

Chapter 7

COGNITION ASSESSMENT AND INTERVENTION

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REFERENCES

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INTRODUCTION

Cognitive complaints that follow concussion/mild traumatic brain injury (c/mTBI), especially those resulting from blasts or other injuries sustained in a combat zone, are multifactorial and not well understood. Clinicians serving service members (SMs) with persistent cognitive complaints that impact daily functions, including communication, must recognize potential contributing factors, such as comorbid pain, fatigue, stress, sleep deprivation, drug effects, and psychological concerns (eg, posttraumatic stress disorder [PTSD], depression, anxiety).¹ For a more extensive discussion of these comorbid factors, as well as for literature reviews of the evidence for the recommended assessments and interventions, clinicians are referred to *Occupational and Physical Therapy Mild Traumatic Brain Injury Clinical Management Guidance*² and the *Speech-Language Pathology Clinical Management Guidance: Cognitive-Communication Rehabilitation for Concussion/Mild Traumatic Brain Injury*.³

This section of the Toolkit was developed by an interdisciplinary group of clinicians, including occupational therapists (OTs) and speech-language pathologists (SLPs). The Toolkit and guidance documents were written to provide practical assistance for generalist clinicians working with SMs with c/mTBI, including those clinicians with limited experience in cognitive rehabilitation. SMs and veterans presenting with c/mTBI and persistent cognitive symptoms often have complex comorbid conditions that may also undermine cognitive abilities and complicate the treatment process. Therefore, it is imperative that clinicians recognize when to refer SMs with complex issues to specialists. Additionally, clinicians are encouraged to move beyond the basics provided in this Toolkit to acquire knowledge and develop skills necessary to manage the challenges and complexities of assessing and providing cognitive rehabilitation for this patient population.

Experts recommend that cognitive assessment after c/mTBI consist of a thorough neurobehavioral and cognitive evaluation using standardized

performance measures, self-report measures, and measures of effort.⁴ OTs and SLPs often contribute to this process with the use of multiple assessment tools to fully characterize the extent of cognitive and communication concerns. While it is a **practice standard** to assess cognition and cognitive-communication complaints following c/mTBI, the choice of which assessment tools to use is determined by the individual clinician (**practice option**) based on the needs of the SM and the specifics of the environment of care. Although the Toolkit includes the best available options, clinicians are advised that many of the assessments have not been validated on adults with c/mTBI.

Similarly, most cognitive rehabilitation interventions were developed for civilians with moderate to severe traumatic brain injury. The efficacy and effectiveness of these interventions have largely been evaluated on more severely injured populations or subject groups consisting of a range of injury severity levels. Despite this ambiguity of evidence, an expert panel convened by the Defense Centers of Excellence (DCoE) for Psychological Health and Traumatic Brain Injury recommended cognitive rehabilitation for SMs with c/mTBI who describe persistent cognitive symptoms at 3 months or more after concussion.⁴ Therefore, those interventions that are either supported by empirical evidence involving studies of adults with c/mTBI or endorsed by the DCoE expert panel are characterized as **practice standards** in the Toolkit. Findings from future studies that are specific to SMs with c/mTBI may lead to further modifications of these recommendations.

The approach and focus of cognitive and cognitive-communication assessment and intervention will vary by discipline and potentially by site. Clinicians are referred to the Toolkit introductions and to the companion guidance documents for a more in-depth discussion of the discipline-specific rationales for recommended rehabilitation practices for c/mTBI.

SECTION 1: ASSESSMENT

INTRODUCTION

Cognitive assessment in acute c/mTBI focuses on tracking the resolution of symptoms to make return-to-activity decisions.⁵ OTs and SLPs may screen patients with c/mTBI within the first 90 days following concussion to determine the presence or

absence of cognitive changes as perceived by the patient, family members, or members of the patient's command. Interaction with the injured individual allows an opportunity to provide education about the relationship between his or her symptoms

and the concussion, recommendations to facilitate recovery during the acute phase after injury, and reassurance about expectation of positive recovery. The screening activity and education have been shown to prevent or reduce the development of persistent symptoms.⁶

Because most acute cognitive changes resolve within 90 days following trauma,^{4,7} comprehensive evaluation is typically deferred until after that time. Cognitive assessment for those with persisting postconcussive symptoms is typically used to guide treatment. This evaluation may be conducted by any combination of rehabilitation professionals, including OTs, SLPs, and neuropsychologists. Specific roles in evaluating cognitive deficits may vary by site and rehabilitation team availability. Evaluating persistent cognitive symptoms following c/mTBI, especially when the injury occurred in a combat zone, should account for the fact that symptoms are likely to be multifactorial in presentation and etiology.

Occupational Therapist Evaluation

OTs assess cognition for several reasons, including to measure baseline, progress, or outcome status; to understand patients' cognitive strengths, weaknesses, and capacity for using strategies to plan intervention; and to estimate the patient's ability to safely perform everyday activities.⁸ Cognitive assessment in occupational therapy involves three elements: (1) evaluating everyday functioning to make inferences about cognition (real-world observation and dynamic assessment), (2) evaluating cognitive processes to make inferences about functioning (standardized tests),⁹ and (3) patient and family interview and self-report.

Interpreting findings is as important to OTs as test administration. Because cognitive assessment involves more than observation checklists and score assignment, OTs consider and document the possible impact of personal and situational factors on performance, including pain, fatigue, stress, and environmental distracters. In fact, many experts suggest that it is impossible to obtain a true picture of SMs' cognitive functioning until these other factors are resolved.¹

In general, cognitive assessment in occupational therapy complements but does not duplicate cognitive assessment provided by other disciplines (including speech-language pathology and neuropsychology). For example, OTs make an effort to avoid using tests or components of tests that comprise a neuropsychological battery to minimize

the likelihood that patients will pre-learn tests and thereby bias findings of a more comprehensive cognitive evaluation. The methods that OTs use to assess cognition vary by site, clinician expertise, and available resources.

Speech-Language Pathologist Evaluation

Assessing cognitive-communication disorders resulting from combat-acquired c/mTBI can be challenging. The Academy of Neurologic Communication Disorders and Sciences Practice Guidelines Group dedicated a specific committee to address this topic. Experts from this group recommended administering a combination of cognitive and language tests, acknowledging the many psychometric problems with using standardized tests for assessing functional performance outside clinical settings, especially tests that have not been designed or validated for individuals with c/mTBI.¹⁰

SLPs assess cognitive-communication impairments that result from c/mTBI for a variety of purposes. Speech-language pathology assessment is conducted to identify and describe the following:

- the nature and severity of the cognitive-communication impairments;
- other factors that may be contributing to these impairments;
- whether the history and physical are consistent with the diagnosis of c/mTBI;
- the underlying strengths and weaknesses related to attention and concentration, retention and memory, information processing, executive function and self-regulation, and linguistic factors, including social skills that affect communication performance;
- the effects of cognitive-communication impairments on the individual's activities (capacity and performance in everyday communication contexts) and participation; and
- contextual factors that serve as barriers to or facilitators of successful communication and participation for individuals with cognitive-communication impairment.¹¹

These functions help clinicians determine the need for behavioral intervention or referral to other healthcare providers, define a therapeutic plan (including goals), and determine prognosis. Initial assessment measures of cognitive-

communication performance may also be used following intervention to provide measures of treatment outcome.

Summary

Specific roles for OTs and SLPs and the methods used to assess cognition vary by site, clinician expertise, availability of members of the rehabilitation team, and available resources. This Toolkit includes assessment options determined to be appropriate in the c/mTBI population and available to generalist clinicians. Some assess-

ments may be more appropriate for occupational therapy interests and goals; other instruments may be more appropriate for communication deficits resulting from cognitive impairments. The ultimate choice for assessment is determined by the clinician's clinical judgment and experience and is based on the needs of the individual SM. Clinicians are advised to select assessments based on what is necessary to determine current status and to plan treatment for a specific SM. More specific information on the assessment tools and their recommended uses are found on the "face sheet" describing each assessment.

BRIEF COGNITIVE ASSESSMENT

Cognistat

Purpose/Description

The Cognistat (Cognistat, Inc, Fairfax, CA; Exhibit 7-1), also known as the Neurobehavioral Cognitive Status Examination, is administered to quantify and characterize possible impairment in a number of cognitive domains when clinical observation or patient self-report suggests concern. It is a microbattery of ten subtests for screening five major areas of cognitive functioning: (1) language, (2) constructions, (3) memory, (4) calculations, and (5) reasoning. It may be used to identify problems, provide treatment, and make referrals. It is **not** intended to replace neuropsychological assessment.

Recommended Instrument Use: Practice Option

This test may be a helpful inclusion in an initial evaluation when:

- the patient has not had or will not have a comprehensive cognitive assessment (eg, neuropsychological assessment or cognitive-communication assessment performed by an SLP) to identify cognitive impairments, and
- the patient has mild to moderate brain injury or complicated mTBI and observation of functional performance suggests the possibility of cognitive dysfunction in a number of domains.

Caution: The Cognistat may not be sensitive enough to detect subtle problems among high-functioning, community-dwelling individuals after TBI.¹² It may not have adequate specificity when

used with adults with psychiatric problems (ie, performance on the Cognistat may suggest cognitive disability when, in fact, there is none).¹³

Administration Protocol/Equipment/Time

The Cognistat is comprised of the test kit (including equipment such as the stimulus book and tokens), the manual (which specifies the step-by-step administration protocol), and the profile form.

For each area of the test other than memory, the patient is first presented with a screening item. Ability is assumed to be normal if the patient passes the screen and no further testing is done in that area. If the patient does not pass the area screen, the clinician administers all the items in the respective subtest. Therefore, it takes approximately 5 minutes to administer the Cognistat to individuals with normal cognition, and about 30 minutes to administer to those with cognitive impairments. The results of each Cognistat subtest are plotted on the profile form.

Detailed administration and scoring procedures are available for purchase from the developer and are not included in this Toolkit. Clinicians should

EXHIBIT 7-1

COGNISTAT RESOURCE INFORMATION

Available from:
Cognistat, Inc
PO Box 460
Fairfax, CA 94978
www.cognistat.com

refer to the test booklet and manual for additional information regarding psychometric properties and score interpretation, particularly for the most recent edition of the test.¹⁴

Groups Tested With This Measure

The Cognistat has been tested on a number of populations, such as those with stroke,¹⁵ TBI¹² (including c/mTBI during initial trauma hospitalization¹⁶), and older adults (with and without dementia or disability).^{17,18}

Interpretability

A clinician plots the patient's scores for each subtest, which may be within the average range or reflecting mild, moderate, or severe dysfunction in the following areas: orientation, attention, comprehension, repetition, naming, constructions, memory, calculations, similarities, and judgment.

The Cognistat manual discusses cautions in interpreting test data. For example, the Cognistat may be insensitive to those with superior premorbid intelligence and to patients with frontal lobe injuries who are able to correctly provide a verbal response to practical judgment questions but who may not be able to execute the described performance in real life. The manual also describes the potential influence of medications, pain, and fatigue or sleep deprivation on test performance.

The test was standardized on 60 normal, nongeriatric volunteers, 59 nonmedically or psychiatrically ill geriatric subjects, and 30 neurosurgical patients with documented lesions.

- Minimal detectable change (MDC): No information on MDC was provided. Because

the test is designed to focus on the degree of disability, it does not discriminate between average and superior performance. This ceiling effect limits the relevance of test-retest reliability.¹⁹

- Responsiveness estimates: not applicable. The purpose of this test is not to measure change over time.

Reliability and Validity Estimates

- Reliability: There is no published literature that describes interrater or intrarater reliability of the English version of the Cognistat. However, Chan and colleagues describe earlier work in establishing high levels of interrater reliability (with intraclass correlations of 0.85–0.99) in the Chinese version of the Cognistat.²⁰
- Concurrent validity: In a retrospective study involving adults with TBI admitted to a tertiary care rehabilitation, the results of the Cognistat were compared to that of other neuropsychological tests.²¹ Forty-seven percent of the 45 participants had c/mTBI. There were statistically significant correlations with the neuropsychological test for the following subtests: Cognistat attention with Trail Making Test ($r = -.33$, $P < .05$); Cognistat comprehension with the Token Test ($r = .30$, $P < .05$); Cognistat memory with the California Verbal Learning Test ($r = .68$, $P < .001$) and the Logical Memory II from the Wechsler Memory Scale—Revised ($r = .43$, $P < .005$); Cognistat Construction with the Wechsler Adult Intelligence Scale—Revised Block Design ($r = .54$, $P < .005$).

Selected Reference

Kiernan RJ, Mueller J, Langston JW, Van Dyke C. The Neurobehavioral Cognitive Status Examination: a brief but differentiated approach to cognitive assessment. *Ann Intern Med.*1987;107:481–485.

Repeatable Battery for the Assessment of Neuropsychological Status

Purpose/Description

The Repeatable Battery for the Assessment of Neuropsychological Status (RBANS; Psychological Assessment Resources Inc, Lutz, FL; Exhibit 7-2) is a screening measure of cognitive functioning.

Twelve subtests comprise the five domain-specific index scores in addition to a combined total-scale index score.²² The domain-specific areas include:

- immediate memory (word list and story recall),
- visuospatial/constructional (complex figure copying and line orientation judgment),
- language (confrontation naming and gen-

- erative naming),
- attention (digit span and coding), and
- delayed memory (delayed free recall of a word list, story, and complex figure, in addition to recognition trial of the word list).

Recommended Instrument Use: Practice Option

The RBANS is a useful cognitive screening tool to measure general performance level.²³ Because the RBANS is a screening measure, it should be given in conjunction with other cognitive tests. The RBANS can be used for repeated screenings.^{22,24} It was designed as a brief measure to characterize mild deficits and has been demonstrated to be sensitive to concussion.^{25,26}

Administration Protocol/Equipment/Time

The RBANS²² includes manuals, record forms, two equivalent alternate test forms (for repeated testing or tracking neurological status over time), and scoring templates. This test is usually administered in less than 30 minutes.^{22,24,27}

Groups Tested With This Measure

The test manual contains additional clinical data for 404 individuals diagnosed with Alzheimer's disease, vascular dementia, human immunodeficiency virus dementia, Huntington's disease, Parkinson's disease, depression, schizophrenia, and mild to severe TBI.^{22,24}

Interpretability

- Norms: The RBANS has been standardized on 540 individuals between the ages of 20 to 89 years.^{22,24} Norms are available in the test manual.
- Scoring: RBANS scores are interval data with a normative mean of 100 and a standard deviation of 15.^{22,24}
- MDC: not available
- Responsiveness estimates: not available

Reliability Estimates

- Internal consistency: Cronbach's alphas were calculated for the RBANS and showed strong internal consistency (0.84) for the total scale score for patients with

EXHIBIT 7-2

REPEATABLE BATTERY FOR THE ASSESSMENT OF NEUROPSYCHOLOGICAL STATUS RESOURCE INFORMATION

Available from:

Psychological Assessment Resources Inc.
16204 North Florida Avenue
Lutz, FL 33549
www4.parinc.com
Phone: 800-331-8378
Fax: 800-727-9329

moderate to severe TBI.²⁸ Strong internal reliability was also shown for the immediate memory, delayed memory, and visuospatial/construction index scores, while weak reliability was shown for the language and attention index scores.²⁸

- Interrater: not available
- Intrarater: not available
- Test-Retest: Forms A and B of the RBANS allow for retesting patients without content-related practice effects.²⁴ Specific information was available for comparisons between patients with schizophrenia and a normal control group. Test-retest intervals using forms A and B ranged from 1 to 134 days, and there was no effect of time on the retest performance.²⁹

Validity Estimates

- Content/Face: not available
- Criterion: not available
- Construct: The RBANS has been validated as a useful and sensitive instrument for a variety of populations, including those with TBI, dementia, stroke, schizophrenia, substance abuse, and multiple sclerosis.^{24,27}

In another study that included patients with mild to severe TBI and a control group, significantly lower scores were found for the total scale, attention, and delayed memory indexes for patients with TBI, followed by the immediate memory, language, and visuospatial/construction index scores.³⁰

Selected References

- McKay C, Casey JE, Wertheimer JC, Fichtenberg NL. Reliability and validity of the RBANS in a traumatic brain injured sample. *Arch Clin Neuropsychol*. 2007;22:91–98.
- Randolph C. *Repeatable Battery for the Assessment of Neuropsychological Status: Manual*. San Antonio, TX: Psychological Corporation; 1998.
- Randolph C. *Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) Supplement 1*. Upper Saddle River, NJ: Pearson Education, Inc; 2008.

Cognitive Linguistic Quick Test

Purpose/Description

The Cognitive-Linguistic Quick Test (CLQT; Pearson/PsychCorp, San Antonio, TX; Exhibit 7-3) was designed to enable a quick assessment of strengths and weaknesses in five cognitive domains in adults with known or suspected neurological dysfunction: (1) attention, (2) memory, (3) language, (4) executive functions, and (5) visuospatial skills. The test is composed of ten tasks, with five tasks created specifically with minimal language demands to assist in evaluating the cognitive functions of those with language disorders. The ten tasks of the CLQT are:

1. personal facts,
2. symbol cancellation,
3. confrontation naming,
4. clock design,
5. story retelling,
6. symbol trails,
7. generative naming,
8. design memory,
9. mazes, and
10. design generation.

The CLQT is useful for screening a full range of cognitive processes in patients who may have decreased language skills.

Recommended Instrument Use: Practice Option

The CLQT may be used to target areas for direct treatment or everyday management of impaired skills, to identify the need for more in-depth testing, or to help determine a differential diagnosis. The test was developed as a broad cognitive screening instrument to provide the examiner direction for further observation or administration of more in-depth formal and informal measures in the specific areas where the examinee has difficulty. The CLQT was not developed as a comprehensive tool for

EXHIBIT 7-3

COGNITIVE LINGUISTIC QUICK TEST RESOURCE INFORMATION

Helm-Estabrooks N. *Cognitive Linguistic Quick Test (CLQT)*. San Antonio, TX: The Psychological Corporation; 2001.

Available from:

Pearson/PsychCorp
Pearson, Attn: Inbound Sales & Customer Support
19500 Bulverde Road
San Antonio, TX 78259-3701
Phone: 800-627-7271
Fax: 800-232-1223
Clinical Customer Support@Pearson.com

determining differential diagnosis. The CLQT may be given by professionals experienced in administering cognitive assessment instruments to adults with acquired neurological dysfunction.

Administration Protocol/Equipment/Time

- Administration time: 15 to 30 minutes
- Scoring time: 10 to 15 minutes (cut scores, no normative data)
- Can be administered at a table or bedside (as long as the patient can sit up and use a pen)
- Test components: examiner's manual, stimulus manual, record form, response booklet, and scoring transparencies
- Additional materials: pen and stopwatch or a watch that can measure seconds
- Available in both English and Spanish

Groups Tested With This Measure

The CLQT has been administered to individuals who sustained right, left, and bilateral hemisphere

strokes, TBI, and Alzheimer's disease.³¹ In a study comparing the cognitive-communication results from the Cognistat and the CLQT in participants with mTBI, the CLQT identified more individuals with high-level cognitive-communication deficits than the Cognistat in the acute setting.³²

Interpretability

The CLQT is a criterion-referenced test with severity ratings for two age categories (ages 18–69 and 70–89). Severity ratings of mild, moderate, severe, and within normal limits are established for each of five cognitive domains: (1) attention, (2) memory, (3) executive functions, (4) language, and (5) visuospatial skills. A total composite severity rating and a clock-drawing severity rating are also derived. Criterion cut scores are available for each task for both age categories.³¹

The author's clinical expertise, informed by the data from the CLQT Nonclinical Research Sample and the CLQT Clinical Research Sample, guided the development of age categories, task criterion cut scores, and cognitive domain severity ratings.³¹

- Norms: none
- MDC: not available
- Responsiveness estimates: not available

Selected References

Helm-Estabrooks N. *Cognitive Linguistic Quick Test (CLQT)*. San Antonio, TX: The Psychological Corporation; 2001.

Parashos SA, Johnson ML, Erickson-Davis C, Wielinski CL. Assessing cognition in Parkinson disease: use of the Cognitive Linguistic Quick Test. *J Geriatr Psychiatry Neurol*. 2009; 22(4):228–234.

BROAD ASSESSMENT OF COGNITIVE-LINGUISTIC ABILITIES

Woodcock-Johnson III Tests of Cognitive Abilities

Purpose/Description

The Woodcock-Johnson III Tests of Cognitive Abilities (WJ III COG; The Riverside Publishing Company, Rolling Meadows, IL; Exhibit 7-4) is an assessment instrument that provides a comprehensive set of individually administered, norm-referenced tests for measuring intellectual abilities.³⁴ The test results provide standard scores and percentiles for general intellectual ability, broad cognitive subdomains referred to as "clusters," and specific cognitive subtests. Certain clusters represent broad categories of cognitive abilities related to cognitive performance. The clusters include verbal ability (standard and extended

Reliability and Validity Estimates

- Reliability: Test-retest stability coefficients ranged between 0.03 and 0.81 for the tasks. The test-retest stability coefficients ranged between 0.61 and 0.90 for the cognitive domains. Measures were based on a nonclinical sample, where there was little difference in performance between test and retest as the examinees received a perfect score on most tasks, resulting in attenuation.³¹
- Validity: The manual provides descriptive evidence to support test validity or "the appropriateness of proposed interpretations and uses of the test," including test content, internal structure, and relations to other variables.³¹

In a study of persons with Parkinson's disease, the CLQT correlated well with the Mini-Mental State Examination.³³ The CLQT was judged to be superior to the Mini-Mental State Examination because it also provides domain-specific information.

scales), thinking ability (standard and extended scales), and cognitive efficiency (standard and extended scales). The WJ III COG provides a strong normative reference against which to compare the c/mTBI population.³⁵ The standard battery contains the following subtests:

1. Verbal Comprehension: picture vocabulary, synonyms, antonyms, and verbal analogies.
2. Visual-Auditory Learning: long-term storage and retrieval of visual and auditory association.
3. Special Relations: identifying pieces that complete a target shape.
4. Sound Blending: auditory processing of blending sounds into a word.

EXHIBIT 7-4**WOODCOCK-JOHNSON III TESTS OF
COGNITIVE ABILITIES RESOURCE
INFORMATION**

Available from:

The Riverside Publishing Company
3800 Golf Road, Suite 200
Rolling Meadows, IL 60008
www.riversidepublishing.com
Phone: 800-323-9540
Fax: 630-467-7192

5. Concept Formation: categorical reasoning based on inductive logic.
6. Visual Matching: perceptual speed.
7. Numbers Reversed: short-term memory span.
8. Incomplete Words: auditory analysis and closure.
9. Auditory Working Memory: working memory for digits and words.
10. Visual-Auditory Learning-Delayed: recall of information for subset (visual-auditory learning) after a delay.

Recommended Instrument Use: Practice Option

The WJ III COG has not been normed on patients with brain injury; however, it has been used extensively to evaluate cognitive-communication abilities across an age span.³⁵ Clinicians using the WJ III COG need to follow the guidelines specified in the examiner's manual for training prior to administering and scoring the tests. Competent interpretation of the WJ III COG requires a higher degree of knowledge and experience than is required for test administration and scoring.^{34(p7)} Graduate-level training in the areas of cognitive assessment and diagnostic decision-making is suggested.

Administration Protocol/Equipment/Time

The WJ III COG³⁴ contains two easel test books, an examiner's manual, a technical manual, a computer scoring program, test records, subject response booklets, a CD recording, scoring guides, and an optional carrying case. The standard battery contains subtests 1 through 10 and takes approximately 45 to 50 minutes to administer by an experienced examiner. The

extended battery contains subtests 11 through 20 and takes approximately 1.5 to 1.75 hours to complete.

Groups Tested With This Measure

The WJ III COG can be used for educational, clinical, or research purposes in individuals from preschool to geriatric age.³⁴ The test can identify the client's strengths and weaknesses to determine the nature and extent of impairment and to aid in classification and diagnosis. The WJ III COG was used in the validation of the Automated Neurological Assessment Metric, a library of computer-based assessments of cognitive domains developed and implemented by the Department of Defense as a pre- and postcombat measure of neurocognitive performance.³⁶ In its earlier version (Woodcock-Johnson Psycho-Educational Battery-Revised) the test was shown to differentiate between patients with and without confirmed brain damage, and between closed head injury cases and psychiatric diagnoses.³⁷ In a study of 117 SMs who sustained blast-related mTBI, Parrish and colleagues³⁵ found that the WJ III COG consistently highlighted deficits in cognitive efficiency, while patients scored higher on verbal performance measures.

Interpretability

- Norms: Normative data has been obtained on over 8,800 subjects from 2 to 90 years of age with demographic characteristics that closely match the general population of the United States.³⁴ Normative data can be found in the WJ III COG test manual.
- Parrish, Roth, Roberts, and Davie³⁵ reported that the majority of SMs with c/mTBI scored within normal limits on the subtests, but measures of cognitive efficiency were consistently below the mean when compared to the normative sample. The standard score across subtests for SMs was 92; that was below the normative mean of 100. More than 25% of patients scored below one standard deviation on 8 of 11 subtests and clusters.
- Scoring: Specific instructions for scoring subtests are provided in the manual.³⁴ Raw scores and birthdate can be entered in the Compuscore and profiles program to calculate derived scores and discrepancies. The program also provides a summary narrative report, age and grade profiles, and standard score and percentile rank profiles.

- MDC: not available
- Responsiveness estimates: not available

Reliability Estimates

- Internal consistency: not available
- Interrater: Of the median cluster reliabilities, most are 0.90 or higher. Of the median test reliabilities, most are 0.80 or higher and several are 0.90 or higher.³⁴ The full-scale score reliability (general intellectual ability) is .97.
- Intrarater: not available
- Test-Retest: Across the 29 reliabilities for the subtests of the WJ III COG and tests of achievements for all ages, the median retest reliability was 0.94. Test-retest correlations by age and length of retest intervals ranged from 0.60 to 0.96 on the subtests.³⁴

Validity Estimates

- Content/Face: not available

- Criterion: The WJ III COG items were developed based on a complex array of statistical measures, including Rasch single-parameter logistic test model, multiple regression, and factor analyses for item calibration, scaling, cluster composition, and validation. Coverage of content, including tables, can be found in the technical manual.³⁴
- Construct: Woodcock, McGrew, and Mather³⁴ state that all of the WJ III COG tests conform to the areas of narrow ability, broad ability, and general intellectual ability derived from the Cattell-Horn-Carroll theory of cognitive abilities. Confirmatory factor analyses patterns indicated that all tests for the WJ III COG have minimal influence of construct-irrelevant variance. The cognitive cluster intercorrelations are low to moderate (0.20–0.60), suggesting that the broad cognitive abilities are related to, yet distinct from, one another.³⁴

Selected References

- Jones WP, Loe SA, Krach SK, Rager RY, Jones HM. Automated Neuropsychological Assessment Metrics (ANAM) and Woodcock-Johnson III Tests of Cognitive Ability: a concurrent validity study. *Clin Neuropsychol*. 2008;22(2):305–320.
- Parrish C, Roth C, Roberts B, Davie G. Assessment of cognitive-communication disorders of mild traumatic brain injury sustained in combat. *Perspect Neurophysiol Neurogenic Speech Lang Disord*. 2009;19:47–57.
- Woodcock RW, McGrew KS, Mather N. *Woodcock-Johnson III Tests of Cognitive Abilities Examiner and Technical Manuals*. Itasca, IL: Riverside Publishing; 2001.

DOMAIN-SPECIFIC ASSESSMENTS

Attention

Test of Everyday Attention

Purpose/Description. The Test of Everyday Attention (TEA; Thames Valley Test Company, Suffolk, England; Exhibit 7-5) is administered during initial evaluation to quantify and specify difficulties with attention if they have been reported by the patient or family member or observed by the clinician. The TEA is premised on the theoretical assumption that attention is comprised of at least three separate systems: selective attention, sustained attention, and attentional switching. The test is based on the imaginary scenario of a vacation to Philadelphia and involves the following eight ecologically plausible subtests.

1. **Map Search** (selective attention). Patients try to locate as many symbols as possible (eg, knife-and-fork sign representing an eating facility) on a colored map of Philadelphia in 2 minutes.
2. **Elevator Counting** (sustained attention). Patients pretend they are in an elevator and the visual floor indicator is not working. They figure out what floor they are on by counting a series of tape-presented tones.
3. **Elevator Counting With Distraction** (selective attention). Patients follow the same procedure as number 2, except they count low tones while ignoring high tones.
4. **Visual Elevator** (attentional switching). Patients perform a reversal (attentional

EXHIBIT 7-5**TEST OF EVERYDAY ATTENTION
RESOURCE INFORMATION**

Developed by Thames Valley Test Company, Suffolk, England, this test is available from:
 Northern Speech Services & National
 Rehabilitation Services
 117 North Elm Street, PO Box 1247
 Gaylord, MI 49734
 www.nss-nrs.com
 Phone: 888-337-3866
 Fax: 989-732-6164

- shifting / cognitive flexibility) task as they count up and down to follow a series of visually presented “floors” in the elevator.
5. **Auditory Elevator With Reversal** (attentional switching). As with subtest 4, patients perform a reversal task involving counting “floors,” but the stimuli are presented via audiotape.
 6. **Telephone Search** (selective attention). Patients look for key symbols indicating plumbers (or restaurants or hotels in versions B and C) in a simulated telephone directory.
 7. **Telephone Search Dual Task** (divided attention). Participants search the telephone directory while counting strings of auditory tones. The difference between scores for subtests 6 and 7 represents a “dual task decrement.”
 8. **Lottery** (sustained attention). Patients listen for their winning number (such as BC155) in this 1-minute test, writing down the two letters preceding all numbers ending in “55.”

Recommended Instrument Use: Practice Option. This test may be a helpful inclusion in an initial occupational therapy evaluation when:

- the patient has not had and will not have a comprehensive cognitive assessment (eg, neuropsychological assessment or cognitive communication assessment performed by an SLP) to identify cognitive impairments **or** if the results of aforementioned testing do not specify attentional performance, and

- the patient has c/mTBI and self-report or observation of functional performance suggests possible attention deficits.

Note: Because of the level of challenge associated with some of the subtests, the TEA may not be appropriate for individuals who are sensitive to auditory stimuli (as in some cases of PTSD) or those with hearing or vision limitations.³⁸

Administration Protocol/Equipment/Time.

The TEA is comprised of the test kit (including stimulus cards and maps, cue book, three audiotapes, and one videotape), the administration and scoring manual (which specifies the step-by-step administration protocol), and procedural guide scoring sheets. It takes 45 to 60 minutes to administer. Detailed administration and scoring procedures are available for purchase from the developer and are not included in this Toolkit.

Groups Tested With This Measure

The TEA has been tested on or used with a variety of diagnostic groups who are at risk for having attentional deficits, including mild,³⁹ moderate, and severe TBI; mild Alzheimer’s disease; and stroke.³⁸ It is sensitive to age effects in the normal population.³⁹

Interpretability

- Norms: TEA scores of 154 healthy volunteers (ages 18–80 years) were used to establish normative values. Scores were stratified by four age bands and two levels of educational attainment.³⁸
- Scoring: Rather than a single summary score, the TEA results are plotted as scaled-scores for each subtest on the scoring sheet’s summary plot. Cut-off scores (signifying abnormal performance) and detailed scoring and interpretation procedures are described in the administration manual.
- MDC: Although three versions of the test are provided, there are practical and time limitations to readministering the test solely to quantify progress or impact of treatment. Test developers recommend against readministering only portions of the test.
- Minimal clinically important differences: not available
- Responsiveness estimates: not available

Reliability Estimates

- Internal consistency: not available
- Interrater: not available
- Intrarater: not available
- Test-Retest: One week after taking version A of the TEA, 118 normal volunteers performed version B; a subsample who were given version B were tested with version C after 1 week. Correlation coefficients (Pearson product-moment) ranged from .59 to .87, not including the elevator counting and lottery tasks, for which there was a ceiling effect.³⁸ Decreased reliability was noted with the dual-task decrement due to learning effects.

Validity Estimates

- Content/Face: Test developers suggest that the imaginary scenario associated with the TEA (that of visiting Philadelphia as a tourist) adds to the face validity of the subtests.
- Construct: TEA subtest scores are moderately to strongly correlated with existing tests of attention (Pearson product-moment correlations ranging from 0.49–0.63).³⁸
- Discriminative: Robertson and colleagues reported statistically significant differences in most subtest scores for healthy controls and stroke survivors.³⁸ Chan⁴⁰ reported similar findings for TBI.
- Criterion: not available

Selected References

Chan RC, Lai MK. Latent structure of the Test of Everyday Attention: convergent evidence from patients with traumatic brain injury. *Brain Inj.* Jun 2006;20(6):653–659.

Robertson IH, Ward T, Ridgeway V, Nimmo-Smith I. The structure of normal human attention: The Test of Everyday Attention. *J Int Neuropsychol Soc.* 1996;2(6):525–534.

Information Processing Speed

Speed and Capacity of Language Processing

Purpose/Description. The Speed and Capacity of Language Processing (SCOLP; Pearson/PsychCorp Support San Antonio, TX; Exhibit 7-6) provides a measure of slowing in the rate of information processing, particularly with regard to language comprehension.⁴¹ It consists of two tasks: the speed of comprehension test (silly sentences, or SST), which measures rate of information processing, and the spot-the-word (STW) test, which estimates premorbid verbal ability. The clinician can determine whether poor performance on the SST represents a decrement secondary to brain injury or to an individual's premorbid low-verbal functioning.

Recommended Instrument Use: Practice Option. The SCOLP may be informative during an initial speech-language pathology assessment of an individual's cognitive abilities, especially when the examiner is interested in capturing a measure of verbal processing speed. In addition, this instrument may be used as a broad estimate of premorbid ability. The test may be given when a patient has not had and will not have a comprehensive neuropsychological assessment.

Consider using the SCOLP when the patient has

c/mTBI and self-report or observation of functional performance suggests possible deficits of information processing speed. This test may be used as an outcome measure following a period of focused intervention for information processing speed. The SCOLP offers multiple parallel versions for repeat testing.

Administration Protocol/Equipment/Time. The approximate time required for each task (SST and STW) is about 5 minutes. The SST requires individuals to verify simple sentences, half of which are true

EXHIBIT 7-6

SPEED AND CAPACITY OF LANGUAGE PROCESSING RESOURCE INFORMATION

Developed by Alan Baddeley, Hazel Emslie, Ian Nimmo-Smith, the SCOLP is available from:
Pearson/PsychCorp Support
19500 Bulverde Road
San Antonio, TX 78259-3701
ClinicalCustomerSupport@Pearson.com
Phone: 800-627-7271
Fax: 800-232-1223

(eg, "Rats have teeth."), and half of which are false (eg, "Nuns are sold in pairs."). The individual has 2 minutes to evaluate as many of the 100 sentences as possible. Four parallel forms of the test (versions A, B, C, and D) are available for repeat testing. Each set of 100 sentences has an instruction page with a brief explanation of the test, together with six practice items.

For the STW, the patient is instructed to place a checkmark beside the real word in each pair. Guessing is encouraged when the person is uncertain about a word pair. The test is untimed. For each subtest, raw scores are converted into an age-based scaled score or percentile score by means of tables provided in the test manual.

Groups Tested With This Measure. The SCOLP has been tested on a number of populations, including older Americans who are living in the community^{42,43}; individuals with mTBI^{44,45} or schizophrenia⁴⁶; juvenile offenders⁴⁷; persons using a range of drugs, including alcohol and benzodiazapines; those who have experienced intense stressors, such as individuals with high-pressure nervous syndrome⁴¹; and as an indicator for dysexecutive syndrome.⁴⁸

Interpretability.

- Norms: Normative data was collected on a stratified sample of 224 subjects, with approximately equal numbers sampled from six socioeconomic classes, and from four age bands (16–31, 32–47, 48–64, and 65–80). The age group above 65 was considered insufficient to provide robust norms. Norms are available for three age groups: 16 to 31, 32 to 47, and 48 to 64 in the test manual⁴¹ to assess the speed-capacity discrepancy (the extent to which comprehension speed deviates from that predicted by vocabulary). This provides an indication of the probable degree of cognitive impairment.
- MDC: not available
- Responsiveness estimates: The SST is sensitive to information-processing deficits associated with mTBI in the early postinjury phases. Ponsford et al⁴⁹ investigated the outcome of adults with c/mTBI at 1 week and 3 months postinjury to identify factors associated with persisting problems. By 3 months postinjury, the symptoms present at 1 week postinjury were resolved and no impairments were evident on neuropsychological measures, including the SCOLP.

Reliability Estimates.

- Internal consistency:
 - SST: Based on a sample of 25 people tested with the SST on two occasions, performing two different versions on day one and day two, and timed over the first 25 and second 25 sentences on each occasion, correlation between performance on these two halves was 0.84 for the first session and 0.87 for the second, suggesting good split-half reliability for these abbreviated versions.⁴¹
 - STW: Internal reliability was 0.78 for version A and 0.83 for version B.⁴¹
- Interrater: not available
- Intrarater: not available
- Test-Retest reliability, alternate-form reliability, and practice effects:
 - SST: Parallel form reliability (versions A and B) was 0.93. Test-retest reliability of the performance of rugby players was 0.78.⁴⁴ The performance of normal and head-injured people across 20 successive test sessions, tested on 10 different forms with each used twice, showed an improvement in both groups over the 20 occasions.⁵⁰
 - STW: Parallel form reliability (versions A and B) was 0.78.^{41,51} Test-retest reliability of rugby players after a 1- to 2-week interval was 0.64. There was no effect of practice on the number of words correctly identified.⁴⁴

Validity Estimates.

- Content/Face: not available
- Criterion: not available
- Construct validity:
 - SST: The SST correlates highly with measures of general language processing capacity (category generation: 0.52; color naming: 0.56; semantic categorization: 0.55; grammatical reasoning: 0.60; vocabulary: 0.51; and the STW: 0.57⁴¹). Correlations with nonsemantic speeded tasks (eg, digit symbol: 0.44; symbol digit: 0.44; letter-matching: 0.34–0.39) and fluid reasoning (Raven's Matrices: 0.20) were lower.^{41,44} Clinically, the SST has been shown to be sensitive to information-processing deficits associated with c/mTBI in the early postinjury phase.^{44,45,52} Deficits tended to resolve 3 months postinjury.⁴⁵

- STW: The STW has shown adequate convergent validity with other measures of crystallized intelligence and premorbid function. Moderately high correlations have been reported

between the STW and the Mill Hill Vocabulary Scale (0.60–0.71)^{41,51} Wechsler Verbal Intelligence Quotient ($r = 0.61$) and Full Scale Intelligence Quotient ($r = 0.58$).⁵³

Selected References

- Baddeley AD, Emslie H, Nimmo-Smith I. *The Speed and Capacity of Language Processing (SCOLP) Test*. Bury St. Edmunds, ENG: Thames Valley Test Company; 1992.
- Hinton-Bayre AD, Geffen G, McFarland K. Mild head injury and speed of information processing: a prospective study of professional rugby league players. *J Clin Exp Neuropsychol*. Apr 1997;19(2):275–289.
- Papagno C, Baddeley AD. Confabulation in a dysexecutive patient: implication for models of retrieval. *Cortex*. Dec 1997;33(4):743–752.
- Ponsford J, Willmott C, Rothwell A, et al. Impact of early intervention on outcome following head injury in adults. *J Neurol Neurosurg Psychiatry*. 2002;73(3):330–332.

Executive Functions

Behavior Rating Inventory of Executive Function-Adult

Purpose/Description. The Behavior Rating Inventory of Executive Function-Adult (BRIEF-A; Psychological Assessment Resources Inc, Lutz, FL; Exhibit 7-7) is a standardized measure of an adult's executive functions or self-regulation skills in his or her everyday environment.⁵⁴ The BRIEF-A includes a self-report that is completed by the patient and an informant report from a person familiar with the patient. The informant report can be used alone if the patient has limited awareness of his or her deficits. There are a total of 75 items that are scored using a 3-point rating scale. Five of the items are validation items, resulting in a total of 70 items separated into the behavior rating index (BRI; 30 items) and the metacognitive index (MI; 40 items). The BRI and MI are further divided into non-overlapping clinical scales that measure various aspects of executive function. These areas include:

1. Inhibit
2. Self-Monitor
3. Plan/Organize
4. Shift
5. Initiate
6. Task Monitor
7. Emotional Control
8. Working Memory
9. Organization of Materials

Recommended Instrument Use: Practice Option. The BRIEF-A was designed for a broad range of individuals with developmental, neurological, psychiatric, and medical conditions. It may be administered in research and clinical settings by neuropsychologists, psychologists, and rehabilitation professionals, and is available in over 20 different languages (see product detail at www4.parinc.com). Executive functions are not often evident in a structured, quiet, one-on-one testing environment. This instrument provides an option for measuring the presence of executive deficits as observed by family members in everyday functioning. It can be used alone when the rated individual is unable to complete the self-report form or has limited awareness of his or her own difficulties, or in addition to the self-report form to gain multiple perspectives on the individual's functioning. Data from

EXHIBIT 7-7

BEHAVIOR RATING INVENTORY OF EXECUTIVE FUNCTION-ADULT VERSION RESOURCE INFORMATION

This tool, developed by Roth, Isquith, and Gioia, is available from:

Psychological Assessment Resources
Incorporated
16204 North Florida Avenue
Lutz, FL 33549
www4.parinc.com
Phone: 800-331-8378
Fax: 800-727-9329

the BRIEF-A can help the clinician identify areas requiring further assessment as well as suggest specific problems for targeting treatment goals and strategies.

Administration Protocol/Equipment/Time. The BRIEF-A⁵⁴ contains a professional manual, self-report forms, self-report scoring summary / profile form, and informant report scoring summary / profile form. It takes approximately 10 to 15 minutes to administer and 15 to 20 minutes to score.

Groups Tested With This Measure. The BRIEF-A was standardized on men and women 18 to 90 years of age and validated on mixed clinical, healthy samples of 223 subjects with a variety of developmental, systemic, neurological, and psychiatric disorders, such as attention disorders, learning disabilities, autism spectrum disorders, TBI, multiple sclerosis, depression, mild cognitive impairment, dementia, and schizophrenia.⁵⁴ Brown et al⁵⁵ demonstrated a positive effect of atomoxetine treatment on the BRIEF-Adult Version Self-Report (BRIEF-A) compared to a placebo in young adults with attention deficit hyperactivity disorder. In a study of 98 11- to 16-year-old adolescents with TBI compared to 97 neuropsychologically healthy controls, the BRIEF-A demonstrated significantly greater parent-adolescent discrepancies on ratings of executive dysfunction in the TBI group than in the control group.

Interpretability.

- Norms: Normative data for the BRIEF-A was obtained on 1,050 men and women between 18 to 90 years of age from a wide range of racial, ethnic, and educational backgrounds and geographic regions.⁵⁴
- Scoring: Roth, Isquith, and Gioia⁵⁴ report that computer software is available for scoring test items. Scale scores are converted into T-scores, which can be graphed, and also into percentiles. T-scores have a mean of 50 and standard-deviation of 10 for all nine scale scores, the BRI index score, the MI index score, and the global executive

composite (GEC) score. There are also three validity scales (negativity, inconsistency, and infrequency) used in the BRIEF-A.

- MDC: not available
- Responsiveness estimates: not available

Reliability Estimates.

- Internal consistency: Internal consistency was moderate to high for the self-report normative sample (alpha coefficients ranged from 0.73–0.90 for clinical scales and 0.93–0.96 for indices and GEC score) and high for the informant report normative sample (0.80–0.93 for clinical scales and 0.95–0.98 for indices and GEC score). For the mixed clinical/healthy adult sample, the self-report alpha coefficients ranged from 0.80–0.94 for clinical scales and 0.96–0.98 for indices and GEC.⁵⁴
- Interrater agreement: The manual states that the self-report-to-informant-report correlations ranged from 0.44–0.68 for the scales, 0.63 for the BRI, 0.61 for the MI, and 0.63 for the GEC.⁵⁴ General disagreement between patients and informants should be taken into consideration.
- Intrarater agreement: not available
- Test-retest: Test-retest correlations ranged from 0.82 to 0.94 over an average interval of 4.2 weeks for the self-report form (n = 50), and ranged from 0.91 to 0.96 over an average interval of 4.2 weeks for the informant report form (n = 44).⁵⁴

Validity Estimates.

- Content/Face: not available
- Criterion: not available
- Construct: Roth, Isquith, and Gioia⁵⁴ state that validity was demonstrated via profiles of the BRIEF-A scores in clinical populations, such as individuals with attention deficit hyperactivity disorder, multiple sclerosis, and TBI.

Selected References

Roth R, Isquith P, Gioia G. *Behavior Rating Inventory of Executive Function-Adult Version (BRIEF-A)*. Lutz, FL: Psychological Assessment Resources, Inc; 2005.

Behavioural Assessment of Dysexecutive Syndrome

Purpose/Description. The Behavioural Assessment of Dysexecutive Syndrome (BADs; Thames

Valley Test Company, Suffolk, England; Exhibit 7-8)⁵⁶ was designed to assess the effects of dysexecutive syndrome, impairments associated with damage to the frontal lobes of the brain.⁵⁷ These

EXHIBIT 7-8

BEHAVIOURAL ASSESSMENT OF DYSEXECUTIVE SYNDROME RESOURCE INFORMATION

Developed by Thames Valley Test Company,
Suffolk, England, the Behavioural Assessment of
Dysexecutive Syndrome is available from:

Northern Speech Services & National Reha-
bilitation Services
117 North Elm Street
PO Box 1247
Gaylord, MI 49734
www.nss-nrs.com
Phone: 888-337-3866
Fax: 989-732-6164

impairments lead to difficulties with planning, organizing, initiating, and self-monitoring. The battery is comprised of six tests that replicate real-life, complex tasks, and the dysexecutive questionnaire (a 20-item self-report of how dysexecutive syndrome impacts daily functioning). The six tests include:

1. Temporal Judgment: involves the patient's ability to estimate how long various events last.
2. Rule Shift Cards: tests the patient's ability to change an established pattern of responding.
3. Action Program: tests practical problem solving in which a cork has to be extracted from a tall tube.
4. Key Search: tests strategy formation in which patients demonstrate how they would search for lost keys.
5. Zoo Map: tests the patient's ability to develop a plan to visit 6 of 12 possible locations in a zoo.
6. Modified Six Elements: tests planning, task scheduling, and performance monitoring.

Recommended Instrument Use: Practice Option. The BADS is to be administered by OTs, SLPs, or psychologists (see product detail at www.nss-nrs.com).

- This test may be a helpful inclusion in an initial occupational therapy evaluation when dysexecutive syndrome is the primary barrier to functioning.

- Administration of the BADS may also provide valuable information at various decision-making junctures (eg, discharge to independent living, return to work, etc).

Because of its length and time involved in administration, the BADS is **not** recommended for repeat administration as an outcome measure of treatment.

Administration Protocol/Equipment/Time.

The BADS is comprised of the test kit (including all materials and supplies), the administration and scoring manual (which specifies the step-by-step administration protocol), and procedural guide scoring sheets. It takes 45 to 60 minutes to administer. Detailed administration and scoring procedures are available for purchase from the developer and are not included in this Toolkit.

Groups Tested With This Measure. The BADS has been tested on individuals with brain injury, healthy controls, and those with schizophrenia,⁵⁶ including those with c/mTBI.⁵⁸

Interpretability.

- Norms: The BADS was normed on 216 non-brain-injured individuals with a range of abilities and ages (16–87 years of age). Age-stratified norms are provided (up to 40 years, 41–65, and 65–87).
- Scoring: The patient is assigned a profile score for each test (0–4), and these are summed to calculate an overall profile score. Profile scores can be converted to a standard score, from impaired, low average, average, and high average to superior.
- MDC: Not calculated. As mentioned earlier, because of its length and time involved in administration, it is **not** recommended for repeat administration as an outcome measure of treatment.

Reliability Estimates.

- Interrater: Twenty-five healthy controls were tested with a second tester present. Interrater reliability was high, ranging from 0.88 to 10.00.⁵⁶
- Test-Retest: Twenty-nine healthy controls repeated the BADS 6 to 12 months after they took it the first time.⁵⁶ None of the differences in means between first and second testing were statistically significant.

Correlation coefficients ranged from -0.08 (rule shift cards) to 0.71 (key search).

Validity Estimate. Construct: The BADS discriminated between groups with and without brain injury.⁵⁶

Selected Reference

Wilson BA, Evans JJ, Alderman N, Burgess P. The development of an ecologically valid test for assessing patients with a dysexecutive syndrome. *Neuropsychol Rehabil.* 1998;8:213–228.

Functional Assessment of Verbal Reasoning and Executive Strategies

Purpose/Description. The Functional Assessment of Verbal Reasoning and Executive Strategies (FAVRES; CCD Publishing, Guelph, ON, Canada; Exhibit 7-9) is designed to assess subtle cognitive-communication difficulties in adults with acquired brain injuries. This functional measure targets aspects of complex communication, verbal reasoning, and executive functioning. It was designed to detect deficits that may not be apparent on typical standardized tasks.

The FAVRES tasks challenge the examinee's language and executive functions through timed reading (under pressure), comprehending complex material, reasoning, and problem solving. The level of comprehension assessed includes discriminating relevant versus irrelevant information, detecting the speaker's purpose, discriminating between statements of fact and opinion, distinguishing between emotional and logical arguments, and evaluating the speaker's bias, prejudice, and attitude.

The FAVRES consists of four verbal reasoning tasks. Each task provides a meaningful context one might encounter at work or in family or social situations. Each task presents a situation novel to the examinee. All the information needed is provided within the task. The four tasks address planning an

event, scheduling, making a decision, and building a case.

Recommended Instrument Use: Practice Option. This instrument was designed for adults with acquired brain injury with suspected impairment of cognitive-communication functions, practical reasoning, or executive functions. It was designed to be administered by SLPs to provide further analysis of complex communication. According to the developer, Sheila MacDonald, "Education at the master's and Ph.D. level is recommended as well as registration or certification in a regulated profession."^{59(p23)} Examinees that were tested originally were 18 years of age and over. A preliminary study suggested that the FAVRES tasks may be useful in predicting readiness for return to work.⁶⁰

Administration Protocol/Equipment/Time. Administration takes about 50 to 60 minutes for all 4 tasks. Tasks can be administered separately over several sessions if required. A 5-point scoring system captures the degree of accuracy. There are four types of scoring: (1) time score, (2) accuracy score, (3) rationale score, and (4) strengths and weaknesses checklist. After the examinee completes the reasoning task, a post hoc analysis of reasoning subskills is conducted. Equipment needed for the test includes a stopwatch, two pens, the examiner's scoring booklet, response booklet, stimulus pages for task 1, and stimulus page for task 3.

Groups Tested With This Measure. Groups tested with this measure include adults ages 18 to 79 with mild to moderate acquired brain injury; pregroup therapy and postgroup therapy to assess for therapy outcome and return to duty; and participants with TBI who are at the community reintegration phase of intervention. It was not designed for severely or acutely impaired patients.⁵⁹

Interpretability.

- Norms: control group of 101 adults aged 18 to 79 years without a history of acquired brain injury, learning disability, or psychiatric

EXHIBIT 7-9

FUNCTIONAL ASSESSMENT OF VERBAL REASONING AND EXECUTIVE STRATEGIES RESOURCE INFORMATION

The Functional Assessment of Verbal Reasoning and Executive Strategies was developed by Sheila MacDonald in 2005 and is available from:

CCD Publishing
Suite 26
5420 Highway 6 North
Guelph, ON, Canada, N1H612

disorder. The normative sample was compared to that of 52 individuals with acquired brain injury who ranged in age from 19 to 64 years old. The individuals with brain injury functioned at or above Rancho Level 6 (confused appropriate) on the Rancho Levels of Cognitive Functioning⁶¹; could tolerate at least 1 hour of assessment; and were able to read at least one page of text.

- MDC: not available
- Responsiveness estimates: not available

Reliability and Validity Estimates.

- Interrater reliability: for the accuracy and reasons scores of the four tasks across 20 participants, kappa coefficients were 0.81

and 0.85, respectively. A second interrater reliability analysis compared the accuracy scoring of two different examiners on one task for all 153 subjects. The kappa coefficient was 0.86 for this comparison.⁵⁹

- Parallel-form reliability: not available
- Construct validity: to differentiate individuals with acquired brain injury from those without: t-test $P < 0.0001$.⁵⁹
- Predictive validity: sensitivity and specificity demonstrated when FAVRES total accuracy and/or total rationale scores were used to classify subjects as brain injured.
- Concurrent validity: FAVRES scores were compared with the Scales of Cognitive Ability for TBI (SCATBI,⁶² preliminary data only; further research is warranted).

Selected References

Isaki E, Turkstra L. Communication abilities and work re-entry following traumatic brain injury. *Brain Inj.* May 2000;14(5):441-453.

MacDonald S. *Functional Assessment of Verbal Reasoning and Executive Strategies*. London, UK: CCD Publishing; 2005.

Memory

Rivermead Behavioral Memory Test

Purpose/Description. The Rivermead Behavioral Memory Test (RBMT; Thames Valley Test Company, Suffolk, England; Exhibit 7-10) is administered to quantify and characterize impairment of everyday memory functioning when clinical observation or patient self-report suggests concerns in this area. The subtests simulate everyday memory challenges experienced by individuals with c/mTBI (eg, re-

membering names, faces, routes, appointments) and results are used to inform treatment focusing on memory compensation. An extended version (RBMT-E) was designed to detect subtle decrements in memory performance.⁶³

The first version of the test was published in 1991. RBMT-E was published in 1999 and RBMT-II was published in 2003. In 2008, the RBMT-3 was released, incorporating elements of the RBMT and RBMT-E and a new subtest (novel task) was added. Clinicians should refer to the *RBMT Administration and Scoring Manual*⁶⁴ for additional information regarding psychometric properties and interpretation of scores specific to the version of the test they are administering.

The discussion of the RBMT in this document is not specific to any particular version of the test unless otherwise indicated.

Recommended Instrument Use: Practice Option. This test may be a helpful inclusion in an initial evaluation when:

- the patient has not had and will not have a comprehensive cognitive assessment (eg, neuropsychological assessment or cognitive-communication assessment performed by an SLP) to identify cognitive impairments or if the results of aforementioned testing do not specify memory performance; and

EXHIBIT 7-10

RIVERMEAD BEHAVIORAL MEMORY TEST RESOURCE INFORMATION

The Rivermead Behavioral Memory Test was developed by the Thames Valley Test Company, Suffolk, England and is available from:

Northern Speech Services & National
Rehabilitation Services
117 North Elm Street, PO Box 1247
Gaylord, MI 49734
www.nss-nrs.com
Phone: 888-337-3866
Fax: 989-732-6164

- the patient has c/mTBI and self-report or observation of functional performance suggests the possible memory dysfunction.

This test is not recommended as an outcome measure. Cognitive rehabilitation for memory inefficiencies associated with c/mTBI involves instruction in compensatory memory strategies, not remediation of memory impairments. Because the RBMT administration and scoring procedures do not incorporate use of memory aids, repeated administrations of the test do not measure the impact or nature of intervention.

Administration Protocol/Equipment/Time. The RBMT is comprised of the test kit (including stimulus books and assessment materials), the administration and scoring manual (which specifies the step-by-step administration protocol), and procedural guide scoring sheets. As indicated above, the test includes remembering the following: names and faces, location of a hidden object, an appointment, details about a story, and a route. The RBMT-3 also includes performance of a novel task. It takes approximately 30 minutes to administer.

There are two types of scoring: a screening score and a standardized profile score. The screening score is obtained by pass or fail scoring and ranges from 0 to 12. Raw scores vary by subtest (eg, up to 21 points for story [immediate] versus up to 5 points for route [delayed]). Therefore, raw scores are standardized to equate the weight of each subtest by giving it a maximum weighting of 2, resulting in a standardized profile score ranging from 0 to 24. Use of the profile score is recommended because it is believed to give the more reliable estimate of patients' memory capabilities.⁶⁵

Groups Tested With This Measure. The RBMT has been tested on a number of populations, including community-dwelling older adults with mild cognitive impairment,⁶⁶ veterans with combat-related PTSD,⁶⁷ adults hospitalized for unipolar depression,⁶⁸ and individuals with TBI,⁶⁵ including those with mild cognitive impairment.⁶⁹

Interpretability.

- Norms: RBMT has been standardized on healthy people ages 16 to 69 and on people with brain injury ages 14 to 69.⁶⁵ Normative

data has been expanded for subsequent versions of the test; clinicians should rely on normative data provided in the manual specific to the RBMT version used.

- MDC: not applicable (repeat administration is not recommended)
- Responsiveness estimates: Not applicable (repeat administration is not recommended)

To interpret the score, the clinician locates the patient's RBMT score in one of the four memory impairment categories based on cut-off scores described in the administration manual. Because the RBMT and RBMT-II may not be sensitive enough to identify subtle memory deficits,⁷⁰ it is possible that individuals with c/mTBI may obtain a "normal" score on the RBMT and still have memory impairment.

Reliability and Validity Estimates. Reliability and validity of the RBMT were evaluated in a study involving 176 adults with brain injury.⁶⁵

- Interrater reliability: In the aforementioned study, interrater reliability was established by having 40 subjects scored separately but simultaneously by two raters. Ten raters participated in the study and there was 100% agreement between raters for all 40 subjects.
- Parallel-form reliability: There are four parallel versions of the RBMT within the test kit. Parallel-form reliability was evaluated by administering two versions of the test to 118 people with brain injury. Overall, the correlation between the two scores was .78 for the screening score, and .85 for the profile score.
- Concurrent validity: RBMT profile scores had moderate to substantial correlation with the Warrington Recognition Test (0.63 with the Recognition Memory Test for Words, 0.43 with the Recognition Memory Test for Faces).⁶⁵
- Construct validity: Wilson and colleagues⁶⁵ found statistically significant differences between RBMT subtest scores ($P < .001$) for patients with brain injury as compared to healthy controls ($n = 118$).

Selected References

- Makatura TJ, Lam CS, Leahy BJ, Castillo MT, Kalpakjian CZ. Standardized memory tests and the appraisal of everyday memory. *Brain Injury*. 1999;5:355–367.
- Wilson BA, Cockburn J, Baddeley AD, Hiorns R. The development and validation of a test battery for detecting and monitoring everyday memory problems. *J Clin Exp Neuropsychol*. Dec 1989;11(6):855–870.

Contextual Memory Test

Purpose/Description. The Contextual Memory Test (CMT; Harcourt Assessment, Inc, San Antonio, TX; Exhibit 7-11)⁷¹ was developed to assess awareness of memory performance, strategy initiation, and recall of visual information in adults with memory dysfunction. It is comprised of a memory questionnaire and a memory task.

Recommended Instrument Use: Practice Option. This test may be a helpful inclusion in an initial evaluation when:

- the patient has not had and will not have a comprehensive cognitive assessment (eg, neuropsychological assessment and/or cognitive communication assessment performed by an SLP) to identify cognitive impairments **or** if the results of aforementioned testing do not specify memory performance, and
- the patient has c/mTBI and self-report or observation of functional performance suggests possible memory dysfunction.

Administration Protocol/Equipment/Time. Detailed administration procedures are specified in the manual, which, along with score sheets and pictures, is available for purchase. Test administration takes 5 to 10 minutes (plus a 15- to 20-minute interference task). The patient is instructed to study a picture card comprised of objects associated with either a morning routine or restaurant for 90 seconds. Immediate, delayed, and total recall scores are recorded. The questionnaire is used to examine performance awareness and strategy use.

Selected References

Gillen G. *Cognitive and Perceptual Rehabilitation: Optimizing Function*. St. Louis, MO: Mosby, Inc; 2009.

Toglia JP. *The Contextual Memory Test*. San Antonio, TX: Harcourt Assessments; 1993.

Social Communication

Boston Naming Test

Purpose/Description. The Boston Naming Test (BNT) is used to evaluate visual confrontation naming ability.⁷⁴ The test consists of 60 black-and-white line drawings of objects, ranging from simple, high-

EXHIBIT 7-11

**CONTEXTUAL MEMORY TEST
RESOURCE INFORMATION**

The Contextual Memory Test is available from:
Harcourt Assessment, Inc
19500 Bulverde Road
San Antonio, TX 78259
www.harcourtassessment.com

Groups Tested With This Measure. Groups tested with this measure include adults 18 years and older with memory impairment secondary to multiple pathologies, as reported by Gillen.⁷² No studies have been conducted using this measure with large groups of individuals with c/mTBI.

Interpretability.

- Norms: The normative sample is based on 375 adults, ages 17 to 86, as reported by Asher.⁷³
- Scoring: The test yields immediate, delayed, and total recall scores that are compared to norms and analyzed for patterns using the summary of findings worksheet.⁷³

Reliability and Validity Estimates.

- Parallel forms: Reliability of the two versions (restaurant picture card, morning routine picture card) ranges from 0.73 to 0.81.⁷²
- Test-retest: Reliability ranges from 0.85 to 0.94.⁷²
- Concurrent validity: established based on comparisons with the Rivermead Behavioral Memory Test (correlations ranging from 0.80 to 0.84).⁷²

frequency vocabulary to rare words. The test is a measure of confrontation naming based on findings that dysnomia results in greater difficulties with the naming of low-frequency objects. Naming difficulties may be rank-ordered along a continuum. Items on the BNT are ordered according to their ability to be named, which is thought to be correlated with their frequency.

Recommended Instrument Use: Practice Option. Word-finding difficulties can occur with neurological impairment resulting from many different etiologies, including c/mTBI. This instrument may be used by an SLP to further evaluate suspected word-finding difficulties after a more comprehensive language assessment has been administered or when a patient complains of word retrieval difficulties.

Administration Protocol/Equipment/Time. Equipment needed for testing is the test stimulus booklet, the response booklet, a stopwatch or watch or clock with a seconds hand, and a pen or pencil for recording responses. The complete test takes 10 to 20 minutes to administer. Detailed administration and scoring procedures are available with test materials.⁷⁴

Groups Tested With This Measure. The BNT has been used extensively in adults and children. This type of picture-naming vocabulary test is useful when examining children with learning disabilities and evaluating adults with brain injury or dysfunction.⁷⁴ The BNT has been adapted and translated for use in at least a dozen languages, including a 30-item adaptation for Spanish-speaking people in the United States.⁷⁵ The test is commonly administered by neuropsychologists as well as speech pathologists and other clinicians to assess naming ability. Patients with TBI have been tested with this instrument; however, there is a paucity of literature describing the performance of individuals with c/mTBI. The BNT was included in a test battery administered to 11 individuals who sustained c/mTBI.⁷⁶ No significant differences in performance between patients and controls were found on the BNT.

Interpretability.

- Norms: The norms available in the test booklet are limited to small groups of adults ranging in age between 18 and 79 (N = 178), who were of above average education (mean = about 14 years), and children ranging in age between 0 and 5 years old and 5 to 12 years (N = 356). Information about geographical region, ethnicity, or time reference for this normative data is not provided.

Additional normative reports for English speakers are found in the literature. Heaton et al⁷⁷ com-

pared data from studies conducted over a period of 25 years and presented norms separately for two ethnicity groups, Caucasians and African Americans, organized by age, gender, and education.^{78–80}

The mean number of items correct for 1,000 adults (ages 20 to 85) was 53.3 for males and 47.7 for females⁷⁷; for 78 adults,⁸¹ 54.31; and for 60 adults,⁸² 54.50 (standard deviation 3.52, range 40 to 59 years). Cross-sectional studies suggest that age^{77,80} and verbal intelligence affect the BNT scores.⁸³ Gender has been reported to be unrelated to BNT performance.^{78,79,84,85}

- MDC: Based on a study of 541 “normal” elderly (ages 50 to 99 years old), reliable change index scores indicated that an annual decline of four points on the BNT is needed for a statistically reliable decline in an individual.⁸⁶
- Responsiveness estimates: not available

Reliability Estimates.

- Internal consistency: coefficient alpha for the 60-item form has been reported to range from 0.78 and 0.96.^{87–90}
- Interrater reliability: For the 60-item form, interrater reliability has been reported to range between 0.78 and 0.96, with an average of 0.89.
- Intrarater reliability: 0.98⁸²
- Test-retest reliability was high over short intervals. For longer time intervals, such as 11 to 12 months, test-retest reliability was marginal to high; for example, in a healthy, elderly Caucasian adult population, test-retest reliability ranged between 0.62 and 0.89⁹¹; and high retest reliability (0.92) was measured in a normal or neurologically stable adult population.⁹²

Validity Estimates. The BNT has been shown to correlate highly with other language-related measures, including the Visual Naming Test of the Multilingual Aphasia Examination,^{93,94} as well as with measures of intelligence, including the Verbal Comprehension Factor of the Wechsler Adult Intelligence Scale–Revised. Poor performance on the BNT has been described in subjects with neurologic disease, including left hemisphere and brainstem strokes,⁹⁵ anoxia,⁹⁶ multiple sclerosis and Parkinson’s disease,^{97–99} Alzheimer’s disease,^{98,100} and closed head injuries.^{10,101,102}

Selected References

- Goodglass H, Kaplan E, Barresi B. *The Assessment of Aphasia and Related Disorders*. 3rd ed. Philadelphia, PA: Lea & Febiger; 2000.
- Graves RE, Bezeau SC, Fogarty J, Blair R. Boston Naming Test short forms: a comparison of previous forms with new item response theory based forms. *J Clin Exp Neuropsychol*. Oct 2004;26(7):891–902.
- Henderson LW, Frank EW, Pigatt T, Abramson RK, Houston M. Race, gender and educational level effects on Boston Naming Test scores. *Aphasiology*. 1998;12:901–911.
- Kaplan EF, Goodglass H, Weintraub S. *The Boston Naming Test*. 2nd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2001.
- Nicholas LE, Brookshire RH, MacLennan DL, Schumacher JG, Porrazzo S. The Boston Naming Test: Revised administration and scoring procedures and normative information for non-brain-damaged adults. *Clinical Aphasiology*. 1988;18:103–115.
- Saxton JA, Ratcliff G, Munro CA, et al. Normative data on the Boston Naming Test and two equivalent 30-item short forms. *Clin Neuropsychol*. Nov 2000;14(4):526–534.

The Awareness of Social Inference Test

Purpose/Description. The Awareness of Social Inference Test (TASIT; Pearson/PsychCorp, San Antonio, TX; Exhibit 7-12) provides a systematic examination of social perception (ie, the ability to identify emotions and to make mental state inferences or to understand the meaning of conversational remarks meant nonliterally and to differentiate between these and literally intended remarks). It was designed as a criterion referenced test (ie, to have strong ceiling effects and low variability for individuals with a normal range of social perception skills) to assess whether individuals meet a criterion of adequate social perception ability

and clearly differentiate neurologically normal individuals and those with significant deficits in social perception.

The test is comprised of videotaped vignettes of everyday social interactions and response probes. Based on recent theoretical accounts of how social cues contribute meaning in conversations, it assesses poor understanding of emotional expressions and difficulty integrating the contextual information that is part of normal social encounters.

TASIT has three sections assessing different components of social perception:

1. Part 1: The Emotion Evaluation Test (EET) is an ecologically valid test of emotion recognition.
2. Parts 2 and 3: Social Inference–Minimal and Social Inference–Enriched assess the ability to interpret conversational remarks meant literally or nonliterally as well as the ability to make judgments about the thoughts, intentions, and feelings of speakers.

Statistically equivalent alternate forms are available for retesting.

Recommended Instrument Use: Practice Option. The test may be a helpful component of an evaluation when there is a history of brain injury and the observation of functional performance suggests the possibility of cognitive dysfunction in a number of domains, including social communication.

EXHIBIT 7-12

THE AWARENESS OF SOCIAL INFERENCE TEST RESOURCE INFORMATION

The Awareness of Social Inference Test is available from:

Pearson/PsychCorp
Pearson, Attn: Inbound Sales & Customer Support
19500 Bulverde Road
San Antonio, TX 78259-3701
Phone: 800-627-7271
Fax: 800-232-1223
ClinicalCustomerSupport@Pearson.com

Administration Protocol/Equipment/Time. The complete TASIT test kit includes: a manual, record forms A and B, a DVD, and stimulus books.¹⁰³ The DVD contains 28 video-recorded vignettes of professional actors enacting ambiguous scripts representing 7 basic emotions. The stimuli are dynamic; portray naturalistic, complex expressions; and provide intonation and gestural cues. Respondents choose the perceived emotion from the following descriptors: happy, surprised, sad, angry, anxious, revolted, neutral.

On Part 1, the EET, the ability to correctly recognize emotional expression is assessed by asking subjects to decide which of the basic seven categories each emotional expression represented. On Part 2, Social Inference–Minimal, after viewing each vignette, participants are required to answer questions regarding the speaker’s feelings, beliefs, intentions, and meaning. On Part 3, Social Inference–Enriched, 16 vignettes are presented that provide additional information before or after the dialogue of interest to “set the scene.” The ability to interpret the vignettes correctly is assessed via a set of four questions for each vignette.

The TASIT requires between 75 and 90 minutes to administer and score. More severely involved patients requires more time for viewing and responding to questions.

Groups Tested With This Measure. This test has been administered to neurologically normal, English-speaking, Australian adults, ages 14 to 60 years old, including some from the police training academy and the navy. All subjects had secondary school education or higher (average 13 years; standard deviation 2 years of education).¹⁰³

The test has also been administered to adults with severe traumatic brain injuries,^{104–107} schizophrenia,^{108,109} and progressive degenerative diseases, including frontotemporal dementia, progressive nonfluent aphasia, Alzheimer’s disease, corticobasal degeneration, and progressive supranuclear palsy.¹¹⁰ No published studies to date have specifically used this measure in individuals with c/mTBI.

Interpretability.

- Norms: The test was administered to 275 young adults who scored 84% accuracy or above on all facets. The mean performance of the group with TBI, for both first and second administration of Form A and Form B, showed significant differences from the normal population.¹⁰⁴

- TASIT Part 1:
 - Normative means: Form A, 24.86 (standard deviation 2.11); Form B, 24.15 (standard deviation 2.53)
 - TBI means: Form A, 19.22 (standard deviation 5.06); Form B, 19.53 (standard deviation 4.72)
- TASIT Part 2:
 - Normative means: Form A, 54.11 (standard deviation 4.29); Form B, 52.88 (standard deviation 5.30)
 - TBI means: Form A, 44.13 (standard deviation 8.66); Form B, 40.59 (standard deviation 8.62)
- TASIT Part 3:
 - Normative means: Form A, 55.64 (standard deviation 4.82); Form B, 55.11 (standard deviation 5.28)
 - TBI means: Form A, 44.47 (standard deviation 7.38); Form B, 42.44 (standard deviation 8.09)

For the TBI group, poor scores on sarcasm and lies reflected difficulty answering questions concerning the thoughts, feelings, and intentions of the speakers.

- MDC: not reported
- Responsiveness estimates: not available

Reliability and Validity Estimates.

- Test-retest reliability: ranged from 0.74 to 0.88. On alternate forms, reliability ranged from 0.62 to 0.83. There was no significant difference between total scores on Forms A and B. TASIT is not overly prone to practice effects and is reliable for repeat administrations.¹⁰⁴
- Interrater: There is no published literature that describes interrater or intrarater reliability of the TASIT.¹⁰⁴
- Validity: Concurrent validity was examined in subsets of a sample of 116 adults with TBI by relating TASIT performance to standard tests of neuropsychological function and specific social perception measures. TASIT was associated with face perception, information processing speed, and working memory. Socially relevant new learning and executive tasks were significantly associated with TASIT performance. Nonsocial tasks showed little association. Ekman photos and theory of mind stories were also associated.¹⁰⁴

- Construct validity: For Part 1, 12 adults with severe TBI were significantly worse than controls, especially on fear and neutral items. For Part 2, speakers with severe TBI performed normally on sincere exchanges but were poor on sarcastic exchanges. For Part 3, speakers with TBI were poorer than normal speakers on sarcasm but not on lies.

Ecological validity: 21 people with severe TBI were assessed on TASIT as well as rated for their social competence in a spontaneous encounter. Poor TASIT performance predicted social interaction skills. Persons with TBI displayed especially insensitive use of humor.¹⁰⁵

Selected References

- McDonald S, Bornhofen C, Shum D, Long E, Saunders C, Neulinger K. Reliability and validity of The Awareness of Social Inference Test (TASIT): a clinical test of social perception. *Disabil Rehabil*. Dec 30 2006;28(24):1529–1542.
- McDonald S, Flanagan S. Social perception deficits after traumatic brain injury: interaction between emotion recognition, mentalizing ability, and social communication. *Neuropsychology*. Jul 2004;18(3):572–579.
- McDonald S, Flanagan S, Rollins J. *The Awareness of Social Inference Test*. Bury St. Edmonds, UK: Thames Valley Test Company; 2002.
- McDonald S, Flanagan S, Rollins J, Kinch J. TASIT: a new clinical tool for assessing social perception after traumatic brain injury. *J Head Trauma Rehabil*. May–Jun 2003;18(3):219–238.
- McDonald S, Tate R, Togher L, et al. Social skills treatment for people with severe, chronic acquired brain injuries: a multicenter trial. *Arch Phys Med Rehabil*. 2007;89(9):1648–1659.

The La Trobe Communication Questionnaire

Purpose/Description. The La Trobe Communication Questionnaire (LCQ; may be obtained from J.Douglas@latrobe.edu.au) measures perceived social communication ability from multiple sources, including self and others (eg, friends, family, and clinicians) who regularly converse with the individual.¹¹¹ The LCQ is derived from the four conversational maxims of Grice's Co-operative Principle,¹¹² including: 1) quantity (amount of information), 2) quality (accuracy of contribution), 3) relation (relevance of contribution), and 4) manner (how the information is said). The LCQ includes two forms: Form S, to be administered to the primary subject, and Form O, for the subject's nominated "close other" (a person who knows the patient well). Both forms are identical in content and contain 30 items that were initially developed and psychometrically evaluated on young adults and healthy close others. A variation of Form O is available for use with rehabilitation workers when data are collected on clinical populations.¹¹¹

Recommended Instrument Use: Practice Option. The LCQ is to be administered for clinical and research use by SLPs and other rehabilitation professionals.¹¹¹ This instrument is recommended

for use by a single person or in a group context to assess each individual's self-perception of communication competence. It is designed for persons with diagnoses of TBI, stroke, or dementia. The instrument may also be administered by a close other. It is recommended that the LCQ be administered "interview-style" to people with TBI so assistance can be provided if needed.¹¹³

Administration Protocol/Equipment/Time. The LCQ consists of Form S, Form O, and a variation of Form O.¹¹⁰ Administration time with informants is approximately 15 minutes, and interview format with individuals with TBI takes approximately 30 minutes.

Groups Tested With This Measure. The LCQ was evaluated with young healthy adults, individuals with severe TBI, and close others (relatives or friends).^{111,113} Although the LCQ has been evaluated with young healthy adults, it has not been formally studied with the c/mTBI population.

Interpretability.

- Norms: The LCQ was psychometrically evaluated on 147 young adults and 109 close others; all were healthy and had no history of psychiatric or neurological dis-

order.¹¹¹ Further psychometric evaluation was conducted on 88 adults with severe TBI and 71 close others.¹¹³ Norms are as follows:

- Control group (mean age 21.2; range 16 to 39 years): 88% completed high school: LCQ score 52.47 (standard deviation 9.62)¹¹¹
- Informants group (mean age 32.76): LCQ score 47.17 (standard deviation 9.93)¹¹¹
- In a clinical group with severe TBI¹¹³ with a mean age of 32.26 years (standard deviation 12.12): LCQ score 54.94 (standard deviation 14.08)
- Informants group of close others: LCQ score 59.35 (standard deviation 14.94)
- Scoring: Modified Likert-type scales with 1 (never or rarely) to 4 (usually or always) are used to score responses. Six items on the LCQ require reverse scoring (ie, lowest frequency rating represents the highest perceived difficulty) distributed randomly to serve as internal response bias checks.¹¹¹
- MDC: not available
- Responsiveness estimates: not available

Selected References

Douglas JM, Bracy CA, Snow PC. Measuring perceived communicative ability after traumatic brain injury: reliability and validity of the La Trobe Communication Questionnaire. *J Head Trauma Rehabil.* Jan–Feb 2007;22(1):31–38.

Douglas JM, O’Flaherty CA, Snow P. Measuring perception of communicative ability: the development and evaluation of the La Trobe Communication Questionnaire. *Aphasiology.* 2000;14:251–268.

Discourse Comprehension Test

Purpose/Description. The Discourse Comprehension Test (DCT; Exhibit 7-13) was designed to assess comprehension and retention of spoken narrative discourse by adults with aphasia, right-hemisphere brain damage, or TBI. The test consists of 10 stories and a set of yes-or-no questions for each story. The stories are controlled for length, grammatical complexity, listening difficulty, and reading level. The questions systematically assess a listener’s comprehension and retention of directly stated and implied main ideas and details from a homogeneous set of stories. The stories are presented in two versions:

1. Listening comprehension version: to assess comprehension and retention of

Reliability Estimates.

- Internal consistency: This was found to be high for the LCQ (Cronbach’s alpha for primary respondents was 0.85; for close others, it was 0.86; for those with severe TBI was 0.91 and close others was 0.92).^{110,112}
- Interrater and intrarater: not applicable (patient and familiar others fill out questionnaires)
- Test-retest: Test-retest reliability was acceptable at 8 weeks for the self-report ($r = 0.76$).¹¹¹ For 18 participants with severe TBI, greater than 5 years after injury, test-retest Pearson r coefficients across a 2-week interval were acceptable (in individuals with TBI, $r = 0.81$; in close others, $r = 0.87$).¹¹³

Validity Estimates.

- Content/Face validity: not available
- Criterion: not available
- Construct validity: A principal-component factor analytic procedure was completed on the self-report data ($n = 147$). A six-factor solution was produced with all factors, including items from at least two Gricean maxims, and the cognitive construct used to guide the original item selection.¹¹³

spoken narrative discourse.

2. Silent reading comprehension version: to assess comprehension and retention of written narrative discourse.

EXHIBIT 7-13

DISCOURSE COMPREHENSION TEST RESOURCE INFORMATION

The Discourse Comprehension Test, developed by Brookshire and Nicholas, is available from:

BRK Publishers
Minneapolis, MN 55438
Phone: 612-835-2940

Recommended Instrument Use: Practice Option. This test is intended to supplement the information gained from standard multimodality language tests and from tests that assess comprehension and retention of single words and isolated sentences. The DCT is designed to provide a more complete picture of how the individual performs in more natural communication interactions.

The DCT can be used to:

- identify deficits that may affect daily-life communication,
- guide the selection of treatment tasks,
- monitor changes in performance with treatment, and
- counsel communication partners.

The test is appropriate for brain-injured adults who have:

- adequate hearing for the test conditions,
- intelligible and reliable “yes” and “no” responses (either spoken, by head nods, or by pointing to response cards), or
- correct responses to at least half of the question pairs in the listening version of the sentence comprehension test, or the subject should respond correctly to at least half of the 20 yes-or-no questions in the auditory verbal comprehension subtest of the Western Aphasia Battery.¹¹⁴

Administration Protocol/Equipment/Time. Administration time is approximately 20 minutes. Materials include the listening comprehension version (stories and questions), stimulus tape, audiocassette player, story cards, silent reading comprehension version, question sheets, response record form, test report forms, and a stopwatch.

Detailed administration and scoring procedures are available with test materials.

Groups Tested With This Measure. Non-brain-damaged adults, aphasic adults with left-hemisphere brain damage, nonaphasic adults with right-hemisphere brain damage, and adults with TBI,¹¹⁵ including c/mTBI,¹¹⁶ have been tested with this measure. The test was designed to assess comprehension and retention of spoken narrative discourse by adults with aphasia with right-hemisphere brain injury; it was not designed to differentiate

non-brain-damaged from brain-damaged adults, nor was it designed to differentiate between brain-damaged adults with different etiologies or sites of brain injury.¹¹⁷ However, no published studies have specifically used this measure on individuals with c/mTBI.

Interpretability.

- Norms: Forty non-brain-damaged adults, 20 aphasic adults with left-hemisphere brain damage, 20 nonaphasic adults with right-hemisphere brain damage, and 20 adults with TBI were tested with the listening version of the DCT.¹¹⁵
- MDC: not available
- Responsiveness estimates: not available

Reliability Estimates.

- Internal consistency: not available
- Test-Retest: The test-retest reliability of performance was measured for the aphasic subjects and the right-brain-damaged subjects ($r = .87$ for aphasic subjects, $r = .95$ for right-brain-damaged).¹¹⁵

Validity Estimates.

- Content: The stories in the DCT were constructed to evaluate comprehension and retention of main ideas, details, and directly stated and implied information. The eight questions for each story test four main ideas (two stated and two implied) and four details (two stated and two implied). The validity of the DCT's classification of questions is supported by the performances of non-brain-damaged adults and the three groups of brain-damaged adults.¹¹⁷
- Construct and criterion-related validity: There are no standardized tests for assessing brain-damaged adults' comprehension of spoken discourse. Therefore, DCT performance cannot be compared to performance on other measures of discourse comprehension. DCT has been compared to auditory comprehension subtests of other assessments, including the Boston Diagnostic Aphasia Exam (.76),¹¹⁸ a shortened version of the Porch Index of Communicative Ability (.64),¹¹⁹ and the Sentence Comprehension Test (.53).¹²⁰

EXHIBIT 7-14**MORTERA-COGNITIVE SCREENING MEASURE ADDITIONAL INFORMATION**

The test author wishes to provide free access to the Mortera-Cognitive Screening Measure (M-CSM). In return, the author requests that the user of the M-CSM send her the results. In addition, the author requests that the following information be included:

- the population (age, diagnosis, or disability) assessed with the M-CSM;
- the clinical setting in which the M-CSM was used;
- the user's background related to profession, years of experience, and area of practice; and
- any questions or specific comments on the M-CSM regarding ease of use, content, format, levels of scores, or any other areas of concern.

Any information submitted to the author that is related to results or feedback must not contain any identifying or personal information. All results and feedback must be anonymous and reported in aggregate.

At the request of the author, please send the above information in either paper or electronic format to:

Marianne Mortera, PhD, OTR/L
Columbia University—Programs in Occupational Therapy
710 West 168th Street, Neurological Institute, 8th Floor
New York, NY 10032
mhm2101@columbia.edu

Selected References

- Brookshire RH, Nicholas LR. *Discourse Comprehension Test*. Minneapolis, MN: BRK Publishers; 1997.
- Duff MC, Proctor A, Haley K. Mild traumatic brain injury (MTBI): assessment and treatment procedures used by speech-language pathologists (SLPs). *Brain Inj*. Sep 2002;16(9):773–787.
- Nicholas LE, Brookshire RH. Consistency of the effects of rate of speech on brain-damaged adults' comprehension of narrative discourse. *J Speech Hear Res*. Dec 1986;29(4):462–470.
- Nicholas LE, Brookshire RH. Comprehension of spoken narrative discourse by adults with aphasia, right-hemisphere-brain damage, or traumatic brain injury. *Am J Speech-Lang Path*. 1995;4:69–81.

FUNCTIONAL PERFORMANCE ASSESSMENTS**Mortera-Cognitive Screening Measure*****Purpose/Description***

The Mortera-Cognitive Screening Measure (M-CSM; academiccommons.columbia.edu/catalog/ac:123173; Exhibit 7-14) is a structured observational tool that involves two functional tasks associated with preparing a light meal (soup and sandwich). The clinician rates patient behaviors during task performance based on the cognitive dimensions of each subtask. The cognitive dimensions included in the M-CSM are often problematic after brain injury (shifting and sustaining atten-

tion, visual-attention scanning, awareness of disability, judgment relative to safety, recall, planning and problem solving).^{121,122}

Recommended Instrument Use: Practice Option

This functional assessment may be used to identify ways in which possible cognitive inefficiencies or impairments manifest themselves in the performance of everyday tasks. While the M-CSM may not be sensitive to cognitive inefficiencies typical of c/mTBI, it may be particularly useful in observing kitchen performance and competence for service members who lack experience in meal preparation.

Administration Protocol/Equipment/Time

A kitchen setting (including a stovetop) is required to administer the M-CSM along with food ingredients and cooking supplies. The M-CSM takes 20 to 60 minutes to administer, depending upon the patient's meal preparation skills and background, and his or her familiarity with the testing environment (eg, location of supplies; Form 7-1).

Groups Tested With This Measure

The M-CSM was designed for use on patients with brain injury. However, no published studies have specifically used this measure on individuals with c/mTBI.

Interpretability

- Norms: No norms have been developed for this instrument.
- Scoring: The clinician rates patient behaviors.

Selected References

Mortera MH. Instrument development in brain injury rehabilitation: Part I. *Phys Disabilities Special Interest Section Q*. 2006a;29(3):1-4.

Mortera MH. Instrument development in brain injury rehabilitation: Part II. *Phys Disabilities Special Interest Section Q*. 2006b;29(4):1-2.

Dynamic Assessment of Functional Performance

Purpose/Description

Functional task observation is a critical component of a comprehensive cognitive and visual assessment. Because they are highly structured, many standardized tests do not challenge patients' ability to utilize their executive skills in unstructured tasks or environments. Therefore, systematic observation of functional task performance provides unique opportunities to further understand patients' challenges and strengths. By observing patients as they perform everyday tasks, OTs assess the extent to which task, environment, and personal characteristics interact to impact performance. Furthermore, therapists modify task and environmental variables to just-right challenges specific to an individual's goals and to determine under which circumstances the patient's performance is optimized.

OTs design patient-relevant functional tasks and use an observation worksheet, like the Sister Kenny Dynamic Functional Task Observation Checklist

(0 = no problem, 1 = potential problem, 2 = problem) during task performance based on the cognitive dimensions of each subtask.

- MDC: not available

Reliability and Validity Estimates

- Interrater reliability: Two groups of therapists rated videotaped task performance with intraclass correlation coefficients ranging from 0.71 to 0.93 (videotape 1) and 0.54 to 0.68 (videotape 2).¹²³
- Content validity: Two groups of five occupational therapists with clinical expertise in brain injury and cognitive rehabilitation examined the M-CSM by using the content validity rating form, which comprised three parts (cognitive processes and the theoretical foundation, cognitive processes and their necessity with the CSM functional tasks, and adequacy of the cognitive descriptors).¹²³

(Form 7-2), to analyze task and environmental characteristics and to catalog the associated personal characteristics and overall performance.

Recommended Instrument Use

The Dynamic Functional Task Observation Checklist may be used to structure patient performance observations during the assessment phase and throughout the episode of care.

Administration Protocol/Equipment/Time

These dimensions vary depending on the task that is developed by the clinician. The sample tasks that follow take 15 to 25 minutes to perform and involve various office supplies.

Groups Tested With This Measure

These methods have not been formally tested on any groups. This description is an effort to propose methods by which OTs can standardize observational tasks for their own use.

Patient name: _____

Date: _____

FORM 7-1**OBSERVATION SCHEDULE FOR THE MORTERA-COGNITIVE SCREENING MEASURE**

Directions: For each cognitive process observed, mark one of the three levels that best indicates the individual's level of performance.

Soup**A. Gathering items: saucepan, can of soup, bowl, spoon/ladle, manual or electric can opener**

1) Sustained attention	Score
(2) Unable to sustain focus on gathering all items even with visual, verbal, or tactile cues (1) Requires 1–2 visual, verbal, or tactile cues to sustain focus on gathering all items (0) Sustains focus on gathering all items	
2) Shifting attention	Score
(2) Unable to resume retrieval of items if interrupted, even with visual, verbal, or tactile cues (1) Requires 1–2 visual, verbal, or tactile cues to resume retrieval of items (0) Able to resume retrieval of items if interrupted from task	
3) Visual-attention scanning	Score
(2) Unable to locate items within visual fields even with visual, verbal, or tactile cues (1) Requires 1–2 visual, verbal, or tactile cues to locate items within visual fields (0) Locates all items within visual fields	
4) Judgment relative to safety	Score
(2) Intervention by other required to avoid a problem (1) Requires 1–2 visual, verbal, or tactile cues to incorporate safety strategy if item(s) out of reach	

(0) Retrieves items in a safe manner	
5) Recall	Score
(2) Unable to retrieve all necessary items even with visual, verbal, or tactile cues (1) Requires 1–2 visual, verbal, or tactile cues to retrieve necessary items (0) Retrieves all necessary items	

B. Reads and/or follows directions on soup can

6) Sustained attention	Score
(2) If refers to directions, unable to sustain focus on reading directions even with visual, verbal, or tactile cues (1) If refers to directions, requires 1–2 visual, verbal, or tactile cues to sustain focus on reading directions (0) If refers to directions, sustains focus on reading directions	
7) Visual-attention scanning	Score
(2) If refers to directions, unable to locate/read directions in all visual fields (1) If refers to directions, requires 1–2 visual, verbal, or tactile cues to locate/read directions in all visual fields (0) If refers to directions, able to locate/read directions in all visual fields	
8) Awareness of disability	Score
(2) Unable to indicate difficulty locating/reading directions (1) Requires 1–2 visual, verbal, or tactile cues to indicate difficulty locating/reading directions (0) Not applicable or indicates if having difficulty locating/reading directions	
9) Recall	Score
(2) Checks directions repeatedly yet unable to initiate steps (1) Checks directions repeatedly but able to initiate steps	

(0) Indicates no need for directions and is able to initiate steps	
10) Planning/problem solving	Score
(2) Unable to complete steps in an orderly sequence even with visual, verbal, or tactile cues (1) Requires 1–2 visual, verbal, or tactile cues to complete steps in an orderly sequence with or without following directions (0) Completes steps in an orderly sequence with or without following directions	

C. Opens can with can opener

11) Sustained attention	Score
(2) Internal/external distractions interfere even with visual, verbal, or tactile cues (1) Requires 1–2 visual, verbal, or tactile cues to sustain focus on task (0) Opens can without internal/external distractions within appropriate timeframe	
12) Visual-attention scanning	Score
(2) Can is partially opened even with visual, verbal, or tactile cues (1) Requires 1–2 visual, verbal, or tactile cues to completely open can (0) Can opened completely	
13) Awareness of disability	Score
(2) Unable to acknowledge difficulty with can opener even with visual, verbal, or tactile cues (1) Requires 1–2 visual, verbal, or tactile cues to acknowledge difficulty with can opener (0) Not applicable or acknowledges difficulty with can opener	
14) Judgment relative to safety	Score
(2) Requires immediate visual, verbal, or tactile cues to avoid possible injury from sharp edges (1) Requires 1–2 visual, verbal, or tactile cues to stabilize can and carefully handle sharp edges (0) Safely stabilizes can and carefully handles sharp edges	

D. Pours soup and/or liquid into saucepan

15) Sustained attention	Score
(2) Internal/external distractions interfere even with visual, verbal, or tactile cues (1) Requires 1–2 visual, verbal, or tactile cues in order to refocus on task (0) Pours soup without internal/external distractions within appropriate timeframe	
16) Visual-attention scanning	Score
(2) Pours soup over edge of saucepan (1) Requires 1–2 visual, verbal, or tactile cues to prevent pouring soup over the edge of saucepan (0) Pours soup toward center of saucepan	
17) Awareness of disability	Score
(2) Unable to indicate difficulty pouring soup/liquids (1) Requires 1–2 visual, verbal, or tactile cues to indicate difficulty pouring soup/liquids (0) Not applicable or indicates difficulty pouring soup/liquids	
18) Judgment relative to safety	Score
(2) Unable to pour liquids slowly and carefully even with visual, verbal, or tactile cues (1) Requires 1–2 visual, verbal, or tactile cues to pour liquids slowly and carefully (0) Pours liquids slowly and carefully	

E. Heats soup

19) Visual-attention scanning	Score
(2) Unable to check for signs that soup heats and/or adjusts correct dial even with visual, verbal, or tactile cues	

(1) Requires 1–2 visual, verbal, or tactile cues to check that soup heats and/or adjusts correct dial (0) Checks for signs that soup heats and/or adjusts correct dial accordingly	
20) Judgment relative to safety	Score
(2) Requires immediate cues/intervention to avoid contact with heat (1) Requires 1–2 visual, verbal, or tactile cues to note temperature of soup or avoids contact with heat (0) Vigilance noted regarding temperature of soup and avoids contact with heat	
21) Planning/problem solving	Score
(2) Unable to adjust dial sequentially with heating soup even with visual, verbal, or tactile cues (1) Requires 1–2 visual, verbal, or tactile cues to adjust dial sequentially with heating soup (0) Not applicable or adjusts sequentially with heating soup	

F. Turns off burner

22) Visual-attention scanning	Score
(2) Unable to locate correct dial for burner (1) Requires 1–2 visual, verbal, or tactile cues to locate correct dial for burner (0) Locates correct dial for burner	
23) Judgment relative to safety	Score
(2) Unable to note if dial is in “off” position with visual, verbal, or tactile cues (1) Requires 1–2 visual, verbal, or tactile cues to note if dial is in “off” position (0) Able to note if dial is in “off” position	

G. Pours soup into bowl or uses ladle

24) Sustained attention	Score
(2) Distractions interfere, causing spilling of soup (1) Requires 1–2 visual, verbal, or tactile cues to avoid spilling soup (0) Pours or ladles soup without distractions interfering	
25) Visual-attention scanning	Score
(2) Pours or ladles soup outside bowl (1) Requires 1–2 visual, verbal, or tactile cues to pour or ladle soup into center of bowl (0) Pours or ladles soup toward center of bowl	
26) Awareness of disability	Score
(2) Unable to indicate difficulty pouring or ladling soup (1) Requires 1–2 visual, verbal, or tactile cues to indicate difficulty pouring or ladling soup (0) Not applicable or indicates having difficulty pouring or ladling soup	
27) Judgment relative to safety	Score
(2) Requires immediate cues/intervention to make contact with hot soup (1) Requires 1–2 visual, verbal, or tactile cues to safely and slowly ladle soup into bowl (0) Safely and slowly pours or ladles soup into bowl	

Sandwich

A. Gathering items: can of tuna, condiments, bread, can opener, bowl, plate, utensils

28) Sustained attention	Score
(2) Internal/external distractions interfere even with visual, verbal, or tactile cues (1) Requires 1–2 visual, verbal, or tactile cues to refocus on task (0) Pours soup without internal/external distractions within appropriate timeframe	

29) Shifting attention	Score
(2) Unable to retrieve items from various locations even with visual, verbal, or tactile cues (1) Requires 1–2 visual, verbal, or tactile cues to retrieve items from various locations (0) Able to retrieve all necessary items from various locations	
30) Visual-attention scanning	Score
(2) Unable to locate items within visual fields even with visual, verbal, or tactile cues (1) Requires 1–2 visual, verbal, or tactile cues to locate items within visual fields (0) Locates all items within visual fields	
31) Awareness of disability	
(2) Unable to indicate difficulty with retrieving (1) Requires 1–2 visual, verbal, tactile cues to indicate difficulty retrieving items (0) Not applicable or indicates difficulty retrieving items	
32) Judgment relative to safety	Score
(2) Intervention by other required to avoid a problem (1) Retrieves items without thought to safety when item out of reach (0) Retrieves items in a safe manner	
33) Recall	Score
(2) Unable to retrieve all necessary items even with visual, verbal, or tactile cues (1) Requires 1–2 visual, verbal, or tactile cues to retrieve necessary items (0) Retrieves all necessary items	

B. Opens cans with can opener

34) Sustained attention	Score
(2) Internal/external distractions interfere even with visual, verbal, or tactile cues (1) Requires 1–2 visual, verbal, or tactile cues to sustain focus on task	

(0) Opens can without internal/external distractions interfering with task performance	
35) Visual-attention scanning	Score
(2) Can is partially opened even with visual, verbal, or tactile cues (1) Requires 1–2 visual, verbal, or tactile cues to completely open can (0) Can opened completely	
36) Awareness of disability	Score
(2) Unable to indicate difficulty using can opener (1) Requires 1–2 visual, verbal, or tactile cues to indicate difficulty using can opener (0) Not applicable or indicates difficulty using can opener	
37) Judgment relative to safety	Score
(2) Requires immediate intervention to avoid possible injury (1) Requires 1–2 verbal or tactile cues to stabilize can or avoid sharp edges (0) Safely stabilizes can and avoids sharp edges	

C. Drains liquid from can

38) Shifting attention	Score
(2) Unable to resume focus on draining liquid even with visual, verbal, or tactile cues (1) Requires 1–2 visual, verbal, or tactile cues to sustain focus on task (0) Able to empty can of liquid	
39) Judgment relative to safety	Score
(2) Requires immediate cues/intervention required to avoid contact with sharp edges (1) Requires 1–2 verbal or tactile cues to stabilize can or avoid sharp edges (0) Safely and carefully avoids sharp edges	

D. Places tuna in bowl

40) Visual attention-scanning	Score
(2) Tuna placed outside bowl	
(1) Requires 1–2 visual, verbal, or tactile cues to place tuna in bowl	
(0) Places tuna in bowl	

E. Adds condiments

41) Visual attention-scanning	Score
(2) Condiments placed outside bowl	
(1) Requires 1–2 visual, verbal, or tactile cues to place condiments in bowl	
(0) Places condiments in bowl	

F. Spreads tuna mixture on bread

42) Visual attention-scanning	Score
(2) Unable to spread tuna over bread even with visual, verbal, or tactile cues	
(1) Requires 1–2 visual, verbal, or tactile cues to spread tuna mixture evenly over bread	
(0) Spreads tuna mixture evenly over bread	

Reproduced with permission from: Mortera MH: *Mortera-Cognitive Screening Measure*.
<http://academiccommons.columbia.edu/catalog/ac:123173>. New York, NY: Programs in Occupational Therapy,
 Columbia University; 2004. Accessed August 21, 2013.

FORM 7-2
SISTER KENNY DYNAMIC FUNCTIONAL TASK OBSERVATION CHECKLIST

Component		Descriptions of Characteristics	Notes
Task	Perceived degree of difficulty	☐ Easy ☐ Moderate ☐ Difficult	
	Perceived degree of familiarity	☐ Familiar ☐ Familiar with new challenges ☐ Unfamiliar	
	Type of instruction provided	☐ Verbal ☐ Written ☐ Demonstrated ☐ Pictorial	
	Physical demands	☐ Sedentary ☐ Active ☐ Gross motor ☐ Fine motor ☐ Other: ☐ Other:	
	Cognitive Demands	Attention	☐ Sustained ☐ Divided ☐ Alternating
Memory		☐ Processing new info ☐ Retrieving info	

	Cognitive Demands	Executive functioning	☐ Planning ☐ Prioritizing ☐ Self-monitoring ☐ Problem solving	
Task (cont)	Visual demands	☐ Visual acuity ☐ Scanning ☐ Visual attention ☐ Other:		
Environment	Performance setting	☐ Clinic ☐ Community		
	Stimulus-arousal properties	☐ Little to no distracters ☐ Auditory distracters ☐ Visual distracters		
Person	Physical considerations	☐ None ☐ Pain ☐ Decreased endurance ☐ U/E limitations ☐ L/E limitations ☐ Decreased balance		
	Emotional considerations	☐ None ☐ Seems anxious ☐ Seems depressed ☐ Other		
	Visual/auditory considerations	☐ Lighting needs ☐ Glasses, patches ☐ Hearing device		

Person	Self-awareness associated with the task at-hand	☐ Anticipatory ☐ Emergent ☐ Intellectual ☐ Little to none	
Performance	Task completion	☐ Task completion ☐ Task partially completed ☐ Could not complete	
	Task accuracy	☐ Totally accurate ☐ Somewhat accurate ☐ Not accurate	
	Activity tolerance	☐ Functional with no breaks ☐ Functional with self-initiated breaks ☐ Impaired, needed breaks and cues to take them ☐ Lethargic/unable	
	Problem-solving approach	☐ Logical/systematic ☐ Trial and error ☐ Unable to initiate	
	Self-prediction-reflection	☐ Able to accurately predict performance ☐ Able to reflect on performance ☐ Needed cues to predict performance ☐ Needed cues to reflect on performance	
	Response to feedback	☐ Responsive to feedback: uses feedback ☐ Defensive and reluctant ☐ Refusal to listen/argues	

Component	Descriptions of characteristics		Notes
Performance (cont)	Strategy use (specify)	Strategy: ☐ Independently initiated ☐ Cues required Strategy: ☐ Independently initiated ☐ Cues required Strategy: ☐ Independently initiated ☐ Cues required Strategy: ☐ Independently initiated ☐ Cues required	

Interpretability

- Norms: There are no norms for this process, but as individual clinicians craft and frequently use a core set of observational tasks, they will readily identify abnormalities, errors, or discrepancies in performance.
- MDC: not established
- Responsiveness estimates: not established
- Reliability and validity estimates: not established

Selected References: none

Protocol

The following sample tasks provide opportunities for clinicians to observe a patient's ability to initiate memory compensation strategies (task instructions are too detailed to be easily remembered) and ability to stay on task during an activity of some duration. Adding time pressure may further challenge the patient's organizational skills.

Sample Functional Tasks

I. Filing Task

A. Items needed:

- i. Eight file folders: four files labeled with capital letters (A–F, G–L, M–R, S–Z) and four labeled with lowercase letters (a–g, h–m, n–s, t–z)
- ii. 26 index cards with letters of the alphabet, all capitalized
- iii. 26 index cards with letters of the alphabet, all lowercase
- iv. 25 index cards with random first and last names (eg, John Smith)
- v. A yellow piece of paper
- vi. One business envelope
- vii. Red and black pens

B. Give the patient the following directions:

- i. Ask for filing supplies. File for 5 minutes. Place the uppercase letters in the uppercase folders, the lowercase letters in the lowercase folders. File the name cards in the uppercase folders according to the first letter of the first name.
- ii. Ask for a yellow piece of paper. Draw a stick figure and make sure the figure is wearing a hat and one shoe. Fold the paper in thirds. Place it in the envelope and seal the envelope.
- iii. Using a black pen, write your mailing

address on the envelope and draw a stamp in the corner.

iv. Tell me when you are done.

C. The patient is asked to predict:

- i. How long the task will take
- ii. How many errors he or she will have
- iii. How difficult it will be (easy, average, difficult)
- iv. Which aspects will be easy and which will present a challenge

II. Envelope Task

A. Items needed:

- i. 20 business envelopes addressed with random names and addresses in six different cities with six different zip codes
- ii. A deck of cards, with 10 cards from 3 of the suits removed
- iii. Pen and paper

B. Give the patient the following instructions:

- i. Sort the envelopes into zip codes.
- ii. Within each zip code, alphabetize the names by the first letter of the last name.
- iii. Sort for 5 minutes.
- iv. Ask for a deck of cards.
- v. Identify the missing cards.
- vi. Verbally describe another method you could have used to identify the missing cards.
- vii. Identify which method would be most efficient.
- viii. Draw a picture of a clock with the hands at 2:15.
- ix. Tell me when you are done.

C. The patient is asked to predict as described above.

American Speech Language and Hearing Association Functional Assessment of Communication Skills for Adults

Purpose/Description

The American Speech Language and Hearing Association Functional Assessment of Communication Skills for Adults (ASHA-FACS; Exhibit 7-15) is a quick and easy-to-administer measure of functional communication behaviors at the level of disability, based on direct observations of typical communication performance across the following domains: social communication; communication of basic needs; reading, writing, and number concepts; and daily planning. Within each domain, specific

functional behaviors are rated on a seven-point scale of independence, ranging from ability to perform the activity fully independently, through five levels of “does with” varying degrees of assistance, to unable to perform the activity at all.

Recommended Instrument Use: Practice Option

ASHA-FACS was designed for clinicians to rate functional communication behaviors of adults with speech, language, and cognitive-communication disorders resulting from left hemisphere stroke and from TBI. It is designed to measure at the level of disability, consistent with the World Health Organization’s international classification scheme. The design of the ASHA-FACS was based on a definition of functional communication formulated in 1990 by an ASHA advisory group, stated as “the ability to receive or to convey a message, regardless of the mode, to communicate effectively and independently in natural environments.”^{124(p2)}

In a review of the evidence leading to recommended best practices for assessing individuals with cognitive-communication disorders after TBI (including c/mTBI), the ASHA-FACS was one of a few standardized, norm-referenced tests that met most established criteria for validity and reliability for use with this clinical population.¹⁰ It was 1 of only 4 of the 31 tests reviewed that evaluated performance outside clinical settings. It was unique in that it was based on research about daily communication needs in the target population and incorporated consumer feedback about ecological validity into the design.

EXHIBIT 7-15

AMERICAN SPEECH LANGUAGE AND HEARING ASSOCIATION FUNCTIONAL ASSESSMENT OF COMMUNICATION SKILLS FOR ADULTS RESOURCE INFORMATION

Developed by Carol Frattali, Audrey Holland, Cynthia Thompson, Cheryl Wohl, and Michelle Ferketic, the American Speech Language and Hearing Association Functional Assessment of Communication Skills for Adults is available from:

American Speech-Language and Hearing
Association
ASHA Product Sales 426, PO Box 1160
Rockville, MD 20849
Phone: 301-296-8590, 888-498-6699
www.asha.org/shop

Administration Protocol/Equipment/Time

The ASHA-FACS includes a 117-page manual and a CD version, allowing automatic tabulation of incremental client assessments in Microsoft Excel (Microsoft Corporation, Redmond, WA).¹²⁴ Also included are a paper-and-pencil version with score summary and profile forms that purchasers can copy, a rating key on a 5-by-7-inch card, and an electronic index of *The International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9-CM) codes. The ASHA-FACS requires approximately 20 minutes to administer.

Refer to the test manual for specific descriptions of the domains of communication. Each domain is rated globally on the basis of a scale of qualitative dimensions: adequacy, appropriateness, promptness, and communication sharing. The measure yields domain and dimension mean scores, overall scores, and profiles of both communication independence and qualitative dimensions.

Groups Tested With This Measure

Field-testing included 185 adults: 131 with aphasia from left cerebrovascular accident, 54 with cognitive-communication impairment resulting from TBI. Subjects from three severity groups were tested: mild, moderate, and severe, based on Western Aphasia Battery scores. Ages ranged from 16 to 89 years (133 males, 52 females).¹²⁴

Interpretability

- Norms: Communication independence mean scores by impairment group are available for persons with aphasia and with cognitive-communication impairments. No test norms are available.¹²⁴
- MDC: not available
- Responsiveness estimates: not available

Reliability and Validity Estimates

The usability, sensitivity, reliability, and validity of the ASHA-FACS were demonstrated through two separate pilot tests and one field test.¹²⁴

- Sensitivity and specificity: The ASHA-FACS scale showed good sensitivity (75%) and specificity (82.4%) values.¹²⁴
- Internal consistency: Cronbach’s alpha was 0.955; internal consistency indicated that most item scores covered the full seven-point rating scale, showed high cor-

relations between items within assessment domains, were internally consistent with respect to assessment domain, and that all items were measuring the same underlying construct. The data indicated that all domain scores correlated with overall ASHA-FACS scores.¹²⁴

- Interrater reliability: Interrater reliability correlations on the seven assessment domain scores ranged from 0.72 to 0.92. Overall communication independence scores had high interrater agreement (mean correlation was 0.95), as did overall scores (mean correlation was 0.90).¹²⁴
- Intrarater reliability: Intrarater reliability for communication independence mean scores by assessment domain ranged from 0.95 to 0.99, and intrarater reliability of overall communication independence scores was 0.99. Intrarater reliability of qualitative dimension mean scores ranged from 0.94 to 0.99, and 0.99 for the overall qualitative dimension scores.¹²⁴
- Test-Retest reliability: Interclass correlation coefficient was 0.995 ($P < 0.001$).¹²⁴

Validity Estimates

- Criterion: The ASHA-FACS was moderately correlated with other measures of language and cognitive function, as demonstrated by external criterion measures used with subjects with aphasia and cognitive-communication impairments from TBI. Correlations that were significant at the 0.05 level were as follows:
 - 0.76 between Western Aphasia Battery,¹¹⁴ Aphasia Quotients, and ASHA-FACS overall scores.
 - 0.82 between the ASHA-FACS and the Functional Independence Measure scales¹²⁵
 - 0.84 between the ASHA-FACS overall scores with the SCATBI⁶² severity scores.
 - Nonsignificant correlations were obtained from SCATBI subtest scores and ASHA-FACS domain scores obtained from the mild to moderately impaired TBI group.
- Social validity: Evaluation of social validity indicated high positive correlations between ASHA-FACS overall scores and ratings of overall communication effectiveness by clinicians ($r = 0.81$).¹²⁴

Selected References

- Frattali CM, Thompson CK, Holland AL, Wohl CB, Ferketic MM. *The American Speech-Language-Hearing Association Functional Assessment of Communication Skills for Adults (ASHA FACS)*. Rockville, MD: ASHA; 1995.
- Mitrushina MM, Boone KB, Razani J, D'Elia LF. *Handbook of Normative Data for Neuropsychological Assessment*. 2nd ed. New York, NY: Oxford University Press; 2005.
- Turkstra LS, Coelho C, Ylvisaker M. The use of standardized tests for individuals with cognitive-communication disorders. *Semin Speech Lang*. Nov 2005;26(4):215–222.

SECTION 2: INTERVENTION

INTRODUCTION

Cognitive rehabilitation is a systematic, functionally oriented therapy program based on assessment and an understanding of a patient's brain-behavioral deficits.¹²⁶ The goals of therapeutic interventions for cognitive sequelae of c/mTBI are to enhance the individual's capacity to process and interpret information, foster independence, and improve the individual's ability to function in all aspects of family, work, and community life.^{126–129}

A review of the cognitive rehabilitation lit-

erature¹³⁰ yielded substantial evidence to support interventions for attention, memory, executive function, and social communication skills. Only a few of these interventions have been evaluated empirically for persons with c/mTBI. In fact, few studies have addressed cognitive treatment for individuals with mild injuries.¹³¹ However, severity-of-injury classification does not always correspond to the severity of the deficit requiring rehabilitation, and "a mild TBI can result in mild but very disabling cognitive

impairments that interfere with one's ability to participate in society."^{131(p261)} While acknowledging the methodological shortcomings of existing studies on the efficacy and effectiveness of cognitive intervention with the c/mTBI population, this should not be interpreted as evidence for the lack of potential meaningful benefit of such treatments.^{131,132} Because evidence on combat-related c/mTBI is still emerging, recommendations for cognitive interventions in this section evolved from several sources, including literature reviews that encompassed mild as well as moderate TBI in persons with injuries incurred in civilian and military settings, and through a consensus process of experienced clinicians working with civilian patients seen in rehabilitation centers as well as SMs and veterans with c/mTBI seen in military treatment facilities, Veterans Administration medical centers, and academic settings.

Cognitive intervention in the Department of Defense and the US Department of Veterans Affairs should address the unique needs of military and veteran populations with reference to returning to duty, school, or work; balancing military and family relationships; and readjusting to civilian life (see Chapter 9, Performance and Self-Management, Work, Social, and School Roles), and should consider the risk for posttraumatic stress and other comorbidities, including pain, headache, irritability, sleep disturbances, and poor anger management.¹³² The overwhelming majority of people who sustain c/mTBI recover fully in a matter of days to months.^{133–135} Some, however, may develop chronic neuropsychological problems and functional disability and require intervention.^{4,136} The presence of comorbidities, such as PTSD, is a significant predictor of physical, cognitive, and emotional symptoms following deployment, including symptoms associated with c/mTBI.^{137,138} Pain and sleep disorders may also challenge an individual's cognitive abilities and complicate the treatment process; therefore, caution must be exercised when attributing cognitive difficulties to a specific etiology, such as c/mTBI.

An interdisciplinary team approach reduces the risk of missing potential complicating factors that may negatively influence rehabilitation outcomes. Members of the team, including OTs, SLPs, and neuropsychologists, have complementary roles in cognitive intervention,⁴ and many professional disciplines contribute to the cognitive rehabilitation literature. Consistent with the interdisciplinary nature of cognitive rehabilitation, clinicians from different disciplines will likely develop common strategies with the patients they serve and reinforce the use of those strategies in their own practices. In general, cognitive rehabilitation helps patients with c/mTBI develop improved understanding of the factors contributing to their performance problems, along with strategies and life-management skills necessary to optimize execution of everyday activities. Cognitive rehabilitation comprises these components:

- **Patient education.** Important components include instruction in the core concepts related to thinking skills. SMs with cognitive complaints benefit from an understanding of their own thinking strategies, situations where breakdowns or inefficiencies occur, and ways to emphasize and use personal strengths.
- **Strategy identification and skill development.** As patients begin to understand their personal cognitive vulnerabilities, opportunities are provided to collaborate with a clinician to identify compensatory strategies compatible with their roles and responsibilities, personality, and preferences. SMs then learn how to use these strategies in personally relevant activities.
- **Skill transfer and habit formation.** Once patients are proficient with the strategies and skills necessary to compensate for cognitive inefficiencies, the clinician encourages and reinforces their use to create habits that support productivity and optimal quality of life.

OVERVIEW OF COGNITIVE REHABILITATION

Cognitive rehabilitation may focus on attention, concentration, speed of processing, perception, memory, auditory and reading comprehension, communication, reasoning, problem solving, judgment, initiation, planning, and self-monitoring. Specific interventions may be directed at the following:

- reinforcing, strengthening, or reestablishing previously learned patterns of behavior,
- establishing new patterns of cognition

through compensatory mechanisms for impaired neurologic systems, and

- enabling patients to adapt to their cognitive disability to improve their overall functioning and quality of life.¹²⁶

A paradigm shift has occurred in cognitive therapy. Traditionally, exercises and mass learning trials were used to restore cognitive processes. The focus has now shifted to a contextualized paradigm

with patient-centered needs that allows evaluation and therapy to be functional and naturalistic. This paradigm examines the support available in the patient's personal interactions and communication environments.¹³⁹

Training and education in the use of compensatory strategies has been shown to be effective in decreasing the functional impact of cognitive impairments.^{128,140} Metacognitive strategy instruction involves systematic, step-by-step procedures that focus on formulating goals, self-monitoring and comparing performance with goals or outcomes, making strategy decisions based on the performance-goal comparison (ie, adjusting the plan

based on feedback to achieve the desired goal), and implementing the change in behavior (ie, executing alternative solution).¹⁴¹

Although directly aimed at improving cognitive and psychosocial functioning, cognitive rehabilitation may indirectly result in enhanced overall functioning. For example, improvement in memory may facilitate compliance with a medication regimen, improvement in attention and auditory and reading comprehension may increase understanding of instructions from healthcare providers, and improvement in executive function may foster better decision-making with respect to treatment options.¹²⁹

INTERVENTION METHODS

Cognitive rehabilitation is grounded in scientific evidence, including theoretical foundations of brain-behavior relationships, cognition, communication, neuroplasticity, learning theories, behavioral modification, and counseling. Neuroplasticity refers to the adaptive capacity of the nervous system and the mechanism by which the brain encodes experience and learns new behavior, and relearns lost behavior in response to environmental demands and rehabilitation.¹⁴² Instructional practices

that enhance neuroplasticity include providing intensive, repetitive practice of functional targets with careful consideration of salience, potential for generalization, and personal factors.¹⁴³

At present, there are no empirically supported cognitive rehabilitation practices specific to c/mTBI. The cognitive rehabilitation practices described herein are based on the broader cognitive rehabilitation literature derived from research on individuals with moderate to severe TBI.

CLINICIAN TIP SHEET: PRINCIPLES OF COGNITIVE REHABILITATION

The following is a practice summary for cognitive rehabilitation.

- Positive expectations for recovery should be emphasized by providing education regarding the natural course of c/mTBI and using risk-communication strategies that highlight the patient's strengths and abilities and demonstrate the improvements that occur during the treatment course.¹⁴⁴
- During the intervention process, clinicians help patients better understand and manage the influence of various factors on their cognitive performance. The term "awareness" in this context refers to self-understanding; it does **not** describe impaired self-awareness that is associated with brain impairment found in moderate to severe TBI.
- Intervention programs should be based on results of thorough individualized assessments to identify cognitive strengths and weaknesses and changes in cognitive function following c/mTBI.^{126,143,144}
- Rehabilitation plans should be developed with consideration for the timeframe available, realistic discharge criteria, and skills and abilities that the patient brings to the rehabilitation process.
- Therapeutic intervention should focus on retraining previously learned skills, reinforcing strengths, teaching compensatory strategies, developing functional skills, modifying the environment, and increasing self-awareness to facilitate successful adaptation or adjustment.^{126,143}
- Rehabilitation of cognitive processes and functional skills should be combined to facilitate application of compensatory strategies to real-life situations.¹⁴⁵ Treatment should be embedded in meaningful contexts and individualized to fulfill the unique needs of each patient and ensure ecological validity and generalizability from controlled situations in therapy to natural environments in daily routines.^{127,143}

- Clinicians should be systematic in their treatment planning and should realize that every patient learns differently and requires individually tailored instructions or strategies.¹⁴⁶ Methods involved in selecting instructional targets and presenting and reinforcing target information can facilitate learning and directly influence learner outcomes.¹⁴³
- Group intervention should be considered throughout the rehabilitation process when appropriate and available.⁴
- Involvement of significant others is highly encouraged, and community activities and vocational trials should be incorporated when appropriate to promote generalization.^{4,127,129}
- Comorbidities should be addressed, as appropriate, to optimize recovery and rehabilitation.^{4,132,134}

COGNITIVE INTERVENTION TECHNIQUES TO PROMOTE PATIENT ENGAGEMENT, AWARENESS, AND LEARNING

Purpose/Background

Cognitive intervention after c/mTBI largely involves helping the patient understand his or her cognitive vulnerabilities, then learn and employ appropriate and effective strategies for managing information in everyday life. The extent to which patients actually learn new approaches and adhere to recommendations will be determined, in part, by clinicians' effectiveness as teachers and in engaging patients in the process of learning and behavior change. Intervention will be optimally effective if:

- patients decide to make changes, such as using a memory aid, because they believe that doing so will enable them to meet their own goals; and
- patients understand why a cognitive strategy is being recommended, how to use the strategy correctly, develop effective skills in employing the strategy, and have ample opportunity and reinforcement to repeatedly practice the new skill or strategy in the context of personally relevant, real-life tasks.

Strength of Recommendation: Practice Option

Use of motivational interviewing and experiential learning methods have not been empirically evaluated in patients who have c/mTBI. However, these methods are recommended by clinicians with expertise in cognitive rehabilitation after c/mTBI.

Intervention Methods (Select From the Following Options as Relevant to the Patient)

- Use motivational interviewing¹⁴⁷ so the patient assumes responsibility for the learning and change process. See the clinician tip sheet on motivational interviewing for information about how to use this technique to promote patient engagement in behavior change.
- Provide education about the role of self-awareness in the therapy process, using the awareness hierarchy proposed by Crosson and colleagues.¹⁴⁸ Awareness in this context refers to having an understanding of factors that influence cognitive performance (rather than awareness deficits associated with brain impairment in moderate or severe TBI; see Patient Handout: Change Begins with Awareness).
- Incorporate self-reflection into intervention when patients are practicing newly learned compensatory cognitive strategies (see Clinician Tip Sheet: AAA Self-Reflection).
- Employ training methods in therapy so the patient has both factual and experiential knowledge regarding when and how to use cognitive compensatory strategies (see Clinician Tip Sheet: Methods to Promote Compensatory Cognitive Strategy Learning).
- Help patients identify core cognitive compensatory strategies that improve performance in an array of everyday activities (see Clinician Tip Sheet: Core Cognitive Strategy Recommendations Grid).

CLINICIAN TIP SHEET: MOTIVATIONAL INTERVIEWING

Motivational interviewing refers to the therapeutic style of interacting with patients that has a clear goal of eliciting self-motivating statements and behavioral changes. The clinician provides noncon-

frontational feedback about the degree and type of inefficiency that has been noted from interview, structured assessment, and objective observation (Exhibit 7-16).

EXHIBIT 7-16

MOTIVATIONAL INTERVIEWING

Using motivational interviewing during therapy sessions enables the clinician to work **with** a patient rather than work **on** a patient. By guiding patients and helping them identify the areas they wish to change and the methods that work for them, the ideas become their own and change becomes more readily accepted.

Background

This approach was developed for individuals with chemical dependency issues. There is a complete guide available free of charge, Treatment Improvement Protocols #35 (order by calling the National Clearing House for Alcohol and Drug Information at 800-729-6686 or 301-468-2600).

The clinician who uses these techniques is able to:

- express empathy through reflective listening;
- communicate acceptance and respect for the patient's perspective;
- establish a nonjudgmental collaborative relationship;
- be a supportive and knowledgeable consultant;
- compliment rather than denigrate;
- listen rather than tell;
- gently persuade, understanding that change is up to the patient;
- provide support through the process of change;
- develop discrepancy between patient goals and values and current behavior;
- help patients recognize the discrepancy between current abilities and future goals;
- avoid arguments or direct confrontation;
- adjust to rather than oppose resistance; and
- support self-efficacy and focus on strengths and hope.

Six strategies that help achieve these goals include:

1. **Ask open-ended questions** (questions that cannot be answered with one word or single phrases). For example: "Tell me about some strategies you are currently using or have

tried in the past to help you deal with the memory changes you are describing," rather than: "Are you using a calendar system?"

2. **Listen reflectively.** Demonstrate that you have heard and understood the patient by reflecting what the patient said. For example: "It sounds like the calendar system you are using has helped you avoid missing appointments."
3. **Summarize.** It is useful to periodically summarize what has transpired up to a certain point in treatment. For example: "It sounds to me like your memory errors are really frustrating for you. It also sounds like you have found some ways to decrease that frustration by using your calendar."
4. **Affirm.** Support and comment on the patient's strengths, motivation, intentions, and progress. For example: "The self-discipline you are using to write up a plan each day in your calendar before you leave home is really going to serve you well as you continue to recover and adjust."
5. **Elicit self-motivational statements.** Have the patient voice personal concerns and intentions, rather than try to persuade the patient that change is necessary. For example:

Clinician: "Describe for me the biggest frustration or concern that you are encountering with your memory."

Patient: "I am often late for things because I look at my book in the morning but can lose track of time or forget about my afternoon appointments."

EXHIBIT 7-17

FRAMES ACRONYM FOR MOTIVATIONAL INTERVIEWING

Feedback: Reflect your observations of inefficiency in a respectful manner.

Responsibility: Place responsibility for change squarely on the patient. Help the patient identify areas for change and investigate the methods that could help with that process.

Advice: Give advice in a non-judgmental manner.

Menus: Provide self-directed change options.

Empathy: Show genuine warmth and respect for each patient.

Self-Efficacy: Help the patient develop optimistic empowerment.

I was never late before this injury.”

Clinician: “It sounds like being late for things is really frustrating for you.”

Patient: “It is embarrassing. It makes me look irresponsible.”

Clinician: “I can understand how looking irresponsible is frustrating.”

6. **Ask permission to share your observations and or ideas.** This simple step really creates trust and respect. For example:

“Are you interested in exploring some strategies that could help you manage time and avoid being late?” If the patient indicates that he or she is not interested in your ideas, you may need to move on to other areas of concern that are not as intimidating to the patient.

Use the **FRAMES** acronym to remember how to use motivational interviewing during all therapy assessment and intervention sessions (Exhibit 7-17).

CLINICIAN TIP SHEET: AAA SELF-REFLECTION FORM

Once the patient has identified compensatory cognitive strategies that appear workable, he or she practices using the strategies to perform clinic or real-life tasks. The patient uses the AAA worksheet to reflect on performance, which is the primary benefit of performing the practice tasks (see Patient Handout: AAA Self-Reflection).

“AAA” refers to the three parts of the worksheet:

1. **Anticipation.** The patient fills out the anticipation section **before** he or she performs the task. The patient is

asked to predict performance time, anticipate number of errors, and outline the strategies that he or she intends to use or practice.

2. **Action.** The patient fills out the action section **while** performing the task.
3. **Analysis.** The patient fills out the analysis section **after** performing the task. The patient compares predicted performance to actual performance and generates his or her own feedback, which is more potent than receiving feedback from others.

CLINICIAN TIP SHEET: METHODS TO PROMOTE COMPENSATORY COGNITIVE STRATEGY LEARNING

Background

To learn compensatory cognitive strategies and use them in everyday life, patients need ample opportunities for strategy practice and application. Rather than simply talking with patients about recommended strategies, clinicians should allocate over 60% of the patient’s learning and training time to actual practice using the newly learned strategy in the context of real-life tasks.¹⁴⁷ The learning process proceeds as follows:

1. The patient learns factual knowledge about the recommended compensatory cognitive strategy and how to use it (Table 7-1).
2. The patient gains experience using the compensatory cognitive strategy while receiving assistance to use it in increasingly complex and personally relevant activities within therapy sessions and as therapy homework (Exhibit 7-18).

CLINICIAN TIP SHEET: CORE COGNITIVE STRATEGY RECOMMENDATIONS GRID AND WORKING LOG

Purpose/Background

It is imperative that clinicians help patients develop habitual use of a select number of core strategies that can be employed in a variety of life areas, rather than a separate strategy for each unique situation or challenge. If the latter approach is used, the patient becomes overwhelmed and often does not use any compensatory strategies at all. There-

fore, developing an individualized core cognitive strategy recommendations grid is one central goal of a therapy episode of care (see Patient Handout: Core Cognitive Strategy Recommendations Grid). A core cognitive strategy recommendations grid is an individualized summary sheet that lists the primary cognitive compensatory strategies that the patient has selected and successfully employed to address his or her problems of greatest concern.

TABLE 7-1

USING DECLARATIVE AND PROCEDURAL KNOWLEDGE IN STRATEGY TRAINING

Type of Knowledge	Teaching Methods	Clinical Examples
Patient learns what to do via interactive discussions with the clinician (declarative knowledge)	Discussion, provision of written materials	Patient and clinician review a handout that describes various internal memory strategies. Patient and clinician discuss ways in which the patient could use an alarm watch for appointment reminders.
Patient learns how to do it via supervised practice (procedural knowledge)	Demonstration-return demonstration of strategy procedures	Patient practices using PQIRST (a memory strategy to recall reading material) during a therapy session. Patient practices setting alarm prompts on the alarm watch.

PQIRST: preview, question, read, summary, test

Developing a Core Cognitive Strategies Recommendations Grid

1. During the assessment process, the patient identifies his or her most concerning areas of functioning; the clinician and patient jointly determine which problem area to tackle first in therapy. The top areas of concern are listed in the “problem area” column of the working log (see Patient Handout: Working Log).
2. The clinician keeps track of the specific compensatory strategies that the patient employs to address the problem areas he or she has identified. Additionally, the clinician indicates whether or not, once employed, the strategy effectively helped improve the patient’s performance. The recommended strategy is listed adjoining the related problem area. Once the patient has actually used the strategy (either in the clinical or home setting), its effectiveness is rated. Less-than-optimal strategies are refined, logged, and again evaluated for effectiveness.
3. The clinician refers to the lists of compensatory cognitive strategies described in the Attention, Memory, and Executive Function sections of the Toolkit for ideas about what to recommend to the patient.
4. The clinician will initially use the working log to track the areas addressed in treatment and the strategies being considered.
5. Over the episode of care, patterns of key compensatory cognitive strategies (core strategies) will be evident; these are the strategies that the patient has successfully employed to improve performance associated with a number of problem areas.

EXHIBIT 7-18

USING CONTEXTUAL KNOWLEDGE IN STRATEGY TRAINING

Type of Knowledge	Teaching Method	Clinical Examples
Patient learns when to use the strategy in real-life situations (contextual knowledge)	Strategy refinement and practice in the context of work simulations, personally relevant tasks	• Patient uses the PQIRST every day when reading the newspaper. • Patient sets up alarm prompts on an alarm watch specific to his/her medication regimen. • Patient practices using note-taking strategies to learn a new task at work.

PQIRST: preview, question, read, summary, test

6. As the therapy midpoint approaches, the patient and clinician collaborate to create the core cognitive strategy recommendations grid. The grid is finalized at discharge from therapy.

Benefits of the Core Strategies Grid

The process of developing a core strategies grid advances patient ownership of the strategies during treatment and at the discharge session. For successful use after intervention, it is very important that patients take the thinking options and strategies that have been covered in treatment and make them their own. The working log can be completed at multiple junctures in treatment to reinforce the importance of these strategies; the core recommendations form should be assembled with the patient at his or her last session.

Patients can refer to the grid when they need to get back on track. It is not uncommon for patients to quit using strategies when their lives become easier to manage. However, at times when personal factors are no longer being managed and a patient's situational demands have changed, he or she may need to review the list and reestablish strategy use. Sometimes previous strategies may not be adequate due to promotion or family changes, and the patient can be counseled to come back for another episode of care.

If patients return for follow-up care, the grid helps remind clinicians of what was effective for specific individuals. If patients contact the clinician with questions or are scheduled to come back for a follow-up session, the grid is an excellent tool to determine what strategies should be reemployed and what areas need further exploration. This tool can result in more effective follow-ups.

COGNITION EDUCATION

Purpose/Background

Experts recommend the provision of verbal and written educational information about c/mTBI symptoms (eg, headache, difficulties with memory or attention) as well as reassurance that these are likely to recover over a period of weeks or a few months.^{149–151} As people are helped to understand their symptoms, they are less likely to overreact to them or misattribute them to significant brain damage.¹⁵¹ By explaining normal cognition and the impact of c/mTBI on cognition, clinicians help patients understand why errors occur and thus help them avoid declines in self-efficacy that can be caused by misattributing errors to significant brain damage. Also, postconcussion syndrome may be averted or ameliorated because people with c/mTBI learn to appreciate how personal and situational factors may interact with typically transient symptoms of brain injury¹⁵² and implement cognitive compensatory strategies that optimize effectiveness.

As well, information provided to the individual's support system (eg, spouse, family members, friends) is a critical aspect of intervention.¹⁵³ Although some patients may respond to self-guided education and access to the correct information about c/mTBI recovery, others will require a structured educational program that is clinician-guided and individualized, particularly those patients with prolonged exposure to untreated cognitive and emotional symptoms.

Intervention will be optimally effective in this realm if education efforts involve a two-way

discussion rather than a formal lecture and topics are discussed if and when relevant to patients. Components of a structured patient education program about c/mTBI and its effect on cognition include discussion of:

- common specific and nonspecific symptoms and potential effects on social, work, school, and family interactions;
- common comorbidities and related disorders, such as anxiety, pain, PTSD, sleep difficulties, and depression;
- the overlap in symptoms between c/mTBI and other problems (eg, irritability, anxiety, attention deficit disorder, sleep disturbances); and
- the normal recovery pattern from c/mTBI and the expectation of full recovery within 3 months for most individuals.^{150,151}

Strength of Recommendation: Practice Standard

Although there is no specific protocol for cognition education that has been studied empirically, the practice of providing education after c/mTBI is supported by evidence.^{150,151,154}

Intervention Methods

- Provide information about c/mTBI educational resources, including websites.
- Provide education regarding human

information processing (see Clinician Tip Sheet: How to Explain Human Information Processing).

- Provide information about the multifactor model to explain performance declines after c/mTBI (see clinician tip sheet and related patient handout).

Educational Resources

Recognized and reputable websites should be provided to direct the patient to accurate information about c/mTBI. Appropriate resources can guide the individual away from inaccurate or alarming information about moderate to severe TBI, and can provide an excellent framework for education, access to interactive brain anatomy videos, and additional handouts and personal success stories that reinforce the expectation of recovery.

Support and educational groups developed specifically for those recovering from c/mTBI can also provide an excellent setting for education in a peer-supported environment. These groups may help remove the focus on self and the individual experience of impairments while reinforcing the concepts of normalization and that “you are not alone.”

National Resources

- Department of Veterans Affairs/Department of Defense Evidence-Based Guideline: Evaluation and Management of Concussion/mTBI—Subacute/Chronic: http://www.healthquality.va.gov/mtbi/concussion_mtbi_full_1_0.pdf
- DCoE Summary Fact Sheets: <http://www.dcoe.health.mil/ForHealthPros.aspx>.

- Defense and Veterans Brain Injury Center patient education materials, which include topics such as mood changes, headache management, healthy sleep, improving memory, c/mTBI information at the time of injury (acute), c/mTBI information for use more than 1 month after injury or at postdeployment health assessment (not for acute period concussion), 10 ways to improve your memory, TBI and mood changes, rehabilitation for healthy sleep, headache and neck pain, and head injury and dizziness: www.dvbic.org.
- Brain Injury Association: www.biausa.org.
- American Veterans With Brain Injury: www.avbi.org.
- Department of Veterans Affairs, National Center for PTSD: www.ptsd.va.gov.
- The Journey Home—the CEMM Traumatic Brain Injury website: www.traumaticbraininjuryatoz.org.
- Rehabilitation and Reintegration Division, Office of the Surgeon General, US Army: www.armymedicine.army.mil/prr/edtraining.html.
- Michigan TBI Services and Prevention Council: www.michigan.gov/documents/mdch/TBI_Recovery_Guide_10.8.08_252053_7.pdf.

Local Resources

Local resources include area support groups and organizations. The National Brain Injury Association website provides links to local resources by state. Regional, state, and city-specific organizations and healthcare facilities may provide additional information regarding available local resources.

CLINICIAN TIP SHEET: HOW TO EXPLAIN HUMAN INFORMATION PROCESSING

Purpose/Description

This information helps the patient understand normal cognition and how cognitive compensatory strategies may improve performance after c/mTBI (see Patient Handout: How to Explain Human Information Processing). Although some aspects of how people remember new information remain unknown, it is generally believed to be a multistage process referred to as “human information processing.” One explanation as to how this takes place is based on the work of Atkinson and Shiffrin.¹⁵⁵

Human information processing is thought to

involve three components: (1) short-term sensory register, (2) short-term (working) memory, and (3) long-term memory. Information from the environment comes into the human information processing system through the senses (seeing, hearing, smelling, etc). Sensory data are held briefly in a series of short-term registers associated with the sensory systems involved in the incoming information. Short-term sensory registers have a large capacity; data are automatically advanced to short-term memory storage after a few seconds without any effort or awareness on our part. It is important to note that people’s ability to remember information

is in part based on accurate information coming in through the senses; therefore, people can optimize memory performance by wearing glasses or using hearing aids, if needed.

From the sensory registers, data are held in short-term memory, which is sometimes referred to as “working memory.” This component is associated with concentration, paying attention, and conscious mental effort. Whereas the short-term sensory registers can hold large amounts of data, people can concentrate on or pay attention to only a finite number of things at once; on average and under normal circumstances, people can simultaneously pay attention to between five and nine things at a conscious or semiconscious level (imagine pots on stovetop burners; see handout).¹⁵⁶ To remember new input (ie, get it stored in long-term memory), a person needs to consciously “simmer” or attend to the idea, name, or action item for 15 to 30 seconds. If that does not occur or if all the available “burners” are full with other thoughts, the input falls out of the system and is not stored in long-term memory.

To remember new information, a person has to be awake, alert, and ready to pay attention. Therefore, patients can optimize their memory by managing sleep, fatigue, and pain; avoiding alcohol; and working with their doctor to optimize medications. Additionally, for an individual to remember new or incoming information, he or she must focus attention on the thought for approximately half a minute for it to “stick” (ie, be encoded and move from working memory to long-term memory for storage and retrieval).

People may use internal memory strategies to help them actively encode the new, incoming information. Anything that a person is paying attention to (pain, distractions in the environment, worries, intrusive thoughts, hypervigilance) takes up space in working memory. If people have a lot on their minds, they will be vulnerable to forgetting new, incoming information. Most memory failures or inefficiencies (such as forgetting appointments, forgetting things to do, coming into a room and forgetting why, forgetting what was said in a conversation) can be explained by problems associated with working memory; that is, people do not pay attention long enough for the information to get stored in long-term memory.

Most experts believe all the information we have learned is stored in our long-term memory. This includes something as recent as the name of a

person you just met to the name of your third grade teacher. Long-term memory storage has an infinite capacity and stores newly learned information (ie, what we learned moments ago) as well as what we learned in the distant past. Information is thought to be stored in related groups that are linked in a network to other groups of information.

Here’s a snapshot of how working memory and long-term memory work together. Imagine you are fixing a leaky pipe at home. As you are planning your approach, you think about how you handled the problem the last time. In doing so, working memory sends a request to long-term memory, which kick-starts a search process to locate the needed information. Once found, long-term memory storage sends the information to working memory, where it takes space on a “burner” as you think about it and plan your next steps. Most people with c/mTBI do not have difficulty with long-term memory; once the information is stored, they are able to retrieve it as well as everybody else.

Many people use external memory aids, such as planners or smartphones, to help them manage information. Doing so allows them to offload incoming information from working memory (including appointments, chores, and errands), remain confident that they have a back-up, and keep limited-capacity working memory resources available for attending to other incoming information or to the task at hand.

Implications for Concussion/Mild Traumatic Brain Injury

After c/mTBI, people may have a variety of distracting physical symptoms (eg, dizziness, headache, musculoskeletal pain, hearing and visual problems). These distractions take up space in the thinking process, using up some of their five to nine “burners.” As a result, people with c/mTBI have difficulty remembering information, concentrating, and even problem solving. Stress and worry can have the same effect, taking up mental space that could otherwise be used in the process of remembering information.

Compensatory strategies, like writing things down or placing the information in an electronic device (eg, smartphone) can help patients keep track of necessary information if the burners are full of symptom-related distractions or worries and remain in control of their lives.

IMPROVING ATTENTION AND SPEED OF PROCESSING

Purpose/Background

After c/mTBI, many patients describe difficulty paying attention during tasks and handling all of the distracters in the environment. Many patients also complain of difficulty dividing their attention between tasks. Attention problems may be in part due to slowed information processing speed associated with diffuse axonal injury.^{157,158} Sohlberg and Mateer's¹⁵⁹ model of attention includes a hierarchy of subsystems, with divided attention requiring the most mental effort. The integrity of each attention component is dependent on the integrity of those below it. The attention hierarchy is as follows:

- **Divided:** the ability to respond concurrently to multiple tasks or demands.
- **Alternating:** the capacity for mental flexibility to shift attention focus and move between tasks with different cognitive requirements.
- **Selective:** the ability to maintain a behavioral or cognitive set in the context of distracting or competing stimuli.
- **Sustained:** the ability to maintain a consistent response during a continuous and repetitive activity.
- **Focused:** the ability to respond to specific stimuli (auditory, visual, or tactile).

Speed of information processing is the ability to perceive, attend to, organize, analyze, integrate, retain, and apply information in an efficient manner. Slowing of information processing capacity has been shown to have a major impact on various attentional and linguistic processes, such as encoding, verbal comprehension, and adaptive responding to novel situations.¹⁶⁰ The overarching goal of intervention specific to attention and speed of processing is to help patients become more aware of their attentional and processing skills and expand the repertoire of strategies available to manage personal and situational factors. Intervention in this realm takes the patient through the "TEST" process:

- **Thinking options.** Clinicians provide patient education regarding the hierarchy of attentional skills and the impact of personal and situational factors. This information helps patients understand and reframe attention and problems related to speed-of-processing performance and identify options to better manage demands.

- **Experiencing attention demands.** After providing education about the attention hierarchy and the influence of personal and situational factors, clinicians structure activities in which the patients can experience increasing attentional demands. Experiencing the demands of each level of the hierarchy with clinician feedback helps patients make a personal connection to the education.
- **Strategy choice.** Once areas of inefficiency are observed (via assessment or structured attentional tasks), the clinician helps patients choose individual strategies that will optimize their ability to manage attentional and speed-of-processing demands.
- **Transferring strategy use to the real world.** Through a combination of clinical tasks and real-world experiences, the clinician helps patients develop habitual use of the strategies they have learned.

Strength of Recommendation: Practice Standard

Evidence-based reviews conducted by the Brain Injury Interdisciplinary Special Interest Group of the American Congress of Rehabilitation Medicine recommends attention treatment with direct and metacognitive training to promote compensatory strategy development and foster generalization to real-world tasks during the post-acute recovery from mild or moderate TBI. Repeated use of computer-based tasks without intervention by a clinician is not recommended.¹³⁰

Intervention Methods

- Provide patient education regarding attention (see Patient Handout: Understanding Hierarchy of Attention Levels). Help the patient describe his or her cognitive difficulties and realize related demands (see Clinician Tip Sheet: Inventory of Attention/Speed-of-Processing Difficulties).
- Help the patient experience and assess performance associated with various levels of attentional demand (see Clinician Tip Sheet: Experiencing Attention Levels).
- Help the patient identify strategies that pertain to his or her key tasks and preferences (see Clinician Tip Sheet: Menu of Strategies to Cope With Attention and Speed-of-Processing Difficulties).
- Create opportunities for the patient to practice strategies and employ training methods in therapy.

CLINICIAN TIP SHEET: INVENTORY OF ATTENTION/SPEED-OF-PROCESSING DIFFICULTIES**Purpose/Description**

- Provides a structured and systematic method for gathering information concerning the patient's cognitive difficulties and related demands to gain an understanding of his or her needs, challenges, and awareness of personal and situational factors (see Patient Handout: Inventory of Attention/Speed of Processing Difficulties).
- Records baseline data to develop functional goals and assess patient's progress.
- Serves as a reference for metacognitive strategy training. Clinician guides discussion to help the patient identify personal and situational factors that can increase or decrease challenges to attention and speed of processing.

Protocol

- Review Patient Handout: Change Begins with Awareness. Have the patient fill out the worksheet considering the following information (assist patient as needed).

- Use motivational interviewing during a guided discussion to help the patient focus on the symptoms and problems, and describe his or her difficulties in specific settings, such as home, work, or school.
- Probe for information, particularly factors that can enhance or interfere with performance, for example:
 - task length;
 - other tasks involved that require shifting or sharing attention;
 - personal factors, such as energy level, stress, mood, comfort, interest, intrusive thoughts, and vigilance;
 - environmental factors (ie, noise, lighting, crowds);
 - rate of incoming information and urgency to process and respond to information (for example, the patient may judge self-paced reading as slow or average, or note-taking in a college course as fast); and
 - strategies that the patient may already be using to cope with difficulties.

CLINICIAN TIP SHEET: EXPERIENCING ATTENTION LEVELS**Purpose/Description**

The experiential attention activities are designed to help patients understand firsthand the hierarchical levels of attention. Use the following:

- Patient Handout: Experiencing Attention Levels—Focused and Sustained
- Patient Handout: Experiencing Attention Levels—Selective Attention (Visual and Auditory)
- Patient Handout: Experiencing Attention Levels—Alternating and Divided

This knowledge is geared toward helping patients identify compensatory strategies that optimize their ability to manage various attentional demands and to help them appreciate the importance of managing personal and situational factors.

The attentional activities also provide the clinician with opportunities to observe how the patient manages different levels of attention-based demands, including the following:

- The extent to which the patient modified his or her speed of work to assure accuracy based on the attentional demands of the task.
- The extent to which the patient organized his or her approach to the task, especially those tasks that require systematic scanning.
- The extent to which the patient appeared to employ strategies to optimize his or her ability to attend to the task.

Instructions to Give Patients

- Remind patients that part of your job is to help them increase their awareness, not only of their skill level but of how that interacts with their management of factors that affect their attention (such as fatigue, pain, stress, and negative thoughts).
- Ask permission to share your observations of their performance on the tasks.

Using the Hierarchical Attention Tasks

- Each attention level has an experiential component.
- All the tasks contain self-prediction and self-reflection questions; each takes between 5 to 15 minutes to complete.
- For the patient to experience all attention

levels, you will need the patient worksheet, a radio, a deck of cards, and a pen.

These activities offer the most potential benefit when combined with clinician observation and reflective postperformance dialogue between clinician and patient. However, the activities could be assigned as homework, with patient-therapist reflection on performance at a subsequent session.

CLINICIAN TIP SHEET: OVERVIEW OF STRATEGIES TO COPE WITH ATTENTION AND SPEED-OF-PROCESSING DIFFICULTIES

Purpose/Description

The primary aim of therapy is to help patients identify and implement strategies that relate to areas of weakness, capitalize on preferences and strengths, and are efficient and effective in real-life contexts (eg, environment, people, situations). The strategies presented in this section serve as a springboard and guide for selecting, modifying, and adding strategies to suit patients' individual needs. The strategies include the following:

- optimizing personal factors,
- managing high- and low-demand tasks,
- effectively allocating cognitive resources,
- managing interruptions and multiple tasks, and
- providing strategies for using auditory and visual systems.

Optimizing Personal Factors

Personal factors that may contribute to cognitive performance are identified during review of patient's medical and social history, observed during experiential tasks, or reported by the patient. Help the patient learn to manage these factors to optimize function (see Patient Handout: Understanding the Multifactor Model of Functioning After Concussion). Patients should be advised to talk to their physicians about persistent problems with pain, energy, or sleep and work with a psychologist or psychiatrist to manage stress and negative thoughts. Patients should check with their physicians or psychiatrists regarding current medications that may be sedating. While it may not be possible to substitute or avoid sedating medications, discussing their effects with the patient can reduce misattribution of cognitive symptoms to c/mTBI. Refer to *Co-occurring Conditions Toolkit: Mild Traumatic Brain Injury and Psychological Health*, available from the DCoE website, for a list of medications and their

effects.¹⁶¹ Clinical experience in treating patients suggests that a comprehensive, holistic approach that integrates treatment of cognitive, emotional, and interpersonal skills is a best-practice model for the rehabilitation of c/mTBI sequelae.

Managing High- and Low-Demand Tasks

Patients will be most successful at managing attention limitations if they can decide which tasks to perform at any given time, based on the demands of the environment and circumstances (see Clinician Tip Sheet: Strategies to Improve Attention).

Effectively Allocating Cognitive Resources

Many theories support the notion that attention is a limited resource.^{162,163} One relatively simple strategy is to eliminate or reduce demands that compete for attentional resources and compromise goal-oriented behaviors (see Patient Handout: Modifying Your Approach and Work Space).

Select a task identified by the patient as difficult on the Inventory of Attention and Speed-of-Processing Difficulties handout. Engage the patient in guided discussion and metacognitive training to select appropriate strategies that:

- relate to specific weakness. The patient's postperformance reflections on the Experiencing Attention Levels handout and activities may be used to steer the patient in strategy selection based on demands that be counterproductive.
- can be realistically eliminated or reduced in real-life settings.

Managing Interruptions and Multiple Tasks

Refer to Patient Handout: Strategies to Improve Attention—Managing Interruptions and Multiple Tasks.

Providing Strategies for Using Auditory and Visual Systems

Intervention should focus on reducing the presence of functional limitations caused by difficulties with informational processing to reduce

the severity and duration of the symptom as well as any associated anxiety (see the handouts *Coping with Slower Speed of Processing–Using the Auditory System*, and *Coping with Slower Speed of Processing–Using the Visual System*).

CLINICIAN TIP SHEET: STRATEGIES TO IMPROVE ATTENTION–IDENTIFYING HIGH- AND LOW-DEMAND TASKS

Purpose/Description

Patients will be most successful at managing attention limitations if they can decide which tasks to perform at any given time, based on the demands of the environment and circumstances. The associated *Strategies to Improve Attention–Identifying High- and Low-Demand Tasks*, is designed to help patients analyze their everyday tasks and their own abilities to identify high- and low-demand tasks.

Step 1: Task Analysis

Patient lists the key tasks for which he or she is responsible. The patient then rates the consequence level of these tasks.

Step 2: Self-Analysis

Patient rates how easy or difficult these tasks are to perform at present. Tasks may be deemed difficult because of a cognitive or physical challenge.

Step 3: Identifying High- and Low-Demand Tasks

Patient reviews his or her self-ratings and lists those tasks that are rated as high consequence and difficult (high-demand tasks) and those that are low consequence and easy (low-demand tasks).

The clinician's job is to help patients understand that they can enhance their skill level and productivity by choosing the time of day, environments, and tasks they are engaging in. This strategy improves consistency of performance and, therefore, self-confidence.

High-demand tasks:

- should be performed at the patient's best time of day,
- should be performed in the quietest possible environment possible, and
- should be performed when there will be minimal interruption (eg, completing financial reports at work before others arrive or setting up medication boxes for the week when rested and while family members are in another room).

Low-demand tasks:

- may be performed when the patient is fatigued,
- may be performed when the patient is not able to control the environment, and
- may be performed when the patient anticipates lots of interruptions (eg, folding laundry while watching television; sorting and recycling papers, cans, bottles; shoveling, weeding, sweeping; performing aerobic exercises, like walking or jogging; and vacuuming or loading the dishwasher).

CLINICIAN TIP SHEET: MENU OF STRATEGIES BASED ON ATTENTION HIERARCHY

The primary aim of therapy is to help the patient identify and implement three to five attentional strategies that match his or her problematic tasks and prefer-

ences. Using the patient handouts and Table 7-2, the clinician guides the patient toward the specific strategies that hold the most promise in improving performance.

CLINICIAN TIP SHEET: PRACTICE TASKS FOR ATTENTION STRATEGY REHEARSAL AND TRANSFER

Purpose/Background

Once patients understand the factors that influence their attentional abilities and have identified

cognitive compensatory strategies, they need to practice preferred compensatory cognitive strategies in the context of clinic and real-life tasks. As discussed earlier, simply talking about a potentially

TABLE 7-2

POSSIBLE STRATEGIES BASED ON PATIENTS' VULNERABILITIES ASSOCIATED WITH SPECIFIC LEVELS OF ATTENTION

Level of Attention	Strategy Options
Focused attention	Check with physician or psychologist on current medications, and: • avoid sedating medications, • consider stimulants such as coffee, colas, or tea, if not contraindicated. Take frequent breaks. Schedule higher consequence tasks when most alert. Use external cues to stay on task, such as: • alarms on cell phones or other devices to initiate a task, and • timers set for certain durations to stay on task. Use pause cues.
Sustained attention	Take frequent breaks. Schedule higher consequence tasks when most alert. Use external cues to stay on task, such as: • alarms on cell phones or other devices to initiate a task, and • timers set for certain durations to stay on task. Use pause cues. Allow extra time for tasks.
Selective attention	Control environmental distractions when able; for example: • run errands or tend to social activities at nonpeak hours, • choose to sit in an area with the least number of distractions (corner booth by the wall, etc), • use a personal music player to cancel out background noises, when appropriate. Rest prior to demanding situations. Take frequent breaks. Politely ask others not to visit with you while you are working.
Alternating attention	Control environmental distractions. Take frequent breaks. Use stop notes, including: • cues in your environment that show you where you left off, and • notes that indicate what you did last and what your next thought or action was or would be. Alternate attention between tasks that are high-consequence or difficult and those that are not. Allow phone calls to go to voicemail and address them later. Do not answer people until you have reached a stop point in your work. Politely ask others not to visit with you while you are working. Rest prior to demanding situations. Take frequent breaks. Use alarms to decrease the need to watch the clock.
Divided attention	Do not divide attention on high consequence and difficult tasks. Limit divided attention on high consequence tasks that are easy. Do not talk on a cell phone while driving. Limit conversation while driving. Take frequent breaks. Rest prior to situations that require divided attention. Use alarms to decrease the need to watch the clock.

TABLE 7-3
EXAMPLES OF ATTENTION-RELATED PRACTICE TASKS

Tasks	Description	Vendor/Location
Games for the Brain	Free website that includes 20 games that place various demands on attention.	http://www.gamesforthebrain.com/
Captain's Log	Commercial product that includes 50 multilevel programs and provides more than 2,000 hours of game-like activities.	http://www.braintrain.com/home_users/homeusershome.htm
Mavis Beacon	Software tool that teaches typing skills. It allows the user to build custom lessons, play special typing games, and check the ergonomics.	http://download.cnet.com/Mavis-Beacon-Teaches-Typing-17-Deluxe/3000-2051_4-10441764.html
Brain Bashers	Free website with a collection of brainteasers, puzzles, riddles, games, and optical illusions. BrainBashers is updated with optical illusions and games regularly and has five new puzzles added every other week.	http://www.brainbashers.com/
Freotypinggame.net	30 different typing lessons progressively teach the keyboard. Printable certificates provided on completion. The tests and games have 40 lessons; 10 are based on classic stories to make the typing test more natural. Timed tests of different lengths are available.	http://www.freotypinggame.net/
Technology Tasks	Description	Vendor/Location
Dynavision	Light-training reaction device, developed to train sensory motor integration through the visual system. Challenges individual's ability to take in visual stimuli, process the information, then react to it with a motor response. Originally designed for high-performance athletics and police-military training, it has been used as a rehabilitation training tool for head injuries, visual field deficits, post-stroke recovery, and driver training.	http://www.dynavisiond2.com
Pencil-Paper Tasks	Description	Vendor/Location
Attention-processing training	This comprehensive program helps retrain attention and concentration deficits in adolescents and adults with brain injury. Treatment materials and tasks address five levels of the attention process. Hierarchically organized auditory and visual tasks. Appropriate for patients with attention deficits from mild to severe.	http://www.pearsonassessments.com/HAIWEB/Cultures/en-us/Productdetail
APT-II (also APT-III)	A library of auditory attention compact discs and attention exercises	http://www.pearsonassessments.com/HAIWEB/Cultures/en-us/Productdetail
Brainwave-R	BrainwaveR is a comprehensive pen-and-paper-based cognitive rehabilitation program that is divided into five hierarchically graded modules: attention, visual processing, memory, information processing, and executive functions. The program comprises three components:	http://www.braintreemanagement.co.uk/braintreetraining/bwr.htm

(Table 7-3 continues)

Table 7-3 *continued*

- 1) education—an overview of current theories relevant to rehabilitation that is designed to be used by the clinician with the client and family to ensure good awareness and understanding of the problem area;
 - 2) clinician instructions—rating scales, clinical guidelines, suggestions for how to involve the family, a performance summary chart, and questions to encourage the client to determine the functional relevance of each exercise; and
 - 3) client exercises.
-

useful strategy does little to improve functioning. Patients need many opportunities for practice during clinic sessions and as part of their therapy homework.

How to Use Attention-Strategy Practice Tasks in Therapy

Use the Patient Handout: AAA Self-Reflection Worksheet for Attention and Speed of Processing.

1. Patient and clinician select a functional, meaningful task based on the attention and speed-of-processing strategies that the patient needs to practice.
2. Anticipation
 - Before the task, the patient completes the “Anticipation” section.
 - The patient is asked to expressly predict performance time, anticipate accuracy, and outline the strategies that he or she intends to use or practice.
3. Action
 - During the activity, the patient fills out the “Action” section.
 - Patient performs the assigned task and self-monitors performance.
 - Clinician observes and assesses performance to provide feedback.
4. Analysis
 - After the activity, the patient fills out the “Analysis” section.
 - The patient and clinician compare predicted performance to actual performance. Through guided discussion, the patient generates his or her own feedback to reinforce strengths and successes and for problem-solving to improve performance, as needed.

Repeat this procedure for other tasks and in different settings to facilitate and assess transfer to everyday and novel activities. Remember that any task can be structured to require attention-strategy practice (Table 7-3); it is the patient’s self-reflections and the clinician’s guidance and observations that make the task therapeutic. A clinician selects and sets up a practice task to observe all or some of the following:

- How long can the patient sustain his or her attention?
- Does the patient self-initiate breaks?
- Does the patient handle the distracters in the work area?
- Does the patient initiate changing the environmental distracters?
- If the clinician creates interruptions, can the patient manage alternating attention?
- If the clinician creates interruptions, does the patient initiate strategy use?
- If the task requires divided attention, does the patient initiate a strategy to optimize performance?
- How well does the patient use strategies to modify or compensate for slowed speed of processing to optimize accuracy?

Also consider the following activities of daily living (ADLs) and instrumental activities of daily living tasks (IADLs) as practice:

- checkbook (create a checklist of steps),
- medication set-up (creating a grid with name, dosage, description of appearance, reason taken),
- household assembly tasks, and
- driving simulator.

COMPENSATING FOR MEMORY INEFFICIENCIES

Purpose/Background

Decline in memory function is common after c/mTBI and is also associated with postcombat mental health conditions.^{164,165} Some people describe decrements in their memory and information processing speed for 3 months or more after c/mTBI.¹⁶⁵ These cognitive symptoms may in part be explained by the brain's limited processing capacity as a person attempts to manage distractions associated with symptom management.¹⁵¹ Furthermore, multiple concussions can prolong cognitive problems.¹⁶⁶ Before providing intervention for c/mTBI-related memory concerns, clinicians must be well versed in key concepts and terms.

A simple definition for memory is "the ability to take in, store, and retrieve information."^{167(p1)} Memory is a complex process that involves perception and attention as well as multiple memory subsystems.¹⁴³

- **Short-term memory** allows people to hold a limited amount of information for a brief length of time. The average person can hold approximately five to seven items in short-term memory in the absence of distractions or interruption.^{143,162}
- **Working memory** is similar to short-term memory and allows people to hold information in conscious thought and manipulate that information for storage or retrieval (eg, planning, organizing, sequencing). Working memory provides the mental workspace for temporarily holding onto information while applying strategies during complex activities, such as learning, reasoning, comprehension, and metacognition (ie, reflecting on one's own thinking and making adjustments in the process).
- **Long-term memory** allows people to hold information in a permanent store (ie, minutes to years after initial exposure) and has an unlimited capacity.^{143,162} Long-term memory is a more durable system and is typically intact after concussion; however, people with concussion that have problems with short-term memory have difficulty holding information in mind long enough to prepare it for storage into long-term memory.¹⁴³ Long-term memory can be divided into two components that differ with regard to types of information stored

and how that information is learned and retrieved: declarative and nondeclarative memory.^{143,162}

1. **Declarative memory** encompasses a knowledge base of information and implies conscious awareness and the ability to report something explicitly. It includes two subsystems: episodic and semantic memory. *Episodic memory* is comprised of a person's autobiographical memory or the recall of personal experiences associated with events (eg, birth of a child, wedding anniversary, college graduation). *Semantic memory* is comprised of a person's mental encyclopedia or knowledge base (eg, word meanings, classes of information, facts, ideas). Episodic memory and semantic memory are interdependent when learning and recalling information.¹⁶⁸
 2. **Nondeclarative memory** encompasses the "learning how" portion of skills and is context dependent. It reflects implicit learning through repeated stimulus-response associations and allows a person to learn without having conscious awareness of learning. Nondeclarative memory includes subsystems such as priming and procedural learning. *Priming* refers to the increased probability of producing a response because of previous exposure to or past experiences in producing the response. *Procedural learning* refers to the acquisition of perceptual motor skills or action patterns or sequences (eg, tying shoelaces, learning to program an appointment in an alarm watch).¹⁶⁸
- **Retrospective memory** refers to memory for the past, including past experiences, actions, and information that we have learned.
 - **Prospective memory** refers to memory for things we intend to do in the future, including remembering what we need to do, say to others, or learn.¹⁴³

Memory problems are inconvenient, and they may cause frustration and anxiety. They significantly affect independence, employment, and

education.¹⁴³ Patients may be unaware of the influence of situational factors on their memory and be unfamiliar with the compensatory strategies that might help.

The overarching goal of therapy specific to memory inefficiencies is to help patients expand their repertoire of strategies in this realm through the TEST process (see above, Cognitive Intervention: Improving Attention and Speed of Processing).

Strength of Recommendation: Practice Standard

Training in the use of memory compensation strategies as applied to real-life tasks is supported by empirical evidence.^{126,169} According to the DCoE expert panel, “efficacy has been demonstrated for memory training techniques derived from cognitive neuroscience,”^{4(p245)} particularly for patients with c/mTBI and mild memory impairment. Memory strategy training that assists patients in developing techniques to enhance registration and encoding of information and to improve memory retrieval has been shown to be successful. External memory aids in combination with strategy training resulted in improvement that extended into patients’ everyday memory function, while repetitive memory drills (eg, memorizing word lists, faces, designs without explicit strategy training) have been shown to have little or no efficacy.⁴

CLINICIAN TIP SHEET: INTERVENTION FOR MEMORY IMPAIRMENT

The goal of intervention is to decrease demand on impaired memory processes and improve memory function for everyday activities. The following are cognitive rehabilitation principles formulated by Sohlberg and Turkstra¹⁴³ applied to memory training:

- During the acquisition phase of training, stimuli and contexts should be as similar as possible to the new behavior, strategy, or task that is being established.
- Do not overload the client with multiple target strategies when initiating training.
- Provide the client with multiple practice sessions with a high number of repetitions of practice trials of a new strategy.
- After initial acquisition, target memory strategies should be practiced with distracters similar to those found in the client’s real-life situation.
- Use distributed practice by gradually

Intervention Methods

Provide patient education regarding human information processing (see Education about Cognition section of the Toolkit).

- Help the patient identify strategies that pertain to his or her key tasks and his or her preferences (see Patient Handout: Compensatory Memory Strategies: Internal and External Options).
- Establish goals and methods for learning new memory strategies (see Clinician Tip sheets: Intervention for Memory Impairment and Training Hierarchy for Memory Strategies, and Defense and Veterans Brain Injury Center Handout, “10 Ways to Improve Your Memory”).
- Help patients establish daily and weekly routines for using memory aids (see Patient Handout: Daily and Weekly Planning).
- Help patients keep track of what they read (see Patient Handout: Intentional Reading).
- Create opportunities for the patient to practice strategies in clinic sessions and as homework (see Defense and Veterans Brain Injury Center handout, “10 Ways to Improve Your Memory,” and Clinician Tip Sheet: Practice Tasks for Memory Strategy Rehearsal and Transfer).

lengthening time between probes for new memory strategies.

- Take data to determine the response to intervention and periodically question the client to determine if memory strategies are consistently used in “real-life” situations over time. The client should keep data on the number of times and situations when he or she remembered or forgot to use memory strategies.
- The clinician should help the client develop metacognitive strategies by encouraging self-monitoring and reflection about performance of memory strategies.

Instructional practices that have been experimentally validated and are key to promoting learning for individuals with memory impairments include¹⁴⁶:

- Provide a clear delineation of targets and

employ task analyses when training multistep procedures.

- Constrain errors and control output while the patient is acquiring new information and procedures.
- Provide sufficient and distributed practice with multiple exemplars and ecologically valid targets.
- Use strategies, such as verbal elaboration and visual imagery, to support more effortful processing.

Structuring or modifying the individual's environment and generating management strategies can be helpful in reducing the load on attention, memory, and organizational abilities. Strategies include¹⁵⁹:

- organizing and labeling storage cabinets,
- setting up filing systems,
- creating message centers,
- establishing bill payment systems,
- reducing clutter,
- eliminating distractions, and
- posting signs to inform others in the environment about management strategies.

CLINICIAN TIP SHEET: TRAINING HIERARCHY FOR MEMORY STRATEGIES

Learning to use a memory aid (whether low-tech, such as a day planner, or high-tech, such as a personal digital assistant) involves three aspects of training or learning³⁷:

- acquisition: learning the skills necessary for using the memory aid (adding appointments, setting alarms, note-taking techniques);

- application: using these skills to perform clinical or practice tasks; and
- adaptation: using skills to perform personally relevant home, work, and community tasks.

These three aspects of learning should be considered in guiding the patient towards his or her ultimate objectives of memory aid use (Tables 7-4 and 7-5).⁹

CLINICIAN TIP SHEET: ELECTRONIC MEMORY AND ORGANIZATION AIDS

Smartphone and Mobile Applications

The use of assistive technology is recommended to compensate for cognitive deficits, including problems with attention, memory, and executive functions that may be associated with c/mTBI and related comorbidities. Smartphones and tablet computers are replacing the calendar and notebook to enhance organizational skills and provide reminders for things such as important events, appointments, tasks, and medications for persons with cognitive impairments. These types of devices are relatively low cost and they are considered fashionable and do not carry a stigma or association with disability, potentially improving compliance for use as a compensatory cognitive aid.

SMs with more moderate to severe memory and cognitive difficulties as well as those with mild deficits and significant comorbid physical deficits that limit dexterity may require a full needs assessment prior to the recommendation for use of a specific assistive technology device. Clinicians are referred to Sohlberg and Turkstra¹⁴³ or to Brainline.org¹⁷⁰ for further information on

assessment and evaluation of assistive technology in SMs with more complex conditions.

Assessment should include a systematic process that matches an individual's ability and current and future needs with available devices and strategies.¹⁷¹ Aspects of current and expected cognitive functioning, and the settings in which the device will assist the individual now and in the future, should be assessed. Comorbid conditions, such as low vision, upper limb amputations or paresis/paralysis, and hearing loss must be taken into account to ensure that the selected device will be effective. Prior experience with assistive devices should also be considered to take full advantage of preinjury familiarity and exposure to electronic systems.

Smartphones and similar devices may require training in the use of a computer interface and in techniques for seeking out and downloading appropriate applications from the Internet. Even individuals who are familiar with devices will need training in the effective use of a smartphone or computer as a cognitive aid to optimize function in daily living. This training may be implemented simultaneously with other cognitive therapies or

TABLE 7-4

LEARNING OBJECTIVES OF MEMORY AID TRAINING

Training Sequence	Specific Skills/Objectives
Information entry/retrieval	- Writing appointment information in the appropriate section of a day planner - Inputting appointment information in a smartphone or personal digital assistant - Setting alarm prompts (via cell phone, personal digital assistant, alarm watch) - Establishing routine times of day to refer to planner
Daily and weekly planning	- Establishing a consistent sequence of steps for reviewing tasks and appointments each day - Establishing a consistent sequence of steps for planning the week ahead
Note taking	- Taking notes in order to perform novel, multistep tasks - Taking notes in order to keep track of conversations - Taking notes on reference information

as part of an educationally oriented program to support functional activity and promote successful return to duty and community reentry. Applications created for entertainment purposes, such as games and social networks, can encourage the SM to explore the full potential of an assistive device and support socialization. SMs who often misplace items should also be guided to set up a back-up system in case they lose their electronic devices.

The technology and applications for these electronic devices are constantly changing. The younger, tech-savvy members of the armed forces and veteran communities are familiar with the constant upgrades for these devices and the myriad useful applications. A comprehensive list of applications for specific devices would be outdated before publication; however, a sample of the types of categories of applications that may be appropriate for SMs with c/mTBI residual complaints is included in Exhibit 7-19.

The Making Positive Connections AppReviews site (<http://id4theweb.com/appreviews.php>) provides updates on new applications and useful clinical reviews of existing applications. Additional applications may be of particular importance to SMs

TABLE 7-5

LEARNING TO USE PROMPTS FROM AN ALARM WATCH (EXAMPLE)

Component	Task
Acquisition	During a therapy session, the clinician demonstrates how to set an alarm watch. The patient and clinician set up written instructions as to how to set an alarm watch. The patient sets alarm watch for the next day's appointments.
Application	The patient uses an alarm prompt as a reminder to switch tasks during the therapy session.
Adaptation	The patient is assigned to demonstrate alarm use to spouse. The patient sets the alarm watch to sound as a prompt for morning and evening medications.

involved in an education program (see Chapter 9, Performance and Self-Management, Work, Social and School Roles for suggestions on applications for note-taking, reading, and other school-related tasks).

National Center for Telehealth and Technology

A new genre of smartphone programs specifically designed for troops and healthcare providers has been developed by the National Center for

EXHIBIT 7-19**SMARTPHONE APPLICATIONS**

Calendar/Schedule manager
 Task manager/To do/Reminders
 Shopping/notes
 Home management/Lifestyle
 Headache tracking
 Medication management
 Sleep management
 Fitness
 PTSD/Stress
 Financial management
 Cognitive training
 Cognitive games
 Password manager

PTSD: posttraumatic stress syndrome

Telehealth and Technology (T2), a component of the DCoE for Psychological Health and Traumatic Brain Injury (www.t2health.org/mobile-apps). These applications address psychological health and TBI for SMs and may also be used by civilians with similar conditions. Some examples include:

- Breathe2Relax: guides users through diaphragmatic breathing exercises.
- PTSD Coach: a collaboration between T2 and the Department of Veterans Affairs National Center for PTSD that offers selections such as self-assessment, manage symptoms, find support, and learn about PTSD to assist individuals experiencing PTSD symptoms.
- T2 Mood Tracker: allows users to record and track their emotional states over time,

using a visual analog rating scale.

- Tactical Breather: guides users through tactical breathing exercises to help them control physiological and psychological responses to stress.
- Co-Occurring Conditions Toolkit: an electronic version of the DCoE's Co-Occurring Conditions Toolkit, this application can help healthcare providers assess and treat patients with multiple symptoms that may stem from closed head injury or a number of psychological conditions.
- mTBI Pocket Guide: intended for clinicians, this application is a comprehensive quick-reference guide on improving care for c/mTBI patients that emphasizes current clinical standards of care.

PRACTICE TASKS FOR MEMORY STRATEGY REHEARSAL AND TRANSFER

Purpose/Background

Once patients understand the factors that influence their memory abilities, they need to practice preferred compensatory cognitive strategies in the context of clinic and everyday tasks. Simply talking about a potentially useful strategy does little to improve functioning (see *Techniques to Improve Learning and Patient Engagement*). Patients need many opportunities to practice during clinic sessions and as part of their therapy homework. Practice tasks specific to memory strategies involve using compensatory cognitive strategies to keep track of instructions to novel tasks (Table 7-6).

Procedure for Using Memory-Strategy Practice Tasks in Therapy

1. Patient and clinician collaborate to select a clinic or homework task based on the memory strategies the patient needs to practice.
2. After receiving instructions for the task, the patient completes the Anticipation part of the AAA worksheet (see form in the *Techniques to Improve Learning and Patient Engagement* section.)
3. Patient performs the assigned task, with

clinician observing performance (Exhibit 7-20; some practice should occur in the clinical setting so the patient benefits from this feedback.) During the task, the patient self-observes performance and completes the "Action" section of the AAA worksheet.

4. Upon completing the task, the patient fills out the "Analysis" section of the AAA worksheet.
5. Patient and clinician share their observations and analyses of the performance.

Activities of Daily Living and Instrumental Activities of Daily Living Tasks

Any task can be set up to require memory strategy practice. The patient's self-reflections and the clinician's guidance and observation are what make the task therapeutic. Some ideas for daily activities practice are the following:

- checkbook (create a checklist of steps),
- medication set-up (creating a grid with name, dosage, description of appearance, reason taken),
- kitchen tasks,
- home projects, and
- creating phone lists or address books.

TABLE 7-6
SAMPLE MEMORY STRATEGY PRACTICE TASKS

Computer Tasks*	Description	Vendor/Location
Games for the Brain	Free website includes 20 games that place various demands on memory	http://www.gamesforthebrain.com/
Captain's Log	50 multilevel programs that provide more than 2,000 hours of game-like activities	http://www.braintrain.com/homeusers/homeusershome.htm
Lumosity	Website with a free 5-day trial (requires membership for a small monthly fee after that) that provides a variety of brain engagement challenges, tracks progress, and adjusts the difficulty level to match the user	http://www.lumosity.com/
Technology Tasks	Description	
Global positioning system smartphones	Developing checklists helps patient manage new learning and procedural memory.	
Clinic Tasks	Description	Vendor/Location
Brainwave-R	Brainwave-R is a comprehensive pen-and-paper-based cognitive rehabilitation program that is divided into five hierarchically graded modules: 1) attention, 2) visual processing, 3) memory, 4) information processing, and 5) executive functions. The program comprises three components: 1) education: an overview of current theories relevant to rehabilitation designed to be used by the clinician with the client and family to ensure good awareness and understanding of the problem area 2) clinician instructions: rating scales, clinical guidelines, suggestions for how to involve the family, a performance summary chart, and questions to encourage the client to determine the functional relevance of each exercise 3) client exercises	http://www.braintreemanagement.co.uk/braintreetraining/bwr.htm
Practice tasks for specific aspects of memory function	Prospective memory: "At 10:30, call your cell and leave a message for yourself listing four items to pick up at the store." Procedural memory: "Develop a daily planning checklist that you can use each morning to plan your day." OR "Develop a checklist that gives step-by-step instructions for setting the alarm on your cell phone."	N/A N/A
Card games	Remember or take notes on rules Rehearsal of internal compensatory strategies to optimize recall. Solitaire, cribbage, poker, etc N-factor (requires a deck of cards). Clinician flips the cards and patient must recall:	1 card back, just number; 1 card back, number and suite; 2 cards back; just number; and 2 cards back, number and suite
Reading assignments	Magazine, newspaper, books	N/A

*Logging on, accessing a site, and using different features all require procedural memory. Clinician can have patient create checklists for use as a therapy task. Patients may need to be reminded that the purpose of these tasks is to rehearse compensatory strategy use, not to "fix" memory functioning.

EXHIBIT 7-20**CLINICIAN OBSERVATIONS DURING PRACTICE TASKS**

The clinician selects and sets up the practice task to observe all or some of the following:

- Does the patient self-initiate strategy use?
- If the task requires note taking:
 - Are patient notes legible?
 - Are patient notes detailed enough to be useful?
 - Does the patient refer to them during the task?
 - Does he or she use clarification skills to control the pace of the directions?
- If the patient is using a voice recorder:
 - Does the patient remember to turn it off?
 - Does the patient organize the information for efficient retrieval?
 - Does the patient set alarms or use timers if needed?
 - Does the patient put appointments in planner system?
 - Does the patient make to-do lists and include homework assignments?

IMPROVING EXECUTIVE FUNCTIONS**Purpose/Background**

The term “executive functions” refers to a set of processes and functions that allow individuals to self-regulate their behavior and solve problems. Executive functions guide purposeful behavior throughout the day and are critical to almost every aspect of everyday activities. Problem solving is required “in any situation that involves decision making.”^{172(p157)} Despite the structure that active duty military service provides, it is estimated that SMs make approximately 3,000 decisions in their daily routine.¹⁷³ When SMs transition to the less-structured context of civilian life, demands may increase to 9,000 decisions a day.¹⁷³

After c/mTBI, many patients report difficulty with high-level executive functions (planning, organization, self-regulation, problem solving), which affects their ability to consistently and safely manage higher-level ADL/IADL roles. The overarching goal of therapy specific to executive dysfunction is to help patients expand their repertoire of strategies in this realm through the TEST process (see above, Cognitive Intervention: Improving Attention and Speed of Processing).¹⁷⁴

Strength of Recommendation: Practice Standard

Training in the use of problem-solving and organization strategies as applied to real-life tasks is supported by empirical evidence.^{126,171} Though not specific to persons with c/mTBI, according to the

DCoE expert panel, “a robust literature supports the use of metacognitive strategy training as an intervention for executive function impairments due to TBI.”^{4(p246)} Strategy training that yielded positive outcomes in executive function included the use of multiple-step strategies, strategic thinking, multitasking, problem identification, weighing pros and cons of solutions, monitoring performance, and improving emotional self-regulation. Evidence is sufficient for a recommendation of this type of cognitive remediation as a **practice standard**.

Intervention Methods

1. Improve executive functions. Educate the patient about executive functions (see Clinician Tip Sheets: Treatment of Executive Dysfunction and Understanding Executive Functions, and Patient Handout: Rating Your Executive Function Skills).
2. Help the patient increase self-awareness and self-regulation to support good decision-making in difficult situations (see Clinician Tip Sheets: Improving Emotional Self-Management and Strategies to Improve Self-Regulation–Pausing, and Patient Handouts: Emotional Self-Management Worksheet and Strategies to Improve Self-Regulation–Pausing).
3. Help the patient identify strategies that pertain to his or her key tasks and

preferences (see Patient Handouts: Strategies for Problem Identification, Strategies to Improve Initiation, Building Habits and Routines, Generative Thinking Strategies, Problem Solving Process, Strategy–Prioritization; and Clinician Tip Sheets: Strategies to Improve Initiation, Building Habits and Project Planning Strategy–Divide and Conquer, Routines, Genera-

tive Thinking Strategies, Problem-Solving Process, and Strategy–Prioritization).

4. Create opportunities for the patient to practice strategies in clinic sessions and as homework (see Clinician Tip Sheets: Menu of Strategies to Manage Executive Function Inefficiencies and Practice Tasks for Executive Functions Strategy Rehearsal and Transfer).

CLINICIAN TIP SHEET: TREATING EXECUTIVE DYSFUNCTION

Although there is no universal definition or agreement as to what constitutes executive functions,¹⁷⁵ treatment for deficits in executive functions may be based on three premises¹⁷⁶:

1. Difficulties with problem solving are at the core of executive dysfunction.
2. Problem solving is “supported or thwarted” by emotional states.
3. Attentional processing serves as a foundation for executive functions, emotional regulation, and learning.

The following treatment model for executive function deficits is based on the work of Kennedy and Coelho¹⁷⁷ and Gordon et al.¹⁷⁶ Also note that treatments and strategies that improve attention will also improve executive functions (see Improving Attention and Speed of Processing).

Provide Education

Educate patients about executive functions to give them an informational basis for treatment (see Patient Handout: Understanding Executive Functions). Assess the patient’s initial awareness of strengths and weaknesses within the area of executive functions (see Patient Handout: Rating Your Executive Function Skills).

Problem-Solving Process and Strategies

- **Problem identification.** Before the problem-solving process can begin, problems need to be recognized and identified. Teach patients to recognize the following cues that indicate when problems exist (see Patient Handout: Strategies for Problem Identification).
 - Emotional cues: recognize signs of frustration, anxiety, irritation, and anger as indications of problem areas that

need to be addressed.

- Social cues: pay attention to others’ facial cues, tone of voice, and body language that may indicate a problem is occurring.
- Outcome cues: repeated failure to solve a problem or reach a goal is a clear indication that the current approach to the problem is flawed or that the problem has not been fully understood.
- **Self-monitoring.** Self-monitoring can facilitate early identification of problems. Pause strategies (see Patient Handout and Clinician Tip Sheet: Strategies to Improve Self-Regulation–Pausing) and prediction strategies can enhance self-monitoring (see Patient Handout and Clinician Tip Sheet: AAA Self-Reflection Form). Employing a structured problem-solving framework that includes comparisons of expected and actual outcomes may help identify specific difficulties a patient has to approaching a problem (see Patient Handout and Clinician Tip Sheet: Problem-Solving Process).
- **Goal setting.** The problem-solving process is driven by a specific intention or goal. Teach goal development because patients who set their own goals, rather than have them created for them as part of the rehabilitation process, are more likely to attain them. Refer to references on developing clearly stated goals using the SMART (specific, measurable, achievable, realistic and time-targeted) goal process.
- **Strategy selection.** Strategies should be selected based on a clear description of the goal to be accomplished and clear awareness of the strengths and weaknesses a person brings to solve a problem. Although self-awareness tends to be spared after concussion, if there is a mismatch between perceived abilities and actual abilities,

teach self-awareness (see Patient Handout: Change Begins with Awareness).

- **Strategy planning.** Teach techniques to generate strategies for problem solving (see Patient Handout and Clinician Tip Sheet: Generative Thinking Strategies).
 - Impulsivity may result in selecting an inefficient or ineffective strategy. Teach patients to stop and reflect on a range of approaches, evaluate the pros and cons of each approach, and select the one most likely to achieve the desired goal.
 - Strategies often require multiple steps that need to be performed in a specific order and may require specific materials for successful completion. A structured problem-solving framework can facilitate this complex process (see Patient Handout and Clinician Tip Sheet: Problem Solving Process).
 - Prioritization strategies allow patients to divide larger projects into a series of smaller tasks that can be managed more effectively (see Patient Handout and Clinician Tip Sheet: Project Planning Strategy—Divide and Conquer).
- **Strategy implementation.** No strategy will work if it is not acted upon. Difficulty with initiation can occur for different reasons, including lack of motivation, anxiety, fear of failure, problems with memory, and organically related lack of initiation

resulting from the injury itself. Teach techniques that support initiation and strategy follow-through in everyday activities (see Patient Handout and Clinician Tip Sheet: Strategies to Improve Initiation).

- **Self-monitoring and evaluation of goal attainment.** Poor self-monitoring of performance can result in undetected errors in strategy implementation that can cause a well-developed plan to fail. A number of techniques have been used to facilitate self-monitoring, including pausing strategies (see Patient Handout and Clinician Tip Sheet: Strategies to Improve Self-Regulation—Pausing) and systematic comparison of predicted with actual performance that may be supplemented with verbal mediation of behavior using techniques, such as self-talk (see Patient Handout and Clinician Tip Sheet: AAA Self-Reflection Form).

When faced with a multitude of tasks, people often feel overwhelmed. Prioritization strategies may be used to systematically evaluate the urgency and importance of each task to guide decision making (see Patient Handout and Clinician Tip Sheet: Prioritization). In addition, developing a routine with habitual daily and weekly activities reduces demands on decision making and planning (see Patient Handout and Clinician Tip Sheet: Building Habits and Routines).

CLINICIAN TIP SHEET: IMPROVING EMOTIONAL SELF-MANAGEMENT

Purpose/Background

Headaches, insomnia, depression, and emotional dysregulation may occur after c/mTBI. A crucial, yet often omitted, component of c/mTBI management is the provision of education regarding symptoms such as fatigue, irritability, and mood lability that may be experienced during c/mTBI recovery.⁷ People who regularly experience significant irritability, anger, anxiety, or fear often make poor decisions and struggle to solve problems.¹⁷⁸ Emotional self-management provides a foundation for each phase of the problem-solving process. Treatment aims to reduce the “emotional noise” and negative self-talk that undermine decision making and work to overcome the tendency to react impulsively or to do nothing.¹⁷² The process of improving emotional regulation involves a three-part strategy:

1. Recognize early warning signs of emotional dysregulation (eg, thoughts and physiologic responses, escalation in mood) that can serve as cues to engage in self-regulation strategies to support good decision making (see Patient Handout: Emotional Self-Management Worksheet and Clinician Tip Sheet: Improving Emotional Self-Management).
2. Review and reflect on antecedent conditions (eg, physiologic symptoms, contexts, and people) that are associated with emotional dysregulation to increase awareness of triggers and allow implementation of self-regulation strategies before emotional dysregulation undermines decision making (see Patient Handout: Emotional Self-Management Worksheet and Clinician Tip Sheet: Improving Emotional Self-Management).

3. Develop strategies that can be used to maintain good emotional regulation (eg, relaxation breathing or positive self-talk) to facilitate a sense of calm in difficult situations, or to disengage from a situ-

ation before doing or saying something that will be regretted later (see Clinician Tip Sheet: Improving Emotional Self-Management).

CLINICIAN TIP SHEET: UNDERSTANDING EXECUTIVE FUNCTIONS

Purpose/Background

Patients who understand the nature of problems related to executive functions will be best able to learn new strategies to optimize their performance. The Patient Handout: Understanding Executive Functions can be used to guide a discussion about executive functions between the clinician, the patient, and the patient's significant other.

- Ask patients to complete the self-rating form (see Patient Handout: Rating Your Executive Function Skills) to identify their perceived areas of strengths and weaknesses. Encourage significant others, if present, to share their observations.
- Identifying strengths and weaknesses informs the selection and training of compensatory cognitive strategies described in the Toolkit.

It may be necessary to review this handout again after patients perform clinical tasks that enlist executive functions. Clinicians should ask permission to share their observations of consistency and effectiveness of patients' performance to facilitate understanding of the connection between strategy use and life-management skills. Strategies should be explored to address areas deemed as inefficient.

Self-Regulation

Self-regulation involves:

- Self-awareness (see Techniques to Promote Patient Engagement and Learning)
- Inhibition (regulating emotional responses; see information on emotional self-management and self-regulation in this chapter)
- Resisting distractions and paying attention, learning to focus (see section on Improving Attention Management)
- Appreciating obstacles and problems (see information on problem solving in this chapter)

- Mental flexibility (knowing when and how to change course; see information on generative thinking strategies in this chapter)

Problem Solving

Problem solving involves:

- Understanding the problem itself (see Strategies for Problem Identification in this chapter)
- Generating possible ideas and solutions (see Problem-Solving Process in this chapter)
- Appreciating the limits and restrictions of various solutions
- Prioritizing (see Prioritization in this chapter)
- Flexibility of thinking (see Generative Thinking Strategies in this chapter)
- Making decisions (see Prioritization, Divide and Conquer, and Problem-Solving Process in this chapter)
- Setting goals (see reference materials for information on SMART Goals)
- Anticipating outcomes of a plan (see Problem-Solving Process in this chapter and AAA Self-Reflection Form)

Emotional Self-Management

Emotional self-management involves:

- Identifying early antecedent conditions and signs of emotional dyscontrol
- Identifying strategies to maintain emotional control in difficult situations
- Evaluating strategies to maintain emotional control (see Emotional Regulation Worksheet)

Note that limited self-awareness can undermine any aspect of the problem-solving process. Limited use of self-awareness training is recommended to address specific issues related to self-awareness (see section on Techniques to Promote Engagement and Learning).

CLINICIAN TIP SHEET: STRATEGIES TO IMPROVE SELF-REGULATION–PAUSING

Purpose/Background

Under normal circumstances, most people periodically and unconsciously monitor themselves throughout the day to reflect on how closely their current situation (what they are doing at the moment) matches their goals and intentions. Intact functioning of the frontal lobes and good mental health are essential for such self-reflection. People who experience brain injury, stress, and depression may be less likely to automatically engage in self-regulation and self-monitoring. Therefore, relearning a deliberate pausing strategy may be helpful in reestablishing this important habit of mind (see Patient Handout: Strategies to Improve Self-Regulation–Pausing).

Pausing is a simple concept that relies heavily on executive skills. Patients are continuously counseled to pause and take a moment to reflect. In the beginning phase of treatment, patients use the pausing strategy as a cue to reflect on their current task choices and next steps. As their self-awareness improves and acceptance of strategy use increases, the pause strategy can be expanded to provide a deeper and more enriching form of self-reflection. It is a difficult habit to develop and requires persistence and initiation.

The Basic Steps of Pausing

The patient associates the verbal cues with fingers on his or her hand. He or she is challenged to stop, take a moment, and check-in by considering the following questions:

- What am I doing now?
- Is this what I should be doing?
- If I'm going somewhere, do I have what I need?
- What should I do next?
- Go.

The pause strategy is adapted as patients progress and can be used to meet a variety of treatment areas, such as:

- reminding them to use a compensatory strategy (ie, when leaving a location such as home or work, use checklists, refer to a planner or schedule, ensure they have all belongings and materials);
- managing fatigue or pain via reflection on their body for tension or pain, and the need to take remedial steps; and
- considering the quality of their performance and the presence of a personal or situational factor that is having an effect and might be altered.

Practice

The patient is given a homework assignment and asked to pause at every daily transition (eg, leaving for work, going to lunch, etc) and go through the pause sequence. Patients should be ready to discuss the experience at their next session. Have extra handouts available for them to take home and post in key locations.

CLINICIAN TIP SHEET: STRATEGIES TO IMPROVE INITIATION

Lack of initiation presents a challenge for both patients and clinicians; a team approach is imperative. It is important that the reasons for lack of initiation be explored because the treatments and strategies chosen can vary greatly.

Use the associated patient handout to guide

discussion. Patients are asked to highlight reasons that explain their difficulties with initiation. They are encouraged to add any other reasons to the handout. Discuss with the patient each area of concern and strategies that might help (Table 7-7).

REMEMBER: The goal of therapy is to help patients become aware of the barriers to optimal performance and the strategies to help them overcome the problem. It is important to continually highlight patients' role in their own recovery.

TABLE 7-7

INITIATION CONCERNS AND POSSIBLE COMPENSATORY STRATEGIES

Reasons for Lack of Initiation	Helpful Strategies
Decreased awareness of what needs to be done	Develop a weekly / daily activity list that can be kept in the day planner or posted at home. Instruct patient to check off the tasks when completed on the assigned day. Note: It is easier to add a task to an existing daily routine than adding a task when a person has no such structure (a concern for those who have not yet returned to work).
Lack of energy needed to start or see things through	See fatigue discussion in Toolkit. Common strategies include pacing, prioritizing, planning, taking breaks, and exercise.
Inability to break tasks down into achievable steps	See Divide and Conquer handout
Difficulty with prioritization	See Prioritization handout
Difficulty knowing when to do what	Develop a weekly / daily activity list that can be kept in the day planner or posted at home. Instruct patient to check off the tasks when completed on the assigned day.
Fear of being interrupted	Use “stop notes” and distracter management (see Attention section of Toolkit)
Lack of desire	Refer back to physician or psychologist
Inability to generate ideas of things to do	Use a weekly activity list or brainstorm with significant other
Difficulty tracking time	Use cell phone alarms, alarm watches, timers
Difficulty staying on task/attending	Use timers, control distracters (see Attention section of Toolkit)
Procrastination	Use strategies related to planning, prioritization, alarms and times
Different priorities	Have honest conversation with significant others; adjust responsibility lists
Inability to function under pressure	Use planning, prioritizing, and time-management strategies
Pain	Use pacing, taking breaks, ergonomics; refer to doctor

CLINICIAN TIP SHEET: BUILDING HABITS AND ROUTINES

Purpose/Background

The Patient Handout: Building Habits and Routines is a good discussion point for patients who indicate not knowing what to do as a reason for decreases initiation. It can prompt a meaningful discussion related to the importance of having things to do during the day. Routines and habits help decrease the cognitive energy required to get through the day. They can also help with memory and fatigue management (see Patient Handout: Building Habits and Routines).

Explore these strategies with patients as a means to add structure to their daily life:

- Get up at the same time every day.
- Reestablish personal care routines.
- Use a calendar and a daily planning checklist.
- Be responsible for creating and maintaining your own schedule.

- Carve out time in your day for a balanced life (scheduled appointments, regular home management tasks, hobbies, and social engagements).
- If work is not yet a reasonable goal, consider volunteering. Set up regular times and expectations.
- Create reasonable expectations; set goals for yourself and ask someone you trust to help hold you accountable.
- Set up a recurring task schedule for tasks of priority (see example below). Schedule tasks of importance for certain days of the week and make an effort to adhere to the new regimen.

Suggested Homework Assignment

Assign the patient to fill out a sample week of recurring activities. Make sure activities include personal tasks (exercise, social outings) as well as

home management tasks, work, and the like. Have them report what they find, including answers to the following:

- Is the week well-balanced, or do you tend to do everything on one day and then need time to recover?

- Is the schedule over- or under booked?
- What opportunities do you see for change?

Have them place the grid (Table 7-8) in their information management system or hang it in a prominent place in their home.

CLINICIAN TIP SHEET: GENERATIVE THINKING STRATEGIES

Purpose/Background

For a variety of reasons (including brain injury), people sometimes experience inflexibility in their thinking that leads to feeling “cognitively stuck,” resulting in situations such as the following:

- repeatedly employing the same maladaptive or ineffective approach to tasks, even when it is evident that the approach is not working;
- difficulty formulating more than one solution to a complex problem; and
- inefficient or even ineffectual task performance because they are not evaluating and selecting the best alternative.

Even individuals who typically have no cognitive impairments may occasionally experience difficulties with generative thinking, especially when fatigued, anxious, or stressed.

How to Address Problems With Generative Thinking

The primary way of addressing limitations in generative thinking, regardless of cause, is to increase the patient’s awareness of this vulnerability so that he or she can employ some or all of the compensatory strategies listed on the Patient Handout: Generative Thinking Strategies. The clinician can assign or observe various experiential tasks to:

- assess the patient’s performance in this realm,
- increase the patient’s awareness of this inefficiency, and
- provide opportunities for the patient to practice compensatory strategies.

Examples of Experiential Tasks

Sorting Task

1. Get a container and gather approximately 15 random items.

2. Ask the patient to group those items into five categories and verbally describe what they are (function, color, shape, material, etc). Do not cue the patient unless he or she is unable to categorize the items.
3. Give feedback on appropriateness of choices and descriptions.
4. Ask the patient to create three new categories without repeating any of the categories from the first trial. Give feedback on appropriateness of choices.
5. Ask the patient to create two new categories without repeating any of the previous categories from the first two trials. Give feedback on appropriateness of choices.

Games

- Chess
- Connect 4
- Checkers
- Poker

Pencil-and-Paper Tasks

Generate the following:

- ten similarities or differences on topic of choice (Batman versus Spiderman; country versus city living, etc)
- five to ten reasons something occurred (global warming, Steelers winning the Super Bowl in 2009, financial crisis)
- five to ten possible outcomes (global warming, universal healthcare)
- safety questions with two or three possible answers
- a week of meals and grocery lists
- three different approaches to a home improvement project

TABLE 7-8

GRID OR CHECKLIST TO HELP PATIENTS DEVELOP NEW HABITS AND ROUTINES

Tasks	M	T	W	Th	F	Sa	Su

CLINICIAN TIP SHEET: PROJECT PLANNING STRATEGY–DIVIDE AND CONQUER

Purpose/Background

Many patients find themselves easily overwhelmed at the prospect of performing a complex or multistep project. This undertaking is made more difficult when patients embark on the task before first planning their approach, or if they plan without writing things down. Many individuals respond to this challenge by procrastinating or simply not initiating work at all.

The Divide and Conquer worksheet is presented as a strategy to help patients develop a work plan (see Patient Handout: Project Planning Strategy–Divide and Conquer). This process helps with information management, fatigue and pain management, initiation, and attention.

How to Use The Form

1. List the major task components in the shaded rows (they do not need to be put in order).
2. List specific action items under each major task component (again, list them as they come to mind; they do not need to be in order).
3. Put all the action items in order once you have listed them on the worksheet.
4. Assign yourself deadlines for key steps, if desired.

5. Add to-dos to your planner.
6. Review the example of the completed Divide and Conquer worksheet with the patient.

Examples of Experiential Tasks for Clinic Observation or Homework

1. Ask the patient to use the Divide and Conquer worksheet to organize an unstructured, multistep project that is personally relevant. Review the work plan, offer feedback (as necessary), and assign completion as homework.
2. Assign the patient to instruct a family member in the divide-and-conquer process, completing a work plan for another project.
3. Create an unstructured, simulated work task in the clinical setting. This might include a multicomponent clerical task (such as assembling patient education packets) or a sorting and organizing task (such as reorganizing a storage cabinet). Ask the patient to organize his or her approach beforehand using the Divide and Conquer worksheet. Incorporate use of the AAA form as well (see Techniques for Promoting Engagement and Learning).

REMEMBER: Using this process allows the patients to “clear the burners” in their heads, which can lead to better generative thinking and clearer plan development. This, in turn, can lead to better initiation and follow through. Project completion can be a confidence boost to patients and often results in increased activity level.

CLINICIAN TIP SHEET: PROBLEM-SOLVING PROCESS

The ability to solve problems can be compromised by stress, mood changes, and after effects of c/mTBI. Therefore, patients may be helped by learning a structured approach to problem solving to ensure they are making informed choices instead of relying on trial and error.

How to Use the Patient Handout: Problem-Solving Process

As the patient’s skill level progresses, the form may be eliminated and the patient able to self-talk through the process.

1. The clinician and patient identify a current problem that the patient is trying to solve.
2. The patient is asked to define the problem. This step is important; often the patient has several concerns and it is important to tease out the main one.
3. The patient is asked to define the desired outcome or his or her main goal. This step is also very important; if the outcome is vague, it is much harder to make choices.

4. The patient needs to determine if there is only one solution to the problem.
 - If the answer is “yes,” the patient is instructed to “divide and conquer” the task to develop a project plan.
 - Typically, the answer is “no.” The patient is then challenged to come up with three or four alternate solutions and list the pros and cons of each.
5. The patient is instructed to choose a solution, then use the divide-and-conquer strategy to organize the project.
6. Finally, the patient is asked to reflect back

on his or her choices or plan. Was he or she pleased with the outcome? The process? What was learned? What, if anything, could be done differently next time?

This structured approach to problem solving:

- slows the patient down,
- structures his or her efforts,
- avoids trial and error,
- allows the patient to walk away and come back later without fear of forgetting, and
- helps the patient address one step at a time.

CLINICIAN TIP SHEET: STRATEGY-PRIORITIZATION

People burdened by stress, mood changes, and after-effects of c/mTBI can easily become overwhelmed with myriad daily tasks; establishing a formal process for prioritizing may be helpful (see Patient Handout: Strategy–Prioritization). People have varying skills with regard to developing a daily “to-do” list. Some lists are too long; others involve too few tasks. It is the clinician’s role to ensure that patients are able to make daily lists using the planning checklists that were discussed earlier.

Many patients benefit from a structured process for logically determining how to allocate their energy and time. The four categories associated with importance and urgency, as defined by Covey,¹⁷⁹ are discussed below. The clinician provides examples and encourages the patient to give examples of tasks in his or her life that fit in each category.

- **Urgent and important.** This category includes tasks such as taking medications, paying bills, picking up children, and meeting a higher-ranking officer. They have time deadlines and consequences if not completed. These tasks are usually due that day and at a certain time. Patients may have to set alarms to remember them.

- **Not urgent but important.** This includes tasks such as preparing for a work project at the end of the month, planning a birthday party for a family member, or planning a vacation. These are not due today but will have consequences if they are not worked on. Patients should plan time for these in the week.
- **Urgent but not important.** These tasks must be done by a certain time, but they are not imperative. For example, the garbage truck comes at 8:00 am, but the bins are not full and it is cold outside, or a movie you want to see is at the theater for one more day. Both of these scenarios have deadlines, but there is little or no consequence to you if they are not completed. Patients should only do these tasks if they have extra time and energy.
- **Not urgent and not important.** These are tasks that could easily be completed or deleted with no real cost to you. For example, you want to go to the mall and see what is new for the season, your buddy wants to go fishing but you are not really interested, or you are craving a good cup of coffee. None of these tasks is necessary. Patients should only do these tasks if they have extra time and energy, and the rest of their list is complete.

CLINICIAN TIP SHEET: MENU OF STRATEGIES TO MANAGE EXECUTIVE FUNCTION INEFFICIENCIES

The primary aim of therapy is to help the patient identify and implement core strategies that match his or her problematic tasks and preferences. Using the patient handouts and

the list that follows, the clinician guides the patient toward the specific strategies that hold the most promise in improving performance (Table 7-9).

TABLE 7-9

POSSIBLE STRATEGIES TO ADDRESS SPECIFIC EXECUTIVE DYSFUNCTIONS

Executive Inefficiency	Strategy	Practical Application
Self-regulation Initiation Persisting Stopping Emotional control Self-reflection and adaption	Develop routines/structure Weekly activity tracker Information management systems Checklists Timer use (to persist or stop)	Sit down each morning and plan your day, add activities from your weekly tracker list Set a timer and clean the kitchen until it goes off Set a timer and get off the computer when it goes off
Problem solving Understands the problem itself Generates possible ideas and solutions Appreciates limits and restrictions of various solutions Prioritizes Anticipates consequences Makes decisions	Generative thinking strategies Problem-solving grid Divide and conquer Prioritizing grid	Identify a home improvement you want to make, go through the problem-solving process, choose your best option and use divide and conquer to create a realistic to-do list
Self-awareness	Self-prediction/ reflection forms	Talk with significant other before an event, identify possible concerns and strategies you will use Talk with significant other after the event and review successes and opportunities for improvement

CLINICIAN TIP SHEET: PRACTICE TASKS FOR EXECUTIVE FUNCTIONS
STRATEGY REHEARSAL AND TRANSFER

Purpose/Background

Once patients understand the factors that influence their executive function abilities, they need to practice preferred compensatory cognitive strategies in the context of clinic and everyday tasks. As discussed earlier (see Techniques to Improve Learning and Patient Engagement), simply talking about a potentially useful strategy does little to actually improve functioning. Patients need many opportunities for practice during clinic sessions and as part of their therapy homework. Practice tasks for executive functions tend to be unstructured. The clinician describes the end product to the patient, then the patient is instructed to organize an efficient process by which to get the work accomplished.

Procedure for Using Executive Function-Strategy Practice Tasks in Therapy

1. The patient and clinician select a clinic or homework task based on the executive function strategies that the patient needs to practice (Table 7-10).
2. After receiving instructions to the task, the patient completes the "Anticipation" part of the AAA worksheet (see Techniques to Improve Learning and Patient Engagement).
3. The patient performs the assigned task, with the clinician observing performance (some practice should occur in the clinical setting so the patient benefits from this feedback). During the task, the

TABLE 7-10
SAMPLE EXECUTIVE FUNCTION STRATEGY PRACTICE TASKS

Computer Tasks	Description	Vendor/Location
Games for the Brain	Free website that includes 20 games placing various demands on attention	http://www.gamesforthebrain.com/
Captain's Log	50 multilevel programs that provide more than 2,000 hours of game-like activities	http://www.braintrain.com
Brain Bashers	Free website with a collection of brainteasers, puzzles, riddles, games and optical illusions. BrainBashers is regularly updated with optical illusions and games and five new puzzles are added every other week	http://www.brainbashers.com
Lumosity	Website with a free 5-day trial (then requires membership for a small monthly fee) that provides a variety of brain engagement challenges, tracks progress, and adjusts the difficulty level to match the user	http://www.lumosity.com/
Microsoft Excel	Software can be used to have patients set up tables and budgets (can require high-level problem solving)	Microsoft Corporation (Redmond, WA)
Microsoft Word document	Software can be used to have patients create letters, slide shows, and essays on topics of interest	Microsoft Corporation (Redmond, WA)
Internet	Can be used to assign systematic internet searches (eg, plan a trip to a designated city, include flight, hotel, car rental, three tourist activities, three restaurants on a budget of \$2,000)	Any
Technology Tasks	Description	Vendor/Location
Driving simulators	Can provide opportunities to observe problem solving, reaction time, higher-level attention skills, and activity tolerance	N/A
GPS units/cell phones	Patient can organize and write directions on how to use the gadgets and applications that they may need for daily use	N/A
Clinic Tasks	Description	Vendor/Location
Snap Circuits board	Varies in number of parts and possible projects. The patient follows visual and written directions to construct different electrical projects using snap-on circuit parts. This task can be used to look at ability to follow directions. The clinician can set up the projects with errors and have the patient repair the circuit.	Elenco Electronics Inc (Wheeling, IL) http://www.acsupplyco.com/elenco1/htm_files/snapcircuits.htm

(Table 7-10 continues)

Table 7-10 *continued*

Brainwave-R	A comprehensive pen-and-paper-based cognitive rehabilitation program that is divided into five hierarchically graded modules: 1) attention, 2) visual processing, 3) memory, 4) information processing, and 5) executive functions. The program comprises three components: 1) education (an overview of current theories relevant to rehabilitation designed to be used by the clinician with the client and family to ensure good awareness and understanding of the problem area); 2) clinician instructions (rating scales, clinical guidelines, suggestions for how to involve the family, a performance summary chart, and questions to encourage the client to determine the functional relevance of each exercise); 3) client exercises.	ProEd Inc (Austin, TX) http://www.braintreetraining.co.uk/bwr.htm
TipOver	Game requiring deductive reasoning and visual spatial skills	ThinkFun, Inc (Alexandria, VA) http://www.thinkfun.com/tipover/Bonus.htm
Rush Hour Traffic Jam	Game requiring deductive reasoning and visual spatial skills	ThinkFun, Inc (Alexandria, VA) http://www.thinkfun.com/shop/product/rush-hour,29,0.htm
SET	Visual perceptual game that requires the patient to attend to a variety of properties simultaneously	SET Enterprises Inc (Fountain Hills, AZ) http://www.setgame.com/
Tower of Hanoi	Strategy game requiring patients to generate a solution and persist. Can be made from wood or played on line.	MathIsFun http://www.mathsisfun.com/games/towerofhanoi.html
Models	Any variety. Motorized parts increase complexity.	
Clerical tasks	Patient can practice filing letters, envelopes, copying papers or projects of varying complexity, word processing tasks, schedule creation and maintenance tasks for self or others	N/A
Editing tasks	Patient can practice editing papers, advertisements, budgets, Microsoft Power Point projects	N/A
Assembly tasks	Patient can assemble storage cubes, shoe racks, small tables or stools	Retail stores
Tasks constructed by the clinician	See what is readily available in the clinic and understand the needs of your patients. Develop a task that has designated components (see sample below)	
Clinic Tasks	Description	
Executive tasks created by clinicians should contain:	Information processing demands: Decide the format in which to give the directions (written, verbal, diagrams, combination)	

(Table 7-10 continues)

Table 7-10 *continued*

	• Decide how conclusion or outcome should be communicated (verbal or written summary of status, showing clinician the completed task)
	More than one project or one project with multiple components:
	• Determine the number (requires prioritization and alternating or divided attention) • Requires time management
	Problem-solving requirements:
	• Organization • Generative thinking • Deductive reasoning
	Decision making
Executive task example:	Mail sorting task: Task objective (as described to patient): "Sort the mail into five categories, using the most organized and efficient process possible. Once the material is organized into five categories, ask me for the next set of instructions." Task supplies/materials: • Fake mail consisting of bills to be paid, personal correspondence, advertisements and coupons, articles or potentially interesting information to read later, junk mail that can be immediately recycled • Paper clips, sticky notes, pen/pencil, wastebasket After sorting, the patient is instructed to locate the following information and report it to clinician: • Company/date bills are due and the amount • Advertisements for three items that are found in two separate ads • Choose two more details from two sources of the mail (eg, ask patient to find out the phone number at the March of Dimes for donating cell phones and the letter their child was working on for a school newsletter); any information in the pile can be used • Use AAA form throughout the task

AAA: Anticipation, Action, Analysis

GPS: global positioning system

patient self-observes performance and completes the “Action” section of the AAA worksheet.

4. Upon completing the task, the patient fills out the “Analysis” section of the AAA worksheet. Patient and clinician share their observations and analyses of the performance.

ADL and IADL Tasks

- checkbook
- medication set-up
- household assembly tasks
- driving simulator
- kitchen tasks
- schedule creation and maintenance
- planning activities or events

REMEMBER: Any task can be set up to require executive function strategy practice. The patient’s self reflections and the clinician’s set-up and observation are what make the task therapeutic.

SOCIAL COMMUNICATION

Purpose/Background

Social communication involves a complex interaction of cognitive abilities, awareness of social rules and boundaries, and emotional control.¹⁴² Impairments in social communication may lead to depression, isolation, negative self concept, anxiety, low academic achievement, a reduction in social interaction,¹⁸⁰ or frustrating or embarrassing experiences, and may interfere with relationships or employment.^{131,142} After c/mTBI, cognitive inefficiencies may interfere with language and communication.¹⁸¹

In addition, changes in behavior, such as irritability, anger, and physical aggression that may be associated with c/mTBI and PTSD can negatively affect social communication.¹⁸² For SMs returning from combat, the “battle” mindset that sustained survival in the combat zone may interfere with social communication when transitioning and reintegrating in the home zone. For example, although controlling emotions during combat is critical for mission success, failing to display and discuss emotions after returning home may be perceived negatively (eg, detached and uncaring) and could potentially impair relationships.^{175,183,184}

Evidence-based studies in social communication have generally focused on the moderate to severe TBI population.^{143,180,183,185} However, studies investigating social communication and c/mTBI are beginning to emerge in the literature.^{143,186,187} Social pragmatic skills are commonly impaired by TBI, and social skills training, typically within a group format, has been shown to be effective in improving these skills.⁴

Struchen et al¹⁸⁷ investigated the use of various self-rating measures of social communication to determine overall social integration outcomes of

participants with mild to severe TBI. Results indicated that “reduced social skills can have a major impact on participant restriction for individuals with TBI.”^{187(p38)} The authors recommended that social communication be evaluated as part of the overall clinical assessment because the information would prove valuable for community reintegration.

Tucker and Hanlon¹⁸⁵ found that cognitive difficulties associated with c/mTBI affect the formulation or expression of descriptive information as assessed on narrative discourse measures. These deficits could negatively affect storytelling during social interactions. Struchen¹⁸⁸ described therapy techniques for social communication that have been used in patients with moderate to severe TBI, such as incorporating structured feedback, videotaping and analyzing interactions, modeling, rehearsing, and training in self-monitoring. Although these techniques have yet to be objectively studied in the c/mTBI population, clinical experience with SMs, particularly in group contexts, have demonstrated their usefulness.

Dahlberg et al¹⁴³ investigated the use of social communication group therapy for participants with mild to severe TBI. Four key components to the therapy program included the following:

1. the use of group co-leaders from different disciplines (eg, social work and speech-language pathology) for evaluation and to serve as role models,
2. an emphasis on self-awareness and self-assessment for individual participant goal setting,
3. use of the group format for interaction, feedback, problem solving, and social support, and
4. generalization of skills.¹⁴³

Sessions followed a consistent format that included homework review, brief topic introduction, guided discussions, small group practice, group problem solving and feedback, and homework. Results indicated that this treatment approach was effective in improving social communication.

Based on the literature and clinical experience with SMs with c/mTBI, a comprehensive holistic approach to social communication therapy is recommended that:

1. involves family and friends in individual and group contexts;
2. incorporates self-awareness, emotional, and behavioral self-regulation and executive functions; and
3. uses techniques of direct instruction, modeling, role-playing/simulations, videotaped interactions, feedback, and self-monitoring.

Strength of Recommendation: Practice Option

Despite the lack of robust, evidence-based research in the area of social communication

and TBI,¹⁴³ individual and group interventions that improve pragmatic conversational skills appear to be beneficial based on several small clinical studies with TBI participants.¹³⁰ Clinical experience with the military c/mTBI population has supported the need to address impairment in social communication, particularly in light of co-morbidities such as PTSD. According to guidance provided by members of the DCoE and Defense and Veterans Brain Injury Center Consensus Conference on Cognitive Rehabilitation for Military Personnel With c/mTBI and Chronic Postconcussional Disorder,⁴ social skills training has shown effectiveness in improving problems in comprehending and responding to nonverbal social cues.

Intervention Methods

Treat social communication problems (see Clinician Tip Sheet: Assessment and Treatment of Social Communication Problems).

CLINICIAN TIP SHEET: ASSESSMENT AND TREATMENT OF SOCIAL COMMUNICATION PROBLEMS

Assessment of Social Communication

Competency in social communication should be evaluated through observation and assessment in varied contexts, social functions, activities, and interactions. The evaluation process can include videotaping communicative interactions and incorporating role-play activities to analyze social communication skills.¹⁸⁸

For participation in social roles, functional outcome measures can be used to identify areas of success and areas that continue to limit quality of life. Other areas for analysis include environmental factors (opportunities for the SM to participate in social communication) and personal factors (how the social communication deficits affect the SM). Family members and friends can provide additional information about the SM's performance in daily interactions. Deficits identified in the evaluation can be selected for treatment, depending on the communication needs and social roles of the SM.¹⁴⁴

Commonly Observed Deficits in Social Communication

Expert clinicians have identified problems with social communication skills in SMs with c/mTBI, including:

- unawareness of social communication deficits,
- verbosity (ie, production of excessive amounts of unrelated or tangential information during conversation),
- production of limited amounts of information during conversation,
- inability to identify conversational breakdowns,
- inability to repair conversational breakdowns,
- inability to comprehend nonverbal communication, and
- unawareness of actions, verbal and non-verbal language, postures, and proximity, which can appear aggressive, rude, or indifferent to others.

Treatment Progression

Initially, therapy may consist of individual sessions to increase awareness of the problems affecting social interactions and teach and establish compensatory strategies for social communication skills. As the SM progresses, group therapy can be implemented to allow increased practice in using the compensatory strategies.¹⁴³

Reviewing and analyzing video recordings can be helpful in assessing the adequacy and use of compensatory strategies and techniques within group therapy. Treatment should include family members, friends, and other support individuals to facilitate generalizing improvements in social communication to real-life situations.

Intervention Methods

Based on expert clinical experience, the following are therapy suggestions to increase awareness of social communication skills and teach the use of compensatory strategies:

- Highlights from movies or television programs can be used to assist the SM

in identifying pragmatic communication deficits. Examples of social communication breakdown in the program highlights should be similar to the problems demonstrated by the SM.

- Identification of social communication problems should be followed by discussion and education about why the deficits are problematic in social interactions.
- Video recordings of conversations between the SM and various communication partners can then be evaluated for problems in social communication skills.
- Discussion and education should follow the analysis of the videotaped interactions.
- Compensatory strategies to improve the SM's social communication skills can be taught and practiced in individual and group therapy, and in the home environment.
- Self-evaluation should be encouraged on the use of compensatory strategies in various settings.
- Generalization of compensatory strategies and self-evaluation in the use and effectiveness of strategies should be facilitated in community settings.

CLINICIAN TIP SHEET: TREATMENT SUGGESTIONS FOR SPECIFIC PROBLEMS IN SOCIAL COMMUNICATION

Tangential Comments and Topic Maintenance

Definition: difficulty maintaining the topic of conversation because of poor sustained attention and auditory working memory skills.

Therapy Suggestions: Incorporate compensatory strategies of using written notes during conversation to identify and track topics or asking for clarification of the topic when uncertain.

Conversational Breakdown and Turn-Taking Repair and Revision

Definition: unawareness that there is confusion or a breakdown in the conversation, difficulty repairing or asking for assistance during conversational breakdown because of decreased awareness or poor insight into the needs of the conversational partner, and poor problem solving and judgment.

Therapy Suggestions: Teach the patient to ask for clarification if there is any confusion during the conversation (eg, "I'm not sure about this," "I don't quite understand"), or teach the patient to identify nonverbal cues of the conversational partner (eg,

facial expressions of confusion or uncertainty) to determine whether additional information is needed or information clarification is required.

Verbosity Versus Limited Amounts of Information/Turn-Taking/Quantity/Conciseness

Definition: providing too much or too little information during conversation because of lack of inhibition or awareness, deficits in working memory, or poor problem solving and judgment skills.

Therapy Suggestions: For verbosity or excessive quantity of information, teach the SM to identify the conversational partner's nonverbal cues (eg, facial expression of boredom, conversational partners looking at a watch, looking elsewhere, or shuffling papers). Another suggestion is to provide the SM with a specified number of question cards, tokens, or visual tally marks to use during brief conversations, which will allow the conversational partner to have a turn (eg, "These five cards represent five questions. When you ask the other person questions, it will give him or her the opportunity to talk. We want everyone to take turns during the

conversation. Now, try to use all of the cards during the next 5 minutes”).

If the patient is providing a limited quantity of information or if the information is vague, teach him or her to identify nonverbal cues (similar to those seen during conversational breakdown) and facial expressions of anticipation for more information. Cards, tokens, or visual tally marks can also be used to specify a number of sentences to produce during a conversational turn (eg, “The cards represent sentences. Try to say at least three sentences per turn”).

Anomia, Lexical Selection, Use, Specificity, Accuracy

Definition: difficulty being specific or choosing the correct words in conversation because of deficits in working memory, slow processing speed, or disorganization.

Therapy Suggestions: Teach the patient to use compensatory strategies for anomia (eg, semantic descriptors of a target word) that can aid the listener in determining the intent of the message. Additionally, teach the patient to identify nonverbal cues

related to confusion of the conversational partner so additional descriptions of the target word can be produced. Provide education about the negative effects of using pauses and fillers when anomia occurs.

Anxiety and Anger Management

Definition: an interdisciplinary approach with professionals from medicine, psychology, social work, occupational therapy, and the like is beneficial to address the psychosocial issues of anxiety and anger. Behavioral and medical management may assist in reducing these feelings.

Therapy Suggestions: Educate the patient about how actions, nonverbal and verbal communication, postures, and proximity related to emotions can negatively impact social communication and the conversational partner. For example, the patient’s affect (outward appearance) can be judged as aggressive, nervous, unfriendly, rude, or distant, yet this may not match the SM’s actual emotions. Additionally, if certain actions related to emotions, such as anger, are not inhibited, the patient may become socially isolated.

ACQUIRED STUTTERING AND OTHER SPEECH DYSFLUENCIES

Purpose/Background

Acquired stuttering may occur in individuals returning from combat with c/mTBI.^{33,35,51,117,186} Neurogenic stuttering is generally diagnosed when the onset of stutter-like dysfluencies occurs following a neurological event, such as a head trauma that disrupts normal brain function. In the absence of disruption to neurological function, adult-onset stuttering is often considered to be of psychogenic origin.¹⁸⁹ The differentiation is not always straightforward. The relatively sudden onset of stuttering-like speech can be due to one or a combination of neurological factors, psychological trauma, or medication effects. Trauma can also cause stuttering to recur in adults who previously recovered from developmental stuttering.¹⁹⁰ Fluency disorders may also result from word finding or word retrieval problems associated with cognitive impairments of attention and information processing speed resulting from TBI.²⁶ A fluency disorder, regardless of etiology, presents a serious communication problem that affects an individual’s ability to interact with others. Therefore, it is important to acknowledge and validate the presence of stuttering and to address this communication disorder through evaluation of its nature

and severity. Following the evaluation, therapeutic interventions that focus on symptomatic remediation can be successful with limited intervention. Medication adjustments may be effective in eliminating stuttering symptoms due to medication effects.³³

Strength of Recommendation: Practice Option

Acquired stuttering due to TBI has been widely discussed through case descriptions in the literature.^{28,189–192} The majority of the cases described refer to individuals who sustained moderate to severe brain injuries. An early case description of combat-related acquired stuttering involved an individual diagnosed with combat psychoneuroses.⁵⁹ In recent years, SMs and veterans returning from combat have described acquired stuttering in the presence of TBI and PTSD. Some of these case studies can be found in the literature and many more have been described at conferences.^{33,35,51,117,186}

Intervention Methods

See Clinician Tip Sheet: Acquired Stuttering and Other Speech Dysfluencies Assessment for cases of acquired stuttering.

CLINICIAN TIP SHEET: ACQUIRED STUTTERING AND OTHER SPEECH DYSFLUENCIES ASSESSMENT

Background

Acquired stuttering occurs primarily in adults; thus it is differentiated from developmental stuttering. Adult-onset of dysfluent speech can be due to:

- neurogenic etiology in people with psychosocial-emotional stress,¹⁹³
- psychogenic etiology in the presence of neurologic symptoms,¹⁹⁴
- stuttering associated with acquired neurological disorders,¹⁹⁰
- drug effects,¹⁰³ and
- cognitive-linguistic deficits effects.²⁶

Evaluation

Components of the evaluation of adult-onset dysfluency include:

- background information and case history;
- cognitive, language, and motor speech assessment;
- observation during a variety of speaking conditions, including:
 - reading (single words, short sentences, paragraphs),
 - spontaneous speech (monologue, conversation [minimum 200 syllables]), and
 - more automatic speech (counting, days, months, singing);
- speech situation checklist;
- stuttering severity (Stuttering Severity Instrument¹⁹⁵);
- self-assessment of attitudes (S-24,⁵¹ Locus of Control and Behavior¹⁹³);
- analysis of symptom congruity; and
- trials of fluency enhancing techniques (slowed speech, masking and delayed auditory feedback, pacing) to the following:
 - determine the effects on frequency and severity of dysfluencies, and
 - assess for symptom reversibility that will confirm the diagnosis.

Differential diagnosis begins with a comparison of acquired symptoms with developmental stuttering symptoms. It is difficult based on speech characteristics alone. Clues can be found by integrating the history of onset, course of symptoms, speech

characteristics, and consideration of the following behavior patterns:

- variability of symptoms across tasks and conditions;
- bizarre or unrelated secondary behaviors;
- psychosocial emotional factors;
- other neurologic symptoms, including speech and language disorders;
- performance on fluency-enhancing tasks; and
- intermittent periods of fluency.

Adult-Onset Stuttering

The following are descriptors to guide differential diagnosis of adult-onset stuttering.

Neurogenic Stuttering

Neurogenic stuttering

- usually co-occurs with other neurologic symptoms, including other speech-language or swallowing symptoms;
- elicits an individual reaction of concern when stuttering is present; and
- improves when demands on speech control are reduced, such as when speaking with whispered voice, or in a paced or rhythmic speech pattern.

Psychogenic Stuttering

Psychogenic stuttering is characterized by:

- a history of stuttering symptoms that resolved with stress resolution;
- symptoms that are variable across different speech tasks;
- “bizarre” or atypical accessory behaviors, struggle, or other secondary behaviors during motor speech examination; and it is
- the only communication complaint in the presence of multiple somatic complaints.

Rapid recovery or marked reduction of symptoms can occur with brief symptomatic intervention.

Because acquired stuttering occurs primarily in adults, diagnosis begins with a differentiation of symptoms from developmental stuttering (Exhibit 7-21).

CLINICIAN TIP SHEET: INTERVENTION FOR ACQUIRED STUTTERING AND OTHER SPEECH DYSFLUENCIES

Interventions and prognosis for acquired stuttering will vary depending on whether the etiology is neurogenic or psychogenic. When the etiology is undetermined, the patient response to intervention often contributes to differential diagnosis. For example, psychogenic stuttering responds to fluency-inducing conditions, whereas neurogenic stuttering will not. Neurogenic stuttering is consistent across speech stimuli and tasks and responds best to intervention focused on reducing demands on speech. Resolution of speech symptoms co-occurs with resolution of the neurologic symptoms.

Neurogenic Stuttering Treatment

Neurogenic stuttering treatment can be addressed using behavioral fluency treatment techniques, such as:

- focusing on breath stream, easy onset, gliding, and other strategies often used with developmental stuttering;
- rate reduction;
- self-monitoring;
- biofeedback and relaxation;
- speech pacing techniques to slow rate (eg, tapping as speaking or using a pacing board);

EXHIBIT 7-21

DIFFERENTIAL DIAGNOSIS OF ADULT-ONSET STUTTERING

Developmental Stuttering	Neurogenic Stuttering	Psychogenic Stuttering
• Gradual onset, usually between 2–4 years of age during rapid period of speech and language development • Can occur with developmental speech and language delay and disorders • Repetition, prolongations, and blocks of initial sounds and syllables; differs from cluttering • Occurs on context words • Adaptation effect • Responds to fluency-inducing conditions • Awareness, anxiety, fear and avoidance, tension, struggle increase over time	• Sudden onset in adults, due to neurologic event (eg, stroke, TBI, medication effect [tardive dyskinesia]) • Can occur with aphasia, apraxia, dysarthria; may occur in isolation • Similar core behaviors but not restricted to initial sounds and syllables • May occur on function words as well as content words; consistent across speech tasks • No adaptation effect • Does not respond to fluency-inducing conditions • Awareness, even annoyance, without anxiety, fear, avoidance, struggle; no secondary behaviors	• Sudden onset, in adults; triggered by somatization, prolonged stress or trauma, conversion disorder • Can occur with neurologic disease or present with suspected neurologic disease • Similar core behaviors but not restricted to initial syllables; excessive repetitions on every phoneme • Can occur anywhere in speech; with unusual secondary behaviors that are independent of core behaviors; unusual grammatical constructions (telegraphic) • No adaptation effect • May respond to fluency-inducing conditions • Awareness with variable anxiety, fear, avoidance and struggle; inconsistent relative to severity of symptoms

TBI: traumatic brain injury

- delayed auditory feedback^{189,197}; and
- pharmacological management,¹⁹⁸ including anxiety medications.^{192,196}

Psychogenic Stuttering Treatment

Psychogenic stuttering can be treated with symptomatic therapy.

- Observe speech for musculoskeletal tension.
- Palpate the thyrohyoid space for musculoskeletal tension.
- Educate patient about the association between tension and blocking of airflow.
- Teach patient to identify the locus of their musculoskeletal tension relative to stuttering episodes, to contrast feelings of musculoskeletal tension with muscular relaxation, and to modify and reduce tension.
- Select a high-frequency behavior to modify (eg, eye blinking, laryngeal blocking) or reduce musculoskeletal tension, laying your hands on the problem area if necessary.³³
- Practice speech without musculoskeletal tension, beginning at single word or sound level, depending on severity:
 - Single consonant and vowel syllable prolongation with airflow and easy onset or gliding
 - Single words: change type of dysfluencies (hesitation or repetition and try prolonged rate or synthesized speaking pattern)
 - Present frequent reminders of success with reduced musculoskeletal tension
- Vary speaking patterns after dysfluencies are reduced or eliminated, moving toward natural speech prosody.³³
- Implement techniques used with developmental stuttering, including prolonged speech, fluency shaping, easy onset, light contact, easy repetitions, and diminishing extra motor (secondary) behaviors.
- Reduce excess musculoskeletal tension associated with efforts to speak.
- Provide education and counseling to minimize frustration and other emotional reactions to speech symptoms.
- Provide frequent reassurance and positive feedback for successes.
- Follow a hierarchy of easy to difficult situations to transfer learned skills outside of therapy.^{193,197,199}

PATIENT HANDOUT: CHANGE BEGINS WITH AWARENESS

After c/mTBI, many people are confused and surprised by errors they make on tasks that were easy for them in the past. Progress begins as people become aware of the factors that interfere with their performance. This awareness motivates them to learn and use compensatory cognitive strategies to prevent performance problems before they occur.

AWARENESS = POWER

Becoming aware of inefficiencies, cognitive vulnerabilities, and other factors that sometimes accompany c/mTBI is a learning process in which people move up the awareness hierarchy (Figure 7-1).

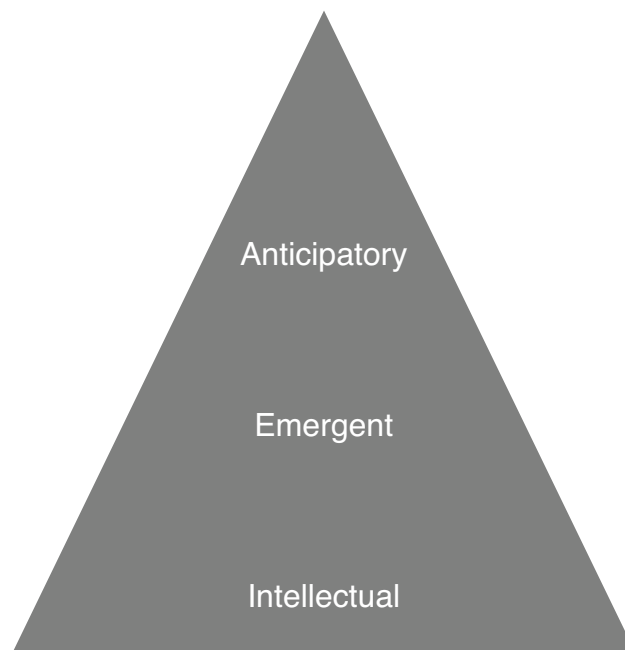


Figure 7-1. Levels of awareness.

TYPES OF AWARENESS

Intellectual awareness: Knowing there is a problem but being unable to recognize it when it is occurring (eg, “People tell me I repeat myself a lot during conversations.”).

Emergent awareness: Recognizing a problem when it is occurring (eg, “As soon as I started my story, I saw people look at me funny, I think I was repeating myself again.”).

Anticipatory awareness: Anticipating a potential problem and having a strategy in mind (eg, “Because I know that I tend to repeat myself, I always ask people if I’ve told them one of my stories before I launch in.”).

One goal of therapy is to help you improve your awareness of the factors that interfere with your performance and of those strategies that help.

PATIENT HANDOUT: CORE COGNITIVE STRATEGY RECOMMENDATIONS GRID

This grid represents a summary of the core cognitive strategies that have been tested and proven effective for you during your therapy program.

Area of Cognitive Inefficiency	Recommended Core Strategy	Real-World Application

**PATIENT HANDOUT: WORKING LOG
CORE COGNITIVE STRATEGY RECOMMENDATIONS GRID**

Problem Area	Cognitive Domain(s)	Date	Strategy Recommended	Strategy Evaluation		
				Effective		
				Yes	No	Maybe

PATIENT HANDOUT: "AAA" SELF-REFLECTION**ANTICIPATION** (fill this section out before performing the task)**Task Description**

Anticipated time (how long it will take to complete the task):

Anticipated accuracy (# of errors likely to make):

Cognitive challenges associated with this task (check all that apply)	Strategies I plan to implement to optimize my effectiveness in performing this task
Attention / concentration	
Memory	
Planning	
Problem solving	

ACTION (fill this section out while performing the task)

Start time: _____ End time: _____

Number of breaks during task performance: _____

ANALYSIS (fill this section out after performing the task)

Actual performance time: _____

- If it took you more time than predicted, why?
- If it took you less time than predicted, why?

Actual accuracy level: _____

- If you made more errors than predicted, why?
- If you made fewer errors than predicted, why?

What factors interfered with your performance?

What strategies **did** you use that helped you perform this task?

In hindsight, what strategies **should** you have used to improve your performance?

List two everyday tasks that pose similar challenges and require similar strategies:

- 1.
- 2.

PATIENT HANDOUT: UNDERSTANDING HUMAN INFORMATION PROCESSING

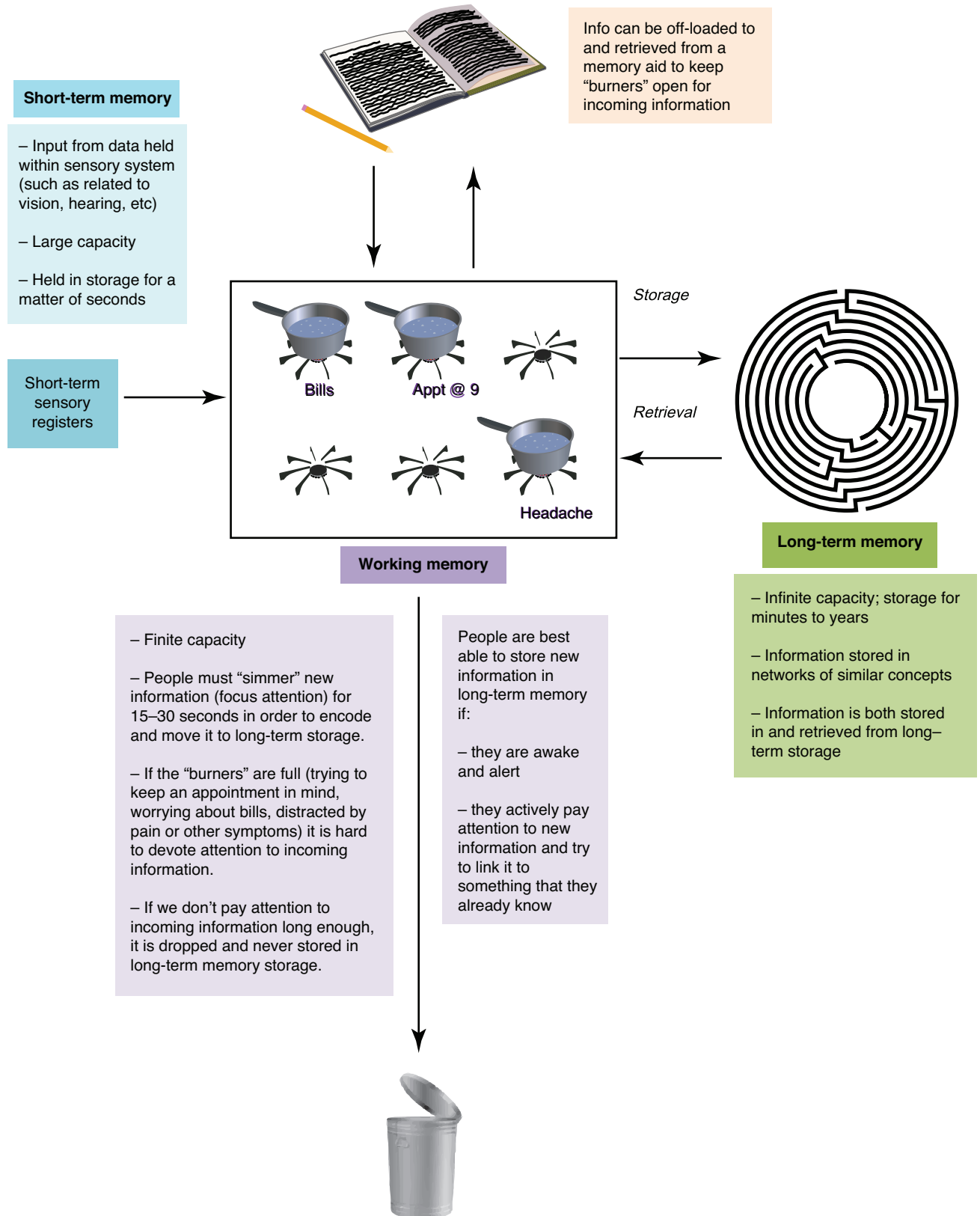


Figure 7-2. Human information processing diagram.

PATIENT HANDOUT: UNDERSTANDING THE MULTIFACTOR MODEL OF FUNCTIONING AFTER CONCUSSION



Figure 7-3. Multifactor model of functioning.

After concussion, an individual's injury combines with other factors to impact performance of everyday activities, social interactions, and ability to cope with stress.¹ These factors include:

- **personal factors:** internal distracters (such as fatigue, stress, physical symptoms, and negative thoughts), and
- **situational factors:** external distracters (such as noise, visual stimuli in the environment), multi-tasking, speed of processing, and information processing demands of the task at hand.

Fluctuations in performance from one day or situation to the next can often be explained by the presence of one or more of these complicating factors. Therapy enables patients to learn how to use various strategies to address and minimize the influence of personal or situational factors that interfere with their performance.

You may be able to improve your functioning after c/mTBI by managing various personal and situational factors. Here are some examples.

Personal Factors

Fatigue

- Perform tasks requiring high levels of concentration during times of the day when you are alert and energized. Save easy or routine tasks for times of the day when you tend to be tired. With this adjustment, you can remain active throughout the day.

- Institute good sleep hygiene practices.

Stress and Negative Thoughts

- Recognize when you are distracted by worries, stress, and negative thoughts.
- Work with mental health providers to identify strategies to manage your worries, stress, and intrusive thoughts.

Pain

- Perform tasks requiring high levels of concentration during times of the day when pain levels are lower. Save easy or routine tasks for times of the day when pain levels are greater. With this adjustment, you can remain active throughout the day.

Situational Factors

Noisy or Visually Distracting Environment

- Recognize when the environment is making it difficult to concentrate and make changes (modify the environment to minimize these factors or move to a different environment to eliminate distracters).
- Consider using “white noise” to buffer distracting sounds and noise.
- Remember that if you have difficulty filtering out noises, you may fatigue more quickly.

Multitasking

- Remember it is generally easier to do one task at a time. To optimize efficiency, avoid dividing or shifting attention among multiple tasks.
- Use strategies that slow down the rate at which you process new information. For example, ask people to repeat information, if necessary. Employ a “pause” strategy to give yourself a moment to stop and focus your attention on what’s going on around you and how you can best manage the new information.

PATIENT HANDOUT: UNDERSTANDING HIERARCHY OF ATTENTION LEVELS

Paying attention involves different levels of mental effort (Figure 7-4). We go back and forth between these attention levels all day. The higher the attention demands of the task or situation, the harder a person has to concentrate, and the more effort or energy is required to complete the activity.

- **Some tasks require lower levels of attention; others require higher levels of attention.**
 - Focused attention: I say your name and you turn and look at me.
 - Sustained attention: You listen to the news.
 - Selective attention: You filter out the music on the radio while balancing your checkbook.
 - Alternating attention: You are conversing with a friend at a coffee shop when your cell phone rings. After speaking to the caller, you hang up and continue the conversation with your friend.
 - Divided attention: You drive the car while talking with your passenger.
- **In addition to the task itself, personal and situational factors place demands on your attention.**
 - Personal factors: Being tired or worried makes it harder to pay attention.
 - Situational factors: Working in a noisy environment makes it harder to pay attention.
- **Remember, you optimize your ability to perform everyday tasks when you...**
 - understand your strengths and weaknesses specific to paying attention.
 - manage personal and situational factors that decrease your ability to pay attention.
 - choose the times of day or circumstances under which you can best handle tasks that demand the highest levels of attention.

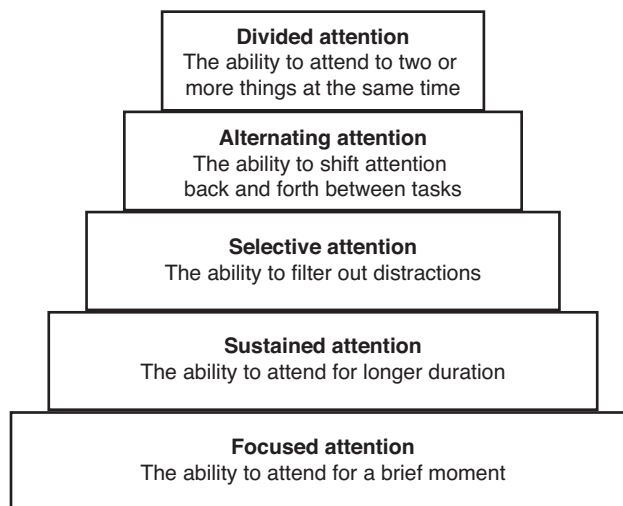


Figure 7-4. Hierarchy of attention levels.

PATIENT HANDOUT
INVENTORY OF ATTENTION/SPEED-OF-PROCESSING DIFFICULTIES

NAME _____ DATE _____

Task/Setting		DEMANDS						Rate of Processing
		Frequency of Problem	Length of Task	Alternate with Another Task	Same Time as Another Task	Personal Factors	Environmental Factors	
		Times per week	Minutes /hours					Slow Average Fast
	Strategies:							
		Times per week	Minutes /hours					Slow Average Fast
	Strategies:							
		Times per week	Minutes /hours					Slow Average Fast
	Strategies:							
		Times per week	Minutes /hours					Slow Average Fast
	Strategies:							

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PATIENT HANDOUT: EXPERIENCING ATTENTION LEVELS—FOCUSED AND SUSTAINED**Instructions**

- Read the activity description for each attention level.
- Before you start the activity, fill in the Self-Prediction chart.
- Perform the activity, then fill in the Self-Reflection chart.
- Be prepared to discuss your impressions with your clinician.

Sustained Attention Activity

Scan the rows of letters and cross out only the vowels. Work as quickly and as accurately as possible.

Self-Prediction: Hard / Average / Easy	No. of Errors:	Energy Cost: Low / Average / High
--	----------------	-----------------------------------

A T U R F G V I E S Q N B V M A O I P L K M P O R T D E V C X W A
 S E R U J N M V C X D J U I P K H G R E W Q C S X S Z S D V K L O L
 O E I J H G R W Q X C G B V G E D K J N B E I U T Y P K O L C X Z D S
 D T F E Q U T Y O P N M G F G V X C S D H J I P L I U T R W S X Z X
 V F D U J G I J H N G E R I U Y H L O I U H B G V F D X Z A E R D V O
 T U R F G V I Q S Q N B V M A O I P T K M P O R T D E V C X W A T Q
 S E R U J N M V C X D J U I P K H G R E W Q C S X S Z S D V K L O L
 O E I J H T W Q X C G B V G E Q K J N B E I U T Y P K O L C X Z D S
 D T F E Q U T Y O P N M T F G V X C S Q H J I P L I U T R Q S X Z X T
 V F T Q J G I J H N G E R I U Y H L O I Q B G V F D X Z A E R D V O R
 T U R F G V I Q S Q N B V M A O I P T K M P O R T D E V C X W A T Q
 S E R U J N M V C X D J U I P K H G R E W Q C S X S Z S D V K L O L
 O E I J H T W Q X C G B V G E Q K J N B E I U T Y P K O L C X Z D S Q
 D T F E Q U T Y O P N M T F G V X C S Q H J I P L I U T R Q S X Z X T
 V F T Q J G I J H N G E R I U Y H L O I Q B G V F D X Z A E R D V O R

Self-Reflection: Hard / Average / Easy	No. of Errors:	Energy Cost: Low / Average / High
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CLINICIAN ANSWER KEY

Correct answers: 115 vowels on the sheet

Row #1: 10

Row #2: 6

Row #3: 8

Row #4: 6

Row #5: 11

Row #6: 8

Row #7: 6

Row #8: 8

Row #9: 6

Row #10: 9

Row #11: 8

Row #12: 6

Row #13: 8

Row #14: 6

Row #15: 9

PATIENT HANDOUT: EXPERIENCING ATTENTION LEVELS—SELECTIVE ATTENTION (VISUAL AND AUDITORY)

Instructions

- Read the activity description for each attention level.
- Before you start the activity, fill in the Self-Prediction chart.
- Perform the activity, then fill in the Self-Reflections chart.
- Be prepared to discuss your impressions with your clinician.

Selective Attention (Visual Distracter) Activity

Scan the rows of letters and cross out only the letters T and Q. Work as quickly and accurately as possible.

Self-Prediction: Hard / Average / Easy	No. of Errors:	Energy Cost: Low / Average / High
--	----------------	-----------------------------------

T U R F G V I Q S Q N B V M A O I P T K M P O R T D E V C X W A T
 S E R U J N M V C X D J U I P K H G R E W Q C S X S Z S D V K L
 O E I J H T W Q X C G B V G E Q K J N B E I U T Y P K O L C X Z D
 D T F E Q U T Y O P N M T F G V X C S Q H J I P L I U T R Q S X Z X
 V F T Q J G I J H N G E R I U Y H L O I Q B G V F D X Z A E R D V O
 T U R F G V I Q S Q N B V M A O I P T K M P O R T D E V C X W A T
 S E R U J N M V C X D J U I P K H G R E W Q C S X S Z S D V K L
 O E I J H T W Q X C G B V G E Q K J N B E I U T Y P K O L C X Z D
 D T F E Q U T Y O P N M T F G V X C S Q H J I P L I U T R Q S X Z X
 S O R K W G E A O W G H U S P R G Y H H F D W S F G J U E K Q F I B
 M Y D R A E F G H I W J X H U W J K Q O P W I L O W H E A P F
 D W T Y U S A G W O P F H W Q I H J K L S E F G M Q D Y S H J X

Self-Reflection: Hard / Average / Easy	No. of Errors:	Energy Cost: Low / Average / High
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Selective Attention (Auditory Distracters) Activity

Scan the rows of letters and cross out the Fs and Cs; ignore anything you hear.

Self-Prediction: Hard / Average / Easy	No. of Errors:	Energy Cost: Low / Average / High
--	----------------	-----------------------------------

T U R F G V I Q S Q N B V M A O I P T K M P O R T D E V C X W A T
 S E R U J N M V C X D J U I P K H G R E W Q C S X S Z S D V K L
 O E I J H T W Q X C G B V G E Q K J N B E I U T Y P K O L C X Z D
 D T F E Q U T Y O P N M T F G V X C S Q H J I P L I U T R Q S X Z X
 V F T Q J G I J H N G E R I U Y H L O I Q B G V F D X Z A E R D V O
 T U R F G V I Q S Q N B V M A O I P T K M P O R T D E V C X W A T
 S E R U J N M V C X D J U I P K H G R E W Q C S X S Z S D V K L
 O E I J H T W Q X C G B V G E Q K J N B E I U T Y P K O L C X Z D
 D T F E Q U T Y O P N M T F G V X C S Q H J I P L I U T R Q S X Z X
 S O R K W G E A O W G H U S P R G Y H H F D W S F G J U E K Q F I B
 M Y D R A E F G H I W J X H U W J K Q O P W I L O W H E A P F
 D W T Y U S A G W O P F H W Q I H J K L S E F G M Q D Y S H J X

Self-Reflection: Hard / Average / Easy	No. of Errors:	Energy Cost: Low / Average / High
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CLINICIAN INSTRUCTIONS AND ANSWER KEY

Alternating Attention Activity 1

Clinician Instructions

Patients begin by adding the numbers in the row. At the first asterisk (*), ask them to switch to subtraction; at the second asterisk, switch to multiplication; at the third asterisk, switch back to addition; at the fourth asterisk, switch back to subtraction; and at the fifth asterisk, switch back to multiplication.

Correct Answers

(+) 4 = 9 = 11 = 15 = 20 = 28 = 29 = 31 = 34 = 35/
(-) 30 = 24 = 20 = 12 = 9 = 5 = 1/
(×) 5 = 10 = 10 = 30 = 60/
(+) 65 = 69 = 70 = 79 = 80 = 85 = 86 = 90/
(-) 81 = 80 = 72 = 70 = 61 = 60 = 56 = 50 = 45 = 40 = 32 = 30 = 29 = 20 = 13 = 11/
(×) 22 = 22 = 44 = 0 = 0 = 0/
(+) 2 = 6 = 7 = 12 = 15 = 17 = 18 = 22/
(-) 16 = 12 = 7 = 4 = 3/
(×) 6 = 18 = 18 = 36 = 72 = 72 = 0/
(+) 5 = 12 = 20 = 26 = 28 = 31 = 35 = 42 = 47 = 49 = 55 = 58/
(-) 51 = 47 = 43 = 37 = 31 = 29 = 28 = 20 = 13 = 8 = END

Divided Attention

Clues:

Outdoors
Alive
1 to 2 feet tall
Has roots
Has leaves
Fragrant
Green
Colorful
Pedals
Needs water
Answer: flower

CLINICIAN INSTRUCTIONS AND ANSWER KEY

Selective Attention (Visual Distracter)

Scribble over all the letters to create a visual distracter before giving patient worksheet.

Correct answers: 43 Ts and Qs

Row #1: 6
Row #2: 1
Row #3: 4
Row #4: 7
Row #5: 3
Row #6: 5
Row #7: 1
Row #8: 4
Row #9: 7
Row #10: 1
Row #11: 1
Row #12: 3

Selective Attention (Auditory Distracters)

Turn on a radio; after patient completes two lines, start talking about random subjects.

Correct answers: 26 Fs and Cs

Row #1: 2
Row #2: 2
Row #3: 2
Row #4: 3
Row #5: 2
Row #6: 2
Row #7: 2
Row #8: 2
Row #9: 2
Row #10: 3
Row #11: 2
Row #12: 2

PATIENT HANDOUT: EXPERIENCING ATTENTION LEVELS—ALTERNATING AND DIVIDED**Alternating Attention Activity 1**

This is a calculation task. Beginning with the first number, add each number to the one that follows, keeping the sum in mind. When you get to the asterisk (*), report your answer and the clinician will tell you which mathematical operation to do next.

Self-Prediction: Hard / Average / Easy	No. of Errors:	Energy Cost: Low / Average / High
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1 3 5 2 4 5 8 1 2 3 1 * 5 6 4 8 3 4 4 * 5 2 1 3 2 * 5 4 1 9 1 5 1 4 * 9
 1 8 2 9 1 4 6 5 5 8 2 1 9 7 2 * 2 1 2 0 5 8 * 2 4 1 5 3 2 1 4 * 6 4 5 3
 1 * 2 3 1 2 2 1 0 * 5 7 8 6 2 3 4 7 5 2 6 3 * 7 4 4 6 6 2 1 8 7 5 END

Self-Reflection: Hard / Average / Easy	No. of Errors:	Energy Cost: Low / Average / High
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Alternating Attention Activity 2

Your clinician will give you a deck of cards; you are to sort the deck into two piles. Start by putting the red cards in one pile and the black cards in the second pile. In 15 to 20 seconds, the clinician will direct you to sort them into piles of even and odd numbers.

Self-Prediction: Hard / Average / Easy	No. of Errors:	Energy Cost: Low / Average / High
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Self-Reflection: Hard / Average / Easy	No. of Errors:	Energy Cost: Low / Average / High
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Divided Attention Activity

This task involves doing two things at once. Sort a deck of cards into suits and put them in numerical order, with the aces acting as low cards. At the same time, your clinician will give you a clue every 15 to 30 seconds. Using these clues, you are to figure out what word the clinician is thinking of while you continue to sort the deck of cards.

Self-Prediction: Hard / Average / Easy	No. of Errors:	Energy Cost: Low / Average / High
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**PATIENT HANDOUT: STRATEGIES TO IMPROVE ATTENTION–
IDENTIFYING YOUR HIGH- AND LOW-DEMAND TASKS**

Key Attention Management Strategy: Match the Task to Your Attentional Abilities:

- Perform easy or low-consequence (low demand) tasks at times of the day or under circumstances in which your ability to pay close attention is limited.
- Perform easy or low-consequence tasks when the work environment is not something you can control.
- Perform high-consequence or difficult (high demand) tasks at a time in your day when you are well-rested, mentally alert, and when your symptoms (pain, headache) are under control.
- Perform high-consequence or difficult tasks in a quiet environment.

Before you can implement the above strategies, you must identify your high- and low-demand tasks.

1. List the key tasks that you are responsible for in everyday life. Consider work, home, personal, family responsibilities.
2. Rate the consequence level of each task.
 - high-consequence tasks: no tolerance for error (eg, bill paying, data entry, internet stock trading)
 - low-consequence tasks: errors do not really matter (eg, folding laundry, recycling, tooth brushing)
3. Rate the difficulty level of each task.
4. Review the chart and identify the tasks you rated as high consequence or difficult and those you rated as low consequence or easy.

I am responsible for these key tasks:		Consequence Level		Difficulty Level	
		High	Low	Tough	Easy
Personal					
Family					
I am responsible for these key tasks:		Consequence Level		Difficulty Level	
		High	Low	Tough	Easy
Work					
Household					

MY HIGH-DEMAND TASKS:

**Perform in quiet environments or when well rested, when symptoms are under control.*

MY LOW-DEMAND TASKS:

**Perform in more distracting environments or when symptoms are present but not debilitating.*

PATIENT HANDOUT: STRATEGIES TO IMPROVE ATTENTION–MODIFYING YOUR APPROACH AND WORKSPACE

Optimizing your attention begins with awareness of your vulnerabilities and the strategies that can help. You can make it easier to perform most tasks if you optimize your approach and work environment by reducing demands at this time. Here are some suggestions that may work for you and in your workspace.

Reduce Length of Task

- Set a timer to help you focus for a specific amount of time before taking a break.
- Take a brief quiet break every 30 to 60 minutes or more (get a drink of water, stretch, etc) to optimize your alertness.
- Use an alarm to remind you to take a break and to return to a task or initiate another task.
- Plan ahead so you schedule tasks that require high levels of attention at high-energy times of the day or when you are least likely to be distracted by pain or fatigue. Schedule easy tasks at times you are likely to be tired and less able to pay attention; be assured that these tasks do not require high levels of energy or attention.
- Allow extra time to complete tasks with scheduled breaks.

Reduce Competing Tasks

- Apply the above strategies to reduce demand on focused or sustained attention.
- Do one task at a time if possible, or alternate with another tasks that is not high consequence or difficult.
- Do not divide attention on high consequence and difficult tasks.
- Set an alarm to remind you to initiate another task.
- Organize your space and your work task (eg, keep all things needed for a task in one drawer, categorize and file orders for a task in a binder) so that you can shift from one assignment to another easily.
- Do not talk on a cell phone while driving or operating other equipment.
- Limit conversations while driving.

Reduce Personal and Environmental Factors That Can be Distractions

- Apply the above strategies for focused/sustained and alternating/divided attention.
- Rest prior to demanding situations.
- Set the room temperature so it is cool enough to keep you alert yet comfortable.
- Dim lights, close curtains, wear dark glasses, or face your back to light if glare or bright lights are uncomfortable. On the other hand, increase light or magnitude of what you are seeing or reading if you have low vision to reduce strain.
- Close the door or go to a quiet room or quieter part of a room.
- Choose to sit in an area with the least number of distractions (eg, corner booth by the wall).
- Turn off unnecessary noise in the environment. No television or radio if you find them distracting.
- Create “white noise” to block ambient noises around you that are hard to ignore (eg, turn on a small fan so that the hum of the fan blocks distracting noise from nearby conversations, use music to block out background noise).
- Situate yourself as you work so that visual distractions are minimized (avoid positioning yourself in front of a door or window if outside activities make it hard to concentrate).
- Temporarily move objects out of your sight that draw your attention away from the task at hand.
- Try to refrain from conversation or interruptions during a task or until you have reached a “stop point.” Develop a script to politely explain to family members or coworkers that you work most efficiently in quiet without diversions. To maintain relationships, develop another script to invite visits from them or engage in conversation at other times when it will not compete with your work.
- Run errands or attend social activities at nonpeak hours.

PATIENT HANDOUT: STRATEGIES TO IMPROVE ATTENTION—MANAGING INTERRUPTIONS AND MULTIPLE TASKS

Optimizing your attention begins with awareness of your vulnerabilities and the strategies that can help. Minimize the cost of interruptions and best handle multitasking by planning your strategy in advance. Here are some strategies that might work for you.

- If you know you are going to be interrupted, select a highly familiar, mundane task to perform (such as folding laundry, cleaning counter surfaces) rather than a task that requires high levels of accuracy and demands your undivided attention (such as bill paying, computer data entry).
- Knowing that a conversation may cause distractions (and errors) while you work, find a polite way to discontinue the conversation. Come up with some polite phrases ahead of time, such as “I have to concentrate on this right now, so can I get back to you later to hear more?”
- If interrupted, finish your thought or attempt to reach a breakpoint before stopping what you are doing. You may need to hold up your hand to signal the person that you will be right with him or her in a moment.
- Use “stop notes” to pick back up after an interruption (Figure 7-5). Stop notes are a way to capture your thoughts about what you were doing or thinking at the time you stopped work. Here are some examples:
 - If interrupted while reading, write down a few notes and place a “sticky” note at the place you stopped.
 - If interrupted on a project, create a stop note that includes what you last completed and where to restart the task (later in the day, tomorrow, or next week).
- Plan for interruptions before you get started on a project that will take many days (weeks or months) to complete by creating a “divide-and-conquer” project game plan. Developing a step-by-step plan before you begin work enables you to place a checkmark by the last step completed when interrupted and to pick right back up on the next step when you get back to the project. The same strategy may help you juggle two projects at the same time.
- If you know that you need to be interrupted mid-task (to go to an appointment, for example), set an alarm to remind you at the appropriate time. That way you can fully attend to what you are doing without worrying that you will forget to stop.
- Implement strategies aimed at modifying your approach to the task and structuring your environment.

STOP NOTE

11/11/09

What I just did:

- Called Ann @
state farm + got
damage estimate
- She will call me
back with salvage
value

To do next:

☐ call body shop
☐ fax paperwork

Figure 7-5. Example of a stop note.

PATIENT HANDOUT: COPING WITH SLOWER SPEED OF PROCESSING—USING THE AUDITORY SYSTEM

Background

At times you may not be able to control or change the complexity and rate of incoming information. Under these conditions, you can still be proactive and make it easier to perform most tasks with strategies to enhance your ability to hear, the quality of the listening conditions, and processing of information through optimal use of the auditory system.

Step 1: Recognize adverse listening conditions or demands to predict potential difficulty. This level of awareness allows you to select and use an appropriate strategy.

Step 2: Your clinician will guide you through the process of selecting, trialing, and implementing an appropriate strategy that works for you when you need it. Some examples include:

- Turn off appliances (television, radio) and close doors and windows to reduce extraneous information and noise that can compete with what you really want or need to hear and understand.
- Ask for or seek preferential seating (up front, away from machinery). This will allow you to see the speaker, and possibly even lip read if necessary.
- Do not pretend to understand: clarify! Ask questions to make sure you understand instructions and assignments.
- Retell, restate, or paraphrase directions and instructions to confirm your understanding.
- Use technology (eg, digital recorders, smart pens) to record lectures and lessons for playback at home during study and homework sessions.
- Record meetings, briefings, and appointments for playback at a later time or during daily review.
- Use an assistive listening device to improve your hearing in challenging situations, such as in large meeting rooms and lecture halls.

PATIENT HANDOUT: COPING WITH SLOWER SPEED OF PROCESSING—USING THE VISUAL SYSTEM

Background

At times you may not be able to control or modify the demands or the complexity and rate of incoming information. Under these conditions, you can still be proactive and make it easier to perform most tasks with strategies to enhance ability to hear and to process the information you hear through optimal use of the visual system.

Step 1: Recognize adverse listening conditions or demands that can be helped by adding a visually mediated strategy. This level of awareness allows you to select and use an appropriate strategy.

Step 2: Your clinician will guide you through the process of selecting, trialing, and implementing an appropriate strategy that works for you when you need it. Here are some examples:

- Choose face-to-face interactions and make frequent eye contact with the speaker to keep engaged in an interaction and benefit from verbal and nonverbal cues.
- Make liberal use of visual models, pictures, videos, and computer-generated models, or any other means available.
- Use organizers, like agendas and smartphone applications, create to-do lists, or use calendar applications in cellular phones to store and review information.
- Use your visual reasoning skills to understand materials and to express your own understanding.
- Have tasks demonstrated when possible.
- Select closed-caption (subtitles) option when watching television or videos.
- Send or request texts to clarify information after a conversation.
- Read notes, book chapters, or manuals or do internet searches ahead of time (for example, before a lecture) to cue into and anticipate new terms, words, and concepts.
- Create a study guide that includes key vocabulary with definitions, guiding questions, and a clear statement of learning goals for the task. Prepare for what you are going to hear.
- Ask for assignments and directions in writing, in e-mails, or as a summary after a discussion.

**PATIENT HANDOUT: AAA SELF-REFLECTION WORKSHEET FOR ATTENTION
AND SPEED OF PROCESSING**

Anticipation (complete this section before performing the task)

Task description:

Anticipated time (how long it will take to complete the task):

Challenges associated with this task	Strategies I plan to implement to optimize my effectiveness in performing this task
Sustained attention	
Selective attention	
Alternating attention	
Divided attention	
Speed of processing	

Anticipated accuracy (number correct/errors):

Action (complete this section out while performing the task)

Start time: _____ End time: _____

Number of breaks during task performance:

Analysis (fill this section out after performing the task)

Actual performance time: _____

If it took you more time than predicted, why?

If it took you less time than predicted, why?

Actual accuracy level: _____

If you made more errors than predicted, why?

If you made fewer errors than predicted, why?

What factors interfered with your performance?

What strategies did you use that helped you perform this task?

In hindsight, what strategies should you use to improve your performance?

List two everyday tasks that pose similar challenges and require similar strategies:

1.

2.

PATIENT HANDOUT: COMPENSATORY MEMORY STRATEGIES—INTERNAL AND EXTERNAL OPTIONS

Background

People use a number of strategies to make sure they consistently and effectively keep track of information. After c/mTBI, these strategies become important in assuring ongoing competent performance of daily tasks. In therapy, you will identify and learn to use the memory strategies that help you function at your best.

There are two categories of memory strategies:

1. Internal strategies (those that involve thinking techniques to help you encode new information into memory).
2. External strategies (those that involve physical aids, such as using notes, planners, devices, or alarms to help you keep track of information without relying on your memory).

You will likely find both categories of memory strategies helpful. Here are some examples of strategies to explore with your clinician.

Internal Strategies

- Helpful in situations when it is impractical or inappropriate to take notes (such as remembering information while driving).
- Helpful to remember information for which a written note might be insecure (such as remembering one's personal identification number or password).

Strategy Example	Description	Real-life Application
Visual imagery ^{1,2}	Making a mental picture of to-be-remembered information	Imagining items to be purchased while sitting around in your living room
First letter mnemonics ²	Using the first letter of each to-be-remembered item to create a word	To help remember names: N: notice (facial features) A: associate the person's face with something familiar to you or an image that the name suggests M: mention the name in conversation E: Exaggerate some aspect of the name or face to hold it in memory
Mental retracing ³	Reviewing activities from the recent past to help trigger recollection of what they need to do	Can be used when people forget their current intention (eg, walking into a room and forgetting why or what was needed from the room)
Alphabetic searching ^{3,4}	Word retrieval strategy	When having trouble retrieving a name or concept, individual systematically reviews the letters of the alphabet that may serve as a first letter cue to trigger recall of the desired information
Elaborated encoding of information ^{5,6}	Strategies are used to hold and manipulate information in short-term memory in ways that will facilitate stronger encoding and storage of the information in long-term memory	When learning definitions for concepts in school, mentally 1) review the definition, 2) rephrase the definition in your own words, 3) match the word to synonyms or antonyms, and, 4) use the word in self-generated sentences

(table continues)

table continued

Peg mnemonics ^{4,7}	An associative memory strategy in which a person memorizes a “peg-set” of imaginable words (eg, one is a bun, two is a shoe, three is a tree, four is a door, five is a hive, six is sticks, seven is heaven, eight is a gate, nine is a line, ten is a hen)	Once the “peg-set” is memorized, additional items that need to be remembered can be associated with items on the list and an image created that incorporates both items. The visual association of new items to those on the memorized list facilitates retrieval of the desired information
Spaced retrieval ⁸	Learning is most effective when the learning episodes are spread out over time (distributed learning) rather than all at once (massed practice). Spaced retrieval is a specialized form of distributed learning in which a small amount of information is learned and then retrieved at a very short interval (eg, 1 minute). The length of the interval is systematically increased (eg, 2 minutes, 4 minutes, 8 minutes, etc)	This is a powerful learning strategy that has been used successfully to train people with dementia with new skills

External Strategies

- Helpful in situations when keeping track of information would be effortful or unreliable.
- Helpful in situations when you want to focus your attention fully on the task at hand (rather than worrying about potentially forgetting something important).
- Assistive technology for cognition provides a means of recording important information for later review. Devices that serve this purpose include smart pens, smartphones, and voice recorders as well as low-tech options such as a notepad and pencil or wipe-off board.

Strategy Example	Description	Real-life Application
Day planner/ calendar	Low technology Paper-and-pencil planner Dry-erase board	Using a daily planner to keep track of medical appointments, therapy assignments, and family activities
Cellular phone, other smartphone, or computer	Calendar with alarm Task applications Alarm clock Stopwatch	Using calendar or scheduler function to set alarms for time-specific prompts
Environmental cues	Organizing and structuring the environment to facilitate efficient retrieval of personal items, compliance with due dates or medication schedules, recall of information; includes use of sticky notes, checklists, labels, key holders, mail sorters, pill boxes	Organizing and labeling storage cabinets, setting up filing systems, creating message centers, establishing bill payment systems, reducing clutter

(table continues)

table continued

Alarm watch	Setting daily alarms to prompt taking medications, routine breaks or pauses, or time-specific actions
Data sources: 1) Killam C, Cautin RL, Santucci AC. Assessing the enduring residual neuropsychological effects of head trauma in college athletes who participate in contact sports. <i>Arch Clin Neuropsychol</i>. Jul 2005;20(5):599–611. 2) Parenté R, Herrmann D. <i>Retraining Cognition: Techniques and Applications</i>. 2nd ed. Austin, TX: Pro-ed; 2002. 3) Duff MC, Proctor A, Haley K. Mild traumatic brain injury (MTBI): assessment and treatment procedures used by speech-language pathologists (SLPs). <i>Brain Inj</i>. Sep 2002;16(9):773–787. 4) Moffat N. Strategies of memory therapy. In: Wilson BA, Moffat N, eds. <i>Clinical Management of Memory Problems</i>. Rockville, MD: Aspen; 1984. 5) Oberg L, Turkstra LS. Use of elaborative encoding to facilitate verbal learning after adolescent traumatic brain injury. <i>J Head Trauma Rehabil</i>. Jun 1998;13(3):44–62. 6) O’Neil-Pirozzi TM, Strangman GE, Goldstein R, et al. A controlled treatment study of internal memory strategies (I-MEMS) following traumatic brain injury. <i>J Head Trauma Rehabil</i>. Jan–Feb 2010;25(1):43–51. 7) Stringer AY. <i>Ecologically Oriented Neurorehabilitation of Memory</i>. Los Angeles, CA: Western Psychological Services; 2007. 8) Turkstra LS, Bourgeois M. Intervention for a modern day HM: errorless learning of practical goals. <i>J Med Speech-Lang Path</i>. 2005;13:205–212.	

PATIENT HANDOUT: DAILY AND WEEKLY PLANNING

Background

You will be most effective with your memory aid if you establish consistent daily and weekly procedures for adding information to your system and reviewing information you have already inputted.

- A **daily planning routine** will ensure that you see notes and information in a timely fashion.
- A **weekly planning routine** will help you anticipate upcoming events (and coordinate with others) and put prompts into the system for the week ahead.

- Decide on a consistent time of day (morning or evening) for daily planning and stick to it.
- Decide on a consistent day of the week for weekly planning.
- During the planning process, follow each step as listed on your checklist.
- Check off each step after it is completed.
- Remember, you will establish a habit if you consistently repeat the steps involved in planning.

Your clinician will guide you through developing a daily and weekly planning procedure that addresses your needs and preferences.

Here are examples:

EVENING PLANNING ROUTINE

STEPS:	M	T	W	Th	F	Sa	Su
1. Review "to do" list							
2. Check off all completed tasks and forward undone tasks to tomorrow							
3. Review tomorrow's appointments							
4. Set cell phone to alarm 1 hour before the appointment							
5. Make a note on tomorrow's planner page to remind you to do this procedure again							

WEEKLY PLANNING ROUTINE

STEPS: WEEK OF:							
1. Review your appointments for the week ahead; make sure all are recorded on calendar							
2. Make notes to yourself to do your exercise program on M, W, & F							
3. Check the family calendar and transfer relevant information to the planner							
4. Ask Sarah if she needs you to help in some way next week; if so write notes on appropriate days							
5. Make a note on next Saturday's planner page as a reminder to do this procedure again							

DAILY PLANNING ROUTINE

STEPS:	M	T	W	Th	F	Sa	Su

WEEKLY PLANNING ROUTINE

STEPS: Week of:							

PATIENT HANDOUT: MEMORY STRATEGY–INTENTIONAL READING

What Is Intentional Reading?

- An approach to reading that requires the reader to intentionally go through stages of memory, actively focusing attention and encoding new information.
- This strategy can be helpful if you have trouble paying attention when reading or if you have difficulty remembering what you read.

How You Do It

1. Have a pen and paper available when you start reading.
2. Divide your paper vertically into halves.
3. On the **left side** of the paper, write down **important facts or key points**.
 - This ensures that you sustain attention long enough to process the information.
 - It ensures that you slow down your reading pace to allow for note taking.
 - It ensures that you encode information.
 - It requires you to isolate the most important components of the text.
 - It ensures that you understand the main point of the information.
4. On the **right side** of the paper, write down your **thoughts, questions, and opinions**.
 - What questions come to mind related to the content?
 - What does this material remind you of?
 - Are there any diagrams or pictures that can capture the content better than words?
5. Look back at the reading material to see if you can answer your own questions. Keep your paper to remind you of what you read in case you need it later.

Example

Intentional Reading Form	
Important facts/information	• Questions • Reminds me of . . . • Diagrams/charts • Things I need to look up

PATIENT HANDOUT: TEN WAYS TO IMPROVE YOUR MEMORY

Defense and Veterans Brain Injury Center

This tool is to be used as a patient education resource during a visit with your provider. Developed by subject matter experts from the Department of Defense and Veterans Administration (Version 2: 4 May 2009) Defense and Veterans Brain Injury Center, 11300 Rockville Pike, Suite 707 Rockville, MD 20852. Telephone: (301) 589-1175. Fax: (301) 230-1976. Website: www.dvbic.org

1. **Get seven to eight hours of sleep.** Keep a quiet, cool environment. Go to sleep at the same time nightly. Don't nap. Avoid high-energy video games / movies / television prior to bedtime. Avoid exercise before bedtime.
2. **Write it down.** Keep a notebook and pen with you and write things down, it will keep you on track and help remind you of important things, like taking your medication. Day planners or small calendars also help.
3. **Avoid alcohol, tobacco, excessive caffeine, and energy drinks.** These increase sleep problems, anxiety, blood pressure levels, and overall stress.
4. **Prioritize.** Make a list of things that need to be taken care of, place them in order of importance, and check them off when completed.
5. **Get a routine.** Put your keys in the same spot every day. Park in the same areas. Being consistent helps memory and lowers anxiety.
6. **Keep mentally active.** Work crossword puzzles. Read a book. Play a board or card game, like solitaire or concentration. Learn something new every day.
7. **Decrease your stress level.** Don't take on too much at one time. Keep stress to a minimum. Stress hormones can damage your brain and add to depression and anxiety. Learn to say "no" when you're feeling overwhelmed. Ask for help when you need it. Make time for you.
8. **Stay physically active.** Take the dog for a walk. Take the stairs instead of the elevator. Small spurts of exercise add up. The higher blood flow to your brain helps promote cell growth. Exercising is also a mood booster and helps with mental clarity.
9. **Feed your brain.** Eat high-quality foods at regular intervals. Fish, colorful fruits and vegetables, milk, eggs, whole grain breads, nuts, and beans all help keep the brain and body healthy.
10. **Avoid further brain injury.** Consider swimming, walking, or running instead of playing football or boxing. Wear a helmet when riding your bike or motorcycle. Drive safely. Stay sober.

PATIENT HANDOUT: UNDERSTANDING EXECUTIVE FUNCTIONS

People make thousands of decisions every day. Most of these decisions are automatic and habitual (eg, reaching for a stick shift to change gears). However, when faced with unfamiliar or highly complex situations, decision making becomes conscious and deliberate (eg, finding a new route when blocked by road construction).

Most everyday activities fall into one of two categories:

1. Automatic tasks (skilled performance, habits, and routines)
2. Unfamiliar, changing, or complex tasks

People rely on the frontal lobe of their brains to organize their approach to unfamiliar, changing, and complex tasks. The frontal lobe of the brain is responsible for high-level thinking skills called “executive functions.”

Executive functions describe two main categories of thinking skills: self-regulation and problem solving.

Self-Regulation

Self-regulation involves:

- Initiation
- Self-awareness
- Inhibition (regulating emotional responses)
- Resisting distractions/paying attention
- Appreciating obstacles and problems
- Mental flexibility (knowing when and how to change course)

Problem Solving

Problem solving involves:

- Understanding the problem
- Generating possible ideas and solutions
- Appreciating limits and restrictions of various solutions
- Prioritizing
- Anticipating consequences
- Making decisions

You may be less effective with executive functions when you are stressed or depressed, or if you have experienced a concussion. Inefficiencies in self-regulation and problem solving will become more pronounced when you are fatigued, in pain, stressed, experiencing negative thoughts, or when there are distracters in the environment.

The first step in addressing this issue is to try to understand in which areas your performance might break down. For example, do you know what you need to do but you can’t get started? Do you get started, but can’t change course even when you know what you’re doing is not moving you toward the intended goal?

Review the list of skills associated with self-regulation and problem solving on **Patient Handout: Rating Your Executive Function Skills**. Mark an “X” in each area where you see a personal strength and in each area you perceive as a weakness.

The second step in addressing this issue is to identify and then practice strategies that can help you maintain efficient and effective performance of your tasks and life roles. Work with your clinician to determine the strategies that are best for you.

PATIENT HANDOUT: RATING YOUR EXECUTIVE FUNCTION SKILLS

Executive Functions	Strength	Weakness
<i>Self-Regulation</i>		
Initiation: Can I get myself started?		
Focus: Can I resist distractions and stick to task?		
Self-monitor: Do I know when I've made a mistake?		
Mental flexibility: Can I change a plan when needed to reach my goal?		
<i>Problem Solving</i>		
Identification: Do I recognize when there is a problem?		
Flexibility: Can I think of more than one way to approach a problem?		
Evaluation: Do I know which plan is the best one to reach my goal?		
Prioritization: When faced with multiple problems, do I know which one to work on first, second, etc?		
Recognizing consequences: Am I able to predict how a plan will work, or am I surprised by the outcome?		
Decision making: Can I make decisions or do I get lost in the process and never really decide on what to do?		
<i>Emotional Regulation</i>		
Emotional regulation: Can I keep a clear head when solving problems, or does irritability, anger, or other emotion lead to poor decision making?		
Self-awareness of emotions and decision making: Can I recognize the situations that trigger irritability and anger and use strategies to keep my thinking clear?		

PATIENT HANDOUT: STRATEGIES FOR PROBLEM IDENTIFICATION

Problem Identification

The sooner a problem is recognized, the sooner you will be able to begin the process of problem solving, and the better the outcome is likely to be. Paying attention to cues within a situation, including your own emotions and the reactions of others around you, can signal that things may not be going as well as you would like and indicate that a problem exists.

Emotion Cues

Feelings of frustration, anxiety, irritation, and anger may be signs of problems that need to be addressed. Many of these emotions are uncomfortable and often a first response is to avoid thinking about these emotions. Instead try to:

- step back and observe the emotion and how it feels.
- avoid actively doing anything about the emotion; simply observe it, neither blocking it nor holding on to it.
- identify the emotion.
- focus on the underlying problem by asking yourself where the emotion is coming from.

Social Cues

Problems may be signaled by the reactions of others around us. As you interact with others:

- pay attention to how they respond to you. Look for expressions of irritation, frustration, or lack of engagement.
- if the situation permits and you are comfortable bringing this up, ask the person you are talking with if there is anything wrong. If not, you may ask others present in the group, at a later time, if they noticed any problems in the situation.
- begin the problem-solving process if problems are identified.

Outcome Cues

When problem-solving approaches fail, it is often because of one of two reasons: the problem has not been fully understood or the current approach to the problem is flawed.

- Review the entire problem sequence using Patient Handout: Problem-Solving Process to identify any weakness in problem identification or planning.
- Problems in self-monitoring may result in undetected errors that can undermine the success of the plan. Use the “pausing” strategy (see Patient Handout: Strategies to Improve Self-Regulation–Pausing) at intervals through the problem-solving process to help you identify mistakes that can be corrected.

PATIENT HANDOUT: EMOTIONAL SELF-MANAGEMENT WORKSHEET

Problems with emotional regulation can present as a significant barrier to problem solving. When people become frustrated, irritated, or angry, their thinking becomes less clear and they may say and do things that work against them and undermine their goal accomplishment. Many times people feel that irritability and anger “come out of nowhere” to cause difficulties. However, there are often recognizable early warning signs that, when identified, can signal the beginnings of irritability or anger that can turn into loss of emotional control.

The Emotional Self-Management Worksheet helps you:

- analyze situations where you have experienced difficulties with emotional regulation, and
- develop strategies to maintain the emotional control that supports good decision making and problem solving.

In the first column, you are asked to recall the physical characteristics, specific behaviors, cognitive signs, and emotions that led up to the problem situation. This allows you to identify patterns that can indicate that you may have difficulty controlling emotions. For example, you may notice that headaches, fatigue, a strained-sounding voice, and difficulty concentrating are frequent indicators of subsequent loss of emotional control. In the second column, you identify the context where a loss of emotional control occurred (eg, where you were, who was there, and what was occurring) to describe patterns that may give you insights into what situations serve to trigger a loss of emotional control. For example, you may notice frequent difficulty when you come home from work and are discussing your day with your spouse while your children are running around and yelling to get your attention. In the third column, you describe your reaction (eg, what you thought, what you felt, and what you did).

Typically, what we think strongly influences how we feel, and in turn what we do. Changing patterns of thinking in stressful situations can have a significant impact on how you feel and how you respond. Identifying early warning signs and triggers of emotional dyscontrol allows you to develop strategies that will help you keep your cool in challenging situations. Strategies to keep calm under stress include:

- **Relaxation breathing.** Using relaxation breathing takes practice but can be a powerful strategy for maintaining a sense of calm in stressful conditions.
 - Inhale slowly, counting to 3 or 4 as you inhale.
 - Exhale slowly and double the count of the exhalation. For example, if you inhale to a count of 3, exhale to a count of 6.
 - As you exhale, think of an image that is compatible with being calm and relaxed.
- **Positive self-talk.** We all have a little voice in our head that tells us what to do. This is normal. When things seem to go wrong, sometimes that voice becomes negative (eg, “I’m too slow,” “I can’t do this like I used to,” “They are always working against me”). This pattern of thinking can impact subsequent feelings and behavior and result in emotional control difficulties that undermine problem solving. Develop a list of positive self-talk statements that you can use in difficult situations (eg, “I don’t have to rush, I can take my time,” “I’ll relax and do my best work,” “People are doing their best to support me”). Positive thinking tends to create positive feelings that translate into greater emotional stability and control. This ultimately results in better problem solving.

Before the Reaction	Context (situation)	My Reaction
Physical indicators (eg, headache, fatigue, pain, jaw tension)	Earlier events (eg, late for work and feeling rushed, argument with spouse)	What did I think?
Behavioral indicators (eg, loud voice, tapping foot)	Where did the difficulty occur?	What did I feel?
Cognitive indicators (eg, confusion, trouble following conversation, feeling rushed)	Who was present?	What did I do?
Emotional indicators (eg, feelings of, irritability, anger, embarrassment)	What was the situation?	What was the outcome?

PATIENT HANDOUT: STRATEGIES TO IMPROVE SELF-REGULATION--PAUSING

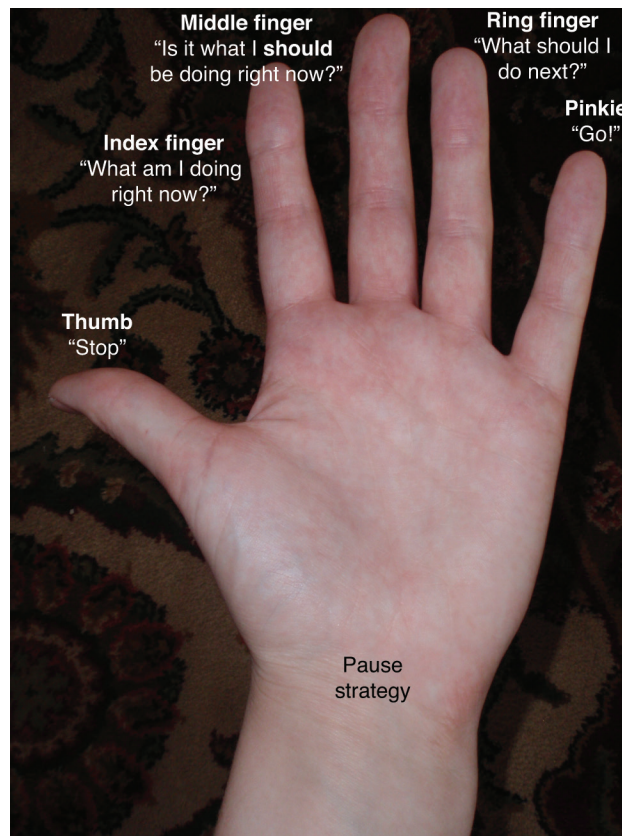


Figure 7-6. Pausing, a strategy that can improve your thinking in many ways, refers to taking a moment to align your brain and your body and to think calmly about what you are doing at the present time. It is helpful when you feel overwhelmed, distracted, or absentminded. Pausing can be used throughout the day and in almost every situation. Use your hand as a cue to think about the five steps involved in pausing.

PATIENT HANDOUT: STRATEGIES TO IMPROVE INITIATION

Sometimes people find that they just do not have the “get-up-and-go” that they had before a brain injury. These are some strategies to help you improve initiation.

Step 1

The first step to improving your initiation is to figure out what the barrier is. Difficulty with initiation can be caused by a variety of factors:

- decreased awareness of what needs to be done
- lack of energy needed to start or see things through
- inability to break tasks down into achievable steps
- difficulty with prioritization
- difficulty knowing when to do what
- fear of being interrupted
- lack of desire
- inability to generate ideas of things to do
- difficulty tracking time
- difficulty staying on task/attending
- perfectionism
- procrastination
- different priorities
- inability to function under pressure
- pain

Step 2

Next, identify the life management skills or strategies that can help you move beyond that barrier. The strategies need to match the barriers. Strategies for the common issues are suggested below.

Fatigue/Pain

- Pacing; taking a break
- Balanced lifestyle (good nutrition, sleep, exercise)

Executive Issues (difficulty with organization, planning, and attention)

- Checklists; external prompts (alarms)
- Stop notes
- Environmental adaptations
- Development of routines or habits

Overwhelmed

- Divide and conquer
- Problem-solving approaches
- Pausing; prioritization

Emotional Contributors

- Work with a psychologist

PATIENT HANDOUT: BUILDING HABITS AND ROUTINES

The Benefits of Structure

After illness or injury (or even another life change, such as retirement), individuals find themselves without structure or automatic habits and routines. This can lead to decreased time-management skills, disorganization, decreased productivity, and increased everyday memory errors. Inefficiencies like these make a person feel a sense of loss and decreased self-confidence. However, one of the best ways to get back on track is to set up new patterns of activity and repeat them consistently until they become new habits and routines.

Here are some suggestions for adding structure to your daily life:

- Get up at the same time every day.
- Reestablish personal care routines.
- Use a calendar and a daily planning checklist.
- Be responsible for creating and maintaining your own schedule.
- Carve out time in your day for a balanced life: scheduled appointments, regular contribution to home management tasks, and time for hobbies and social engagements.
- If work is not yet a reasonable goal, consider volunteering. Set up regular times and expectations.
- Create reasonable expectations; set goals for yourself and ask someone you trust to help hold you accountable.
- Set up a recurring task schedule for tasks of priority (see example below). Schedule tasks of importance for certain days of the week and make an effort to adhere to the new regimen.

Example Worksheet

Tasks	M	T	W	Th	F	Sa	Su
Morning aerobic exercise							
Sort mail inbox							
Check bank balance							

PATIENT HANDOUT: GENERATIVE THINKING STRATEGIES

What is Generative Thinking?

Generative thinking refers to the ability to come up with a variety of options or alternate solutions to problems or task approaches. It is a frontal lobe function and very susceptible to fatigue, stress, pain, and negative thoughts.

Generative thinking enables people to come up with a number of possible solutions to a given problem. By generating a number of possible solutions, the individual can evaluate them and ultimately select the best one. Generative thinking prevents people from getting locked in to only one approach.

Strategies That Help People Generate a Variety of Options and Solutions

Consider these options if you feel like you just can't come up with alternate solutions (and especially when the one you're using is ineffective).

- Leave the task or situation, do something else for a while, and come back later. Often a break will free your thinking and other circumstances may prompt new ideas.
- Brainstorm with another person.
- Gather more background information.
- Think about similar problems in the hope that it will enable you to think differently about your problem or task at hand.

If you experience difficulty with generative thinking as you perform tasks that are easy and familiar, you may simply need to use the pausing strategy to self-reflect.

- Are your personal factors under control?
- Are the situational factors making this more difficult?

PATIENT HANDOUT: PROJECT PLANNING STRATEGY–DIVIDE AND CONQUER

Instructions

This worksheet guides you through the process of developing a project plan before you begin work. Use this worksheet to organize your approach to unfamiliar, complex, or overwhelming tasks and for projects that will span multiple days.

1. List the major task components in the shaded rows, but don't worry about putting them in order.
2. List specific action items under each major task component. Again, list them as they come to mind; don't worry about putting them in order.
3. Put all the action items in order once you have listed them on the worksheet.
4. Assign yourself deadlines for key steps, if desired. Add "to-dos" to your planner.

[illegible]

Example

Project: Clean out the garage		
Order	Task List	Deadlines
	Get rid of all trash and recycling	9/4
1	Get some large trash bags from Menards	
3	Remove/sort recycling	
2	Set up/label bags–metal, glass, newspaper	
4	Take to recycling center	
5	Clear out/bag all trash	
	Figure out and install new storage options	9/8
9	Talk to Sarah about what we want to add to the garage	
11	Go to Home Depot–buy supplies	
10	Ask Keith to help me install stuff and block out time for this	
12	Install storage items	
13	Put stuff away	
	Give away kid stuff that we no longer need	9/4
6	Talk to kids about which of their bikes, wagons etc they no longer use or want	
8	Pack up stuff in truck and bring to Goodwill	
7	Decide if there are any other non-kid things that we want to give to Goodwill	
	Clean the floor and put items away	9/18
14	Buy sweeping compound at Menards	
15	Move the vehicles out of the garage	
16	Sweep and then hose garage down	
17	Put everything back	

PATIENT HANDOUT: PROBLEM-SOLVING PROCESS

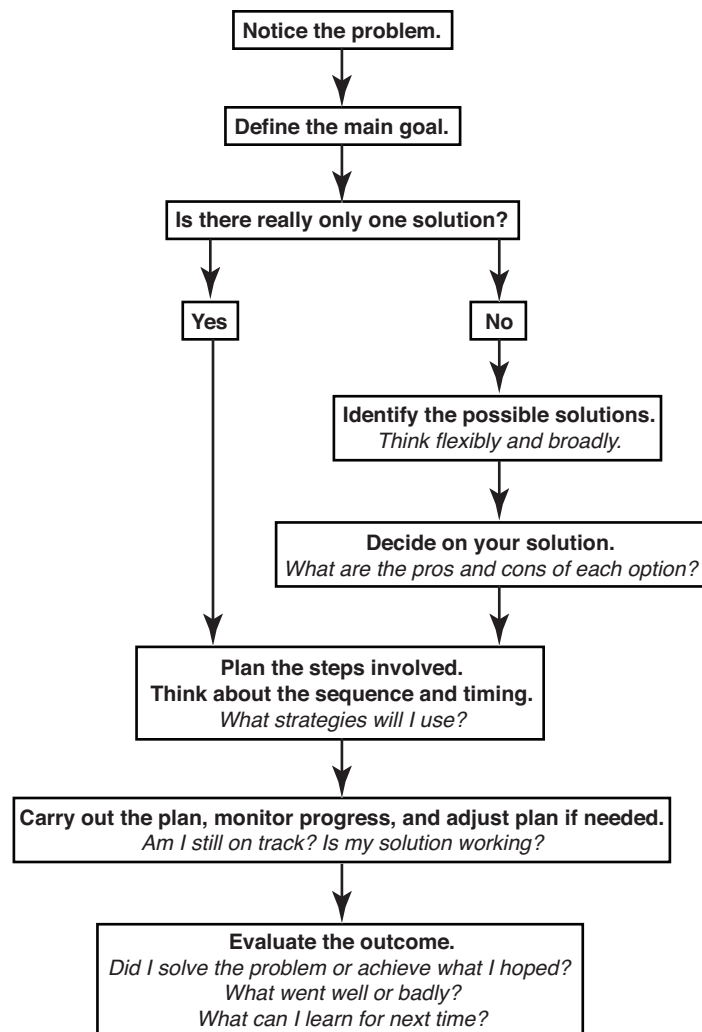


Figure 7-7. Steps in the problem-solving process.

Date:		
Problem Noticed:		
1. Main Goal:		
2. If there is really only one obvious solution, go to section 5 and plan the steps. If there is more than one possible solution, go to section 3.		
3. Alternative solutions	Pros	Cons
4. Decision:		
5. Plan:		
Steps	Strategies	Done: ✓
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Remember to monitor and evaluate! Are things going well? If not, do you need to change your plan?		

PATIENT HANDOUT: STRATEGY–PRIORITIZATION

Taking the time to figure out what is most important can help you manage time and accomplish what matters most, despite fatigue and pain.

Make Sure Your Actions are Aligned with Your Priorities Each Day

Step 1

Write out your to-do list. This allows you to clear space in your mind for more important things.

Step 2

Rate each task on the list using urgent/important categories.¹

- High urgency/high importance: These are tasks that have time deadlines and serious consequences if they are not achieved promptly. These need to be fit into your current day plans as able. **[JUST DO IT]**
- Low urgency/high importance: These are tasks that are important to you, but there is no immediate deadline pending. It is important to schedule time to address these tasks. By planning for them, you may avoid always having urgent/important tasks dominating your time. **[PLAN FOR IT]**
- High urgency/low importance: These are tasks that have deadlines but the consequences are not as high. If it is important to other people in your life, delegate the task to them. If a task must be completed by you, it is often less tiring to “just do it” than continue to carry it over from day to day. Consider deleting the task from your list if it is truly not important. **[JUST DO IT, DELEGATE IT, OR DELETE IT]**
- Low urgency/low importance: These tasks are not important to you and do not have immediate deadlines. It is worth asking yourself if it needs to be done at all, does it matter to someone else, or do you want to ignore it until it becomes urgent or you have more time. **[DELEGATE, DELETE, OR IGNORE IT]**

Step 3

Make sure that tasks rated as high urgency/high importance and low urgency/high importance are added to your cell phone, planner, or calendar.

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