-monitoring). (See Fry & O’Brien 2002 for further description.)

- **Time to administer**: Varies with the severity of information processing difficulty and the complexity of tasks assessed. Able to complete the assessment on 4 or 5 tasks in most cases over one to two hours.

- **Scoring**: Stage 1: The OT employs a standard observational task analysis, breaking down everyday task performance into steps, and identifying errors in performance. Stage 2: A cognitive task analysis is used, directed at the cognitive processes underlying performance.

- **Minimal Clinical Difference (MCD)**: Not determined to date.

### Psychometrics – Reliability & Validity

- **Reliability**: Adequate internal consistency (schizophrenia).

- **Validity**: Adequate concurrent construct validity between trained therapists (brain injury; schizophrenia, mild dementia).

- **Other Aspects of Validity**: Construct validity; studies indicate that PASAT scores reflect speed of information processing, some type of attentional process, and working memory — such as by correlations with other neuropsych measures (many populations including traumatic brain injury, cognitively intact, multiple sclerosis, lupus).

- **Pro & Cons**: Poor correlation with measures of everyday function. Cannot be used for test-retest scores as it is susceptible to practice effects. Negatively affected by increased age, decreasing IQ (and probably education), and low math ability. May cause undue anxiety and frustration for the client. Individuals with speech or language impairment at a distinct disadvantage. Recent research has shown it to be difficult even for the general population (Brooks et al., 2011). Care to be taken to identify the reasons underlying any low score before interpreting it as clinically significant.

### The Perceive: Recall: Plan: Perform (PRPP) System of task analysis

- **Overview**: The PRPP is a standardised, 2-stage, criterion-referenced assessment. In a general sense, it provides a framework to enhance observational assessment of a client’s information processing (cognitive function) during routines, tasks and sub-tasks that are meaningful and relevant to the client. Performance is analysed from a cognitive processing perspective in terms of Perceive (attention and sensory perception), Recall (memory), Plan and Performance (self-monitoring). (See Fry & O’Brien 2002 for further description.)

- **Time to administer**: Varies with the severity of information processing difficulty and the complexity of tasks assessed. Able to complete the assessment on 4 or 5 tasks in most cases over one to two hours.

- **Scoring**: Stage 1: The OT employs a standard observational task analysis, breaking down everyday task performance into steps, and identifying errors in performance. Stage 2: A cognitive task analysis is used, directed at the cognitive processes underlying performance.

- **Minimal Clinical Difference (MCD)**: Not determined to date.

### Other Aspects of Validity:

- **Validity**: Studies indicate that PASAT scores reflect speed of information processing, some type of attentional process, and working memory — such as by correlations with other neuropsych measures (many populations including traumatic brain injury, cognitively intact, multiple sclerosis, lupus).

- **Pro & Cons**: Adequate concurrent construct validity between trained therapists (brain injury; schizophrenia, mild dementia).

- **Other Aspects of Validity**: Construct validity; studies indicate that PASAT scores reflect speed of information processing, some type of attentional process, and working memory — such as by correlations with other neuropsych measures( many populations including traumatic brain injury, cognitively intact, multiple sclerosis, lupus).

- **Pro & Cons**: Poor correlation with measures of everyday function. Cannot be used for test-retest scores as it is susceptible to practice effects. Negatively affected by increased age, decreasing IQ (and probably education), and low math ability. May cause undue anxiety and frustration for the client. Individuals with speech or language impairment at a distinct disadvantage. Recent research has shown it to be difficult even for the general population (Brooks et al., 2011). Care to be taken to identify the reasons underlying any low score before interpreting it as clinically significant.

### Vancouver Coastal Health and Providence Health Care, Occupational Therapy Practice: Occupational Therapy Cognitive Assessment Inventory & References, v. 2 (April 2014)
<table>
<thead>
<tr>
<th>Assessment Name</th>
<th>Overview</th>
<th>Psychometrics – Reliability &amp; Validity</th>
<th>Pros &amp; Cons</th>
</tr>
</thead>
</table>
| **The Repeatable Battery for the Assessment of Neuro-psychological Status (RBANS)**<br>Now sold as: RBANS Update (2012)<br>Screening assessment; Impairment level<br>Population: originally developed for assessing dementia; but applied in research to other populations (schizophrenia, brain injury, etc.)<br>Norms: Age 12 to 89 years. The norms in the manual are based on United States population normative standardization (and can be applied to various dementias; Huntington’s disease, Parkinson’s disease, depression, schizophrenia and traumatic brain injury).<br>Subsequent publications have examined performance for a variety of populations including other languages, and for specific populations (e.g., Iverson et al., 2009, norms for schizophrenia).<br>http://www.rbans.com/ | This is a brief neuropsychological battery that consists of 12 subtests that provide for 5 index scores: immediate and delayed memory, attention, language (picture naming, semantic fluency), and visuospatial/constructual skills. It was developed for 2 purposes: (1) as a stand-alone, core battery for detection and neurocognitive characterization of dementia; and (2) to detect and track neurocognitive deficits (and recovery) in a variety of disorders. There are 4 equivalent alternate forms, thus allowing for retesting.<br><br>**Time to administer:** about 30 minutes (thus, an extended screening assessment).<br>**Scoring:** the raw scores for the 12 subtests are scaled together to create 5 index scores, which are then summed to convert to a total scale score. As per test booklet, computation of scores takes <5 minutes.<br>**Cautions:**<br>- The subtest data should not be used as “stand-alone” measures, but only to help interpret index (total) score performance<br>- Do not rely on a single source of information, such as the RBANS retest scores, to conclude that there has been a significant change in the client’s neurocognitive status.<br>- Age, education, & level of cognitive functioning may affect the “effort index” (EI) – significant caution is warranted when interpreting EI results in older adults with suspected dementia.<br>- For stroke, Green (2013) recommends using a cut-off of <70 as “highly likely to have cognitive impairment” and between 70-80 as “likely to have a cognitive impairment”. Those who score >80 should be assessed on more detailed neuropsych tests before concluding that there is no cognitive impairment present.<br><br>Minimal Clinical Difference (MCD): not determined to date. | **Reliability:**<br>- Generally adequate internal consistency for each index score and total scale (brain injury outpatients)<br>- Adequate test-retest reliability (using alternate versions) (<i>healthy controls</i>)<br>- Excellent test-retest reliability (using alternate versions) (<i>schizophrenia</i>)<br><br>**Predictive Validity:**<br>- Linear regression analyses showed predictive validity of RBANS index scores for the 6 domains of the “CDR scale”, a semi-structured interview of patients & informants (domains = memory, orientation, judgment & problem solving, community affairs, home & hobbies, and personal care) – in particular for the language and immediate memory subtests (for individuals with dementia or mild cognitive impairment)<br>- Across studies there are inconsistent results in terms of the RBANS’s predictive validity of occupational status (i.e., working or not working) post schizophrenia.<br><br>**Group Differences:**<br>- Differentiates between older adults who may have illnesses associated with aging but no cognitive impairment, and adults with dementia.<br>- Poor sensitivity in differentiating between adults with mild cognitive impairment (MCI) and cognitively intact peers for only 3 of 5 indexes and 6 or 12 subtests.<br>- Differentiates between healthy adult controls and: -adults with bipolar disorder<br>-adults with schizophrenia<br>-adults post-stroke<br>-Differentiates between healthy adolescents and adolescents with psychotic disorders<br><br>**Other Aspects of Validity:**<br>- Adequate to excellent concurrent/construct validity for most subtests and the 4 index scores, with neuropsych tests measuring similar cognitive constructs (brain injury inpatients and outpatients) | **Pros:**<br>- Fairly quick to administer, and can be done at bedside, no major set-up required<br>- Administration and scoring gets easier as you learn/practice using it<br>- This is a “neuropsych” test that OTs can use (i.e. without needing a masters/PhD in psychology)<br>- Researchers have found RBANS to be suitable for detecting and tracking mild cognitive impairment (MCI) presumed to be due to Alzheimer’s Disease.<br>- May be useful in reducing amount of testing administered to a client by providing a relatively quick screen without administering a full neuropsych test battery (depending on factors such as purpose of assessment).<br><br>**Cons:**<br>- Cannot use language component on non-English speakers<br>- Difficult to understand results without having good knowledge on the concepts of statistical significance, bell curve etc.<br>- Expensive, in particular to purchase full kit (with all 4 versions): $549.00 USD. Less expensive for only 1 version: $259.00. Cost of 25 forms: $99.00.<br>- Use caution in using the RBANS to detect mild cognitive impairment (MCI); it lacks sensitivity to MCI for many subtests<br>- Lacks assessment (screening) of executive functions<br>- Research indicates that it does not necessarily have high specificity for cognitive impairment for individuals with schizophrenia or brain injury (being that this was developed for assessing dementia, and lacks assessment of “frontal functions”)<br><br>**Rivermead Behavioural Memory Test (RBMT)**<br>*note there is Version II (2003) and Version III (2008)*<br>*there is also a version for children: RBMT-C<br>**In-depth assessment; Impairment level (memory)**<br>Assessment of memory related to functional tasks. Assesses visual, verbal, recall, recognition, immediate, delayed and prospective memory, & ability to learn new info.<br>RBMTC-3 adds “novel task”.<br><br>**Time to administer:** 30-40 minutes<br>**Scoring:** RBMT-2: Screening score (max 12) or | **Reliability:**<br>- Adequate parallel form reliability for RBMT (mixed sample of healthy adults and “clinical cases”).<br>- Excellent inter-rater reliability (mixed sample of healthy adults and “clinical cases”).<br><br>**Predictive Validity:**<br>- (no studies to date)<br><br>**Group Differences:**<br>- differentiates between healthy controls and: | **Pros:**<br>- Allows comparison to norms<br>- Results (strengths/weaknesses for memory) allow the OT to provide more specific and individualized memory strategies<br>- Results are useful to include in an education session for family members<br>- Modest ability to predict everyday memory failures<br>- Parallel versions (RBMT-3) allow for test-retest (thus, evaluation of change over time)<br>- Ecological validity is supported through use of
<table>
<thead>
<tr>
<th>Assessment Name</th>
<th>Overview</th>
<th>Psychometrics – Reliability &amp; Validity</th>
<th>Pros &amp; Cons</th>
</tr>
</thead>
</table>
| **Population**: designed for adults with acquired, non-progressive brain injury. | Standardized profile score (SPS) (max 24) | - brain injury (RBMT and RBMT-3)  
- Korsakoff’s Syndrome / chronic alcoholics (RBMT-3) | some “task performance” elements and concurrent validity with therapists’ and relatives’ ratings of individuals with brain injury |
| Normative group: English speaking adults to age 89 | RBMT-3: Sum scaled score can be used to calculate a General Memory Index, Percentile Rank, and Confidence Interval. Subtests can be plotted on a Scaled Score Profile. Note: Standard Error of Measurement (SEM): 5.35 (RBMT-1); 5.32 (RBMT-2) | **Other Aspects of Validity**:  
- Poor to adequate concurrent validity with impairment-based tests of memory (brain injury)  
- Adequate to excellent concurrent validity between RBMT and therapists' observations of memory failures over a mean of 35 hours, thus evidence of ecological validity (brain injury)  
- Adequate concurrent validity between RBMT and relatives’ ratings (brain injury)  
- Adequate concurrent validity between RBMT-3 and proxy rating of the Prospective and Retrospective Memory Questionnaire (mixed sample of healthy adults and “clinical cases”)  
- Adequate concurrent validity for some subtests of RBMT with a test of functional status, the Environmental Status Scale – a broad measure of functional disability (multiple sclerosis)  
- More research is needed on the ecological validity of the RBMT-3 in individuals with alcohol-related memory deficits as well as in other client groups | **Cons**:  
- Client needs to have good attention to participate.  
- Caution in using it with clients who have limited insight about memory changes.  
- Cost may be prohibitive ($651.00 for complete kit; $123.00 for extra forms)  
- OT needs to take time to learn how to administer, and become familiar with subtests (including spatial memory task)  
- Quiet room required (a con if one is not available)  
- Administration time can be quite lengthy. Despite manual suggesting 30 minutes, it can take up to 50 minutes or longer (especially if OT not very familiar with it)  
- Does not detect mild memory deficits  
- Caution if using with individuals who have limited English abilities (normative group = English speakers) |
| **Swanson Cognitive Processing Test S-CPT** | A battery of 11 information processing/working memory subtests: semantic association and categorization; auditory digit, nonverbal, and picture sequencing; phrase recall, story retelling, rhyme, spatial organization, directions, and mapping skills. An abbreviated version has 5 subtests.  
A systematic cuing system is used, to allow measurement of the client’s potential competence when provided with probes/hints (considered ‘dynamic assessment’). Results, therefore represent the client’s “processing potential” which is the difference between their actual performance level, and what they can achieve with probes.  
**Time to administer**: 3+ hours (sometimes 4-5 hours)  
**Scoring**: 7 composite scores representing mental processing ability; ‘probe score’, processing difference score, etc.  
**Minimal Clinical Difference (MCD): not determined to date.** | **Pros**:  
Some OTs have found this test useful with higher level clients who wish to return to school (for example, to help identify strategy use, strengths & weaknesses in working memory, connect performance to academic achievement)  
Can use all 11 tests or selected subtests  
Allows OT to come up with ideas for interventions  
Can be administered in 1 or 2 sections  
A dynamic tool, the OT can provide hints; demonstrates learning, strategies used | **Cons**:  
The manual/forms may be difficult to find.  
Takes a very long time to administer plus extra time to prepare  
Research has focused on use of this test in educational (not health care) settings.  
More sensitive to higher functioning clients  
Query sensitivity to different ethnic/cultural groups  
Not easy to learn; needs practice beforehand  
May be a little overwhelming for client and therapist |
| **SIMARD-MD ("Screen for the Identification of Cognitively Impaired (Medically At-Risk Drivers, a Modification of the DemTect")** | A newly developed (2010), brief screening tool for use by physicians to identify drivers who are cognitively impaired and, therefore, at risk for driving. A pencil-and-paper tool.  
**Time to administer**: Less than 7 minutes  
**Scoring**: Easy to score, with cut-off points to identify those who would vary likely pass or fail a driving assessment. (Note: “cut-off points do | **Reliability**:  
No information to date | **Pros**:  
Stated by authors to be predictive of driving – **but caution: see Predictive Validity and Cons**  
May be a helpful tool for driver screening of older adults (not yet researched with other populations)  
No training required for the clinician  
Test (and information) readily accessible on website, no cost.  
Quick and easy to administer to English speaking clients |

Vancouver Coastal Health and Providence Health Care, Occupational Therapy Practice: Occupational Therapy Cognitive Assessment Inventory & References, v. 2 (April 2014)
<table>
<thead>
<tr>
<th>Assessment Name</th>
<th>Overview</th>
<th>Psychometrics – Reliability &amp; Validity</th>
<th>Pros &amp; Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Symbol Digit Modalities Test (SDMT)</strong></td>
<td>The SDMT is a screening tool developed to identify cerebral dysfunction in children and adults ages (age 8 plus) – involving attention, visual scanning, and (if written response is required) motor speed. The client is presented with a series of geometric figures and, with reference to a key at the top of the page, indicates which number (from 1 to 9) matches each figure. The client can provide written or spoken responses. This test is optimally not used on its own, but as part of a battery of cognitive (neuropsych) tests. More recently, a computerized version became available (c-SDMT) – initially developed to be used during fMRI research. There have also been some alternate forms developed for use by researchers, to try to eliminate practice effect with repeated use (Benedict et al., 2012). Researchers suggest clinicians consider replacing PASAT with SDMT in the Multiple Sclerosis Functional Composite – due to slightly better predictive validity &amp; easier administration.</td>
<td><strong>Reliability:</strong> Excellent test-retest reliability (normal controls) Excellent test-retest reliability for c-SDMT (healthy controls and multiple sclerosis) Excellent test-retest reliability (schizophrenia) Practice effect shown if administered 1 week apart (schizophrenia) Excellent test-retest reliability using alternative forms of the SDMT (multiple sclerosis)</td>
<td><strong>Pros:</strong></td>
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<td><strong>Time to administer:</strong> usually 5-10 minutes total (including instructions) with 90 seconds for the actual test. <strong>Scoring:</strong> Scoring is simple, conducted using the “autoscore” form that is part of the test form. <strong>Minimal Clinical Difference (MCD): not determined to date.</strong></td>
<td><strong>Group Differences:</strong> Differentiated between individuals who are likely vs. unlikely to pass an on-road driver test (healthy &amp; cognitively impaired older adults living in community) – but not 100% sensitivity/specificity</td>
<td></td>
<td><strong>Only one research study to date</strong> <strong>Highly language based test</strong> <strong>Michel Bedard (Director, Centre for Research on Safe Driving) identifies the authors’ claims as overstated; no independent research; possible conflict of interest due to DriveABLE connection</strong> <strong>Poor screening discrimination because 50-80% of clients need to be sent for further testing (e.g., DriveABLE recommended)</strong></td>
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<tr>
<td><strong>Test of Everyday Attention (TEA)</strong></td>
<td>The TEA has 8 subtests to measure different aspects of attention (as per factor analysis: visual selective attention/speed; attentional switching; sustained attention; and auditory-verbal working memory. As per test description in manual, also tests for divided attention). There are 3 versions (A, B, C). Note: children’s version is also available (TEA-Ch).</td>
<td><strong>Predictive Validity:</strong></td>
<td><strong>Pros:</strong></td>
</tr>
<tr>
<td><strong>Population:</strong> Youth to elderly with cognitive difficulties, in particular, individuals who not have 100% sensitivity; thus, there is potential for false positive results</td>
<td>Reliability: Adequate concurrent validity with a test of functional status, the Environmental Status Scale – a broad measure of functional disability (multiple sclerosis) Adequate concurrent validity with a test of functional status, the Environmental Status Scale – a broad measure of functional disability (multiple sclerosis) Adequate concurrent validity with a test of functional status, the Environmental Status Scale – a broad measure of functional disability (multiple sclerosis) Adequate concurrent validity with a test of functional status, the Environmental Status Scale – a broad measure of functional disability (multiple sclerosis)</td>
<td></td>
<td><strong>3 parallel versions allows for test-retest (although there may be practice effects with the dual-task decrement)</strong> <strong>Assesses auditory &amp; visual attention (but bias is auditory)</strong> <strong>May be useful for high level clients who have limited insight</strong></td>
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<tr>
<td><strong>Population:</strong> Community dwelling elders referred for driving assessment</td>
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<td>They are safe to drive.</td>
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</tbody>
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### Trail Making Test A & B (TMT)

**Assessment Name**
- **Trail Making Test A & B (TMT)**

**Overview**
- 

**Psychometrics – Reliability & Validity**
- **Reliability:**
  - Excellent inter-rater reliability (population unknown).
  - Excellent test-retest reliability for both TMT A and B (major depression) – but other studies caution of practice effects.

**Predictive Validity:**
- Construct validity that a battery of neuropsych tests (including TMT) is associated with functional outcomes (with 37% of variance shared) (schizophrenia).
- A systematic review indicates methodological limitations in research studies that aim to determine clinically useful cut-off scores in determining fitness to drive (Roy & Molnar, 2013).

**Group Differences:**
- Sensitive to normal age-related declines in cognition.

**Other Aspects of Validity:**
- Construct validity is supported for TMT-A to require mainly visuo perceptual abilities and TMT-B to reflect primarily working memory and task-switching ability, in correlating with other neuropsych measures (healthy subjects).
- Construct validity of TMT A and B as cognitive impairment measure is supported by poor to excellent concurrent validity with other variations of trail-making tests (college students).
- TMT-A and CCT-1 may help predict pass/fail of driving test (older adults referred for driver

**Pros:**
- Simple, quick

**Cons:**
- For clinical populations, there is very little of research to date associating TMT results with measures of everyday function including driving – the best evidence is for neuropsych batteries that include TMT, and not a TMT on its own.
- Cannot use for re-testing due to practice effects
- TMT and CCT may not be equivalent – so do not use as alternative versions for test-retest
- Be careful what norms are used (depends on part what test is used – TMT, CCT, OTMT). Norms of TMT A and B may no longer be applicable to current US population. The Comprehensive Trail Making Test (CTMT) was developed to overcome limitations (with excellent internal consistency, adequate test-retest reliability, and adequate concurrent validity with other neuropsych tests, for a large norm group).
- Requires knowledge of the numbers and letters used in the English language

**Scoring:**
- Simple scoring. Don’t use original cut-off scores, because age and education affect scores; instead, use 2004 norm data available on-line (see Reference List).

**Time to administer:**
- 5-10 minutes

**Minimal Clinical Difference (MCD):**
- not determined to date.

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**Assessment Name**
- **Assessment Name**

**Overview**
- 

**Pros & Cons**
- 

**Cons:**
- Quiet room required - some extra materials required (stopwatch, CD player)
- Quite high level, can be quite challenging
- Need to take time (about an hour) to try it out yourself prior to attempting to administer
- Interpretation of scores can be time-consuming
- Ceiling effects for some subtests for some age groups
- Caution in using with individuals with hearing or visual impairment

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**Scoring:**
- Score for each subtest.

**Option 1:**
- Plot raw scores on the tables provided in the manual (appendices) to determine scaled-score for each subtest, which depends on client’s age range. If scaled-score falls within shaded area, then performance is likely abnormal.

**Option 2:**
- Use Table 9 in manual to compare the scaled-score with percentile range (e.g., scaled-score 10 = 43.4%–56.6% percentile; or use tables provided in Appendixes to convert raw score to an approximate percentile.

**Minimum Clinical Difference (MCD):**
- ??not determined to date.

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**Trail Making Test A & B (TMT)**

**Population:**
- children and adults. Studies with many populations including dementia, acquired brain injury, depression, schizophrenia.

- [http://www.pearsonclinical.com](http://www.pearsonclinical.com)
- [http://www4.parinc.com](http://www4.parinc.com)

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**Minimal Clinical Difference (MCD):** not determined to date.
**Test for Nonverbal Intelligence (TONI) – “A language-free measure of cognitive ability”**

**Screening assessment:** Impairment level (intelligence)

**Population:** recommended for use with children or adults (age 6-89) when a measure of intelligence is required and where traditional intelligence tests are inappropriate (language impaired, hearing impaired, non-English speakers).


**Assessment:** A neuropsych measure of a small piece of the construct of “fluid intelligence” (purporting to measure aptitude, abstract reasoning, problem solving). Designed for children and adults. There are 2 parallel versions (A and B). All items are abstract/figural; verbal or non-verbal instruction is provided; and the examinee responds with simple but meaningful gestures such as pointing, nodding or blinking. The most recent version is the TONI-4, with updated norms. Not to be confused with the CTONI (Comprehensive Test of Nonverbal Intelligence).

**Time to administer:** 15-20 minutes.

**Scoring:** Raw scores can be converted to age-based percentiles or index (standard scores) and compared to norms.

**Minimal Clinical Difference (MCD):** not determined to date.

**Reliability:**
- Poor to excellent internal consistency (various populations)
- Excellent test-retest and parallel form reliability for an earlier version (children).
- (No additional published research could be found including for TONI-4; manual unavailable for review)

**Predictive Validity:**
- (No published research on validity could be found on TONI-3 or TONI-4; manual unavailable for review)

**Group Differences:**
- (No published research on validity could be found on TONI-3 or TONI-4; manual unavailable for review)

**Other Aspects of Validity:**
- (No published research on validity could be found on TONI-3 or TONI-4; manual unavailable for review)

**Pros:**
- Completely non-verbal
- Simple instructions; can be administered by anyone who follows instructions carefully and has some formal training in administration
- Detailed directions for administering, scoring, and interpretation (in the manual).
- A 20-year body of reliability and validity research is cited and summarized in the test manual
- Good for pre- and post test application
- Low cultural loading

**Cons:**
- A review of an early version of the TONI recommends exercising extreme caution in interpreting results of this test as a measure of intelligence, in part because it is a non-verbal test (Shelly, 1982).
- Limited published research on current and recent versions (TONI-3, TONI-4); need test manual to review psychometrics.
- Accessible research literature focuses primarily on use of the TONI as a measure of intelligence (for adults and children), without addressing any concurrent or predictive validity for measures of everyday function.
- Cost is about $380.00 for initial kit, and then $60.00 for each subsequent package of 50 test forms.

**Texas Functional Living Scale (TFLS)**

**Screening assessment:** More so than in-depth; task performance level

**Population:** Originally developed for people with dementia, but has expanded to other groups including adults intellectual disability, schizophrenia, traumatic brain injury.

**Normative Data:** The norms provided in the manual (2009) are for various diagnostic groups: probable Alzheimer disease, mild severity, mild and moderate intellectual disability, major depressive disorder, TBI, schizophrenia, autistic disorder. Aged 18-80, 800 examinees included in the TFLS is comprised of 24 items assessing cognition in the context of specific impairment items as well as various IADLs. It is divided into 4 subscales assessing ability to use analog clocks and calendars, perform calculations involving time and money, utilize basic communication skills in everyday activities, and memory. The 4 subscales are: time, money & calculation, communication, memory.

**Time to administer:** Approx 20 minutes. Can be administered across more than 1 session, as long as item #22 is done in 1st session.

**Scoring:** Raw scores are converted into cumulative percentages and the total raw score can then be converted into a T-score. The manual provides qualitative descriptors for cumulative percentages and T-scores (i.e., “high average” to “severely impaired”).

**The manual also provides suggestions for score cut-offs to suggest whether the person has adequate functional competence for independent living; assisted living; or a special assessment; adults with acquired brain injury).

**Reliability:**
- Adequate to excellent internal consistency (Alzheimer’s disease)
- Excellent inter-rater reliability (for normative sample)
- Excellent test-retest validity at 1 month (Alzheimer’s disease)
- **Practice effects:** there is slightly higher performance when tested the 2nd time due to practice effects (roughly a ¼ standard deviation of the T-score) suggesting relatively consistent performance over time – but the OT should be aware of this.

**Predictive Validity:**
- (Nothing found to date)

**Group Differences:**
- Differentiates between healthy controls and adults with Alzheimer’s disease, and dementia in general
- Did NOT differentiate between normal controls and mild cognitive impairment (MCI).

**Other Aspects of Validity:**
- Excellent concurrent validity in comparing TFLS to other measures:
  - Less than $200.00

**Pros:**
- Provides a fairly quick screen of cognition in the context of IADLs
- In considering the excellent convergent validity with the MMSE, the TFLS can be used to assess overall level of cognitive impairment while providing clinical information that is ecologically valid (regarding function).
- Test items are easily obtained (e.g., a current calendar, stopwatch, telephone etc.)
- Allows OT to provide prompts to the client to obtain best score.
- Direct observation reduced patient/caregiver reporting bias.
- Memory subscale assesses 3 aspects of memory: immediate recall, delayed recall, prospective memory
- May be quicker to administer than ILS.
- Relatively affordable (compared to other measures): less than $200.00

**Cons:**
- Money and calculation subscale use US $ including $1 bills (need to adapt for this); and pennies are also used (need to find some or adapt for this)
- Communication subscale uses tasks that may not
<table>
<thead>
<tr>
<th>Assessment Name</th>
<th>Overview</th>
<th>Psychometrics – Reliability &amp; Validity</th>
<th>Pros &amp; Cons</th>
</tr>
</thead>
<tbody>
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<td>normative sample.</td>
<td>care unit. <strong>However, it is cautioned:</strong> “…Recommendations about level of care should not be based on a single score but should include multiple aspects of assessment and information sources…” – thus, consider NOT using these cut-off values.</td>
<td>the Independent Living Scales (ILS), although only adequate concurrent validity in comparing the memory subscales (dementia).</td>
<td>be familiar to your client (especially younger adults): cheque writing, use of phone book, addressing envelope.</td>
</tr>
<tr>
<td><a href="http://www.pearsonclinical.com/therapy/products/100000222/texas-functional-living-scale-tfls.html">http://www.pearsonclinical.com/therapy/products/100000222/texas-functional-living-scale-tfls.html</a></td>
<td>Minimal Clinical Difference (MCD): not determined to date.</td>
<td>• Excellent convergent validity in comparing with the MMSE (dementia).</td>
<td>• Test results alone are NOT conclusive – must use clinical reasoning taking into consideration other assessment activities/tests.</td>
</tr>
<tr>
<td>YouTube video on mock administration of this test: <a href="http://www.youtube.com/watch?v=wgRmURZfOoU">http://www.youtube.com/watch?v=wgRmURZfOoU</a></td>
<td></td>
<td>• Adequate convergent validity in comparing with an informant-rated measure of daily functioning, the Blessed Dementia Rating Scale (BDRS) (Alzheimer’s disease).</td>
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<td></td>
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<td>• As expected, poor correlation in comparing TFLS with a dementia behaviour rating scale, thus demonstrating the expected discriminant validity (i.e., showing that the tests measure different constructs: the TFLS assesses functional skills, and the rating scale taps emotional and behavioral disturbance). (Alzheimer’s disease)</td>
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<td></td>
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</tr>
</tbody>
</table>
## General References


### Websites

- **Rehab Measures**: [http://www.rehabmeasures.org](http://www.rehabmeasures.org)
- **The Centre for Outcome Measurement in Brain Injury (COMBI)**: [www.tbims.org/combi/](http://www.tbims.org/combi/)

## Test-Specific References

### AMPS: Assessment of Motor Process Skills

#### Psychometrics


### Behavioural Assessment of Dysexecutive Syndrome (BADS)

#### Manual


#### Psychometrics


**Butt Non-Verbal Reasoning Test (BNVTR)**


**Cognistat (Neurobehavioral Cognitive Status)**

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<tbody>
<tr>
<td>Test Name</td>
<td>Manual/Website</td>
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**Independent Living Scales**


**Psychometrics:**


**Kohlman Evaluation of Living Skills (KELS)**


**Psychometrics:**

<table>
<thead>
<tr>
<th>Test</th>
<th>Reference</th>
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<tbody>
<tr>
<td></td>
<td>Further details and references: <a href="http://www.ot-innovations.com/content/view/27/55/">http://www.ot-innovations.com/content/view/27/55/</a></td>
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<td>Psychometrics:</td>
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Other resources:

Modified Mini-Mental State Exam (3MS)


Psychometrics: (see further details at http://www.med.uottawa.ca/courses/CMED6203/3MS_manual.pdf)

Andrew, M. K., & Rockwood, K. (2008). A five-point change in Modified Mini-Mental State Examination was clinically meaningful in community-dwelling elderly people. Journal of Clinical Epidemiology, 61, 827-831.


Montreal Cognitive Assessment

Psychometrics (see also a comprehensive reference list at http://www.mocatest.org/)


<table>
<thead>
<tr>
<th>The Perceive, Recall, Plan, Perform (PRPP) System of task analysis</th>
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<tr>
<th>The Repeable Battery for the Assessment of Neuropsychological Status (RBANS)</th>
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<tr>
<td>Following are some selected papers. See the website for a long and comprehensive list of papers (<a href="http://www.rbans.com/publications.html">http://www.rbans.com/publications.html</a>), including a summary of papers demonstrating clinical validity:</td>
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Vancouver Coastal Health and Providence Health Care, Occupational Therapy Practice: Occupational Therapy Cognitive Assessment Inventory & References, v. 2 (April 2014)


### Rivermead Behavioural Memory Test (RBMT)

- **Manuals** (these provide a lot of psychometric information):
  - Psychometrics:

### Swanson Cognitive Processing Test (S-CPT)

- **Psychometrics**:

### SIMARD-MD (Screen for the Identification of Cognitively Impaired Medically At-Risk Drivers, a Modification of the DemTect)

- **Psychometrics**:

### Symbol Digit Modalities Test (SDMT)

- **Psychometrics**:


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<thead>
<tr>
<th>Test for Nonverbal Intelligence (TONI) – A language-free measure of cognitive ability</th>
<th>Manual (note: the kit for TONI-3 is no longer available for purchase, but TONI-4 is available)</th>
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