OCCUPATIONAL THERAPY COGNITIVE ASSESSMENT INVENTORY

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.


<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> (ICF: activity &amp; participation)</td>
<td>• Provides screening assessment in context of occupation (e.g. Cognitive Performance Test, Kettle Test)</td>
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<tr>
<td></td>
<td>• In-depth understanding of the impact of cognitive deficits on occupation (e.g. AMPS, EFPT, ILS)</td>
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<td></td>
<td>• May provide higher ecological &amp; predictive validity than impairment-based screening</td>
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<tr>
<td><strong>Level of Impairment</strong> (ICF: body-structure)</td>
<td>• To augment screening at level of task performance (e.g. SMMSE, MoCA, Cognistat)</td>
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<td>• To provide some in-depth understanding of specific cognitive components such as memory, attention, (e.g. Rivermead Behavioural Memory Test, Test of Everyday Attention)</td>
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<td>• Be aware of limitations (e.g. predictive validity, depth of assessment)</td>
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<table>
<thead>
<tr>
<th>Reliability</th>
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<tr>
<td><strong>Internal consistency (Chronbach’s α or split-half statistics)</strong></td>
<td>Excellent ≥ 0.80</td>
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<td></td>
<td>Adequate 0.70-0.79</td>
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<td>Poor &lt; 0.70</td>
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<tr>
<td><strong>Test-re-test or Inter-rater reliability (ICC or kappa statistics)</strong></td>
<td>Excellent ≥ 0.75</td>
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<td>Adequate 0.40-0.74</td>
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<td>Poor &lt;0.40</td>
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<th>Validity</th>
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<tbody>
<tr>
<td><strong>Concurrent and construct/convergent correlations</strong></td>
<td>Excellent ≥ 0.60</td>
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<tr>
<td></td>
<td>Adequate 0.31-0.59</td>
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<td></td>
<td>Poor ≤ 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?”
### AMPS: Assessment of Motor and Process Skills

*In-depth assessment; Task performance level*

**Pros**:
- Some cultural sensitivity (e.g. client plans own meal of choice)
- Settings

**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.

**Validity**:
- Many studies have been conducted and, overall, the AMPS correlates with at least 5 other measures and is predictive of ADL, level of care, and independence in the home (Douglas et al., 2008). Some examples of research findings:
  - Adequate to excellent concurrent validity compared to tests of cognition & function e.g. FIM & MMSE (mild memory impairment or dementia)
  - Poor concurrent 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)
  - Process score is stronger than Motor score in predicting need for level of assistance to live in the community, although new (2010) cut-off scores have only fair to good discrimination power using “ROC analysis”
  - Excellent predictive validity (Process score) of safety 2 weeks post-discharge home (acute psychiatry)

**Cons**:
- 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)

### Cognistat (Neurobehavioural Cognitive Status Examination)

*Screening assessment; Impairment level (global)*

**Population**: Adolescents to over 65 years

**Normative Data**: Based on 4 groups, each with about 30 subjects: age 20-30, age 40-66, and age 70-92.

**Pros**:
- Broader profile than SMMSE or MoCA, more sensitive than MMSE
- Has been found to identify presence of cognitive impairment in TBI (reliably classifies individuals in acute & post-acute settings into the Cognistat impairment categories)

**Cons**:
- 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
- “Screening” score produces high false positive (so it is recommended to use total score)
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<tr>
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<th>Psychometrics – Reliability &amp; Validity</th>
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| The Cognitive Assessment of Minnesota (CAM) | 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. | Reliability:  
- Excellent internal consistency (residents of long term care facilities with acquired brain injury)  
- Excellent inter-rater reliability (acquired brain injury)  
- Excellent test-retest reliability (acquired brain injury + healthy controls) | Pros:  
- 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.  

Cons:  
- 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 evaluation and is best used as a screen of abilities and deficits. Identifies problem areas to further evaluate.  
- No alternate version available for re-test.  
- For acute care inpatients with acquired brain injury, no value in predicting function for 3 months later. |
| Cognitive Competency Test (CCT) | The CCT has 12 subtests of cognitive skills including: orientation to personal information, social intelligence, memory, reading, financial management, safety, judgment and spatial orientation. | Reliability:  
- Cited by Douglas et al. 2008 as having “adequate” test-retest reliability. | Pros:  
- Commonly used by OTs to predict function for discharge planning  

Cons:  
- Some items are dated, e.g. money management and sequencing  
- Published research on reliability and validity is needed (An OT in Canada is focusing her PhD studies on this.)  
- Caution using subtests for prediction |
| | | Validity:  
- 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 & dementia groups  
- (No other published studies were found) | |
### Cognitive Performance Test

**Screening assessment; Task performance level**

**Population:** Primarily for use with older adults.

Populations researched: first developed for persons with Alzheimer’s Disease (AD); website states that it has been researched with other elderly, dementia, and neuro groups (although it’s unclear: details on CVA and TBI populations).

**Pros:**
- Fairly easy to administer.
- Focus is on function.

**Cons:**
- Requires significant materials (provided with purchase of the test) and designated space.
- Excellent internal consistency.
- Excellent inter-rater and test-retest reliability (Alzheimer’s disease)
- Adequate concurrent validity with MMSE (normal elderly controls, Alzheimer’s disease)
- Adequate to excellent concurrent validity with 2 measures of caregiver-rated ADL (normal elderly controls, Alzheimer’s disease)
- May have some predictive validity of risk of institutionalization over time (over a 4-year follow-up period (dementia)
- Further validity results are discussed on web-site, but specific details were not found in peer-reviewed literature.
- Expensive! ($>500.00).

**Time to administer:**
- At least 45 minutes for all 7 tasks (if mild to moderate cognitive disability).
- Recommended to administer all tasks (at minimum, 4 – otherwise final score is skewed).

**Scoring:**
- Divide total score by 7 for average (final) score, max 6 points, to determine cognitive level and mode (as relates to Allen’s Cognitive levels).
- The lower the score, the more monitoring/assistance required for functional tasks.

**Reliability:**
- Excellent internal consistency.
- Excellent inter-rater and test-retest reliability (Alzheimer’s disease)

**Validity:**
- Excellent concurrent validity with MMSE (normal elderly controls, Alzheimer’s disease)
- Adequate to excellent concurrent validity with 2 measures of caregiver-rated ADL (normal elderly controls, Alzheimer’s disease)
- May have some predictive validity of risk of institutionalization over time (over a 4-year follow-up period (dementia)
- Further validity results are discussed on web-site, but specific details were not found in peer-reviewed literature.

**Pros:**
- Easily portable.
- Easy to transport.

**Cons:**
- Requires significant materials (provided with purchase of the test) and designated space.
- Expensive! ($>500.00).

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### Contextual Memory Test (CMT)

**In-depth assessment; Impairment level (memory)**

**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.

**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 replicable 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)

**Validity:**
- Group differences: differentiated between healthy elderly and adults with Alzheimer’s Disease; and between healthy adults and brain injury
- Excellent concurrent validity with the Rivermead Behavioral Memory Test (brain injury).

**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.

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### Dynamic Assessment of Categorization (Toglia Category Assessment – TCA)

**In-depth assessment; Impairment level (cognitive flexibility, develop strategies)**

**Population:** age 18-86, with brain injury or chronic schizophrenia (with negative symptoms).

**Pros:**
- Portable; can be used at bedside
- Short time to administer
- Uses familiar items (i.e., objects to be categorized)
- Links assessment results with treatment planning (in particular, developing strategy use)

**Cons:**
- Cost: about $100.00 (for simple items and score sheets).
- Requires use of language skills (cannot be used for individuals with moderate to severe aphasia)
- May not be applicable to populations other than acquired brain injury or chronic schizophrenia
- Cannot be used to measure change over time
- Scoring is rather lengthy and may not provide very useful information as applied to assessment of cognition or function.

**Reliability:**
- Adequate to excellent internal consistency (stroke, traumatic brain injury, inpatients with schizophrenia)
- Excellent inter-rater reliability (stroke, traumatic brain injury, inpatients with schizophrenia).

**Validity:**
- Adequate concurrent validity with the Risks Object Classification Test (stroke, traumatic brain injury, inpatients with schizophrenia).
- Adequate predictive validity of IADL tasks (acquired brain injury on acute neurosurgery unit)

**Time to administer:**
- 10-30 minutes

**Scoring:**
- Standardized test score sheet is used. Scores range from 1 (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.

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Vancouver Coastal Health and Providence Health Care, Occupational Therapy Practice: Occupational Therapy Cognitive Assessment Inventory & References, last updated March, 2012
### Executive Function Performance Test (EFPT)

**In-depth** assessment; task performance level (executive functions)

("acts as a screening assessment if you use only 1 or 2 subtests, or if EFPT is used with higher functioning clients)

**Population:** Research has been conducted with stroke, MS & schizophrenia, but no specific normative data yet. Could be used with other groups (ABI, older adults).

**Reliability:**
- Excellent internal consistency (stroke, healthy controls, schizophrenia)
- Excellent interrater reliability (mild stroke & healthy controls, multiple sclerosis)

**Validity:**
- Group differences: differentiated between mild stroke, moderate stroke and healthy controls; and between acute and chronic schizophrenia
- Poor to adequate concurrent validity with various neuropsych tests, suggesting EFPT measures some different aspects of cognition than these tests (stroke & healthy controls)
- Adequate to excellent concurrent validity with 2 executive function tests (BADS, DKEFS), supporting the EFPT as a measure of executive functioning (schizophrenia, acute stroke)
- Adequate concurrent validity with FIM, plus excellent concurrent validity with FAM and AMPS, suggesting EFPT is a good measure of function in particular IADLs (stroke & healthy controls)

**Pros:**
- Ecological validity (assessment of executive function in context of function), portable
- Helps determine supports needed for living at home
- The manual (test protocol booklet) is available online, no cost
- VCH has developed forms that provide all instructions and score sheets (with information taken from manual and laid out in a more organized manner)

**Cons:**
- Need to gather and replenish items; need stove and phone (cell phone is okay)
- Verbal and written English fluency required
- Does not provide a sufficient challenge for higher-functioning clients

**Time to administer:**
45 - 60 minutes.

**Scoring:**
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.

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### Executive Function Route Finding Task (EFRT)

**Screening assessment; Task performance level (executive functions)**

**Population:** Adults with traumatic brain injury or mild cognitive impairment; no normative data to date

**Reliability:**
- Excellent inter-rater reliability (traumatic brain injury; older adults with mild cognitive impairment)

**Validity:**
- Group differences: differentiated between mild cognitive impairment and healthy controls
- 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)

**Pros:**
- Ecological validity (measure of executive function for task performance), portable
- No cost; information readily available in a published article (Boyd, 1993)
- VCH has developed a form that provides the reference, all instructions, and scoring

**Cons:**
- Need to plan ahead for the route that you will be using for each client (cannot necessarily be the same route for every client)

**Time to administer:**
Very lengthy, 3 hours.

**Scoring:**
1- to 4-point scale for each of:
- Task Understanding
- Information-seeking
- Retaining directions
- Error detection
- Error correction
- 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

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### 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

**Reliability:**
- Test-retest and inter-rater reliability not yet tested – limited by lack of a parallel test.

**Validity:**
- Group differences: differentiated between healthy controls and adults with brain injury
- Poor to adequate concurrent validity with measures of executive function (BADS, Dysexecutive Questionnaire, Executive Observation Scale) (brain injury)
- Poor predictive validity of changes in life roles in

**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,
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| Independent Living Scales (ILS) | The ILS is a standardized assessment of competence in IADLS, requiring the client to demonstrate problem solving, demonstrate knowledge, or perform a task. There are 5 subscales: memory/orientation, managing money, managing home and transportation, health and safety, and social adjustment – total 70 items. **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’). **Validity:**  
- Group differences: differentiates between adults with severe brain injury and a non-clinical ‘independent group’, but NOT between adults with mild or moderate brain injury and non-clinical sample.  
- Group differences: did NOT differentiate between adults with dementia & non-clinical group (perhaps because of small sample size)  
- Group differences: differentiated between 3 levels of functional outcome – minimum, moderate and maximum supervision – better than the GAF did (inpt and outpt schizophrenia)  
- 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 & 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) | **Pros:**  
- Includes performance-based testing, 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 symptoms) **Cons:**  
- May not be sensitive enough to identify individuals with mild cognitive impairment.  
- Quiet room (private setting) recommended.  
- 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 |

The norms provided in manual (1996) are for various diagnostic groups: mental retardation, traumatic brain injury, dementia, ‘chronic psychiatric disturbance’, major depression, and schizophrenia.

The ILS is a standardized assessment of competence in IADLS, requiring the client to demonstrate problem solving, demonstrate knowledge, or perform a task. There are 5 subscales: memory/orientation, managing money, managing home and transportation, health and safety, and social adjustment – total 70 items.

**Scoring:** Convert raw scores to standard scores (using charts in manual, with different norms tables for different populations) – resulting in a total score as well as a score for each of the 5 subscales and a score for each of problem solving and performance information. Plot these 8 standard scores on a graph (provided in test form) to determine if the person falls within category of low, moderate or high functioning for each score. (The standard score has a mean of 100 and a standard deviation of 15; higher scores = higher performance.)

**Rating Scale:** Excellent to poor concurrent validity with the Role Resolution List (a structured interview) (brain injury).  
- Excellent concurrent validity with the Hopemont Capacity Assessment Interview (healthy elders)  
- Poor concurrent validity with a negative & 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)  
- Excellent concurrent validity with the Dementia Rating Scale; poor concurrent validity with the Geriatric Depression Scale (dementia)  
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### Kohlman Evaluation of Living Skills (KELS)

**Overview:**
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

**Pros:**
- Excellent inter-rater reliability (acute psychiatry, and older adults)
- Validity:
  - Group differences: 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
  - Excellent concurrent validity with Global Assessment Scale and with BaFPE (population not known)
  - Excellent concurrent validity with FIM and with an IADL measure (older adults)
  - Construct validity supported in assessing older adults’ capacity to live safely and independently in the community – as was determined by comparing KELS scores with a battery of tests often used to screen ability to function safely & independently in the community (measures of cognition, affect, executive & functional status).

**Cons:**
- Caution in using with individuals hospitalized more than 1 month.
- Excellent concurrent validity with MMSE (older adults)
- Construct validity supported in assessing older adults’ capacity to live safely and independently in the community – as was determined by comparing KELS scores with a battery of tests often used to screen ability to function safely & independently in the community (measures of cognition, affect, executive & functional status).

**Reliability:**
- Excellent inter-rater reliability (acute psychiatry, and older adults)
- Validity:
  - Group differences: 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
  - Excellent concurrent validity with Global Assessment Scale and with BaFPE (population not known)
  - Excellent concurrent validity with FIM and with an IADL measure (older adults)
  - Construct validity supported in assessing older adults’ capacity to live safely and independently in the community – as was determined by comparing KELS scores with a battery of tests often used to screen ability to function safely & independently in the community (measures of cognition, affect, executive & functional status).

**Cost:** less than $50.00 for manual through AOTA

**Groups:** Developed for acute psychiatric setting and later assessed and adapted for a geriatric population.

**Wider application includes clients with “mental retardation”, brain injury, geriatric, or otherwise cognitively impaired – although there is a lack of psychometric studies to support use with these populations.

### Kettle Test

**Overview:**
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.

**Time to administer:** approx 20 minutes

**Pros:**
- Ecological validity, portable, assesses functional performance
- VCH has developed a user-friendly instruction and scoring form

**Cons:**
- No memory subtests in the LOTCA (but present in LOTCA-G)
- No scoring form

### Lowenstein Occupational Therapy Cognitive Assessment Battery (LOTCA, LOTCA-II, and LOTCA-G)

**Overview:**
Assesses basic cognitive skills. Used for treatment planning and to measure change. The LOTCA has 20 subtests divided into 4 areas (orientation, perception, visuomotor organization, and thinking operations). The LOTCA-II separated the perceptual area into visual perception, spatial perception and motor praxis and revised items, with 26 items in 6 categories. The LOTCA-G (geriatric) has enlarged items to reduce visual and motor coordination difficulties, shortened sub tests & reduced administration time; and addition of memory.

**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)

**Validity:**
- Group differences: LOTCA differentiates between adults with stroke and healthy controls; most subtests differentiate between individuals with mild and moderate dementia; and differentiates between stroke and healthy adults
- Group differences: for LOTCA-G, differentiates between adults with dementia differ and healthy elderly; most subtests differentiate between individuals with mild and moderate dementia; and differentiates between stroke and healthy adults
- Excellent concurrent validity (also adequate to excellent convergent validity in comparing to a battery of cognitive tests (older adults with suspected cognitive deficits; stroke)
- Adequate to excellent convergent validity (also considered “ecological validity”) in comparing to tests of ADLs and IADLs (older adults with suspected cognitive deficits; stroke).

**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).

**Cons:**
- No memory subtests in the LOTCA (but present in
The LOTCA-G

- Can be long and difficult to administer. 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).

- Construct validity supported for LOTCA using factor analysis.
- Adequate concurrent validity with LOTCA and MMSE (stroke).
- 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).
- Adequate concurrent validity with LOTCA-G and MMSE, with strongest correlations between MMSE and LOTCA-G categories of orientation, visuomotor organization, thinking operations, and memory (dementia).

The LOTCA-G

- Quick to administer.
- The test “manuals” provide very clear guidance for all questions to be asked.
- Two parallel forms allow for test-retest (although only adequate parallel version reliability in one study).

Pros:
- Available in many languages
- 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
- Developed only for use with elderly
- Not suitable for those with severe receptive language problems (i.e., unable to follow simple instructions)
- Cost (approx $200.00) for the manual, plus extra for score sheets
- Questionable in some research as a cognitive screen (not very sensitive to cognitive impairment)
- Adequate but low correlations with function as measured by FIM

Cons:
- Poor internal consistency (older adults without cognitive impairment); excellent internal consistency (older adults with Alzheimer’s disease).
- Adequate inter-rater reliability for MMSE and Clock-drawing (hospitalized elderly)
- Adequate concurrent validity with FIM (hospitalized elderly, acquired brain injury)
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<thead>
<tr>
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<tr>
<td>Impairment level (global)</td>
<td>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</td>
<td>combination of cognitive/neuropsych tests.</td>
<td>“age and education bias”) – thus may have a “false positive” for individuals with low education.</td>
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<td>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.</td>
<td>• Group differences; SMMSE stronger at identifying dementia than MMSE.</td>
<td>Not suitable to be given through an interpreter, or to person with aphasia</td>
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<td>• Group differences; 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)</td>
<td>Not sensitive enough for very mild cognitive changes (in which case the MoCA or Cognistat may be recommended as a screen)</td>
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<td>• Adequate concurrent validity with FIM+FAM (inpatient rehab acquired brain injury)</td>
<td>Although some evidence of concurrent validity with function, one study shows poor predictive validity of function.</td>
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<td>• Excellent concurrent validity between MMSE and a measure of daily function (“Direct Assessment of Functional Status”) (MMSE score mean=23.8, but ranging up to 30/30) – strongest correlation was between MMSE ‘orientation’ and DAFS ‘time orientation’ (dementia).</td>
<td>Recent study cautions against using MMSE as stand-alone tool in determining decision-making capacity (Pachet et al. 2010)</td>
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<td>• Poor predictive validity of MMSE in predicting discharge FIM motor scores (pediatric rehabilitation; subacute stroke).</td>
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<tr>
<td>Modified Mini-Mental State Exam (3MS)</td>
<td>Screening assessment: Impairment level (global)</td>
<td>A clinically meaningful change (in measuring cognitive decline) is considered ≥5 points, although some researchers suggest 10 points. (elderly).</td>
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<td>Population: same as MMSE</td>
<td>A screen to detect dementia and monitor progression. The 3MS is a revision of the MMSE (with 4 additional subtests and modified scoring procedure).</td>
<td>Free score sheets, instructions, and lots of information on web site</td>
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<td>• Can obtain an MMSE score &amp; 3MS score from same test</td>
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<td>• Takes a little longer than MMSE or MoCA</td>
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<td>• No psychometric studies involving younger adults or adults with acquired brain injury or mental illness</td>
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<td>• Lacks sensitivity to mild cognitive impairment.</td>
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<td>• Similar issues as MMSE in terms of interpretation of results – including that cut-off scores are not 100% accurate (sensitive), and interpretation must take into consideration factors such as age, education, &amp; culture.</td>
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<td>• No research to date confirming whether or not 3MS is predictive of occupational performance</td>
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<td>• Excellent test-retest reliability (general psychiatric population; elderly in community)</td>
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<td>Excellent concurrent validity with MMSE (elderly in community).</td>
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<td>Montreal Cognitive Assessment (MoCA)</td>
<td>Screening assessment; Impairment level (global)</td>
<td>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)</td>
<td>No psychometric data yet on traumatic brain injury.</td>
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<td>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.</td>
<td>Excellent test-retest reliability (normal elderly, mild cognitive impairment &amp; mild Alzheimer’s Disease)</td>
<td>Simply a screen for mild cognitive impairment, not otherwise a measure of degree of cognitive impairment, or a predictor of function.</td>
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<td>For English version: allows retest via 3 versions</td>
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<td>More sensitive than SMMSE in identifying mild cognitive impairment</td>
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<td>Recommended by BC Ministry of Health to assist in diagnosis for cognitive impairment of elderly &amp; endorsed by VCH and PHA</td>
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<td>Not otherwise a measure of degree of cognitive impairment, or a predictor of function.</td>
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<td>• Excellent internal consistency (normal elderly, mild cognitive impairment &amp; mild Alzheimer’s Disease)</td>
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<td>• Excellent test-retest reliability (normal elderly, mild cognitive impairment &amp; mild Alzheimer’s Disease)</td>
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<td><strong>Multiple Errands Test (MET)</strong></td>
<td>In-depth assessment; Task performance level (high level cognitive/executive functions)</td>
<td>The MET is a complex shopping task performed in a shopping mall or hospital 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.</td>
<td><strong>Pros:</strong>&lt;br&gt;• No cost for test materials&lt;br&gt;• Ecological validity, assesses what individual can do&lt;br&gt;<strong>Cons:</strong>&lt;br&gt;• Need to develop your own MET (i.e., for your own setting/shopping mall) – but template available from VCH&lt;br&gt;• Need to provide client with some money</td>
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<td><strong>Population:</strong> For high level clients. Developed for individuals with cognitive deficits who are independently mobile, verbal, &amp; able to read/follow instructions. No norms available (although on the VCH form there is a guideline for cut-off for normal expected performance based on info in literature to date)</td>
<td><strong>Reliability:</strong>&lt;br&gt;• Adequate to excellent inter-rater reliability (normal controls and community dwelling acquired brain injury).&lt;br&gt;<strong>Validity:</strong>&lt;br&gt;• Group differences: found to differentiate between healthy controls and inpatients/outpatients with acquired brain injury.&lt;br&gt;• 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).&lt;br&gt;• Adequate to excellent concurrent validity in correlating some subscores of MET with process and motor scores of AMPS.&lt;br&gt;• Ecological (construct) validity: supported in that there are numerous adequate to excellent correlations with measures of executive dysfunction, function (AMPS) and participation (Mayo-Portland Participation and Adjustment Inventory).&lt;br&gt;• Ecological (construct) validity: supported in that 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.&lt;br&gt;• Adequate predictive validity of MET-HV, administered on discharge from inpatient rehab, with Participation Index (M2PI) administered 3 months later (acquired brain injury)</td>
<td><strong>Pros:</strong>&lt;br&gt;• No cost for test materials&lt;br&gt;• Ecological validity, assesses what individual can do&lt;br&gt;• VCH has developed forms that allow for development of a MET for your own setting; &amp; provide instructions &amp; scoring&lt;br&gt;<strong>Cons:</strong>&lt;br&gt;• Need to develop your own MET (i.e., for your own setting/shopping mall) – but template available from VCH&lt;br&gt;• Need to provide client with some money</td>
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<td><strong>Paced Auditory Serial Addition Test (PASAT)</strong></td>
<td>In-depth assessment; Impairment level (attention/working memory, processing speed)</td>
<td>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. PASAT is one of the major components of Multiple Sclerosis Functional Composite test (MSFC) – the visual version (PVSAT) can also be used for the MSFC. (Although recently, 2010, researchers have recommended replacing PASAT with SDMT in the MSFC.) A version is available for children (CHIPASAT). A computer version is also available.</td>
<td><strong>Pros:</strong>&lt;br&gt;• Excellent internal consistency (many studies).&lt;br&gt;• Excellent test-retest reliability (many studies).&lt;br&gt;<strong>Cons:</strong>&lt;br&gt;• Poor correlation with measures of everyday function&lt;br&gt;• Cannot be used for test-retest scores as it is susceptible to practice effects&lt;br&gt;• The PASAT stimuli have been translated into 27 languages (but the scoring manual is in English).&lt;br&gt;• Negatively affected by increasing age, decreasing IQ (and probably education), and low math ability.&lt;br&gt;• May cause undue anxiety and frustration for the client.&lt;br&gt;• Individuals with speech or language impairment at a distinct disadvantage.&lt;br&gt;• Recent research has shown it to be difficult even for the general population (Brooks et al., 2011)</td>
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<td><strong>Pros</strong></td>
<td>developed by OTs</td>
<td>• Does not correlate consistently with functional indices (Barthel Index, Extended Activities of Daily Living Scale, Rating Scale of Attentional Behaviour) (stroke)</td>
<td>Care to be taken to identify the reasons underlying any low score before interpreting it as clinically significant.</td>
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</table>
| **Reliability:** | Adequate internal consistency (schizophrenia) | Adequate parallel form reliability for RBMT (mixed sample of healthy adults and “clinical cases”), Excellent inter-rater reliability (mixed sample of healthy adults and “clinical cases”) | • developed by OTs 
• can use this framework with any functional activity selected by the client or OT (unlike the AMPS). 
• Takes into consideration influence of context (environment) |
| **Validity:** | Adequate concurrent validity with various impairment-based tests of memory (brain injury) | Adequate concurrent validity between RBMT and therapists’ observations of memory failures over a mean of 35 hours, thus evidence of ecological validity (brain injury) | Training will enhance the OT’s competence and confidence in using the framework. However, the trainers are based in Australia and so training is difficult to access for Canadian OTs. |
| **Scoring** | • Care to be taken to identify the reasons underlying any low score before interpreting it as clinically significant. | Adequate concurrent validity between RBMT-3 and therapists’ ratings (brain injury) | Fairly newly developed and, therefore, there is a limited number of psychometric studies to date. |

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

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 assessed from a cognitive processing perspective in terms of perceiving (attention and sensory perception), recall (memory), planning and performance (self-monitoring).

- **Time to administer:** 20 minutes to administer – 10 minutes to score.
- **Scoring:** Scoring options include number of correct responses, percent correct, latency of responding, & number of errors. Interpretation is based on comparison to norms.

**Validity:**
- Adequate internal consistency (schizophrenia)
- Adequate to excellent inter-rater reliability between trained therapists (brain injury; schizophrenia; mild dementia).
- Adequate to excellent test-retest reliability (children with autism; adults with acquired brain injury).

**Reliability:**
- Adequate to excellent inter-rater reliability between trained therapists (brain injury; schizophrenia; mild dementia).
- Adequate concurrent validity with various impairment-based tests of memory (brain injury)
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<td><strong>Swanson Cognitive Processing Test S-CPT</strong></td>
<td>A battery of 11 information processing/working memory subtests: semantic association and categorization; auditory digit, nonverbal, and picture sequencing; phrase recall, story retelling, rhyming; 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 ‘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.</td>
<td>Reliability:  • Adequate to excellent internal consistency (initial norm group of USA and Canadian children and adults; college students) Validity:  • Group differences: differentiates between learning disabled and non-learning disabled (children, college students).</td>
<td>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 &amp; weaknesses in working memory, connect performance to academic achievement); Can use all 11 tests or selected subtests</td>
<td>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; Cost for kit is about $250.00 plus ongoing cost for replacement forms; 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</td>
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<td><strong>SIMARD-MD</strong> (&quot;Screen for the Identification of Cognitively Impaired Medically At-Risk Drivers, a Modification of the DemTect&quot;)</td>
<td>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 very likely pass or fail a driving assessment. (Note: 'cut-off points do not have 100% sensitivity, thus, there is potential for false positive results'). 0-30 – predicted to fail on-road driver test. 31-70 – unable to determine – need to be referred for driving assessment. 71-130 – predicted to pass on-road driver test.</td>
<td>Reliability:  • No information to date Validity:  • Support for construct validity: a regression analysis identified test items from the DemTect which, when used together, could predict pass/fail outcome for an on-road evaluation.  • Group differences: differentiates between individuals who are likely and unlikely to pass an on-road driver test (healthy &amp; cognitively impaired older adults living in community) – but not 100% sensitivity/specificity</td>
<td>Predictive of driving although not 100% accurate; 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</td>
<td>Only one research study to date; Highly language based test; 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; Poor screening discrimination because 50-80% of clients need to be sent for further testing (e.g., DriveABLE recommended)</td>
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<td><strong>Symbol Digit Modalities Test (SDMT)</strong></td>
<td>The SDMT is a screening tool designed to identify cerebral dysfunction in children and adults ages 8-78 (norms available). Normal data is categorized for age groups and gender. The manual and subsequent research indicate that SDMT is an excellent test-retest reliability (normal controls); Excellent test-retest reliability for c-SDMT (healthy controls and multiple sclerosis).</td>
<td>Reliability:  • Excellent test-retest reliability (normal controls)  • Excellent test-retest reliability for c-SDMT (healthy controls and multiple sclerosis) Validity:  • Group differences: differentiates between controls and: multiple sclerosis (C-SDMT more sensitive than paper version), traumatic brain injury, acute stroke, mild cognitive impairment, schizophrenia)  • As part of a neurobehavioural screening battery, may help predict post concussion syndrome (mild traumatic brain injury)  • Adequate concurrent validity with a test of functional status, the Environmental Status Scale –</td>
<td>May be useful as an initial screen of attention and visual scanning for some populations (esp. stroke, traumatic brain injury, multiple sclerosis) – but without prediction of function; Can be administered in a group format; Easy for client to understand the results- thus may be empowering; may help client to develop awareness of cognitive skills, e.g. for someone returning to school</td>
<td>Recommended to be used as part of a more extensive cognitive battery, thus may not be very useful on its own</td>
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<td>Test of Everyday Attention (TEA)</td>
<td>The TEA has 8 subtests to measure different aspects of attention (selective, switching, divided, sustained) and working memory. Children’s version is available (TEA-Ch). There are 3 versions (A, B, C). Time to administer: 75-90 minutes (2 sessions may be required to ensure sufficient time for repetition of the practice trials) Scoring: Score for each subtest. Plot scores on the table provided in the manual: if score falls within shaded area, then performance is likely abnormal</td>
<td>Reliability: • Adequate to excellent test-retest reliability for subtests, except poor test-retest reliability for the dual-task decrement subtest (perhaps due to learning effect?) (normal adults and stroke) Validity: • Group differences: differentiates between healthy controls and brain injury, in particular the map and telephone search subtests. • Group differences: differentiates between mild cognitive impairment and dementia • Group differences: differentiates between stroke and healthy controls • Adequate concurrent validity (although ranges from poor to excellent for various subtests) with neuropsych measures such as Stroop, PASAT, and SDMT (healthy controls and traumatic brain injury) • Adequate concurrent validity with test of functional status, the Environmental Status Scale – a broad measure of functional disability (multiple sclerosis) • Poor concurrent validity between some subtests and 3 measures of function (Barthel Index, Extended Activities of Daily Living Scale, Rating Scale of Attentional Behaviour) whereas neuropsych tests (Stroop Test, PASAT, backward digit span and others) did not correlate consistently with these measures of function (stroke)</td>
<td>Pros: • 3 parallel versions allows for test-retest (although there may be practice effects with the dual-task decrement) • Assesses auditory &amp; visual attention (but bias is auditory) • May be useful for high level clients who have limited insight • Evidence of ecological validity (e.g., some concurrent validity with measures of function) 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</td>
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<td>Trail Making Test A &amp; B (TMT)</td>
<td>A screening test of visual attention, working memory and task-switching/mental flexibility. This is a pencil-and-paper test where the client is required to connect numbers (A) or numbers and letters (B). It is typically part of a neuropsych battery. A variation of Test B is included in MoCA. May be included as part of pre-driver screen battery. There are also 2 versions of the “Color Trails Test” (CTT-1 and CTT-2); and an oral trail making test (OTMT-A, OTMT-B). Time to administer: 5-10 minutes Scoring: simple scoring. Don’t use original cut-off scores. Use the “autoscore” form that is part of the test form.</td>
<td>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. Validity: • Group differences: sensitive to normal age-related declines in cognition. • Construct validity is supported for TMT-A to require mainly visuoperceptual abilities and TMT-B to reflect primarily working memory and task-switching ability, in correlating with other measures (healthy subjects). • Construct validity of TMT A and B as cognitive</td>
<td>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 CTT may not be equivalent – so do not use as alternative versions for test-retest • Be careful what norms are used (depends on what test is used – TMT, CTT, OTMT). Norms of TMT A and B may no longer be applicable to current US population. The Comprehensive Trail Making Test (CTT) is suggested to replace TMT.</td>
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<td>Test for Nonverbal Intelligence (TONI) – “A language-free measure of cognitive ability”</td>
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<td><strong>Population:</strong> 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).</td>
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<td><strong>Screening assessment; Impairment level (intelligence)</strong></td>
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<td><strong>Time to administer:</strong> 15-20 minutes.</td>
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<td><strong>Scoring:</strong> Raw scores can be converted to age-based percentiles or index (standard scores) and compared to norms.</td>
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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 evaluator 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).

**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)

**Validity:**
- (No published research 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 assessment
- 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.
GENERAL REFERENCES:


Websites:


The Centre for Outcome Measurement in Brain Injury (COMBI): [www.tbims.org/combi/](http://www.tbims.org/combi/) (accessed December 2011)

TEST-SPECIFIC REFERENCES:

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Vancouver Coastal Health and Providence Health Care, Occupational Therapy Practice: *Occupational Therapy Cognitive Assessment Inventory & References, last updated March, 2012*
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**Psychometrics:**  
| **Lowenstein Occupational Therapy Cognitive Assessment Battery (LOTCA) and Lowenstein Occupational Therapy Cognitive Assessment Battery for Geriatric Patients (LOTCA–G)** | **Psychometrics:**  
Further details and references:  
**Psychometrics:**  
| **Mini-Mental State Examination (MMSE) (Folstein MMSE; Standardized MMSE – SMMSE)** | **Copy of Assessment Form:** [http://www.bcguidelines.ca/pdf/cognitive_appendix_c.pdf](http://www.bcguidelines.ca/pdf/cognitive_appendix_c.pdf) (accessed October 2011)  
**Psychometrics:**  
Development of a short form of Mini-Mental State Examination for the screening of dementia in older adults with a memory complaint: a case control study. *BMC Geriatrics, 11:* 1-5.


Modified Mini-Mental State Exam (3MS)


**Psychometrics:**


Montreal Cognitive Assessment (MoCA)

**Web site with description, test forms, instructions:** [http://www.mocatest.org/](http://www.mocatest.org/)

**Psychometrics** (see also a comprehensive reference list at [http://www.mocatest.org/references.asp](http://www.mocatest.org/references.asp))


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<th>Test Description</th>
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On-line power point presentation that discusses RBMT:  
**Psychometrics**:  
| SIMARD-MD (Screen for the Identification of Cognitively Impaired Medically At-Risk Drivers, a Modification of the DemTect) | **Website (with access to the test)**: [http://www.mard.ualberta.ca/Home/SIMARD/tool.cfm](http://www.mard.ualberta.ca/Home/SIMARD/tool.cfm) (Accessed December 2011)  
**Psychometrics**:  
**Psychometrics**:  
**Psychometrics**:  


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

Forms, instructions and norms:


Psychometrics:
- [http://neuro.psyc.memphis.edu/neuropsych/np-test1.htm#trails](http://neuro.psyc.memphis.edu/neuropsych/np-test1.htm#trails) (Accessed December 2011)


### Test for Nonverbal Intelligence (TONI) – A language-free measure of cognitive ability

**Manual (note):** the kit for TONI-3 is no longer available for purchase, but TONI-4 is available)


Psychometrics: