Meeting the Educational Needs of Students After ATBI 2014-2015

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Graphics from WWW.nbia.ca/ and www.nytimes.com

ATBI Presentation Agenda

Etiology of ATBI and How It May Impact learning

- Communication
- Attention , Organization, & Memory after ATBI

Re-Integration to School after ATBI

- Prior to release from hospital
- Upon re-entry to school

Assessment for SPED Eligibility After ATBI

- ➤ Initial
- IEP Development
- Ongoing

Remediation and Compensatory Strategies in Educational Settings

- Academic Remediation
- Cognitive Rehabilitation: Attention, Memory, Executive Functions
- Related Services



Learner Objectives

- Become familiar with the prevalence of traumatic brain injury (TBI) in children to better identify and provide appropriate educational services
- Understand the causes and types of brain injury, to include school sports injuries/concussions and the impact each may have on learning
- Understand the process for assisting a student with brain injury to re-integrate into school

Learner Objectives (cont.)

- Understand best practices for engaging in initial and ongoing assessment of students with brain injury using informal/formal assessment methodologies in order to determine eligibility for special education & provide FAPE
- Understand the impact brain injury may have on various cognitive domains of functioning and evidence-based interventions for meeting the educational needs of students with brain injury

NASP Model of Comprehensive and Integrated Services

This presentation is designed to address the following NASP Practice Domains:

- Data-based decision-making and accountability
- Consultation and collaboration
- Interventions and instructional supports to develop academic skills
- Research and program evaluation
- Legal, ethical and professional practice
- Preventive and responsive services



In the book *Missing Pieces: A coping Guide for the Families of Head Injury Victims, Marilyn Colter* Maxwell wrote......

"Living with head injury is like trying to work a jigsaw puzzle without all the pieces."

Graphic from www.zazzle.com



ATBI Brain Quiz



TRUE OR FALSE?

Traumatic Brain Injury (TBI) is the leading cause of death and disability in children and adolescents in the United States.

Graphics from bing.com/imagesand www.nbia.ca



TRUE

Among children ages 0 to 19 years in the US, TBI results every year in an estimated:

> 450,000 children/adolescents sustaining a TBI resulting in:

- **o 7,400 deaths**
- o 62,000 hospitalizations
- **o 384,000 emergency department visits**
- **O Approximately 95% survive their injuries**
- **o 37% of children with 4+ limitations are sent home**

CDC, 2006

Graphic from www.goldenstateofmind.com

Etiology of ATBI and How It May Impact Learning



Graphics from www.nbia.ca/

Types/Causes of Brain Injury

Brain Injury Congenital and Perinatal (no period of normal development) Acquired (following a period of normal development) Perinatal (e.g., birth stroke) Congenital (e.g., PKU) Non-traumatic (internal occurrence e.g., tumor) Traumatic (external physical force)





Open Closed (e.g. gunshot) (e.g. fall)



Information State of Wisconsin Department of Public Instruction; graphics from <u>www.nbia.ca</u>, wikipedia.org/wiki/cCoup_contrecoup_injury

Examples of Non Traumatic Causes of BI

- Cerebral Vascular Accidents
- Ingestion of Toxic Substances
- Medication errors
- Chemotherapy Treatments
- Metabolic Disorders
- Anoxic/Hypoxic Incidents
- Brain Infections
 - Encephalitis/meningitis
- Seizures
- Brain Abscess





Determining Severity of Brain Injury Severity of a brain injury is typically based on the following:

- Loss of consciousness and length of time unconscious
- Abnormal results on a brain scan such as a CT or CAT (Computerized Axial Tomography) Scan or MRI)
- Length of time until the person is first able to follow instructions immediately following injury when conscious
- Duration of confusion
- Degree of post-traumatic amnesia (PTA) inability to store new memories or acquire new learning (Morrison, 2010)

Determining Severity of TBI (cont.)

75% of TBIs are mild in nature (Morrison, 2010)

- GCS of 13 15
- Moderate TBI
 - GCS of 9 12 and LOC of less than 6 hours
- Severe TBI
 - GCS of 3 8 and > 6 hours in coma
- Damage from an injury can be immediate (primary) or secondary (Natasha Richardson 2009)
 - Disoriented auto-regulation resulting from pathophysiological changes in the brain

Concussions / Mild TBI

A concussion is a type o mild TBI, caused by a bump, blow, or jolt (external force) to the head that can change result in impairment to the brain

90 percent of concussions resolve in a few weeks whereas 10 percent have symptoms that last a lifetime and symptoms may not really be mild

A repeat concussion/mild TBI that occurs before the brain heals from the initial injury or concussion, usually within a short amount of time (hours, days, weeks), can slow recovery or increase the chances for long-term health problems

Symptoms of Concussions / Mild TBI

- Physical weakness; fatigue
- Cognitive-communication impairments
- Difficulty learning new information
- Psycho-social problems
- Dizziness; headaches
- Nausea and motion sickness
- ➢ Fatigue
- Ringing in the ears
- Recurrent headaches
- Hypersensitivity to light, noise, touch, smell or taste
- Sensitivity to crowds and busy environments

Typical Cognitive Difficulties Seen After Concussions / Mild TBI

- Attention and filtering issues
- Short-term memory loss
- Information processing issues
- Difficulty with problem solving
- Problems with organization
- Difficulty with judgment and decision-making
- Problems with higher-level thinking skills known as executive skills

Five States Pass New School Sports Concussion Laws in 2014

- 1) Georgia
- 2) Oregon
- 3) Wisconsin
- 4) Tennessee
- 5) California



Glasgow Coma Scale (GCS)

- The GCS is scored between 3 and 15, 3 being the worst, and 15 the best. It is composed of three parameters :
- Best Eye Response, Best Verbal Response, Best Motor Response
- A GCS of 13 or higher correlates to mild BI; 9 to 12 is a moderate injury; 8 or less is a severe brain injury

Teasdale G., Jennett B., LANCET (ii) 81-83, 1974.

GCS (Cont.)

! !		
Best Eye	Best Verbal	Best Motor
Response (1-4)	Response (1-5)	Response (1-6)
1. No eye opening	1. No verbal	1. No motor
2. Eye opening to	response	response
pain	2.Incomprehensible	2.Extension to pain
3. Eye opening to	sounds	3. Flexion to pain
verbal command	3. Inappropriate	4. Withdrawal from
4. Eyes open	words	pain
spontaneously	4. Confused	5. Localizing pain
	5. Oriented	6. Obeys
		commands

Moderate to Severe TBI

Moderate to severe brain injury is defined as a brain injury resulting in a loss of consciousness from 20 minutes to 6 hours and a Glasgow Coma Scale of 9 to 12

> Symptoms can last for a long time or **can be permanent**

Impairments typically may affect many areas such as processing, language, mobility, vision, etc.

Recovery is a slow process and usually requires rehabilitation

Pediatric TBI

Significant age-related variables need to be considered with pediatric TBI (Morrison, 2010)

- Higher incidence of diffuse brain swelling in children as compared with adults
- Brain swelling/edema is associated with serious secondary injuries as the brain presses against the bony ridges of the skull
- Child-adolescent brains engage in a natural process of "pruning" – young brain may engage in this process at a higher rate
 - Cell death as part of natural selection
 - Selectively "weed out" neurons generated in excess

Areas of Possible Impairment After BI TBI may affect one of more the following...

- Cognition
- Language
- Memory
- Attention
- Reasoning
- Abstract Thinking
- Judgment
- Problem Solving

- MOTOR AREA movement/coordination SENSORY AREA fouch/body sensation SPEECH HEARING SMELL VISUAL MEMORY reading/visual/sight music/speech/sight
- Sensory Abilities
- Perceptual Abilities
- Motor Abilities
- Psychosocial Abilities
- Behavior
- Physical Functions
- Information Processing

Speech

Graphics from bing.com/images

Persons with TBI present with enormous variability due to...

Pre-injury profiles





Medical/rehabilitation care/treatment effects

Post-injury family supports & follow through

Rancho Los Amigos Scale

Rancho Los Amigos Cognitive Recovery Scale

- Identifies stages/levels of recovery following BI
 Levels 1-10
- Treatment strategies change as the patient progresses from one level to the next
- Patients progress at different rates
- Patients usually discharged from rehabilitation facility
- prior to "complete" recovery; based on medical necessity
- Levels I-III require total assistance
- Levels IV-VI require some assistance; pt. tires easily, may become overwhelmed

Rancho Los Amigos Scale

- Level I No response
- Level II Generalized response
- Level III Localized response
- Level IV Confused and agitated
- Level V Confused, inappropriate, nonagitated
- Level VI Confused, appropriate

- Level VII Automatic, appropriate
- Level VIII Purposeful, appropriate, standby assistance
- Level IX Purposeful, appropriate, standby assistance on request
- Level X Purposeful, appropriate, modified independent



ATBI Brain Quiz



TRUE OR FALSE?

Injuries to a child's *"developing brain"* may result in delayed consequences that may not be readily apparent at the time of injury or within the first year following the injury.

Graphics from bing.com/imagesand www.nbia.ca

TRUE

For children ATBI is a developing disability.... anticipate & prepare for future learning problems.



Graphics from <u>www.nytimes</u> and other unknown source

Returning to School After ATBI







Graphics from Cliplordart.com; melanomainternational.org ; & ageofautism.org



ATBI BRAIN QUIZ



After ATBI, it is important that the student...

- A. Catch up on missed school work
- B. Return to the same grade and classroom
- C. Have a school reintegration plan for return to school
- D. Be held back in the current grade







Best practice is to develop a <u>school reintegration plan DURING</u> hospitalization/rehabilitation:

Captian Answer Graphic from www.goldenstateofmind.com

Reintegration to School After ATBI Cont'd.

Three stages of re-entry planning by education personnel should occur after hearing a student has sustained a TBI:

- 1) Upon hearing about a student sustaining a TBI
- 2) During hospitalization and/or during inpatient rehabilitation
- 3) Prior to but near time of discharge



Reintegration to School After ATBI

Initial Steps in Communication Following a Student Sustaining an ATBI:

- Parent or social worker notifies school in writing (or verbally) to inform them about a student's head injury
- Parent(s) sign release for medical information so that any evaluation reports may be shared w/school; a request for written records is made
- District designates a point of contact person to communicate with the hospital/medical staff (usually nurse, psychologist, counselor or administrator
- It is recommended that a representative from the school or district visit student in the hospital; possibly observe therapies, and attend discharge meeting if possible

(see POST BI Re-Integration Observation and Plan Forms)

Activity 1: Information From Discharge

Read the Discharge Report for Case Study 1 "Tommy"

Eligibility Under Section 504



Section 504

- A student with a TBI could be eligible as a "child with a disability" as that term is defined by ADA Rehabilitation Act of 1973 (Amended 1990; 2010) Section 504
 The determination of eligibility under Section 504 requires
- The determination of englobility under Section 504 requires an evaluation of whether the student has a physical or mental impairment that substantially limits a major life activity, without regard to mitigating measures, such as a health care plan, medication
- The list of major life activities includes the operation of major bodily functions, including neurological function and brain function

Section 504 Cont'd.

If the student's TBI is temporary in nature, which could occur with milder TBI, or a concussion, a temporary disability could still render the student eligible under Section 504 if the concussion substantially limits at least one major life activity (e.g., the student's brain) for a period of time that significantly disrupts the student's education


Section 504 Cont'd.

- Section 504 defines FAPE to mean the provision of general or special education and related aids and services that are designed to meet the individual needs of students with disabilities as adequately as the needs of nondisabled students are met (34 CFR § 104.33 (b)(1)(i).)
- It is important to note that FAPE under Section 504, is not limited to accommodations
- Most students eligible under Section 504 may require a "504 Plan" that describes the related aids and services needed to meet the student with TBI's individual needs

Assessment for Eligibility for Special Education Under IDEA



Graphic from www.literacyeducators.com

The Individuals with Disabilities Act (IDEA) Defines TBI as:

"...an acquired injury to the brain caused by an external physical force, resulting in total or partial functional disability or psychosocial impairment, or both, that adversely affects a child's educational performance. The term applies to open or closed head injuries resulting in impairments in one or more areas such as cognition; language; memory; attention; reasoning, abstract thinking; judgment; problem solving; sensory, perceptual, and motor abilities; psychosocial behavior; physical functions; information processing; and speech. The term does not apply to brain injuries that are congenital or degenerative, or to brain injuries induced by birth trauma."

(The State of California recently aligned the definition of TBI in Title V Regulations to align to IDEA)

34 Code of Federal Regulations 300.7 (c)(12

Note:

Discussion section of the Federal Register (Vol. 57, No. 189, p. 44842, Tuesday, September 29, 1992) it is stated that "The definition of traumatic brain injury <u>does include</u> an acquired injury to the brain caused by the external physical force of near-drowning."





Assessment/Eligibility for SPED Category of TBI



- Medical and/or health records or historical data indicate a student sustained a head injury caused by an external force; then TBI may be considered when determining eligibility for special education
- TBI is not diagnosed by the school psychologist, rather, the IEP team determines whether a student is eligible for special education under the category of TBI
- An IEP team may initially determine a student meets eligibility criteria for TBI without first conducting assessment, when evidence of such is indicated in medical or health records



ATBI BRAIN QUIZ



TRUE OR FALSE

Students who acquire their brain injuries from nontraumatic events such as infections to the brain, stroke, seizures, anoxia/hypoxia, brain tumor, and late effects of cancer treatment qualify for special education under the category of TBI





The TBI federal eligibility category does <u>NOT</u> apply to injuries caused by <u>non-traumatic events</u>

These students may qualify for services under the eligibility category of OHI-Other Health Impaired

Captian Answer Graphic from www.goldenstateofmind.com

If assessment is deemed necessary to establish eligibility for special education (or to further inform the IEP team regarding needed supports and services), the assessment team would assess the following domains....

- History of the injury and Health related treatment
- Specific cognitive/psychological processes
- Physical and motor skills and limitations

d ➤ Health conditions and limitations

Social/emotional functioning

Adaptive functioning

Communication (Speech & Language)

Academic achievement

...Adversely Affects Educational Performance...

Performance should not only be based on grades & test scores. Assessors also need to consider...

- **o** History and current progress from grade to grade
- Work and study habits
- Social skills, emotional status and behavior
- Change in pre-injury/illness functioning!!!!!
- Ability to access school for a full day
- Progress in accordance with age and ability



AND the severity of the impaired functions may vary across situations, activities & time. Where appropriate, the team must consider & document these variations.

See 20 U. S. C. 1414(b)(4) and (5)

Graphics from bing.com/images

Best Practices for Assessment after ATBI

Conduct a comprehensive psycho-educational evaluation that includes:

- Neuropsychological assessment data that indicates how the student thinks, processes information, and learns; and a description of the injury and current medical status, including medications and limitations
- Ecological: Observations in varied educational settings and times of day
- Compare pre-injury to post-injury functioning
- Periodic, on-going multidisciplinary assessment to monitor healing and recovery from ATBI over time; document effectiveness of interventions

NOTE: skills rapidly change over time in the first 6 months to 1 year after ATBI.

Best Practices for Assessment

Dr. Stephen E. Brock "Rules for School Psychology"

- Rule 1: Always focus on student needs
- Rule 2: There is no such thing as "bad data"
- Rule 3: Look for information that guides interventions
- *Rule 4:* Be prepared to ask difficult questions and deliver bad news
- Rule 5: Everything is data
 - Dr. Brian Leung's "RIOT": Records, Interviews, Observations, Testing
- Rule 6: Statistics do not dictate actions Psychologists decide
- *Rule 7:* Never draw a conclusion from a single data source
- *Rule 8:* There is no such thing as an "untestable" student
 Brock, S. E. (2015). President's Message. *Communique. 43 (5).*

Best Practices for Assessment after ATBI (Cont.)

Ecological / Environmental Analysis

- Allows examiners to evaluate a student performance in various ecologies/environments in natural settings during normal activities of the day
- Observations should be made by multiple assessment team members

Informal analyses such as the above help determine whether the student is able to replicate skills assessed during 1:1 evaluation based upon observations in natural settings; allowing determination of present levels of performance; information to develop goals and objectives; ability to participate in activities in the home, school and community (Ylvisaker, 1998)

Ecological/Environmental Analysis Will Help Determine...

- Changes in performance from prior to injury
- Inability to learn/retain new material
- Poor organization/follow through
- Fatigue/stamina
- Attention/concentration
- Processing time
- Inconsistency of performance
- Poor initiation
- > Ability to **adapt** to new classroom routines
- Frustration tolerance/social/behavioral issues
- Need for routine/schedule
- Intensive outside supports being provided

Post Brain Injury Re-Integration School Ecological Observation Form

Student Name:	DOB:		Grade:	
Name of Observer:	Date of Observation:			
Date(s) of Injury:	School:			

Part I.

Less Positive → More Positive

ATTENTION SUBTYPE	1	2	3	4	5		
SELECTIVE/FOCUSED	Significantly Below Average	Slightly Below Average	Average	Slightly Above Average	Significantly Above Average		
Focuses on teacher lecture							
Attends to detail							
Orients to speaker/staff							
Looks at and focuses on board appropriately							
Responds to questions with							
Tunes out subtle classroom							
SUSTAINED							

TBI Assessment Cautions

The formal evaluation **setting**_may not capture problems presented in less structured, real-life situations (Baxter, Cohen, Ylvisaker, 1985)



WHY??

- A controlled/distraction-free environment may compensate for attention deficits
- Use of short tests/relatively brief testing sessions may compensate for reduced endurance, persistence, attention span
- Very clear test instructions and examples may compensate for reduced task orientation and impaired flexibility/ability to shift from task to task

Assessment Cautions, (cont.)

- Highly structured tasks may compensate for reduced initiation and problem solving.
- Standardized tests may indicate academic abilities within the average range; however there may be significant areas of impairment that impact learning following ATBI
- Standardized, norm-referenced measures...
 - May not assess the full range of skills
 - Have limited predictive validity
- Timed tasks...
 - May reflect motor slowing, not ability
- Measures of prior knowledge...
 - May not reveal difficulty with new learning (Ylvisaker, 1998)



Premise

- Evidence-based: applied research; assessment-intervention linkages; also observation of behavior in complex, real-word situations
- Theory-based
- Cross-battery
- Flexible battery
- "Testing should be limited to the shortest amount of time possible to discern neurocognitive profiles" (Morrison, 2010, p. 808)

Neuropsychologists/Researchers

Objectives

- More in-depth assessment of specific cognitive processes than typical psychoeducational evaluations
- Identify strengths, spared functions and weaknesses
- Identify present levels of performance to track improvement/changes over time and as a result of interventions
- Develop appropriate educational supports; academic modifications and accommodations
- Prognosis with extreme caution

See: Benish, T. & Dukes, N. (N.D.) Traumatic Brain
Injury Follow-Along Project, NASP Communiqué, 37,
2.

Volunteered through the Leadership Education for Neurodevelopmental Disorders (LEND) following one child and her family from onset of injury, through the hospital stay and transition into community services, over a period of 8 months. Shared the family's experience at each stage of the process, observed interdisciplinary team activities and participated in activities in the child's natural setting (home, school, recreation, etc.). Kept a written journal of experiences and met with a faculty mentor to discuss them. Co-experienced emotions, personal struggles, and barriers that the family faced as a result of the injury. 55

Examiner Qualifications

- "The professional competency of school psychology resides with the meaningful interpretation of test results from a brain-based perspective and their linkage with evidence-based interventions" (D. Miller, 2010, p. 20)
- Specialized training, supervision, experience

American Board of School Neuropsychology (ABSNP) Diplomate

American Board of Pediatric Neuropsychology (ABPdN) Diplomate

APA, NASP and State Ethical Principles

- "Psychologists provide services... in areas only within the boundaries of their competence, based on their education, training, supervised experience, consultation, study, or professional experience" (APA, 2002)
- "To benefit clients, school psychologists engage only in practices for which they are qualified and competent" (NASP Principle II.1 Competence, 2010)

Domains of Functioning to be Assessed

- Mental Status
- Attention
- ➢ Memory
- Executive Functioning
- Processing Speed
- Language/Communication
- Motor/Visuomotor
- ➢ Visual/Visuospatial
- ➢Sensory
- Social-Emotional/Behavioral

Mental Status Examination

- > Appearance
- Alertness
- Orientation
- ➢ Rapport
- Mood and Affect
- Speech characteristics

- Thought Processes
- Tempo
- Intellect
- Judgment
- > JOIMAT
- > App: MMSE-2 (PAR)

Attention



Attention

"One of the most pervasive and least understood behavioral disturbances encountered in neuropsychiatric and educational contexts is the symptom of impaired attention" (AF Mirsky, et al. 1991)

Understand attention as a construct

- Many psychologists/experts in ADHD do not define attention as a construct; ADHD is a disorder
- Attention is a neuropsychological process

Attention (Cont.)

Mirsky's Model of Attention Definition: A neuropsychological information-processing model

- Attention: Coordinated action of selectivity, focusing, sustaining concentration or vigilance, switching attention, monitoring distractibility, modulating the intensity of attention, and attention to memorial processes such as rehearsal, retrieval, and coding
- Several distinct elements; organized into a coordinated system (Allan F. Mirsky, et al., 1991)

Therefore,

-Complex set of processes, cannot be assessed in isolation (BD)-Underlies all other higher cognitive activities

- Four/Five major elements: Focus/Execute, Encode, Sustain, Stabilize*, Shift (Koziol, et al., 2014)
 - -Four elements emerged from factor analytic studies; principle components analysis
 - -"Stabilize*" was not a component that resulted from principle components analysis
- Model statistically and clinically applied to both adults and children with TBI as well as normal subjects, those with a variety of disorders, and animal studies

(Mirsky, et al., 1991)

Focus/Execute:

-Focus: "The ability to select target information from an array for enhanced processing... and simultaneously screen out distracting peripheral stimuli"

-Execute: Focus could not be differentiated from the task demand of rapid response output, hence "focus/execute"

> Encode: "The ability to initially register information"

- -Similar to immediate/short-term memory or working memory
- -Involves hippocampus and amygdala
- -Awareness of meaning

(Mirsky, et al. 1991)

- Sustain: "The capacity to maintain focus and alertness over time... for the purpose of successful task completion;" vigilance
- Stabilize: Reliability of attentional effort
 —Minimize variability
- Shift: "The ability to change attentive focus in a flexible and adaptive manner"
 Also referred to as "divided" attention

- Focus/Execute: Wechsler Digit Symbol/Coding; Trail Making Test Part A and B; Stroop Color-Word Interference Test; Cancellation tasks
- Encode: Wechsler Digit Span and Arithmetic; Sentence Repetition; initial trial of Word List learning tasks; immediate recall trial of Story/Narrative recall
- Sustain: Continuous Performance Tests; Go-No Go
- Shift: Wisconsin Card Sorting Test

> Stability: Errors of commission/disinhibition; reaction time

Brain structures involved in attention work together to form a "system"

Different parts of the brain appear to have some degree of specialization for different attentional functions

Evidence indicates that performance on tests of attention may be selectively impaired by different brain lesions

Assessing Attention

- Assessment: Psychometric, clinical, and cultural considerations
- Normative data; established reliability, validity
- "The development of a neuropsychological battery of tests... included the unarguable, logical idea that each test in the battery should assess a different dissociable component of attention" (Koziol, et al., 2014)
- See handout: TBI Domains of Assessment: Selected Tests and Subtests

Attention				
Focus/Execute	CAS-2	Expressive Attention Number Detection Receptive Attention	5 – 18 years	
	NEPSY-2	Auditory Attention	5-16 years	
		Inhibition Naming	5-16 Years	
Sustain	Continuous Performance Tests - various		Various	Computerized assessment
	Conners Continuous Performance Test- 3 rd Ed.		8+ years	Computerized assessment
	Conners Continuous Auditory Test of Attention		8+ years	Computerized assessment
	NEPSY-2	Auditory Attention	5-16 years	
		Auditory Response	7-16 years	
Shift	NEPSY-2	Inhibition Naming Inhibition Inhibition	5-16 years 7-16	

Memory



Memory

Definition: "An alliance of systems that work together, allowing us to learn from the past and predict the future"

-Mechanisms of memory are complex; not well understood

-Memory is not a single, unitary faculty, but a series of separable systems that perform different tasks over widely different time scales from a fraction of a second to many years

(A. Baddeley, 2014)

Memory (cont.)

> Memory has three basic requirements:

- Ability to register information (encode)
- Maintain that information over time (storage)
- Ability to find and output the information (retrieval)
- The things you pay attention to are more likely to be stored... what is not stored cannot be retrieved
- Difficulties may not necessarily implicate a particular structure (i.e., hippocampus), but may involve the connecting tissue/white matter pathways
Storage depends on a series of biochemical processes that may become less efficient with aging, and may be disrupted by factors such as a blow to the head or Alzheimer' s Disease

Researchers: Allan Baddeley, Larry Squire, Daniel Schacter, Endel Tulving, Milt Dehn

Baddeley's conceptualization of memory, based upon Atkinson & Shiffrin (see conceptual model)



Memory Processes – Memory Systems

- Short-term: temporary storage of information in order to perform various functions. (Once the task has been achieved, the information may no longer be required)
 - Memory span: Amount of information that can be stored
- Long-term: Information that is stored for considerable periods of time
- Procedural: Learning behavioral and cognitive skills; simple conditioning; motor skills; operates at an automatic, noncognitive level

(Schacter & Tulving, 1994)

Episodic and Semantic LTM (Endel Tulving):

- Episodic event memory; personal, autobiographical, e.g. remembering particular incidents (going to the dentist last week)
 - Recollections consist of multi-feature representations in which various kinds of information – spatial, temporal, contextual, etc. are bound together in an individual's awareness of personal experience in subjective time (Schacter & Tulving, 1994)
- Semantic factual knowledge about the world e.g.
 knowing the capital of France

Much research on human memory uses verbal materials, because **words are easy to present;** individual' s **responses are easy to record and store**

Declarative and Non-declarative

- Declarative Memory for facts or events; can include memory for words, scenes, faces, stories that can be recalled and "declared" (Squire, 1994)
- Non-declarative Those memories that are not declarative, such as the perceptual representation system including visual, spatial representations
 - Formerly called "Procedural" memory
 - Depend upon multiple brain systems

- Motor memory: acquisition of skills and habits and perceptual-motor skills, such as riding a bike, typing, using manual transmission
- Working memory: A subcomponent of the memory system that holds and manipulates material that is being processed (Baddeley, 2014)
 - Visual-spatial sketchpad
 - Phonological loop
 - Central executive (processor)

- **Assessment**: Tests vs. theory-based
- Importance of the referral question/observed or reported problems
- Assess "learning" and recall: ability to learn and retain new information
- Confirm with observations in the real world, when possible

(See: Handout – "TBI Selected Tests and Subtests")

TBI Domains of Assessment – Selected Tests and Subtests

TBI Area	Test	Subtest	Age	Comment
			Range	
Memory				
Short Term Memory	WISC-V	Digit Span (Forward)	6-16 years	
		Picture Span	6-16 years	
	NEPSY-II	Memory for Names	5-16 years	
Working Memory -	WISC-V	Arithmetic	6-16 years	
Auditory		Digit Span (Backward)	6-16 years	
		Letter-Number Sequencing	6-16 years	
	NEPSY-II	Word List Interference	7-16 years	
Working Memory -	NEPSY-II	Memory for Designs	3-4 years	
Visual		Memory for Designs	5-16 years	
	WISC-V	Picture Span	6-16 years	
Concept/Semantic	NEPSY-II	Narrative Memory	3-4 years	
Memory		Narrative Memory	5-16 years	
Figural Memory	NEPSY-II	Memory for Designs	3-4 years	
		Memory for Designs	5-16 years	
		Memory for Designs Delayed	5-16 years	
<u>!</u>				

Executive Functions

Definition

 Brain structures including, but not limited to the frontal lobes "responsible for skills such as temporal organization, integration, formulation, and execution of novel behavioral sequences requiring the person to respond both to environmental feedback and internal motivational states" (Morrison, 2010, p. 801)

Novel learning/problem solving; self-monitoring

Executive Functions (cont.)

- Although younger children's development involves greater neural plasticity, this variable also creates greater variability in expression and less predictability; this is especially true with attention and executive functions, associated with the frontal lobes, which are the last brain system to develop (Morrison, 2010)
- Deficits in attention and executive functioning may not become apparent until later childhood/adolescence, when greater independence and behavioral control is required

Executive Functions (cont.)

Specific Processes

- Attention and goal-directed persistence
- Planning
- Organization, prioritization
- Working memory
- Metacognition; Self-Monitoring
- Cognitive flexibility
- Problem-solving
- Processing Speed
- Activation/initiation
- Inhibition

Executive Functions (cont.)

- Assessment: Direct measures in addition to questionnaires, interviews, rating scales, observations
- Age-related differences
- Importance of the referral question/observed or reported problems
- Confirm with observations in the real world, when possible
- See: Handout "TBI Selected Tests and Subtests"

Processing Speed

Definition: Processing speed is a measure of how quickly a person is able to carry out simple or automatic cognitive tasks, usually measured under timed conditions

Processing speed involves focused attention

- Other variables include motivation and perception
- Distinguish from a deliberate, generally slow tempo (which may be related to slow processing speed, but not always)

Processing Speed (cont.)

Specific Processes

- Perceptual speed: the ability to quickly seek and compare visual patterns or symbols when presented next to one another or separated within a visual array
- Number facility: the ability to quickly and accurately deal with numbers and basic numerical calculations
- Rate-of-test-taking: the ability to quickly carry out easy tasks or tasks that demand very simple decisions

Processing Speed (cont.)

Assessment: Direct measures supplemented by observations, interview

Distinguish from attentional problems

Confirm with observations in the real world, when possible

(See: Handout – "TBI Selected Tests and Subtests")

Communication/Language

Definition:

- Communication: includes both speech and language, and also includes cues such as intonation, pace of speech, emphasis, as well as nonverbal information such as gestures, facial expressions, eye contact
 - Involves at least two people
- Language: a socially shared code or system that represents and expresses ideas through symbols and rules. Speech is a particular type of language that involves oromotor coordination to produce sounds

Communication/Language (cont.)

- Receptive: auditory processing of sensory information through the ears; comprehension of spoken information
 - Difficulty understanding multiple meanings, jokes, sarcasm, figurative expressions
- **Expressive**: vocal speech or written communication
 - Word-finding problems (aphasia)
 - Inability to express thoughts in sentences
 - Fluent speech but without meaningful content
- Pragmatic: ability to combine form and content in socially acceptable ways

Communication/Language (cont.)

Problems post-TBI include: aphasia (difficulty understanding and producing spoken and written language), poor understanding of social/nonverbal cues, dysarthria (trouble with motor aspects of speech), prosody dysfunction (problems with intonation, inflexion)

- Broca's Aphasia: difficulty recalling words and speaking in complete sentences
- Wernicke's Aphasia: Speech is fluent but displays little meaning

Swallowing, eating difficulties assessed by speech/language professional

Communication/Language (cont.)

Assessment by a Speech/Language Pathologist always indicated with language/communication problems post-TBI

Psychologist' s assessment?

- Assessment contributes to better understanding of the disorder
- Consider cultural, familial factors; second language
- Understand difficulties that present in educational and social settings

Motor/Visuomotor

Definition: Motor functions reflect the ability to perform complex acts that produce movement

- Fine Motor: movements such as writing, typing that use the small muscles of the fingers, toes, wrists, lips, tongue
- Gross Motor: large muscle movements such as walking, kicking that involve the legs, arms, torso, and feet
- Visual functions: gaze, orienting, tracking

Motor/Visuomotor (cont.)

 Development of motor skills is considered to follow certain developmental sequences
 o Head to foot

o Gross to fine

 Certain motor movements depend upon stabilization of some body parts while coordinating movement of other body parts

 Locomotion, eating, handling objects

 Strength, speed, power, rate, stamina are generally beyond the psychologist' s

assessment

Motor/Visuomotor (cont.)

 Assessment performed in collaboration with a Physical Therapist, Occupational Therapist, and/or Adapted Physical Education specialist

- Consider both isolated movements/skills and functional/adaptive use; also setting/environment
 - Positioning
 - Mobility
 - Balance
 - Coordination
 - Reach
 - Laterality

Visual/Visuospatial

Definition: Visuospatial processing is complex and involves distinct but interrelated components

- Ability to discriminate between objects
- To synthesize elements into a meaningful whole (gestalt formation)
- To represent objects mentally
- Judge the orientation of lines and angles
- Understand location, directionality, and relationship of objects in space
- Produce a three-dimensional object set from a two-dimensional model

Visual/Visuospatial (cont.)

- The right brain hemisphere is thought to be specialized for visuospatial processing
 - More recent evidence suggests that both hemispheres may be involved in visual processing, although the right may be more involved with visuospatial construction (Corballis, 2003)
- The visual system consists of the eyes, optic nerves, connecting pathways through to the visual cortex and other parts of the brain

Visual/Visuospatial (cont.)

Assessment in collaboration with School Nurse, Optometrist, Ophthalmologist

Visual problems post-TBI include: dry eyes, poor ocular convergence, visual field loss/neglect, double vision, nystagmus

Sensory

Definition: Sensory processing is thought to exist within three functional units: specifically, one zone for **primary** sensory input (i.e. visual, auditory, tactile, taste, smell), one for **secondary** sensory response programming (gather bits of information to form perception) and output, and one for tertiary arousal (responsible for the integration of sensory perception into something meaningful (Morrison, 2010, p. 799)

-Total sensory loss (blindness, deafness) is rare closed-head injuries

in

-Tertiary zones are most vulnerable, as they are larger and more diffuse

Sensory (cont.)

- Vision problems are the most common sensory problem associated with TBI
 - **o Students may take extra time recognizing objects**
 - May not be able to register/recognize what they are seeing
- Associated problems: sensory changes such as intolerance to light/photophobia, noise
 - Ringing in ears
 - Perceived odors or bad smells
 - Poor taste
 - Persistent skin tingling

Social-Emotional



"No Longer Gage"









Social-Emotional/Behavioral

- Associated problems: personality changes, developmental stagnation
- Behavioral problems: impulsivity, impaired self-control, decreased self-awareness, inability to accept criticism or take responsibility, overly dependent, immature, egocentric, inappropriate sexual behavior
- Psychiatric-emotional: depression, anxiety, mood swings, apathy, anger, irritability, paranoia, confusion, frustration, agitation, insomnia and sleep problems
- May lead to alcohol/drug abuse, addiction (Morrison, 2010)
- Increased prevalence of emotional disturbance

Ongoing Assessment for TBI

Functioning of students with TBI changes rapidly

Ongoing assessment is paramount

A sample tool for progress monitoring levels of functioning over time:

DOMAINS OF FUNCTIONING OBSERVATION FRAMEWORK Description FOR INDIVIDUALS WITH TRAUMATIC BRAIN INJURY (TBI) By Diana Browning Wright, M.S., LEP (see sample in handout)

Prognosis – Long Term Implications of TBI

Prognostic Factors

- Younger age at injury (plasticity, new learning)
 - Children in the 5-10 year-old range fare better than younger children, adolescents, adults
- Premorbid functioning levels
- Psychosocial and environmental supports
- Common sequelae include seizure disorder; moderate-severe TBI more likely to have posttraumatic seizure activity; seizures cause additional brain damage

Activity #2 Case Study – 6-Year-Old: Background, History of TBI, Medical

Step 1: Read Part 1 of the Case Study
Step 2: Discuss:

- What are the salient features of this case? What educational concerns present?
- What school-based assessments would your team recommend/conduct? Discuss neuropsychological and other processes to be evaluated

Activity #2 (Cont.) Case Study – 6-Year-Old: Assessment Results

Step 1: Read Part 2

Step 2: Discuss:

- What are the student's strengths?
- What are the areas of deficit?
- What are the student's educational needs?
- What recommendations would you make?
Activity #3 Case Study – 20-Year-Old

Step 1: Read Case Study

Step 2: Discuss:

- What are the student's strengths?
- What are the areas of deficit?
- What are the student's educational needs?
- What non-academic areas should be addressed and why?
- What would your recommendations be?

Academic Remediation & Learning After ATBI



Graphic from bing.com/images

When There is a Mild TBI...

- Teachers sometimes expect students to perform post injury as they may have prior to injury because they appear "normal".
- They may equate the deficits with lack of effort, poor behavior, etc.
- > Students with TBI may exhibit the following:
 - Difficulty organizing school work
 - Impulsivity, decreased attention & concentration
 - Fatigue, sleep disturbances, sensitive to light, headaches
 - Reading/auditory comprehension problems
 - Dizziness, headaches, balance/spatial disorientation
 - Increased irritability; depression, anxiety
 - May slowly slip from being good/average students



TBI Brain Quiz



Students with TBI are... a) just like students with Learning Disabilities b) just like students with ADHD c) no different than before d) none of the above



(D) none of the above

Students with TBI differ from students with all other disabilities in the onset, complexity & recovery process of the disability

Captian Answer Graphic from www.goldenstateofmind.com

Students with TBI are in a process of recovery...

- Once brain cells die, they do not recover, but surviving brain tissue has the capacity to develop new <u>neuropathways</u>
- Recovery may take weeks, months or years, & progress occurs with access to appropriate intervention
- Students with ATBI must relearn basic tasks such as walking, talking, eating/feeding, dressing, socializing, learning, etc.
- Physical recovery does not always equate with cognitive recovery



Recovery (Cont.)

While TBI has a profound effect on new learning even though previous learning may remain intact, never underestimate the potential for growth & development

Be aware,

- Some deficits are long lasting, requiring life-long services
- Setbacks from PTSD, depression, 2nd injury, seizures, substance abuse can occur



ATBI Brain Quiz



True or False?

All students with ATBI need to be in a special class classroom to receive special education services.

Images taken from bing.com/images





Special education is a service, not a place. There are a range of services offered to best meet the child's needs based on assessment findings. Students are placed in the Least Restrictive Environment (LRE), and may move from one setting to another as they recover.

Captian Answer Graphic from www.goldenstateofmind.com

How Are Students with TBI Served?

- General Ed.w/ 504 Accommodation Plan
- Speech Services Only
- Integration in General Ed. w/supports



- Resource Specialist Program (RSP) (pull in or push out)
- Special Day Class (SDC-various levels and types)
- Private Special Education Non Public Day Schools (NPS)
- Home/Hospital Instruction
- Residential/School programs (NPS)
- Skilled Nursing facility with instruction provided by local district

Determine Levels of Support Needed

> Intensive

> Moderate

> Minimal

Periodic





Graphic from <u>www.algepro.com</u> and http://eastpdxnews.com

Learning Strategies After TBI

Re-teaching lost skills – formation of neuropathways versus only focusing on compensatory strategies

> Teaching a student to LEARN how to LEARN

Teach compensatory strategies – for example, use of a visual schedule or mnemonics device

Provide simple 1,2,3 step directions w/specific # of cues, fading cues over time, with a specific # of trials

Using specific organizational, memory & problem solving strategies

Area of Need: Physical/Health Needs



Graphic from bing.com

PHYSICAL/HEALTH SIGNS	STRATEGY - INTERVENTION
Fatigue/stamina	 Provide rest breaks Shortened school day Home instruction or blended program Provide Extended Year Services Break learning tasks into short segments
Motor Skills oFine ogross oPoor motor planning & initiation	 Conduct Occupational Therapy or Physical Therapy assessment (OT/PT); provide OT/PT
 Left/Right Side Neglect A behavioral syndrome occurring after brain injury. Spatial neglect involves the inability to report, respond, or orient to stimuli, generally in the contralesional space 	 Intervene early for situations that may escalate Allow student to request a time out or removal to a designated area Take a walk (supervised)
Seizures oGrand Mal or Generalized oAbsence or Myclonic oClonic or Tonic or Atonic	 Provide 1:1 adult supervision Provide peers and staff information Allow rest after seizure; avoid learning (sometimes up to two hours post)

PHYSICAL/HEALTH SIGNS	STRATEGY - INTERVENTION
Visual-Perceptual Changes	 Provide colored lenses for reading Provide visual tracking aids such as a colored marker
Hearing Changes	 Provide head phones to block outside noises Provide FM system for hearing loss
Scars / Hair Loss	 Allow student to wear scarf or hat
Self-Care Difficulties	 Provide staff assistance for self-care activities Provide visual aide of steps required for self-care activities Consult with OT to re-teach or provide compensatory strategies
Chronic Pain - Headaches	 Nurse initiate individual health plan Medication administration Medication side effects Seizure management Shunts

Area of Need: Behavior



Graphic from bing.com

BEHAVIOR	STRATEGY - INTERVENTION
Anxiety	 Teach self-regulation strategies such as deep breathing, yoga, biofeedback (via ipad or iphone)
Inappropriate comments toward others	 O Use of social stories or scripts O Role play O Cognitive behavior therapy O Social skills groups O Use of video modeling
Sudden changes in mood	 Intervene early at sign of agitation Allow student to request a time out or removal to a designated area Take a walk (supervised) Stay calm; limit verbal interaction
Sexual disinhibition	 Provide 1:1 adult supervision Use of social stories or scripts to teach appropriate space, touching, etc. Cognitive behavior therapy

BEHAVIOR MANIFESTED	STRATEGY - INTERVENTION
Physical or verbal aggression	 Teach self-regulation strategies Social skills instruction using evidence-based curriculum such as Second Step, etc. Use of behavior contract or levels system Use of video modeling
Refusal; oppositional	 Use of contingency management (if you do this you will get) Use of behavior contract Allow range of choices Avoid power struggle Use <i>PROMPT</i> strategy by Diana Browning Wright (see PENT)
Confabulation (not a	 Use a memory notebook with visuals

Other Strategies to Address Negative Behavior

General Behavioral Strategies:

- Help student build <u>trusting relationships</u> through honest, caring, consistent interactions
- ➢Conduct a Functional Behavioral Assessment (FBA) to determine the functions of the behavior and to gather other important information that may inform replacing the behavior more socially appropriate behavior (See: <u>www.PENT.CA.GOV</u>)
- ➢Implement an individual behavior plan based on data related to the function of the behavior and positive replacement behaviors
- ➢Use of a token economy or levels system tokens are given for successful acquisition of positive behavior
- Daily/weekly progress report (email, phone, or written hard copy)
 Adjust class schedule to align to times during the day when the student with TBI may be more likely to exhibit behavioral challenges
 Use of scripts and directions for teaching and eliciting the adaptive behavior

IDEA Behavior Requirements

IDEA requires that the IEP team consider the use of **positive** behavioral interventions and supports, and other strategies, to address that behavior that impedes the learning of the child with the disability or the learning of his or her peers



Area of Need: Communication





ARES OF WEAKNESS/SIGNS	STRATEGY - INTERVENTION
 Expressive Communication Oifficulty expressing thoughts Oifficulty with sequencing thoughts/events verbally or in writing 	 Use of Augmentative Communication (AAC) - visuals Use of wallet with visuals Provide wait time if due to processing speed or slow motor movement Provide use of a story frame or semantic structure in writing
Receptive Communication oDifficulty understanding multiple meanings, jokes, sarcasm, figurative expressions	 Use of social stories or scripts Role play Cognitive behavior therapy Social skills groups Use of video modeling
Trouble with voice production	 Use of Augmentative Communication (AAC) – visuals
Trouble with articulation (sound production)	 O Use of Augmentative Communication (AAC) – visuals O Allow wait time

ARES OF WEAKNESS/SIGNS	STRATEGY - INTERVENTION
Pragmatic Skills •Difficulty combining form and content in socially acceptable ways	 Provide direct instruction on socially appropriate interaction Use of video modeling or electronic or written social stories Social skills groups with peers (diverse peers)
Aphasia •Broca's - difficulty recalling words and speaking in complete sentences •Wernicke's - Speech is fluent but displays little meaning	 Use of gesturing or sign language Use of Assistive Technology - Augmentative Communication (ATAC) or use of visual aids Allow wait time Provide verbal or physical cue to help student remember word
Dysarthria oTrouble with motor aspects of speech	 Use of Assistive Technology - Augmentative Communication (AAC) or use of visual aids
Prosody dysfunction oProblems with intonation, inflexion	 O Use of video modeling O Practice phrases O Motor learning and practice

Communication i Device Apps

- iCommunicate
- iConverse
- In My Dreams
- iPrompts
- iSpeech
- Learne to Talk
- Locabulary Lite
- Look2Learn AAC
- Mobile Articulations
- MyTalk
- Proloquo2Go
- Sentence Builder
- Sign 4 Me
- Speak it!
- Voice 4U















Graphics from Apple.com/apps

Other Communication Software Options

- Bungalow Software <u>www.BungalowSoftware.com</u> 540-951-0623
- My House, My Town, and My School, CONCENTRATE! by Laureate <u>http://www.laureatelearning.com/products/descriptions/ladldesc.html</u>
- Dragon Systems, Inc. <u>http://www.nuance.com/dragon/index.htm</u>
- Fast Forward <u>http://www.gemmlearning.com/fast_forword_home.php?_kk=fast%20forword&_kt=17</u> <u>624841-3e71-4a5d-bda1-702f7108c236</u>

(Computer drill that improves auditory processing and memory) about \$1,500 - \$2,000

- Aurora Systems, Inc. <u>http://www.aurora-systems.com/</u>
- Auditory Processing Activities: Materials for Clinicians and Teachers. JoAnn H. Jefferies and Roger D. Jefferies. 1991
- Don Johnston, Inc. <u>http://www.donjohnston.com/</u>, Edmark Reading Program, italk 2, Talking Brix, Teach Me to Talk, Communicate
- WordSmart Adult Learning Excellence, <u>http://www.wordsmart.com/ttr/index.php</u> (computer drills that may assist with ATBI survivors that have aphasia and are unable remember / retrieve words)
- Power Vocabulary Builder.com , <u>http://www.powervocabularybuilder.com/esl-english-as-a-second-language.html</u> (computer drills that may assist with ATBI survivors that have aphasia and are unable to remember / retrieve words)
- Visual Voice Tools by Riverdeep <u>http://web.riverdeep.net/portal/page</u> pageid=818,1385215&_dad=portal&_schema=PORTAL

Area of Need: Attention/Organization/Cognition



Graphic from www.wisegeek.com

ARES OF NEED	STRATEGY - INTERVENTION
Short attention span	 Break tasks into smaller learning segments or chunks Highlight one row or line at a time to complete Allow timed breaks Time tasks – use of auditory signals Make learning engaging
Distractibility •Easily distracted by sounds, visuals, movement •Easily distracted by dominating thoughts or feelings •Easily distracted when hungry •Distracted by mood dysregulation	 Make learning engaging Allow multiple means of engagement and input (UDL) (i.e. use visuals, hands-on learning, games, videos, etc.) Teach self-monitoring strategies – use of PDAs or cue cards Use of headphones Use of study carol Allow snack when hungry Allow student to take a break if dysregulated or use of Cognitive behavior strategy for regulation

ARES OF NEED	STRATEGY - INTERVENTION
Poor initiation/difficulty engaging in activity	 Use of "contingency management" If you do this then Provide a visual schedule to Allow choices Provide positive feedback or rewards for engagement
Unable to attend to more than one task at a time	 Break learning into steps by specific tasks Provide visual of tasks Sequence learning

IPOD/IPAD Apps for Attention & Organization

- Awesome Note
- First Then (timers for reminders to complete tasks)
- Flashcards (write reminders, notes, etc.)
- Time Timer (improves time management)
- ToDo (alters, subtasks, checklists)
- Visual Assistant (provides visual, audio, and steps for task)
- (Pocket Compass task-prompting system from AbleLink)



Other Technology- Assisted Programs for Attention & Organization

- BrainTrain <u>http://www.braintrain.com/</u>
- Interactive Metranome

- http://www.interactivemetronome.com/IMPublic/Home.aspx
- Brain Injury: A Home-Based Cognitive Rehabilitation Program
- http://main.uab.edu/tbi/show.asp?durki=49377 (free resource)

Sounds Smart, Captain's Log & Smart Driver by Brain Gym

ttp://www.incrediblehorizons.com/programsforbraininjury.htm

Area of Need: Memory & Learning



AREAS OF WEAKNESS/SIGNS	STRATEGY - INTERVENTION
Unable to remember previously learned tasks	 O Use mnemonic devices O Use visuals O Use memory notebook
Unable to remember names of people from one day to next	 Take photographs of important persons to view when needed
Unable to remember newly learned information	 O Use Use memory aids such as calendars, schedules, lists, notebooks & have student record & check off tasks as they are completed O Establish a memory notebook
Difficulty remembering steps to complete a task	 Provide a visual schedule or sequence of steps for tasks Establish a consistent, daily routine Use of memory notebook

IPOD/IPAD Apps for Memory

- Evernote
- Grocery iQ (builds lists)
- ITPADD (Timer, calculator, tally counter, schedule)
- MyHomework (keep track of homework)
- Picture Scheduler (record details, audio recording)
- To Do (checklists, schedules, timer)



Other Technology-Assisted Programs for Memory

- Word Bubbles by Luminosity, http://www.lumosity.com http://www.lumosity.com
- Little Fingers, <u>http://www.littlefingers.com/</u> (inexpensive thinking & learning exercises \$5 & free trials)
- <u>The Memory Workbook: Breakthrough Techniques to Exercise Your</u> <u>Brain...</u> by Douglas J. Mason
- Brainfit: 10 Minutes a Day for a Sharper Mind and Memory by Corinne Gediman & <u>Dr. Francis Michael Crinella Ph.D.</u>
- Brain Injury: A Home-Based Cognitive Rehabilitation Program
 <u>http://main.uab.edu/tbi/show.asp?durki=49377</u>

Fast Forward

http://www.gemmlearning.com/fast_forword_home.php?_kk=fast%20forword&_k t=17624841-3e71-4a5d-bda1-702f7108c236

(Computer drill that improves auditory processing, processing speed, and memory) about \$1,500 – \$2,000 through local providers)

Area of Need: Reading



Graphic from bing.com/images

Area of Need: Reading (Cont.)

Students with TBI may experience reading difficulty for a variety of reason. It is crucial that the cause of the reading problem is diagnosed in order to remediate effectively. The list below contains some of the more common causes in reading problems with an introduction to how they may be treated.



Graphic from bing.com/images
AREAS OF WEAKNESS/SIGNS	STRATEGY - INTERVENTION
Difficulty with comprehension due to processing	 Engage reading out loud daily trials – first listening to model reader such as Read Naturally or Anita Archer programs
Unable to read for long periods of time (Visual field loss)	 Listen to books on tape while reading along or get audio books on i device or computer
Unable to recall and remember words	 Engage in daily vocabulary/high frequency word drills (games, or or through APPs or Computer Listen to books on tape while reading along or get audio books on i device or computer Listen to model reader and then re- read passages or words allowed

AREAS OF WEAKNESS/SIGNS	STRATEGY - INTERVENTION
Unable to visually see print (double vision, Right or left Hemianopsia, neglect dsylexia, loss of focus, etc.)	 Vision therapy or engage in eye training exercises; bifocal lenses by an optometrist may be needed Listen to books on tape while reading along or get audio books on i device or computer Provide boundary marking tools or devices such as book marks with a window cut out or a sticky tab Use last letter cancellation therapy using red pen and newspaper or magazine
Unable to remember letter sounds	 Use multisensory approaches (sand tray, sky writing, visualizing and verbalizing, glue cards of sounds) – Use Orton Gillingham based programs (Project Read, Distar, Lindamood Bell, Language Letc.)

Causes of Reading Difficulties

- Visual Field Loss. "Hemianoptic Dyslexia" These students have the ability to read words, but complain that it's just too difficult or confusing to read for long periods of time. They avoid reading and often lose their place and get confused.
- **Right Hemianopsia** The student has a blind spot of field loss that moves down the line of text like a curtain hiding what they are trying to read. Boundary marking tools or devices such as book marks with a window cut out or a sticky tab may be helpful. Last letter cancellation therapy can also be beneficial. The student takes a page of newspaper and a red pen. He or she locates and cancels out the last letter of each word with the red pen. It is best to do one newspaper page daily. After two to four weeks, most students with TBI will have retrained their brain to look at the end of words which will help their tracking and reading whole words (Windors & Windsor, 2014).

Causes of Reading Difficulties (Cont.)

- Left Hemianopsia A student with TBI that manifests left hemianopsia has difficulty returning to the start of the next line and may instead begin reading before reaching the start of the next line. Use a boundary marker in a bright color such as red on the left column.
- Neglect Dyslexia Students with this condition will have visual neglect and will have difficulty attending to the left side of the text. This condition is much more difficult to remediate. A boundary marker on the left may be helpful.
- Loss of Focus The student with a TBI may have difficulty eye focusing. This condition may be diagnosed by an ophthalmologist or optometrist with prescribed bifocal glasses.

Causes of Reading Difficulties (Cont.)

- Convergent Disorders Students with TBI may experience reduced convergence after acquired brain injury. May result in double vision. This can also cause eye strain and fatigue in the student. Prisms added to prescription eyewear may help the student. Orthoptic vision therapy has shown some efficacy in remediating this condition.
- Loss of Central Visual Acuity When visual acuity is impaired, magnification devices may be required, including high add bifocals, magnifiers, electronic video magnification systems, and/or special microscopic eye wear.
- Double Vision. "Diplopia" A loss of normal binocular vision may occur from ocular motor paralysis. Prisms may be used to re-establish binocular vision. Patching may be needed. The student should be treated by an ophthalmologist or optometrist.

Learning to Read After a TBI

NOTE: Students that acquired the TBI prior to learning to read will have much more difficulty. They will require intensive, multi-sensory reading remediation using an evidence-based direct instruction reading program. The recommended intensive level needed may vary, but typically they should be served individually or in a group of no more than four or five students for a minimum of one hour daily.

Causes of Reading Difficulties

- Eye Gaze Disorders Students with eye gaze disorders may not be able to look down into the bifocal; however, they often will be able to read with single vision reading eyewear.
- Cognitive/Memory deficits Many students will manifest memory deficits after a TBI. This is most frequently short term, which impacts the ability to form new long term memories.
 - need to rebuild memories of the words and rebuild reading fluency by engaging in frequent read aloud practice.
 - Use of flash cards.

IPOD/IPAD Apps: Reading

- ABC Pocket Phonics (phonics decoding drills)
- ABC Animals
- Alphabet Animals
- Etextbooks
- Istorytime
- See Read Say (high frequency Dolch Words drills)
- The Cat in the Hat (multi-media; highlights words as read)
- Chicktionary (use letters to create words)
- Dragon Dictionary (voice recognition to speak)
- FirstWords: At Home (vocabulary drills)



Other Programs: Reading

Read Naturally

http://www.readnaturally.com/ -builds fluency and comprehension

- Project Read by Language Circle Report Form <u>http://www.projectread.com/</u>; helps teach comprehsion & narrative writing
- Corrective Reading by SRA <u>http://www.mcgraw-hill.co.uk/sra/free-downloads.htm</u>
- Orton Gillingham <u>http://www.orton-gillingham.com/</u>
- Earobics (computer vocabulary/auditory processing)
- Edmark Reading Program
- Reading Milestones <u>http://web.riverdeep</u>
- My Reading Coach & Mindplay T.E.A.M. by Mindplay <u>http://www.mindplay.com/Products/tabid/53/Default.aspx</u>
- Simon Sounds it Out by Don Johnston <u>http://www.donjohnston.com/products/simon_sio/index.html</u>
- Read Out Loud by Don

Johnstonhttp://www.donjohnston.com/products/read_outloud/index.html

Area of Need: Writing



AREAS OF WEAKNESS/SIGNS	STRATEGY - INTERVENTION
Unable to form letters	 Use dot to dot and tracing of letters to reinforce letter formation and re-develop neuro pathways Trace letters written in yellow highlighter ink
Unable to recall and remember letter formation, words, etc.	 Relearn letters using multisensory strategies (sand trays, sand paper, glue cards, large motor, etc.) Use dot to dot and tracing of letters to reinforce letter formation Trace letters written in yellow highlighter

AREAS OF WEARINESS/SIGINS	STRATEGT - INTERVENTION
Unable to sequence events in writing; writing fatigue	 Use organizational strategies for writing paragraphs such as <i>Inspiration Software or other Don</i> <i>Johnston Writing programs</i>
Unable to remember how to spell words	 Relearn writing high frequency words using multisensory strategies (sand trays, sand paper, glue cards, large motor, daily drills on electronic devices etc.)
Unable to physically access writing tools or keypad	 Engage reading out loud daily trials – first listening to model reader such as Read Naturally or Anita Archer programs

IPOD/IPAD Apps: Writing

- Dictionary (with word prediction)
- Evernote
- iWriteWords (practice tracing letters)
- Spel It Rite Pro (select correct word from two choices)
- Word Magic (pictures with letter missing in words)
- Word Scramble 2

Other Technology-Assisted Programs: Writing

- Dragon Writer by Don Johnston
- Pix Writer by Don Johnston
- Inspiration 9 http://www.inspiration.com/Inspiration
- Co:Writer & Write Out Loud by Don Johnstonhttp://www.donjohnston.com/products/writing/index.html
- Kurzweil 300 (text to speech program)
- Point Scribe Writing Program http://www.pointscribe.com/product.html



Links: <u>http://www.inspiration.com/Inspiration</u> <u>http://www.pointscribe.com/videos.html</u> <u>http://www.donjohnston.com/media/flash/product_demo/cowriter6/</u> index.html

Area of Need: Mathematics



AREAS OF IVIALE WEAKNESS	SIRALEGY - INTERVENTION
Unable to do math calculations due to physical impairment	 O Use of assistive low-tech aids and devices such as graph paper, pencil grip O Use of talking calculator
Unable to remember the steps required for math operations	 Limit the time the student engages in math tasks, provide breaks, reduce number of problems, segments tasks
Unable to use keypad on calculator	 Use of assistive technology such as talking calculator
Unable to process steps needed in order to use a calculator	 Re-teach skills using list of visual steps or manipulatives Allow use of calculator Use flash cards or electronic devices to review skills

AREAS OF MATH WEAKNESS	STRATEGY - INTERVENTION
Unable to perform math calculations due to fatigue or side effects of medication	 Limit or change the time the student engages in math tasks Provide breaks Reduce number of problems, segments tasks
Unable to process math due to cognitive or processing difficulties	 O Use manipulatives to re-teach O Provide visual process charts or list of steps O Allow use of a calculator
Student has memory loss of math concepts previously learned	 Re-teach skills using visuals or manipulatives Allow use of calculator Use flash cards or electronic devices to review skills Relearn math facts through use of music (commercial products) Use touch math/ touch points Provide visual cues for reminders when memory is impacted



IPOD/IPAD APPS: Mathematics



- Math Magic <u>http://itunes.apple.com/us/app/math-magic/id291478690?mt=8</u>
- MathSpin3 <u>http://itunes.apple.com/us/app/mathspin3/id338796019?mt=8</u>
- Money Learn to Count

http://itunes.apple.com/us/app/money-learn-to-count-money/id342123042?mt=8

- Pop Math <u>http://itunes.apple.com/us/app/popmath-basic-math/id295536766?mt=8</u>
- Arithmaroo1 <u>http://itunes.apple.com/us/app/arithmaroo-1-a-counting-math/id353711794?mt=8</u>
- Cloud Math <u>http://itunes.apple.com/us/app/cloud-math/id340932586?mt=8</u>
- Coin Math <u>http://itunes.apple.com/us/app/coin-math/id296596459?mt=8</u>
- Cute Math <u>http://itunes.apple.com/us/app/cute-math/id301358953?mt=8</u>
- Freddy Fraction <u>http://itunes.apple.com/us/app/freddy-fraction/id320728417?mt=8</u>
- KidCalc Math Fu <u>http://itunes.apple.com/us/app/kidcalc-math-fun/id324332876?mt=8</u>
- Math Drills <u>http://itunes.apple.com/us/app/math-drills/id302881525?mt=8</u>

Other Remedial Math Programs

 Little fingers <u>http://www.littlefingers.com/</u> - Math Skills by Iggy, Monkey Math, Little Fingers Picture Math, LF ClassroomV3,

(Inexpensive \$5 math programs and free trials)

- Math Munchers Deluxe by Riverdeep <u>http://web.riverdeep</u>
- LSS Talking Calculators, http://www.lssproducts.com/category/talking-calculators
- Smart Tutor Math, Educational Resources ttp://www.edresources.com/result.aspx?findopt1=9&am=0&asm=13&nn=Math
- Fundamentally Math & Key Skills for Math <u>http://www.fundamentallymath.com/</u>
- IXL Math.com, http://www.ixl.com/promo?partner=google&phrase=Search%20-%20math&gclid=CLmkj9St364CFSoGRQod7VtiAw
 (computerized math tutorials by subject and grade)
- Touch Math System, <u>http://www.touchmath.com/</u>

Links: IXL Math Link

Math Munchers Deluxe

Little Fingers Sample Programs

Touch Point Math System



Resource Guide for Students with ATBI

Graphic from www.dia.ala.org

National TBI Resources

- Brain Injury Association of America http://www.biausa.org/
- National Resource for Traumatic Brain Injury http://www.tbinrc.com/
- Brainline.org http://www.brainline.org/resources/international_resources.php
- Centers for Disease Control and Prevention http://www.cdc.gov/TraumaticBrainInjury/
- National Institute of Neurological Disorders & Stroke <u>http://www.ninds.nih.gov/disorders/tbi/detail_tbi.htm</u>
- The Center on Brain Injury Research and Training (CBIRT) <u>http://cbirt.org/resources/educators/</u>
- Lash & Associates http://www.lapublishing.com

TBI Software

- Family Village http://www.familyvillage.wisc.edu/at/hard_software.htmlBrainLine.org
- Itunes Apps
 <u>http://itunes.apple.com/us/app</u>
- Educational Resources <u>http://www.edresources.com/home.asp</u>
- Don Johnston Software <u>http://www.donjohnston.com</u>
- Bungalow Software <u>www.BungalowSoftware.com</u>
- Riverdeep Education Software <u>http://web.riverdeep.net/portal/page?_pageid=818,1385215&_dad=portal&_schema=PORTAL</u>

TBI Resources

- The Concussion Tool Kit for Schools. DVD by Barry Willer, Ph.D., and John Leddy, M.D. Booklet by Phil Hossler, ATC, and Ron Savage, EdD. 2008. Supplement to Lash and Associates Catalog. Contents: DVD: "Concussion" (5 Modules), Pamphlets: "504 Plan Checklist," "Back to School After a Mild Brain Injury or Concussion" and "Concussion in Children...When your child has a concussion." Lash & Associates Publishing/Training, Inc., 708 Young Forest Drive, Wake Forest, NC 27587-9040; 919-562-0015; www.lapublishing.com
- Brain Star. Jeanne E. Dise-Lewis, Ph.D, Margaret Lohr Calvery, Ph.D, and Hal C. Lewis, Ph.D. 2002. Brain Star provides educational materials for both parents and teachers of students with TBI. It emphasizes importance of team work between home and school (intervention strategies). It provides teaching strategies, parenting techniques, and accommodations as well as information on brain injury and it's affect on development. Student scenarios are infused throughout the manual to assist with implementation strategies. Lash & Associates Publishing/Training, Inc., 708 Young Forest Drive, Wake Forest, NC 27587-9040; 919-562-0015; www.lapublishing.com.

Auditory Processing Activities: Materials for Clinicians and <u>Teachers</u>. JoAnn H. Jefferies and Roger D. Jefferies. 1991. Provides specific activities for the remediation of auditory processing problems in children. Useful information for individuals working with survivors of brain injuries which has affected their communication

The Center of Brain Injury Research & Training (CBIRT) <u>http://cbirt.org/</u>

Differentiation through Learning Styles and Memory. Marilee Sprenger. 2008. While this book is not specifically written from the perspective of TBI, its focus on learning styles and memory provides useful strategies for educators working with students with traumatic brain injuries. Content is first organized with general information about learning environments, assessing students' strengths, and best access to learning. Then, chapters offer strategies based on specific learning styles (visual, auditory, kinesthetic). The book closes with helpful case studies. Corwin Press, 2455 Teller Road, Thousand Oaks, CA 91320; 800-233-9936; www.corwinpress

- Educating Students with Traumatic Brain Injury: A Resource and Planning Guide. 1996. A manual which presents background information about the nature of brain injuries, how to assess the student's needs, developing an IEP, and managing specific issues such as behavioral changes, communication difficulties, and coordinating therapies. Chapters 6 and 7 give especially helpful strategy suggestions. #BLTN 96304. Wisconsin Department of Public Instruction, Publications Sales - Drawer 179, Milwaukee, WI 53293-0179; 800-243-8782
- Executive Function in Education from Theory to Practice. Lynn Meltzer, Editor. 2007. This book is written by a number of contributing authors working in the area of research in executive functioning and education. This book describes the significant role executive function plays in learning and describes "how to" improve executive function through the teaching process. The information specific to TBI is limited to attention-deficit/hyperactivity, executive dysfunction, and universal design for learning model. The Guilford Press, 72 Spring Street, New York, NY 10012; 800-365-7006; www.guilford.com

- Guidelines for Serving Students With Traumatic Brain Injuries, Revised Edition. 1996. Presents, in convenient outline form, information which will help educators understand the unique characteristics and educational programming implications of students who have experienced traumatic brain injury. While some of the guidelines are specific to the state of Utah, most of the information will be useful across all districts. Has an order form for those who want to purchase their own copy. Utah State Office of Education, 250 East 500 South, Salt Lake City, UT 84111
- How the Special Needs Brain Learns. David A. Sousa. 2007. This book is an excellent overview of several special education categories and information on how to address those needs. Traumatic Brain Injury is NOT one of the categories. The Introduction and Chapter 1, "The Brain and Learning," are most useful from the TBI perspective. Corwin Press, 2455 Teller Road, Thousand Oaks, CA 91320; 800-233-9936; www.corwinpress.com

- Memory 101 for Educators. Marilee Sprenger. 2006. Using memory strategies, the author developed the acronym N.E.V.E.R. F.O.R.G.E.T. to assist the reader in understanding how memory works. The author also outlines various strategies to guide the educator and students in improving their memory skills. Corwin Press, 2455 Teller Road, Thousand Oaks, CA 91320; 800-233-9936; www.corwinpress.com.
- Signs and Strategies for Educating Students with Brain Injuries: A Practical Guide for Teachers and Schools. Gary Wolcott, Marilyn Lash, and Sue Pearson. 1995. Useful information to use to understand and plan for the educational needs of children and adolescents with brain injuries. Provides guidelines, practical tips, and intervention strategies teachers and caregivers can implement immediately. Presented in a format which is easy to use; information is easy to find even though there is no index. #ISBN: 1-882855-33-7.

The Source for Executive Function Disorders (age16 and up). Susanne P. Keeley. 2003. Written by a specialist in evaluation and treatment of adult neurological disorders in many settings, this is a practically focused book that includes examples and worksheets with thorough discussion by the author. Its main focus is helping a "recovered" person, age 16 years or older, deal with the practical road blocks that come with TBI to the frontal lobe (where executive function is housed). The practical road blocks that appear often relate to time management, memory sequence, social skills related to time management, being able to multitask for returning to work or seeking employment or returning to educational setting. This 8x11 manual is soft cover, about 175 pages and comes with a CD that has worksheets and directions on how to print. CCC-SLP Catalog # ISBN. 10:0-7606-0903-3 and 13: 978-0-7606-0503-5. Publisher: LinguiSystems, Inc., 3100 4th Avenue, East Moline, IL 61244; 800-776-4332; linguisystems.com.

Strategies for Managing Challenging Behaviors of Students with Brain Injuries. Many children and adolescents with brain injuries experience cognitive, physical, and sensory psychosocial and behavioral changes that affect their lives in many ways. Often unwanted behaviors are exhibited that can negatively impact everyday functioning. These behaviors limit participation in activities. The primary focus of this book is on behavioral analysis, intervention strategies, and the acquisition of functional skills. Stephen Bruce, M.Ed, and Lisa Selznick Gurdin, MS, and Ron Savage, Ed. D. 2006. Lash & Associates Publishing/Training, Inc., 708 Young Forest Drive, Wake Forest, NC 27587-9040; 919-562-0015

http://www.tbihelp.org/education_posttbi.htm

What We Know About Educating Students with TBI. Bureau for Education for Exceptional Students, Division of Schools Florida, Department of Education Suite #614, Tallahassee, FL 32399-0400

➢ What Every Teacher Should Know About Learning, Memory, and the Brain. Donna Walker Tileston. 2004. This book discusses how students acquire and process information. The book explains the different types of memory including short-term, working and long-term memory, and how to help students retrieve information. The book is not specifically written for students with TBI. Corwin Press, 2455 Teller Road, Thousand Oaks, CA 91320; 800-233-9936; www.corwinpress.com.

TBI Articles

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- Lash, Marilyn and Jane Haltwanger. When Young Children are Injured, Families as Caregivers in Hospitals and at Home. 1992.
- Lash, Marilyn. When Your Child is Seriously Injured, The Emotional Impact on Families. 1990.
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