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.

Category of Assessment: adopted from "An OT Approach to Evaluation of Cognition/Perception", Vancouver Coastal Health, April 2011

Statistical Evaluation Criteria: from StrokEngine *(accessed Dec 2012)*, **http://www.medicine.mcgill.ca/strokengine-assess/statistics-en.html**

	Screening assessment	**In-depth assessment**
Level of task performance (ICF: activity & participation)	• Provides screening assessment in context of occupation *(e.g. Cognitive Performance Test, Kettle Test)* • May provide higher ecological & predictive validity than impairment-based screening	• In-depth understanding of the impact of cognitive deficits on occupation *(e.g. AMPS, EFPT, ILS)* • May provide higher ecological & predictive validity than in-depth assessment at level of impairment
Level of Impairment (ICF: body-structure)	• To augment screening at level of task performance *(e.g. SMMSE, MoCA, Cognistat)* • Be aware of limitations (e.g. predictive validity, depth of assessment)	• To provide some in-depth understanding of specific cognitive components such as memory, attention. *(e.g. Rivermead Behavioural Memory Test, Test of Everyday Attention)*

Reliability	
Internal consistency (Chronbach's α or split-half statistics)	
Excellent	≥ 0.80
Adequate	0.70-0.79
Poor	< 0.70
Test-re-test or Inter-rater reliability (ICC or kappa statistics)	
Excellent	≥ 0.75
Adequate	0.40-0.74
Poor	<0.40
Validity	
Concurrent and construct/convergent correlations	
Excellent	≥ 0.60
Adequate	0.31-0.59
Poor	≤ 0.3

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?"

Assessment Name	Overview	Psychometrics – Reliability & Validity	Pros & Cons
AMPS: Assessment of Motor and Process Skills In-depth assessment; Task performance level **Population**: age > 2 years	A standardized, performance-based, observational assessment that allows for identification of cognitive difficulties impacting ADL and IADL tasks. The AMPS measures 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 coy of the AMPS computer-scoring software to generate a Graphic Report and a Results and Interpretation Report.	**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)	**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 of choice) • Useful in mental health & physical disability settings • Easy to convert data to a written report (a program does this for you; also provide graphics) • Good for variety of age groups • May be more appropriate than using the assessment activities offered by other task/performance tests such as ILS • Based on MOHO **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.	There are 11 subtests to assess 3 general factors (consciousness, attention and orientation) and 5 major ability areas (language, construction, memory, calculation, & reasoning). **Time to administer**: approx 45 minutes. Screening score also available – but high false positive. **Scoring**: Provides a "cognitive profile" (not a single numerical score), with a cut-off for each test. Cut-off scores place client within categories of "average range" or "mild", "moderate, or "severe" cognitive disability. *Note: As per manual: "…profiles in which no score falls below the gray zone cannot be taken as proof that no cognitive dysfunction exists…" (page 18).	**Reliability**: • Excellent inter-rater reliability (psychiatry) • Adequate to excellent test-retest reliability (psychiatry) • • (*no reliability studies were found for geriatrics or acquired brain injury*) **Validity**: • Group differences: differentiated between healthy elderly, dementia and neurosurgical groups • Group differences: differentiated between stroke and non-brain injured adults • Group differences: differentiated between individuals with & without cognitive dysfunction. (individuals who had been referred to an outpatient geriatric mental health team) • Adequate to excellent concurrent validity with "parallel" neuropsych tests (range of neurological & 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 Behavioural Assessment	**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)

Assessment Name	Overview	Psychometrics – Reliability & Validity	Pros & Cons
		of Dysexecutive Syndrome (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) • Poor predictive validity of FIM self-care scores upon discharge from acute care, and adequate predictive validity of FIM cognitive scores (Chinese adults with stroke)	• 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)
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). **Time to administer:** approximately 40 minutes, or two 20-minute sessions. **Scoring:** The raw scores are plotted on a scoring profile, which shows a pattern of how many items fit into "none to mild impairment", "moderate impairment" or "severe impairment". *Note: As per manual: If an individual scores at below the cut-off, then it is extremely probable that s/he has cognitive impairment. If s/he scores at above the cut-off, then there is still a 23.5% chance that impairment is present. If the examiner continues to suspect cognitive impairment, then further assessment is required.	**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) **Validity:** • Group differences: differentiated between healthy adults and adults with acquired brain injury • Group differences: differentiated between 3 groups of cognitive impairment (mild, moderate, severe) which had been determined by clinician ratings. • Adequate concurrent validity with 2 impairment-based tests: MMSE and Porteus Maze Test Quotient (acquired brain injury) • No predictive validity of CAM (administered to acute care inpatients up to 3 months post acquired brain injury) for predicting functional status 3 months later using FIM + FAM	**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) Screening assessment; Impairment level *(global)* **Population**: older adults	The CCT has 12 subtests of cognitive skills including: orientation to personal information, social intelligence, memory, reading, financial management, safety, judgment and spatial orientation. **Time to administer:** 60 minutes. Can be administered in sections. **Scoring:** per subtest and as a total. An Average Total Score (ATS) below 76% indicates some assistance will be required for ADLs.	**Reliability:** • Cited by Douglas et al. 2008 as having "adequate" test-retest reliability. **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*)	**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

Assessment Name	Overview	Psychometrics – Reliability & Validity	Pros & Cons
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 re: details on CVA and TBI populations).*	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". **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:** • Fairly easy to administer. • Focus is on function. **Cons:** • Requires significant materials (provided with purchase of the test) and designated space. • 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). • Expensive! (>$500.00).
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, <u>and</u> 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.	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.	**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).	**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 – TCA) In-depth assessment; Impairment level *(cognitive flexibility, develop strategies)* **Population:** age 18-86, with brain injury or chronic schizophrenia (with negative symptoms).	Examines the ability to establish categories and switch conceptual set. Emphasizes qualitative aspects of performance, and is based on Toglia's dynamic interaction principles of testing. The evaluee 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. **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.	**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)	**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.

Assessment Name	Overview	Psychometrics – Reliability & Validity	Pros & Cons
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).	A performance-based, standardized assessment of cognitive (executive) function. It examines 5 executive function components (initiation, organization, sequencing, safety & judgment, and completion) for each of 4 tasks (cooking oatmeal, telephone use, medication management, and bill payment). Aims to determine level of support required (i.e., what type of cueing or assistance is required) to perform IADLS. *Current research is investigating use of only the bill-paying task along with a neuropsych battery to augment discharge planning for acute stroke.* **Time to administer:** 45 - 60 minutes. Preferable to administer full test (4 tasks) but can use fewer tests for screening purposes. **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.	**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 **e**xcellent 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 on-line, 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

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
	A performance-based screening of executive functioning to relating to route: task formation, strategy approach, detection & correction of errors, dependence on cueing
	
	Scoring: 1- to 4-point scale for each of:
	  o Task Understanding
	  o Information-seeking
	  o Retaining directions
	  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
		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)

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 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	**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,

Assessment Name	Overview	Psychometrics – Reliability & Validity	Pros & Cons
provides a possible cut-off score of 34-35/45)	memory, execution of task; and various topics in terms of overall impressions (of planning, effort etc.) – maximum score of 45 (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).	correlating test with the Role Resumption List (a structured interview) (brain injury).	phonebook, calculator, telephone, office supplies, day agenda, envelopes, etc.)
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 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.	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. **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.)	**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 adults with chronic psychiatric disorders who have high vs. moderate vs. low Global Assessment of Functioning (GAF) scores; and between adults with schizophrenia & a non-clinical group. • 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

Assessment Name	Overview	Psychometrics – Reliability & Validity	Pros & Cons
Kohlman Evaluation of Living Skills (KELS) Screening assessment; Task performance level **Population:** 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.	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 needs assistance (1 ½ or 1 point). Total score ranges from 0 to 17; a person with a score of <6 is considered capable of living independently.	**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). • 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).	**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: less than $50.00 for manual 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. • Caution in using with individuals hospitalized more than 1 month. • Not applicable to long term care settings (because of activities/test items)
Kettle Test Screening assessment; Task performance level **Population**: adults with identified or suspected cognitive difficulties. (Research to date has been with stroke and older adults with suspected cognitive deficits)	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 **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.	**Reliability**: • Excellent inter-rater reliability (geriatric stroke) • *Note: authors of test feel that test-retest reliability is irrelevant: the test incorporates an element of novel problem solving, thus it is expected that the client would improve on re-test.* **Validity**: • Group differences: differentiated between adults with stroke at discharge from rehabilitation and healthy controls. • Adequate 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**: • Ecological validity, portable, assesses functional performance • VCH has developed a user-friendly instruction and scoring form **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)
Lowenstein Occupational Therapy Cognitive Assessment Battery (LOTCA, LOTCA-II, and LOTCA-G) Screening assessment; Impairment level *(global)* **Population**: adults with neurological deficits (stroke, traumatic brain injury), dementia, mental illness. Psychometrics and norms	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 stroke/brain injury and healthy controls • 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	**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

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also available for children (DOTCA-Ch). Norms are provided (norm group = 20-70) with Israeli norms found to be suitable for US population.	subtests – thus, 23 subtests in 7 cognitive areas (orientation, visual perception, spatial perception, praxis, visuomotor organization, memory). **Time to administer:** 30-90 minutes for LOTCA; 30-45 minutes for LOTCA-G **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.	• 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 with LOTCA-G categories of orientation, visuomotor organization, thinking operations, and memory (dementia)	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).
Middlesex Elderly Assessment of Mental State (MEAMS) Screening assessment; Impairment level *(global)* **Population:** Developed for use with elderly, dementia. Also researched with acquired brain injury.	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. **Time to administer:** 10 minutes **Scoring:** Each subtest is scored 1 (pass) or 0 (fail). Total score: 10-12: expected range for normal elderly 8-9: borderline cognitive impairment, needs further cognitive assessment <7: definitely needs full cognitive evaluation	**Reliability**: • Adequate to excellent internal consistency (hospitalized elderly, acquired brain injury) • Excellent parallel form reliability between Version A and B (community living older adults with depression or dementia) • Adequate parallel form reliability (hospitalized elderly) • Excellent test-retest reliability (dementia) • Excellent inter-rater reliability (older adults with dementia or depression) **Validity**: • Group differences: differentiated between older adults with dementia and depression. • Construct validity: found to be more sensitive than MMSE in detecting mild cognitive impairment (elderly acute psychiatry) • 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) • Adequate to excellent concurrent validity with MMSE and Clock-drawing (hospitalized elderly) • Adequate concurrent validity with FIM (hospitalized elderly, acquired brain injury)	**Pros** • 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) **Cons**: • 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
Mini-Mental State Examination (MMSE) (aka Folstein MMSE; Standardized MMSE – SMMSE) **Note: do not confuse with use of "SMMSE" in the literature to refer to a different test, the "Short form MMSE"* Screening assessment;	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	**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). **Validity**: • Group differences: in some studies, MMSE has failed to differentiate between mild dementia and healthy adults. In one study, MMSE did differentiate, but with less accuracy than a	**Pros**: • Quick screen • 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 **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.,

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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	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.	combination of cognitive/neuropsych tests. • Group differences: SMMSE stronger at identifying dementia than MMSE. • 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) • 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 ranging up to 30/30) – strongest correlation was between MMSE 'orientation' and DAFS 'time orientation' (dementia). • Poor predictive validity of MMSE in predicting discharge FIM motor scores (geriatric rehabilitation; subacute stroke).	"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 may be recommended as a screen) • Although some evidence of concurrent 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	A screen to detect dementia and monitor progression. The 3MS is a revision of the MMSE (with 4 additional subtests and modified scoring procedure). **Time to administer:** 15 minutes. **Scoring**: Maximum score of 100. A score ≤77may indicate cognitive impairment, in particular if education is 9+ years and age <80 years. As with 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. (elderly).	**Reliability**: • Excellent internal consistency – higher than MMSE, likely reflecting in part the larger number of subtests (older adults with and without cognitive impairment) • Excellent test-retest reliability (various studies) • Adequate to excellent inter-rater reliability (general psychiatric population; elderly in community) **Validity**: • Group differences: for older adults with low education, 3MS may be better than the MMSE in differentiating between healthy and Alzheimer's disease. • Excellent concurrent validity with MMSE (elderly in community).	**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 of results – including that cut-off scores are not 100% accurate (sensitive), and interpretation must take into consideration factors such as age, education, & culture. • No research to date confirming whether or not 3MS is predictive of occupational performance
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.	A screen designed to "…to assist first-line physicians in detection of mild cognitive impairment…" (Nasreddine 2005, p. 695). Includes screen for visuospatial/executive, naming, memory (recall), attention, language, abstraction, orientation domains. **Time to administer:** 10 minutes **Scoring:** maximum 30. Education bias is considered by adding 1 point if education is ≤12 years. (Although recent research (Johns 2008) recommends adding 2 points if 4-9 years of education, 1 point if 10-12 years – but these recommendations have not yet been applied to standardized interpretation of scores). A score of 26-30 = considered normal (thus,	**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) **Validity**: • Group differences: found to be more sensitive than MMSE in detecting cognitive impairment (e.g., normal elderly, mild cognitive impairment and mild Alzheimer's disease; stroke; Huntington's disease). • 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)	**Pros** • Free score sheets, instructions, and lots of information on web site • Quick screen • 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 **Cons** • No psychometric data yet on traumatic brain injury. • Simply a screen for mild cognitive impairment – not otherwise a measure of degree of cognitive impairment, or a predictor of function.

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	<26 considered cognitively impaired). A recent study suggests cut-off score be adjusted, with <23 representing cognitive impairment for literate adults aged <80 years (Godefroy et al., 2011).		
Multiple Errands Test (MET) 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 (although on the VCH form there is a guideline for cut-off for normal expected performance based on info in literature to date)	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. **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)	**Reliability**: • Adequate to excellent inter-rater reliability (normal controls and community dwelling acquired brain injury). **Validity**: • Group differences: found to differentiate between healthy controls and inpatients/outpatients with acquired brain injury. • 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). • Adequate to excellent concurrent validity in correlating some subscores of MET with process and motor scores of AMPS. • 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). • 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. • Adequate predictive validity of MET-HV, administered on discharge from inpatient rehab, with Participation Index (M2PI) administered 3 months later (acquired brain injury)	**Pros**: • No cost for test materials • Ecological validity, assesses what individual can do • VCH has developed forms that allow for development of a MET for your own setting; & provide instructions & scoring **Cons**: • Need to develop your own MET (i.e., for your own setting/shopping mall) – but template available from VCH • Need to provide client with some money
Paced Auditory Serial Addition Test (PASAT) In-depth assessment; Impairment level *(attention/working memory, processing speed)* **Population**: Initially developed for individuals with traumatic brain injury; it has since been used with many other populations. Preliminary norms (1977) were for adults age 14-40 years. Since then, updated norms have been published for various age groups.	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:	**Reliability**: • Excellent internal consistency (many studies). • Excellent test-retest reliability (many studies). **Validity**: • Group differences: Differentiates between traumatic brain injury and healthy; and between multiple sclerosis and normal. • 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). • Adequate concurrent validity with test of functional status, the Environmental Status Scale – a broad measure of functional disability (multiple sclerosis) • Poor concurrent validity with a test of functional status, the Environmental Status Scale – a broad	**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** • Poor correlation with measures of everyday function • Cannot be used for test-retest scores as it is susceptible to practice effects • Negatively affected by increasing 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)

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	http://www.robertmcinerney.ca/pasat.html. **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.	measure of functional disability (multiple sclerosis) • Does not correlate consistently with functional indices (Barthel Index, Extended Activities of Daily Living Scale, Rating Scale of Attentional Behaviour) (stroke)	• 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 In-depth assessment; Task performance level **Population**: Adults or children as they perform routines or tasks in an individual or group context Used in multiple settings where the child or adult performs daily routines and tasks (e.g., home, hospital, school, or work). Populations researched to date include traumatic brain injury, schizophrenia, dementia, and HIV.	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), planning and performance (self-monitoring). **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 behavioural 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.	**Reliability**: • 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). **Validity**: • Ecological validity is supported by the PRPP being a criterion-referenced measure involving everyday activity/tasks. • Adequate concurrent validity of PRPP using a complex task (but not using a simple task) with a questionnaire that measures community functioning in people with severe mental illness – ILSS (schizophrenia)	**Pros** • 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) **Cons** • 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. • Fairly newly developed and, therefore, there is a limited number of psychometric studies to date.
Rivermead Behavioural Memory Test (RBMT) *note there is Version II (2003) and Version III (2008) *there is also a version for children: RBMT-C In-depth assessment; Impairment level *(memory)* **Population**: designed for adults with acquired, non-progressive brain injury. Normative group: English speaking adults to age 89	Assessment of memory related to functional tasks. Assesses visual, verbal, recall, recognition, immediate, delayed and prospective memory, & ability to learn new info. RBMT-3 adds "novel task". **Time to administer:** 30-40 minutes **Scoring**: RBMT-2: Screening score (max 12) or standardized profile score (SPS) (max 24) RMBT-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)	**Reliability**: • 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") **Validity**: • Group differences: RBMT and RBMT-3 differentiated between adults with and without brain injury • Poor to adequate concurrent validity with various 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)	**Pros**: • Allows comparison to norms • Modest ability to predict everyday memory failures • Parallel versions (RBMT-3) allow for test-retest (thus, evaluation of change over time) • Ecological validity is supported through use of some "task performance" elements and concurrent validity with therapists' and relatives' ratings of individuals with brain injury **Cons**: • Does not detect mild memory deficits • Caution if using with individuals who have limited English abilities (normative group = English speakers)

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Swanson Cognitive Processing Test S-CPT In-depth assessment; Impairment level *(information processing, working memory)* **Population**: Norms for age 5 to adult. Research has focused to date on use in educational settings (learning disabilities).	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 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.	**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).	**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** • 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
SIMARD-MD ("**Screen for the Identification of Cognitively Impaired Medically At-Risk Drivers, a Modification of the DemTect**") Screening assessment; Impairment level *(pre-driving)* **Population**: Community dwelling elders referred for driving assessment	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.	**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 & cognitively impaired older adults living in community) – but not 100% sensitivity/specificity	**Pros:** • 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 **Cons:** • 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)
Symbol Digit Modalities Test (SDMT) Screening assessment; Impairment level *(attention, visual scanning)* **Population**: Children and adults age 8 to 78 (norms available. Normative data is categorized for age groups and gender. The manual and subsequent research indicate that SDMT	The SDMT is a screening tool was 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	**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 –	**Pros:** • 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 **Cons**: • Recommended to be used as part of a more extensive cognitive battery, thus may not be very useful on its own

Assessment Name	Overview	Psychometrics – Reliability & Validity	Pros & Cons
can be used for many different populations e.g. acquired brain injury, dementia, multiple sclerosis, schizophrenia etc.	used during fMRI research. Researchers suggest clinicians consider replacing PASAT with SDMT in the Multiple Sclerosis Functional Composite – due to slightly better predictive validity & easier administration. **Time to administer:** usually 5-10 minutes total (including instructions) with 90 seconds for the actual test. **Scoring:** Scoring is simple, conducted using the "autoscore" form that is part of the test form.	a broad measure of functional disability (multiple sclerosis)	• May be perceived by client as a math test and may be off-putting • Does not provide specifics about functional problems but may provide a place to start • Cost for manual (about $60.00) and test forms (about $50.00 for each package of 25). • Limited evidence to support SDMT as predictor of everyday function (only one study was found)
Test of Everyday Attention (TEA) In-depth assessment; Impairment level *(working memory, attention)* **Population**: Youth to elderly with cognitive difficulties, in particular, individuals who may have impaired attention and/or impaired working memory. The norm group is a sample of healthy subjects, age 18-80.	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	**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)	**Pros**: • 3 parallel versions allows for test-retest (although there may be practice effects with the dual-task decrement) • Assesses auditory & 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
Trail Making Test A & B (TMT) Screening assessment; Impairment level *(working memory, visual attention, cognitive flexibility)* **Population**: children and adults. Studies with many populations including dementia, acquired brain injury, depression, schizophrenia.	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-	**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 neuropsych measures (healthy subjects). • Construct validity of TMT A and B as cognitive	**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 part 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

Assessment Name	Overview	Psychometrics – Reliability & Validity	Pros & Cons
	off scores, because age and education affect scores; instead, use 2004 norm data available on-line (see Reference List).	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 assessment; adults with acquired brain injury). • Excellent concurrent validity of OTMT-B with TMT-B, but poor concurrent validity of OTMT-A with TMT-A (healthy adults). • Construct validity that a battery of neuropsych tests (including TMT) is associated with functional outcomes (with 37% of variance shared) (schizophrenia).	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).
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).	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 evaluee 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.	**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.

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Montreal Cognitive Assessment (MoCA)	Web site with description, test forms, instructions: http://www.mocatest.org/
	Psychometrics (see also a comprehensive reference list at http://www.mocatest.org/references.asp)
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	Robertson, I. H., Ward, T., Ridgeway, V., & Nimmo-Smith, I. (1994). *The Test of Everyday Attention Manual*. London (England): Pearson Assessment. *(re: lack of correlation between PASAT and functional indices)*
	Tombaugh, T. N. (2006). A comprehensive review of the Paced Auditory Serial Addition Test (PASAT). *Archives of Clinical Neuropsychology, 21*, 53-76.
	Computerized version available at: http://www.robertmcinerney.ca/pasat.html (accessed August 2011)
The Perceive, Recall, Plan, Perform (PRPP) System of task analysis	Chapparo, C., & Ranka, J. (1996). Chapter 9: Research development. *The PRPP Research Training Manual: Continuing Professional Education. 2nd Ed.* Accessed on the Internet, April 2011: http://www.occupationalperformance.com/Index.php?/au/home/assessments/prpp/the_perceive_recall_plan_perform_prpp_system_of_task_analysis
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	On-line power point presentation that discusses RBMT: http://ot.behdin.com/readings/oct1172/MemoryAssessmentpresentation.ppt#273,2,Scope%20of%20Presentation (accessed July 2011)
Swanson Cognitive Processing Test (S-CPT)	Manual: Swanson, H. Lee. (1996). Swanson Cognitive Processing Test (SCPT). Austin, Texas: PRO-ED Inc.
	Psychometrics:
	Swanson, H. L. (2000). Swanson-Cognitive Processing Test: Review and applications. In Lidz, C. S. and Elliott, J. G. (Eds.), *Advances in Cognition and Educational Practice, Volume 6, Dynamic Assessment: Prevailing Models and Applications* (pp. 71-108). New York: Elsevier Science Inc.
	Trainin, G., & Swanson, H. L. (2005). Cognition, metacognition, and achievement of college students with learning disabilities. *Learning Disability Quarterly, 28*, 261-272.
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 (Accessed December 2011)
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Trail Making Test A & B (TMT)	<u>Forms, instructions and norms:</u> http://www.granddriver.net/data/media/docs/UIowa_trailMaking.pdf (Accessed December 2011) http://www.angelfire.com/retro/michaelpoon168/trail_making_test.htm (Accessed December 2011) Tombaugh, T. N. (2004). Trail Making Test A and B: Normative data stratified by age and education. *Archives of Clinical Neuropsychology, 19*, 203-214. (available at http://www.usz.ch/non_cms/neurologie/HealthPro/Davos/normen_tmt.pdf, Accessed December 2011) <u>Psychometrics:</u> http://neuro.psyc.memphis.edu/neuropsyc/np-test1.htm#trails (Accessed December 2011) Atkinson, T. M., Ryan, J. P., Lent, A., Wallis, A., Schachter, H., & Coder, R. (2010). Three trail making tests for use in neuropsychological assessments with brief intertest intervals. *Journal of Clinical and Experimental Neuropsychology, 32*, 151-158. Bowie, C., & Harvey, P. D. (2006). Administration and interpretation of the Trail Making Test. *Nature Protocols, 1*, 2277-2281. Elkin-Frankston, S., Lebowitz, B. K., Kapust, L. R., Hossis, A. M., & O'Connor, M. G. (2007). The use of the Color Trails Test in the assessment of driver competence: Preliminary report of a culture-fair instrument. *Archives of Clinical Neuropsychology, 22*, 631-635. Gray, R. Comprehensive Trail Making Test. (2006). *Journal of Psychoeducational Assessment, 24*, 88-91. Hartman-Maeir, A., Erez, A. B. Ratzon, N., Mattatia, T., & Weiss, P. (2008). The validity of the Color Trail Test in the pre-driver assessment of individuals with acquired brain injury. *Brain Injury, 22*, 994-998. McClure, M. M., Bowie, C. R., Patterson, T. L., Heaton, R. K., Weaver, C., Anderson, H., et al. (2007). Correlations of functional capacity and neuropsychological performance in older patients with schizophrenia: Evidence for specificity of relationships? *Schizophrenia Research, 89*, 330-338. Mrazik, M., Millis, S., & Drane, D. L. (2010). The Oral Trail Making Test: Effects of age and concurrent validity. *Archives of Clinical Neuropsychology, 25*, 236-243. Sanchez-Cubillo, I., Perianez, J. A., Adrover-Roig, D., Rodriguez-Sanchez, J. M. Rios-Lago, M., Tirapu, J., et al. (2009). Construct validity of the Trail Maiking Test: Role of task-switching, working memory, inhibition/interference control, and visuomotor abilities. *Journal of the International Neuropsychological Society, 15*, 438-450. Wagner, S., Helmreich, I., Dahmen, N., Lieb, K., & Tadic, A. (2011). Reliability of three alternate forms of the Trail Making tests A and B. *Archives of Clinical Neuropsychology, 26*, 314-321.
Test for Nonverbal Intelligence (TONI) – A language-free measure of cognitive ability	<u>Manual</u> (**note**: the kit for TONI-3 is no longer available for purchase, but TONI-4 is available) Brown, L., Sherbenou, R. J., & Johnsen, S. K. (1997). *Examiner's manual: Test of Nonverbal Intelligence, A Language-Free Measure of Cognitive Ability. Third Edition (TONI-3)*. Austin, Texas: PRO-ED Inc. <u>Psychometrics:</u> McGhee, R. L., & Lieberman, L. R. (1990). Test-retest reliability of the Test of Non-Verbal Intelligence (TONI). *Journal of School Psychology, 28, 351-353*. Rossen, E. A., Shearer, D. K., Penfield, R. D., & Kranzler, J. H. (2005). Validity of the comprehensive test of nonverbal intelligence (CTONI). *Journal of Psychoeducational Assessment, 23*, 161-172. Shelly, M. H. (1982). Test of Nonverbal Intelligence. *Journal of Reading, 28*, 422-425.