Brain Injury in Children and Youth

A Manual for Educators

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COLORADO DEPARTMENT *of* EDUCATION

ACKNOWLEDGEMENTS

In 2001, the Traumatic Brain Injury (TBI) Manual was written as a joint effort between the Colorado Department of Education, The New Start Project within the Center for Community Participation at Colorado State University in Fort Collins, Colorado, and the Children's Hospital Colorado. The original contributors to the manual are:

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Since 2001, research and practice has changed the area of brain injury significantly, therefore, it was felt that this Brain Injury manual required updating. The TBI Networking Team (TNT) Steering Committee took on the task of reviewing, re-writing and updating information . The newest version of this book was revised by:

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Overview of the Manual

You might be wondering why you as an educator or school staff member should be interested in brain injury. Many people do not realize how common it is for children to suffer a brain injury. Traumatic Brain Injury (TBI) is a leading cause of death and disability among children ages 1 to 19 years in the United States (Faul, Xu, Wald, & Coronado, 2010). Each year, approximately 40 percent of TBIs in the United States occur in the pediatric population (ages 0–19 years) (Faul et al., 2010). The Centers for Disease Control (CDC) estimates that more than 60,000 children and adolescents are hospitalized annually in the United States after sustaining moderate to severe brain injuries from motor vehicle crashes, falls, sports and physical abuse; an additional 631,146 children are seen in hospital emergency rooms and released (Faul et al., 2010). In all, nearly 145,000 children aged 0–19 years are currently living with long-lasting, significant alterations in social, behavioral, physical and cognitive functioning following a TBI (Zaloshnja, Miller, Langlois, & Selassie, 2008).

The Colorado Department of Public Health and Environment (CDPHE) reported that from 2007 through 2009, there were 307 TBI-related deaths and 2,392 Colorado children and youth who were hospitalized and discharged with a TBI. TBI was twice as high for Colorado boys and young males ages 0-20 years who were hospitalized (71.7 TBIs per 100,000 population), compared to the rate for Colorado girls and young females (36.0 per 100,000). The leading causes of non-fatal TBI among Colorado children and youth were motor vehicle-related events in traffic or on public roads and falls. Two additional causes more common among children and youth than adults are those involving other transportation (including motor vehicles not in use on public roads, off-road vehicles, trains, airplanes and water transport), and being struck by/against a person or object (such as in recreational and sporting events).

Although TBI is a high-incidence medical event, from the point of view of the U.S. Department of Education and most state departments of education, TBI is a "low-incidence" educational disability. A significant discrepancy between the incidence of TBI and the identification of children with TBI for special education services continues to exist. Although approximately 145,000 children live with persistent disability following TBI (Zaloshnja et al., 2008), the total number of students receiving special education services under the TBI category is only 24,602 (U.S. Department of Education, 2007]). Furthermore, given that 60,000 children are hospitalized each year for TBI (Faul et al., 2010), a subset of these children who need services are likely not receiving them. Rates of special education identification are higher for some students with TBI, including those with severe TBI, problem behavior, poor academic performance, and socio-economic disadvantage (Donders, 1994; Ewing-Cobbs, Fletcher, Levin, Iovino, & Miner, 1998; Max et al., 1998; Miller & Donders, 2003; Taylor et al., 2003). This discrepancy exists across all states, including Colorado.

As of December, 2012, the Colorado Department of Education reported 497 students identified with brain injury as their primary disability category for special education. Comparing this to the data from the CDPHE which states that approximately 2,392 youth ages 0-20 years are discharged from the hospital with TBI each year, it could be suggested that there may be a significant number of students who are either not receiving special education services at all, or who are receiving services under an inappropriate disability category. While it is difficult to determine how many youth who sustain TBI will experience any long-term educational impact requiring special education support, the Pediatric Registry suggests approximately 19 percent of moderate to severe brain injury will result in on-going, life-long impairment. This data would suggest that we are grossly under-identifying students with brain injury that may benefit from special education services. Additionally, this data only reflects injuries that were of a significant enough medical nature to require hospitalization. Therefore, those with medically "mild" TBI (concussion) who were treated and released from the hospital or who perhaps never sought medical care are not included in these numbers. Schools and districts specifically wanting more information on concussion identification and management and state concussion legislation (Senate Bill 11-040) should refer to http://www.cde.state.co.us/HealthAndWellness/BrainInjury.htm

In the area of moderate-to-severe brain injury, there are many reasons why school personnel may not realize that a student in their classroom has sustained a brain injury:

- If the injury occurred in infancy or before they reached school age, parents may not realize there could be a connection with learning/behavioral problems and the injury. Parents are often told by health care providers that there will not be any long-term effects of the injury. Therefore, they do not report the history when the child starts school.

- The information about the injury may not follow the child through his/her educational career. This happens particularly when the child moves from school-to-school, and/or grade-level to grade-level (such as from elementary school to middle school).
- Both parents and school personnel may miss how a seemingly "mild" brain injury may impact school performance and learning ability.
- A parent may not want to tell the school about injuries that have occurred during domestic violence/child abuse, or injuries that reflect poorly on parental supervision and care.
- Parents may not know of their child's participation in "problem" activities, such as "huffing" or playing asphyxiation games, which cause a non-traumatic (acquired) brain injury.
- Lastly, neither a parent, a doctor or a school professional can tell the extent of the injury at the time of the injury.

Therefore, the school personnel team MUST know how to look for subtle and longer-term effects on any and all students who suffer either a traumatic or non-traumatic brain injury.

Definitions:

- Pre or Post Birth: Any insult to the brain POST birth is considered an "acquired" brain injury (ABI). For all intents and purposes, the child is born with a normally developed brain and then an incident happens that compromises the future growth and potential of that brain.

Acquired or Traumatic Brain Injury:

- An Acquired Brain Injury (ABI) covers ALL injuries to the brain – including both non-traumatic such as anoxic (lack of oxygen to the brain), or toxic (introduction of toxins or chemicals to the brain) and traumatic (external blows to the head from an outside source). Regardless of the cause of the brain injury, consequences of brain injury may be similar and the interventions may be the same.
- A Traumatic Brain Injury, (TBI) is a particular type of acquired brain injury; it is the result of an external blow to the head. A TBI can result in either an "open" head injury – where the skin and bone of the skull are actually penetrated and the brain may be exposed, or a "closed" head injury – where there is no lesion to the skin or skull but there is still damage to the brain within the skull.

For purposes of special education identification (assessment) and intervention, the U.S. Department of Education recognizes TBI, not the broader ABI. The 2004 Reauthorization of the Individuals with Disability Education Act (IDEA) only includes brain injuries as a result of traumatic external force (TBI) as a special education disability label. The Colorado Department of Education aligns with the federal definition of TBI and only allows students with a TBI to be served under the disability category of TBI under IDEA (starting in January 2013). While students with an acquired brain injury are not eligible for the IDEA label of TBI, they can still be eligible for special education services under Other Health Impairment (OHI). For the purposes of this manual, all of the techniques, strategies and assessment tools can be applied to both ABI and TBI. Chapter 5 of this Manual will outline the details of 504 Plans, Response-to-Intervention (RTI) Plans and IDEA.

Mild-Moderate-Severe:

In the medical world, doctors have tried to quantify brain injury by assigning the labels "mild," "moderate," and "severe". Using the Glasgow Coma Scale (GCS), medical professionals observe a patient throughout the first 48 hours in which the injury has occurred and assign levels of responsiveness in three areas:

Eye opening	Motor response	Verbal Response
Spontaneous = 4 To speech = 3 To painful stimulation = 2 No response = 1	Follows commands = 6 Makes localizing movements to pain = 5 Makes withdrawal movements to pain = 4 Flexor (decorticate) posturing to pain = 3 Extensor (decerebrate) posturing to pain = 2 No response = 1	Oriented to person, place, and date = 5 Converses but is disoriented = 4 Says inappropriate words = 3 Says incomprehensible sounds = 2 No response = 1

The severity of TBI according to the GCS score (within 48 hours) is as follows:

- Severe TBI = 3-8
- Moderate TBI = 9-12
- Mild TBI = 13-15

(Reference: http://emedicine.medscape.com/article/326510-overview)

School personnel are warned to not simply rely on labels such as mild, moderate and severe. A label implies a predictive course of recovery. Brain Injury does not lend itself to a predictive course of recovery, no matter the label applied by medical professionals. Many students with a moderate to severe brain injury will be discharged from a hospital setting with distinct physical, medical and educational needs – such as a wheelchair, feeding assistance and special education programming. However, just because they are labeled moderate-to-severe does not mean that they will inevitably require special education services.

Even more misleading is the child/adolescent with a "mild" brain injury, often called a "concussion" or a "ding" to the head. This injury could be the result of violent shaking as an infant, a fall as a toddler, or a sports injury as an adolescent. Many of these "invisible" injuries, while perhaps not significantly impactful at the time, could have serious physical, learning, behavioral or social consequences later. Because the injury was labeled as "mild" at one point, there is a risk of adults not making the connection between the injury and the serious problems that may be occurring later. The seriousness of a brain injury can only be labeled by the level of burden it later poses to the child/adolescent - in the areas of physical health, learning, behavior and social development. School serves as the place where eyes can watch these children for years and decades. It is the responsibility of the school to:

- Be aware of the brain injury (once disclosed by the parent or medical professional).

- Watch for changes in learning, behavior or social skill development.
- Be able to assess and identify appropriate educational options individualized for the student.

Therefore, school personnel have to consider the possibility that a child's learning problems could be stemming from a brain injury. The student with a brain injury may have problems in school that look the same as children with other disabilities, such as Attention-Deficit Disorder, Oppositional Defiant Disorder, or Emotional/Behavioral Disturbance. The student may be identified as having one of those handicapping conditions and may even be on an Individualized Education Plan (IEP). You may wonder then, if the child is identified and receiving special education services, why is it important that he/she be identified with a TBI? It is important because the student's learning and behavior problems come from a different root source, and interventions that work for other disorders may be ineffective for a child with a brain injury. Therefore, a teacher is more effective if he/she understands the true cause of the problem. This manual will assist school personnel in understanding how the brain injury can best be recognized and served.

Chapter 1 provides an overview of basic normal neuroanatomy and neurophysiology. It is helpful to understand how complex the brain is and how disruption to any part of the brain's hard or soft wiring can result in lifelong challenges.

Chapter 2 provides the reader with an understanding of the tasks being mastered during normal development so that the reader can understand how a brain injury can disrupt development at any point.

In **Chapter 3,** the manual describes in depth how there are 16 domains (or skills) most commonly disrupted following a brain injury. Organized in ascending order from the most fundamental building blocks to the highest order of cognitive thought, a brain injury at any age can forever alter the course of neurocognitive development. Chapter 2 focuses on 15 of the most common 16 domains.

Chapter 4 provides an in-depth look at the 16th domain; one of the most difficult areas disrupted following a brain injury – social/emotional competency. As many of the questions from parents and teachers revolve around the student's "intent and ability" with regard to behavior and social skills, an entire chapter is devoted to this topic.

Lastly, **Chapter 5** will explain the federal definition of TBI and its implications on formalized services such as 504 Plans, Response-to-Intervention (RTI) Plans and IDEA (aka special education). Prior to 2013, the state of Colorado was only able to provide special education services to students with TBI under the Physical Disability label. The 2012 legislative session allowed for the opening and rewriting of rules (House Bill 11-1277) and that process has resulted in a standalone definition for TBI (aligned with the Federal definition). Starting in January 2013, schools and districts will have guidelines specific to the assessment and the staffing of student with either a medically documented TBI or an educational identification of TBI.

Overview of Educational and Community Supports/Resources for Children and Youth with Brain Injury in Colorado

Youth Brain Injury Connections

We are extremely fortunate in Colorado to have a funding mechanism, through the Colorado Traumatic Brain Injury Trust Fund, to support an infrastructure for children with brain injury through a partnership with the Colorado Department of Human Services (managers of the TBI Trust Fund), the Colorado Department of Education (CDE), the Colorado Department of Public Health and Environment (CDPHE), local health agencies through the Health Care Program for Children with Special Needs (HCP), the Brain Injury Alliance of Colorado (BIAC), and school districts throughout the state. By working together, we are developing a system of care to support the child from the time of injury through adulthood.

Youth Brain Injury Connections (YBIC) (formerly named the TBI Trust Fund Children's Program) is a program under the TBI Trust Fund that serves youth with brain injury from birth to 21 years.

The goals of the Youth Brain Injury Connections Program are to:

- Increase the knowledge and skills of the people that serve children with brain injury.
- Promote seamless transition and support from the time of diagnosis/identification to the point of transition to adulthood.

These goals are achieved through a multi-pronged approach:

1. Direct Child and Family Support

Youth Brain Injury Connections provides direct support to families to help them locate resources and navigate the education system. This is accomplished through care coordination and educational navigation.

Care coordination

Once referred to the program, each child/family will work with a care coordinator from the Health Care Program for Children with Special Needs (HCP). HCP Care Coordinators are public health professionals located across the state. They have specific training in helping children with brain injury and finding valuable resources in their communities.

The goals of care coordination are:

- Assess child/family needs and strengths.
- Identify resources to address medical, social, education and community needs.
- Collaborate with health care, community and education providers.
- Coordinate multiple resources.

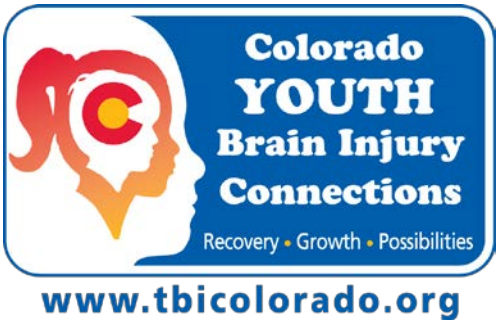
Education consultation

When the child is referred to the program they are simultaneously referred to HCP and the Colorado Department of Education's Brain Injury Health Consultant. The CDE consultant then contacts the child's school to facilitate a connection between the school and the child. CDE, as well as the Regional Brain Injury Liaison (see

below), is available to provide consultation and coaching to the school as they provide support for the child and family navigating the educational system.

Referral Process

The TBI Trust Fund Program partners with the Brain Injury Alliance of Colorado to assist with referrals to the children's program. If you know of a child with brain injury that could benefit from support from the TBI Trust Fund Program, please complete the on-line referral form at www.biacolorado.org. You can also call 1-888-331-3311 if you would like assistance completing the referral form.



2. Systems Support

Colorado Department of Education

The Youth Brian Injury Connections through the TBI Trust Fund Program has a partnership with the Colorado Department of Education (CDE) to provide training to increase skills and knowledge of the systems and people that serve children with brain injury.

Brain injury Education and Health Consultants

In partnership with the TBI Trust Fund, CDE employs a Brain Injury Education and a Brain Injury Health Consultant. The goals of these consultants are to:

- Develop a network of school-based brain injury teams.
- Develop a method for identification, assessment and intervention for children with brain injury.
- Implement a hospital-to-school transition protocol (including emergency departments).
- Provide coordination, training and technical assistance for the Regional Brain Injury Liaisons.

Regional Brain Injury Liaisons

The TBI Trust Fund partners with county health departments and school district personnel to provide region-based training and systems development support. Regional liaisons are located across Colorado. They are public health professionals, school psychologists, school social workers, school nurses, teachers and school-based occupational therapists, etc. The goal is to increase the understanding of the unique needs/gaps in each region of the state and to address these needs/gaps on a regional level to ensure all children in Colorado with brain injury have their needs met. The goals the regional brain injury liaisons are to:

- Identify training needs and facilitate training to meet those needs in their region.
- Build capacity of the region through training and coaching/consultation.
- Work collaboratively with the CDE Consultants to facilitate transition from hospital and emergency departments to school/community.
- Develop a safety net for children with brain injury.

It is the goal of the TBI Trust Fund Program that through the partnerships and with the multi-faceted approach offered by Youth Brain Injury Connections, families affected by brain injury will be connected to resources, be supported by trained personnel across systems and achieve greater outcomes.

Brain Injury Resource Teams

In addition to the supports and infrastructure in place through Youth Brain Injury Connections, some school districts in Colorado have developed brain injury resource teams. These teams are comprised of multi-disciplinary school personnel. What these teams provide to their school districts vary from team to team, however, the general goal of the teams is to provide consultative support for school district personnel who are serving students with brain injury. The brain injury resource team is not intended to supplant the existing school teams or processes for identifying either informal or formal supports for students with brain injury. While it is ideal that districts have a brain injury resource team we also recognize that there are only a handful of formalized teams that exists in Colorado currently. It is also recognized that most of these teams are supported only through the dedication of school personnel willing to volunteer their time to serve on these teams.

Traumatic Brain Injury Networking Team Resource (www.cokidswithbraininjury.com)

This site is designed to provide educators and professionals with practical information that can be used to identify and provide appropriate services to children with a brain injury. Additionally the site provides parents with information on services that are available for their child as well as information on how to access support. State and national resources that provide an overview on brain injury, treatment, advocacy and support groups can be located under the resource section.

The following information is provided on this website:

- **TBI Identification Protocol:** Information and documents related to how to identify a student with a traumatic brain injury.
- **Manual:** This will connect you with the Traumatic Brain Injury Manual which includes information on neuroanatomy, developmental stages, assessing functional behavior, learning implications and intervention strategies as they relate to youth with a brain injury.
- **Matrix:** The matrix offers a wide range of suggested assessment tools and intervention strategies for students with a traumatic brain injury. It covers the 16 areas of processing/learning most commonly affected by a traumatic brain injury.
- **Concussion Info:** Provides information on Colorado legislation, resources and the Concussion Management Guidelines Manual.
- **Regional Map:** Displays the nine brain injury regions within Colorado and contact information for assistance in developing support services, community partnerships and obtaining training assistance.
- **Resources:** A list of brain injury resources within the state and nation.

CHAPTER 1

The Brain: Basic Neuroanatomy/Neurophysiology and Developmental Stages

This Chapter allows the reader to:

- Become familiar with several primary brain functions that are responsible for cognition, emotion and behavior.
- Understand the consequences of TBI when a specific brain area is damaged.

Introduction: The Brain

Without doubt, the human brain is by far the most complex biological organ ever known to exist. The brain has no equal in terms of its remarkably sophisticated processes and functions. The brain is directly responsible for all human behavior, emotions and cognition. Despite the popular comparison between the brain and the amazing feats of supercomputers, one must recognize that it is the human brain that created such supercomputers, or any other extraordinary work of engineering, art or scientific invention.

For all of the brain's complexity and limitless capacity to create wondrous marvels, it is also a fragile human organ and prone to permanent damage. Although the brain has the ability to heal itself after a physical or psychological trauma, there are real limits to the self-healing process due to the brain's complexity. Consider this example. The human foot and ankle, which are commonly injured body parts, have 26 bones. Now think about the human brain. It has more than 50 billion neurons (a low estimate), which means the brain has countless ways it can be damaged.

Brain injury in the pediatric population is especially serious (CDC, 2010). A few decades ago, the standard convention held that children who sustained a brain injury would heal quicker and more completely than adults who had sustained similar injuries. This previous belief, called the Kennard Principle (circa 1942), was not a theory that was supported by empirical studies (Savage, 2009). Medical experts now caution that a developing brain must be protected from damage during sensitive periods of neurological growth. In short, if the brain is the center of "who we are," then it is prudent and essential to safeguard it. For a comprehensive overview of pediatric brain development, access the following **website: www.internationalbrain.org/?q=node/112.**

Basic Neuroanatomy

Although it is not necessary for educational specialists or parents to know the intricate details involving the neurological structures and processes of the brain, it is beneficial and recommended that the reader have a grasp of basic brain functions. This section will illustrate the brain by describing it in an ascending order **(See Figure 1.1)**. The most basic fundamental level involves the cellular aspects of brain. Moving from the basic level, the more evolved complex brain structures and functions reside. At this point, it is critical to emphasize that, while the brain has specialized areas associated with specific processes, the brain operates mostly as an integrated unit. Several regions of the brain must work in concert to produce a viable function such as hearing, seeing, memory, learning and behavior. Much like a large orchestra is made up of several different instruments that play different notes to create music, the brain needs its discrete areas working in harmony to produce effective functions.

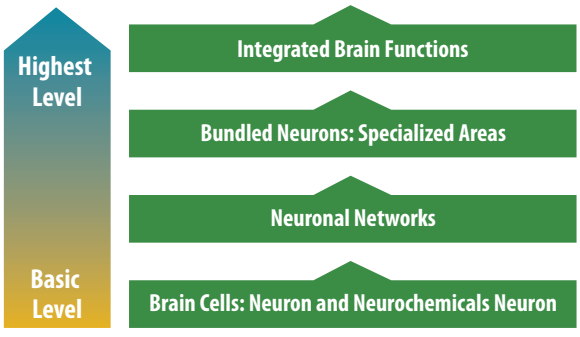
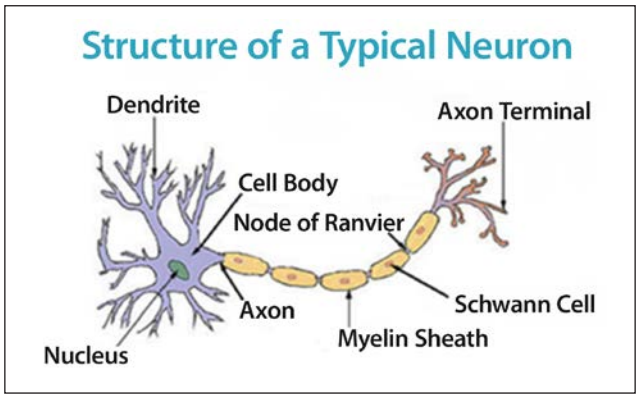


Figure 1.1 Basic Neuroanatomy (Carter, 2009; Sweeney, 2009) Miller, Halstead-Reitan

The Basic Level: The Neuron and Neurochemicals



(Figure 1.2) depicts a basic neuron and its components. (Wikieducator, 2008)

Neurons are specialized nerve cells at the basic physiological level of the brain **(see Figure 1.2)**. Neurons are like the "electrical wires" of the brain that help the brain to communicate with itself and to the rest of the human body. These neuronal wires transmit information and electrical impulses that produce all human thoughts, emotions and behavior.

When neurons are jolted, shaken, stretched, or damaged after a blow to the head, the brain has significant difficulty functioning because its wires cannot send vital messages to other brain areas. In other words, when neurons cannot talk to other neurons, the communication breakdown causes brain dysfunction, such as slowed processing speed (Mathias and Wheaton, 2007).

At this basic physiological and biological level, the two areas that are typically damaged during an injury are the neuron's insulation (a fatty substance called myelin) and its power supply (neurochemicals). Myelin coats the neuron allowing it to transmit an electrical signal efficiently and directly down the cell body so the other neurons can "hear" a message. If the insulation is damaged by twisting, stretching or tearing, the signal is much less efficient and the electrical impulses are broadcasted in different directions. When a neuron's insulation is degraded, the message is garbled and the other neurons cannot hear or understand the signal.

After the brain is injured, the neurons may have difficulty making and transmitting messages because its transmitting power supply and process is disrupted. The brain produces neuro-electrical impulses by the use of neurochemicals (called neurotransmitters). These neurotransmitters are secreted and absorbed in extremely small amounts between neurons. Jolts to the brain upset the tight chemical balances and tolerances necessary for proper brain functioning. Many times, a blow to the brain causes vital neurochemicals to either flood or drain the spaces between and within neurons. An imbalance of neurotransmitters causes a disruption in how the brain controls itself and how it regulates the rest of the body (LearNet, 2006).

Neuronal Networks and Specialized Brain Areas

As previously noted, the basic brain level contains a primary cell called the neuron. Billions of neurons are connected to each other throughout the entire brain to create a network. The network of neurons is connected to tightly bundled specialized cells (called nuclei). The neuronal bundles are found in localized areas of the brain that perform particular functions (Carter, 2009; Sweeney, 2009). These specific brain regions and their primary functions are illustrated in Figure 1.3.

Scientists have various ways to organize the brain and its functions. One way to conceptualize brain processes is to organize its function starting from how the brain develops physiologically. The first areas of the brain to develop are the regions located at the base of the brain. Basal brain areas are generally related to basic physiological functions. For example, two important basal sections are the brain stem and cerebellum. The brain stem and cerebellum control voluntary and involuntary functions such as breathing, heart rate, gross-motor movement and arousal. Brain injuries to these basal areas are extremely serious as such injuries can be fatal (stops heart beats, breathing, consciousness).

Another basic area of the brain is called the limbic system. The limbic system is a very deep brain structure that is highly associated to emotions and memory formation. When parts of the limbic system are damaged, typically from significant blows to the brain or oxygen deprivation, the negative results are memory problems and emotional difficulties.

Key Concept:

A primary brain cell is called the neuron. Damage to the neuron's structure typically degrades the neuron's insulation (myelin sheath) and neurochemicals. Damage to the neuron's insulation may cause processing speed difficulties. When several neurons are injured, it may produce both specific and general difficulties.

The upper regions of the brain are associated with complex functions commonly associated with sensory processes, information processing, and behavior. These highly evolved brain areas, called the cortex, influence verbal communication, fine motor movement, vision, rational thought, comprehension, and reasoning.

When a person sustains an injury to a specific area of the brain, the primary function typically associated with that particular area is usually impacted. For example, damage to the front of the brain generally produces difficulties with problem solving and emotional regulation. Moreover, when one area of the brain is injured, other neurological networks may become disturbed. It is not uncommon for blows to specific areas to also cause general functional problems because the energy from a trauma travels throughout the entire brain producing both localized and broad (diffused axonal) damage.

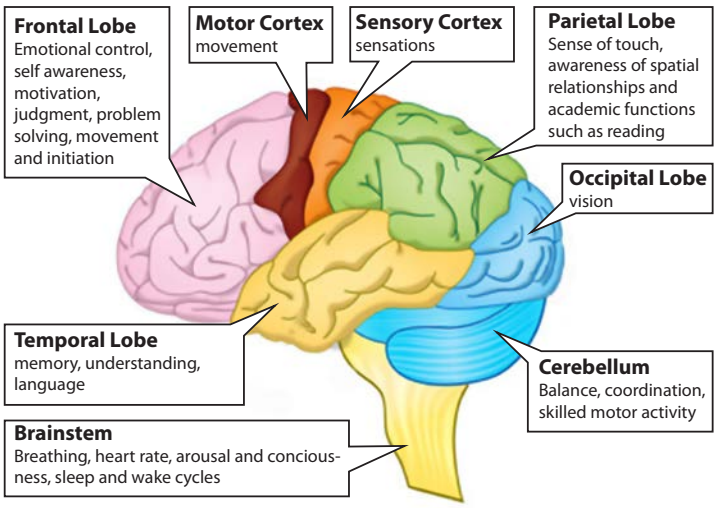


Figure 1.3. Specific Functions of Brain Areas (AgrAbility, 2010)

Integrated Functions: Back vs. Front and Right vs. Left Functions

An oversimplified, but sometimes useful, model of how the brain works is based on the functions divided between two broad neurological areas. Generally speaking, the back of the brain is primarily responsible for processing incoming information, understanding the information and storing information. In short, the back (posterior) neurological areas are concerned with the "input, process, and storage," of information. The front (anterior) parts of the brain are largely involved with regulation of processes and output (behavior). It is widely believed that the anterior area of the brain (frontal cortex) acts as a "manager" of the brain as it is richly connected to several other neurological areas it controls. The frontal

and prefrontal cortex generally directs action, concentration and emotional regulation. Logically, damage to the back of the brain will cause processing difficulties, while frontal damage is correlated to behavioral and emotional difficulties (Fiorello and Hale, 2004).

Another broad conceptualization of brain function has been observed by researchers for decades. It is a commonly held (but simplified) belief that the right hemisphere of the brain is associated with creativity, holistic thinking, novel information processing and visual-spatial processes. In contrast to the right, the left half of the brain is concerned with language, verbal information, sequences, and factual (learned or familiar) information **(See Figure 1.4)**.

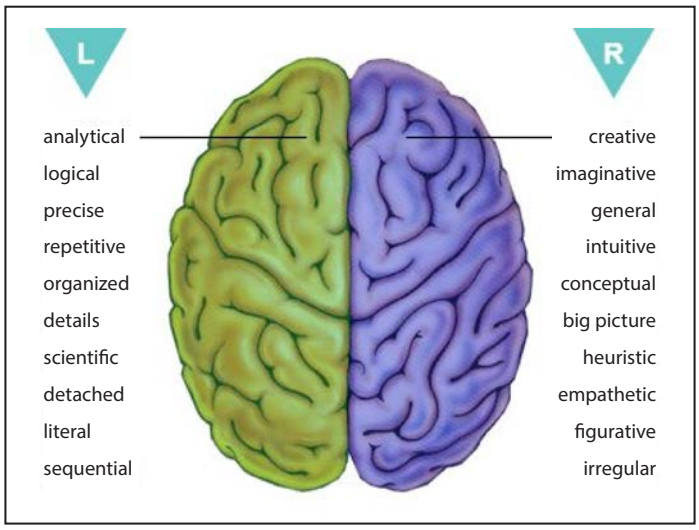


Figure 1.4: Left and Right Brain Hemispheric Functions (BIAA, 2011)

Currently, a refinement of the "right vs. left" model involves an emphasis on "new vs. routine" information processing. Some experts believe the right half of the brain is responsible for processing novel and divergent information. Once the novel information is processed and understood, it is transferred to the left side of the brain where it becomes part of the person's knowledge base. The left side stores routine, familiar and factual information. This previously learned information is later retrieved and utilized when a person engages in routines or responds to the environment (Fiorello and Hale, 2004).

Damage to the right or left side of the brain can produce impairments specifically linked to each hemisphere. For example, injury to the left hemisphere of the brain may decrease a person's ability to speak, understand spoken language or remember facts. Damage to the right side of the brain is especially significant since this region is associated with new learning. Children with right hemisphere brain injury commonly have problems learning in school.

Key Concept:

Specific areas of the brain are related to specific functions. Damage to a particular brain area may produce a specific dysfunction or disorder. However, blows to the brain typically produce both specific and general difficulties. Damage to the front of the brain might create behavioral and emotional problems, while injuries to the back of the brain may yield information processing and physiological impairments. Right hemisphere difficulties hinder new learning, while left hemisphere dysfunctions center on language processes and the utilization of factual or familiar information.

Chapter Summary Points

The human brain is a remarkably complex organ that is responsible for all thought, feelings and actions. Interestingly, the brain can be both resilient and fragile. Researchers know the brain can heal itself and can compensate for damage. However, there are several factors that play into the post-injury recovery outcome. Brain injury recovery depends on the person's age, the nature of the injury, the developmental stage of the person, previous injuries, risk factors, environmental issues, and a host of other considerations. In short, brain injury recovery is a highly individualized situation.

When a brain injury occurs, the disruption can take place at the very basic neurochemical level, or at a larger structural level. Structural damage entails several neurons being physically altered to the point these brain cells do not function well. It is not uncommon for moderate damage in a specific brain area to cause particular deficits that may be permanent. Such deficits may include problems with attention, memory, thinking and personality changes. Finally, it should be emphasized that the brain works as an integrated functional unit, so any damage to one area of the brain is likely to impact other areas as well.

CHAPTER 2

Developmental Stages and the Effects of an Acquired/Traumatic Brain Injury

This Chapter Allows the Reader to:

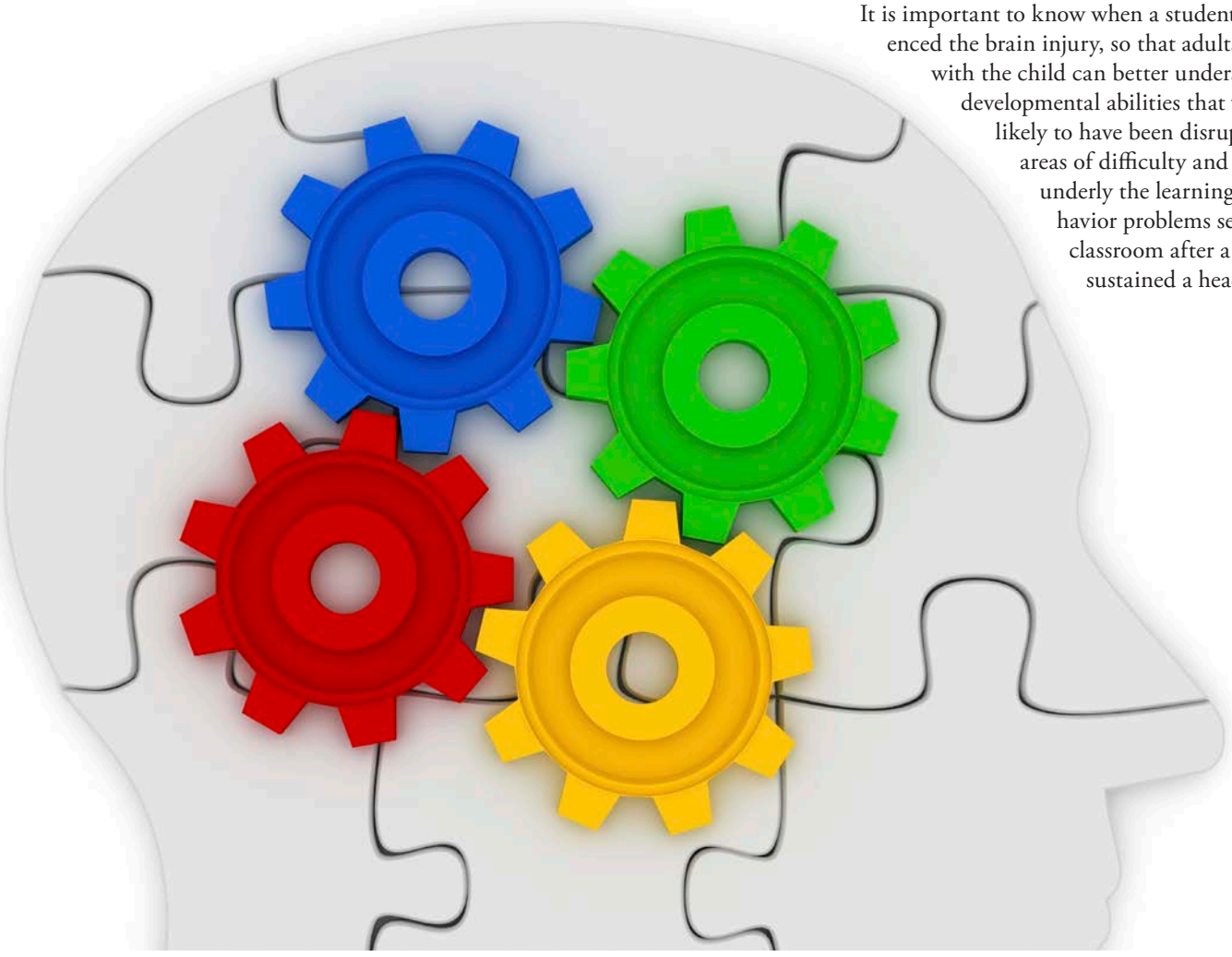
- Understand the major stages of brain development from birth through late adolescence
- Learn the personal, emotional, and social changes typical of each stage.
- Recognize the main effects of a brain injury acquired at each stage of development on behavior and learning

From birth through about age 18, children's brains are in a continuous process of change and development. As the brain grows in size and weight, adding an enormous number of cells, parts of the brain organize into centers to perform certain functions more efficiently. These changes in the brain allow the child to grow, learn, control himself, and become "mature." The child learns to walk and talk, to play soccer and write term papers. He learns to recognize his mother, to experience different feelings, to control temper, and to work cooperatively with others.

The child moves from discovering his hands to building block structures, and mastering mathematical formulas. This process of maturation and development, and the resultant abilities of the child, is set into motion by the changes taking place in the child's brain. The brain's development is regular and predictable. The abilities and skills accomplished at one stage of development provide the foundation for the development of the later stages.

When a child sustains a brain injury, whether as the result of an accident or illness, the injury affects the process of development in the brain. Abilities that are just developing are very vulnerable, and therefore, these are most likely to be disrupted by an acquired/traumatic brain injury. Because skills developed at one stage form the foundation for later-developing abilities, a brain injury sustained early in life can disrupt the appearance of skills at later periods of life.

It is important to know when a student experienced the brain injury, so that adults working with the child can better understand the developmental abilities that were most likely to have been disrupted. These areas of difficulty and inability underly the learning and behavior problems seen in the classroom after a child has sustained a head injury.



Infancy Stage: Birth-3

Normal Developmental Milestones

Newborns and young babies do not understand that they have an existence apart from others. Things happen to them "out of the blue," unconnected with other events. The baby is a jumble of feelings and impressions and receives information from all of his senses—the baby can feel pleasure and pain, and can make basic movements and sounds--- but does not know that these sensations have names such as smelling, feeling or moving. The infant is not self-aware and cannot differentiate various experiences. The infant simply experiences a wide variety of states, and responds, with quiet alertness and comfort, or with flailing, crying agitation.

As the infant grows, he develops a sense of self as a separate being. Impressions begin to separate into distinct experiences, and begin to be integrated with each other. The baby learns that when mother's footsteps are heard in the hall, mother will soon appear.

The baby also learns that he can make certain events happen: if mother does not appear, the baby will cry to make her come. In this way, the baby begins to understand cause-and-effect relationships. This development forms the foundation for understanding all cause-and- effect relationships in the future.

Emotions and emotional regulation are affected in a significant way by the brain development during this period. From a jumble of unrelated feelings, separate emotions begin to emerge and become clearly distinct experiences.

The child begins to express feelings through clearly different behaviors and can even label basic feelings (happy, sad, mad, scared) by the end of this stage.

Once there is an understanding that certain events are routinely paired together, the infant is capable of self-regulation. He can cry for his mother and wait for brief periods without becoming despondent. The sleep-wake cycle begins to be regulated, and by the end of the second year of life, the child's sleep patterns are very close to what they will remain throughout the life span.

Developmental Characteristics: Birth to 3 years:

- Language acquisition
- Refinements in sensory and motor systems
- Regulation of sleep-wake patterns
- Begin to understand cause-effect relationships
- Emotionally egocentric
- Symbiotic relationships with caregivers

Effects of Brain Injury: Birth to 3 years

When a child sustains a brain injury between birth and age three, the developmental milestones described above are disrupted.

The child:

1) has trouble understanding or explaining about what is happening to him,
2) tends to get overwhelmed by experiences, and

3) situations that are most likely interesting to others of his age often are overstimulating. The child appears unpredictable in emotional reactions, seesawing from happy to sad, content to angry, without any apparent cause. Behavior is just as hard to predict, because it does not follow logically from his emotional state.

Behavioral Characteristics After Brain Injury: Birth to 3 Years

- Quick shifts from one emotion or state to another
- Impulsivity
- Use of primitive behaviors (biting, hitting, etc.)
- Lack of self-awareness
- Inability to self-regulate behaviors
- Lack of responsiveness to others

Being unable to distinguish perceptions and emotions clearly, the young child does not develop a solid understanding of cause-and-effect relationships. Because there is a weak connection between what the child has done and the consequences that occur as the result of the behavior(s) the child does not respond to standard punishments or discipline strategies as expected.

While young children do not demonstrate self-control or self-regulation, the persistence of these problems as the child matures presents serious difficulty for parents and teachers. Throughout life, the child who sustained a brain injury in infancy will probably need to rely on others to provide structure, support and supervision much more than what is considered appropriate for that age.

Developmental Disruptions Following Brain Injury: Birth to 3 Years

- Disruption in the ability to regulate state of arousal and sleep
- Lack of understanding of cause- effect relationships
- High reliance on structure, support, supervision and modulation from others
- Sleep disturbance
- Lability: moods shift dramatically and quickly
- Emotional reactions unpredictable, often labeled "irrational"

Preschool Stage: Ages 3 To 6 Years

Normal Developmental Milestones

The preschool years bring important progress in the child's physical, personal, social and emotional development. By age three, a child's sensory systems—sight, hearing, touch, smell and taste—are well developed and differentiated. Motor skills—movement, dexterity and agility—are also progressing.

In addition, during the preschool years, the child begins to coordinate these systems with each other. The child is focused on learning about the concrete properties of things: how they can be moved, shaped, stacked, and created, and learns that certain things are best suited for certain activities (wheels to roll, markers to decorate, and cookies to eat).

There is a fascination with how things work, and much time is spent gaining experience with the physical properties of the world around the child.

The preschooler distills these specific experiences into sets of concepts. Concepts are general principles that describe the physical world. The first concepts relate to size (big and little), amount (all, some and none), speed (fast and slow), and personal conduct (nice and mean).

These concepts allow the child to extend control over the world and give a sense of importance to the child. The child tirelessly categorizes experiences and enjoys learning new concepts.

Developmental Characteristics: 3 to 6 Years

- Very basic understanding of cause and effect relationships
- Developing ability to think before acting
- Focuses on one aspect of the situation at a time
- Emotional focus is on control and mastery
- Concrete and rigid thinking

The limitation cognitively is that only one concept or dimension can be handled at a time. The preschooler's views about the world and the concepts that are developed are completely dependent on personal experiences. Someone is either nice or mean, depending on how that person just acted. The preschooler's thinking is thus

very rigid: there are no middle- ground, no shades of gray, and no extenuating circumstances.

By the end of the preschool stage (age 6), the child is capable of thinking before acting. Actions become more and more "appropriate," not only in general tone, but also in degree. This accomplishment reflects the ability to integrate the thinking, emotion and behavior systems.

The child can make fine distinctions among feelings, thoughts and behaviors and can smoothly interrelate these thoughts, feelings and actions. By the end of this stage, the child is usually able to think before acting, and is cognitively ready to begin to learn academic material in school.

Effects of Brain Injury: 3 to 6 Years

A brain injury acquired between the ages of 3 and 6 may affect the child's ability to organize and manage behaviors and emotions. Because the connections among the thinking, emotion and behavior systems do not develop well, the child seems to feel things more forcefully and more immediately. When experiencing a feeling (such as tired), the child may react on that feeling by having a temper tantrum. Attempts to appeal to the child's rational side will fail, because the "rational side" has not developed. Often, emotions overwhelm the child and the child will often act in a manner that seems aggressive, out-of- control and dangerous to others.

A child who acquires a brain injury between ages 3 and 6 does not learn preschool concepts well. These concepts include: same/different; quantity (some/all), shapes, size (big/little), and time (yesterday, next week). Mistakes in using these concepts will not pose serious problems for the child as a preschooler. Because these con-

cepts provide the foundation for the basic academic skills of reading, writing, and arithmetic the lack of understanding is likely to become a greater handicap as the child progresses through school.

Behavioral Characteristics after Brain Injury: 3 to 6 Years

- temper tantrums
- high emotionality
- impulsivity
- primitive behaviors (biting, hitting, etc.)
- lack of concern for danger and safety
- resistance to influence or direction from parents

A child injured at this stage also has difficulty with executive functions, such as making decisions, judging situations, and planning stages of an activity. There is often difficulty starting or initiating activities, determining how close he is to reaching a goal, changing a plan, and knowing when a task is finished. There is likely to be more difficulty separating from parents and handling transitions or change.

Self-monitoring of behavior or figuring out how to behave in situations that are over-stimulating, unfamiliar, or unclear (in the grocery store, at sports events, and at school recess or lunch) is often extremely difficult for the child to do.

Developmental Disruptions Following Brain Injury: 3 to 6 Years

- Disruption in the connections among thinking-emotion-behavior systems
- Emotional and behavioral extremism
- "Executive function" difficulties
- Poor organization of behavior
- Immediate expression of feelings
- Temper tantrums and rigid behavior
- Poor acquisition of preschool concepts: same/different; quantity (some/all); size (big/little); shapes; time concepts (yesterday/next week)
- Dependence on structure and organization provided by adults

Elementary School Stage: 6 To 12 Years

Normal Developmental Milestones

Children at this stage of development can consider several aspects of a situation at once. They can take another person's point of view. They understand that life is more complicated than the simple set of cause-and-effect relationships they recognized just a year ago. They now think it is "babyish" to throw a tantrum in response to a disappointment. They are capable of listening to reason and responding with understanding. No wonder this stage starts with the "sunny sixes!"

At this age, the child thinks that the intention of acts is important. There is awareness that things do not always turn out as expected or hoped-for and that the motivation or intent is what counts. The ability to pay attention to several things at once and to understand another person's point of view makes it possible for children of this age to work together on teams in school and in sports. Children are truly ready for school.

Their sensory and motor systems are refined and integrated to the point that they are able to sit in desks with "quiet" bodies. Cognitively, the child has matured to the point of being able to understand symbolic information. This development makes it possible to learn to read, spell and do math.

Developmental Characteristics: 6 to 12 years

- Robust understanding of cause-and-effect relationships
- Ready to learn academic skills
- Focus on effort as important
- Recognize intention of acts as important

Effects of Brain Injury: 6 -12 Years

Children who experience a brain injury during the elementary school years typically have difficulty learning new concepts. They may be able to memorize information, but fail to grasp the basic principles required for a true understanding of reading, spelling and math. Children usually end up with a poor performance despite hard work.

Because they rely on memorization and rote learning so much, they have difficulty holding on to what they have learned and using it in new situations. They may be able to memorize a list of spelling words for a test but will not be able to spell them in written compositions.

The child who acquires a brain injury during the early elementary school years often has trouble applying rote-learned skills to creative projects. Although they may be able to read, their comprehension of long paragraphs may be reduced.

They may have a hard time making inferences, organizing new information so they can remember and use it later, and knowing how to act in spontaneous social situations. Any areas of learning weakness or disability that may have been compensated for previously will be more pronounced following a brain injury at this stage.

The child is unable to organize incoming information independently. These organizational problems make it even more difficult to hold on to new information so that it can be retrieved and used later. These basic challenges make the classroom a highly stressful environment. The child is working hard yet receives poor grades and the recommendation to "try harder."

Particularly in the early elementary grades, when children are highly focused on reading levels, spelling test grades, and mastering math facts, the child with a head injury can feel like a failure. Because mastery and accomplishment in school is the primary arena for self-esteem at this stage, school failure can have far-reaching effects.

Children who already have mastered the basic skills of reading, spelling and math before the brain injury may have an uneven learning profile of strengths and weaknesses afterward. For the child, unevenness among abilities creates mental fatigue and frustration. Time spent learning yields fewer rewards.

Often, the child's speed of mental processing is very reduced, resulting in slower learning and spotty learning of new material. Even though the child is working hard, he finds it impossible to finish class work. Children, whose learning problems are misunderstood, develop the feeling that they are just not good at school and thus begin to avoid school.

When the brain injury occurs during this stage, a child's behavior in school and during familiar activities is usually quite good. Behavior problems are more likely to occur during unstructured times. They may make poor judgment; get "carried away" during play, and easily misinterpret others' cues.

They may react to peers in an irritable or aggressive way. The child may get in trouble for fighting during recess or be teased because of their difficulties and become socially isolated or withdrawn from peers because of this.

Developmental Disruptions Following Brain Injury: 6 to 12 Years

- Disruption in reading, spelling, math skills
- Poor performance despite hard work
- School failure/avoidance
- Behavior problems during unstructured times
- Depression, social isolation or withdrawal from peers
- Sleep disturbance
- Fatigue

Early Adolescence: 12 to 16 Years

Normal Developmental Milestones

Beginning in early adolescence, children enter the last stage of major brain change and reorganization. They become able to think of the world abstractly and they are able to organize many sources of information into projects or essays that reflect their own thinking. They are able to analyze information, think logically, and present a convincing argument for a position. At this stage of life, children become capable of organizing, planning, and carrying out complicated, long-term projects. The school system recognizes these changes by requiring children to produce papers, essays and projects rather than simply telling back information they have memorized.

Young people of this age are developing judgment, the ability to plan, and the ability to reason independently. As a society, we recognize this maturity by allowing them to stay by themselves at home, babysit others, and do jobs in the neighborhood for pay. Their parents have learned to count on them to step into these roles. Teenagers are eager to assume the responsibility and monetary rewards that come their way.

Emotionally, the young teenager is entering a period of great change and growth. This means that he is often quite unstable emotionally and will often experience swings of emotion. Self-control will sometimes be good and sometimes poor.

The ability to think in an abstract way means that the adolescent is not as impressed with concrete reality so much anymore. Rather, he can become obsessed with what he imagines could happen. The ability to think of infinite possibilities is highly exciting but also can create anxiety and extremism. The pimple appearing on his face the week before the social event not only prevents the young teen from asking someone to go with him, but also can set off a chain of catastrophic thinking – he probably will never get a date and will end up loveless and unsuccessful forever.

Psychologically, young teenagers are starting to develop a clear and solid sense of identity. They tend to do this at first by being clearer about who they aren't rather than who they are. They may reject things associated with growing up, home and parents as being conventional and "not-me." They try on different styles of dress, hair, and identity and experiment with the effect on others.

This age group already has established personalities, they have responsible roles in the family, and they are largely responsible for their own self-care, schoolwork and plans.

Developmental Characteristics: 12 to 16 Years

- Considers three or more dimensions simultaneously
- Abstract reasoning
- Extremism
- Increasing autonomy
- Beginning identity development
- Social stereotyping
- Responsibility: able to care for self, babysit, perform jobs for pay

Effects of Brain Injury: 12 to 16 Years

A brain injury sustained in early adolescence affects the adolescent's ability to continue with all of these areas of growth. The big brother who may have babysat siblings, ran errands on his bike, and managed his own school and personal responsibilities is now in the position of requiring the care and supervision of others.

The youngster may not be able to return to sports, particularly team sports that require quick decision-making and organization skills. This causes a double loss for the child: the loss of a primary stress-reducing activity and the loss of a shared activity with friends.

Friends also respond to the changes in the child's "personality." Cognitive problems caused by the injury often result in being quieter, less tolerant, less spontaneous, more easily fatigued, and/or more irritable than before.

In school, adolescents with sustained brain injury often have difficulty learning new information. Usually, they are able to remember and use what was learned before the injury, but acquiring new skills becomes harder. Mental processing speed is usually reduced considerably, even in children who have had a mild brain injury. This makes it hard to learn new information, especially in a lecture-type class where the teacher may be talking rapidly and expecting the student to take notes at the same time.

When injured at this stage they may have difficulty organizing complex tasks over time; they may do well on homework due the next day and studying for tests, but they fail to complete long-

range projects. Typically, they have an uneven pattern of academic strengths and weaknesses. This kind of behavior is difficult for teachers to understand and causes a lot of fatigue and stress for the student. Fatigue and school failure often cause frustration.

Key Concept:

It is essential to have a comprehensive evaluation of the child's pattern of cognitive strengths and weaknesses after a brain injury.

Adolescents are capable

The adolescent's natural tendency to exaggerate and catastrophize often results in feelings of depression and hopelessness about ever being able to succeed again. Loss of friends, difficulty with school performance, changed status in family roles, loss of sports and other social coping strategies, and inadequate information about specific learning profile cause emotional pain for the young adolescent.

Usually, the adolescent is acutely aware of these changes, adding to his despair. It is essential to have a comprehensive evaluation of the child's pattern of cognitive strengths and weaknesses after a sustained brain injury, to educate him about his abilities, make the accommodations/modifications necessary for school success, and prevent these serious emotional problems.

Developmental Disruptions following Brain Injury: 12 to 16 Years

- Unevenness in cognitive profile
- New learning deficits
- Slower rate of mental processing
- Difficulty organizing complex tasks over time
- Judgment and reasoning difficulties
- Increased "frustration" response
- Depression
- Fatigue

Late Adolescence: 16 to 19 Years

Normal Developmental Milestones

By the end of adolescence, children are able to plan, organize, think about things in a complex way, show good judgment, respond to changes in plans with flexibility, and solve problems in a sophisticated way. They have a relatively solid sense of who they are, what they like to do, and what they are good at.

Older adolescents link their identity to these positive attributes; they have "grown out of" the reactionary views of the younger teenager. At this stage, teens are able to learn on their own, and most schoolwork involves self-directed study.

Adolescents are capable of true friendships, which are grounded in shared values, rather than superficial appearances. The primary emotional and psychological task of this period is to establish independent identity related to the major roles of adulthood: love and work. By the end of this stage, the young adult has a clear sense of his sexual identity, vocational plans, and social roles.

Developmental Characteristics: 16 to 19 Years

- Complex reasoning and judgement
- Ability to plan and execute complex projects over time
- Solid sense of own identity based on positive identifications
- Social sophistication
- Capacity for altruism

Older adolescents typically are employed, at least during the summer months; they transport themselves to and from appointments; and they usually have developed goals and plans for the future, at least in terms of whether they are headed to college or not.

Typically, they are becoming more calm and reflective; they have been gaining experience with abstract reasoning and so are much less prone to over-reacting and extremism in their thinking.

Effects of Brain Injury: 16 to 19 Years

When an older adolescent sustains a brain injury, cognitive changes usually involve subtle connections and "higher-order" abilities. Abstract concept formation, organization, initiation, the ability to keep track of several things at once, reasoning, and judgment abilities are usually affected.

These changes in thinking abilities are felt in subtle changes in personality, responsibility, and social behavior. The youngster may be quieter, more "to himself," more irritable with his parents, peers, or family members, and avoidant of social situations.

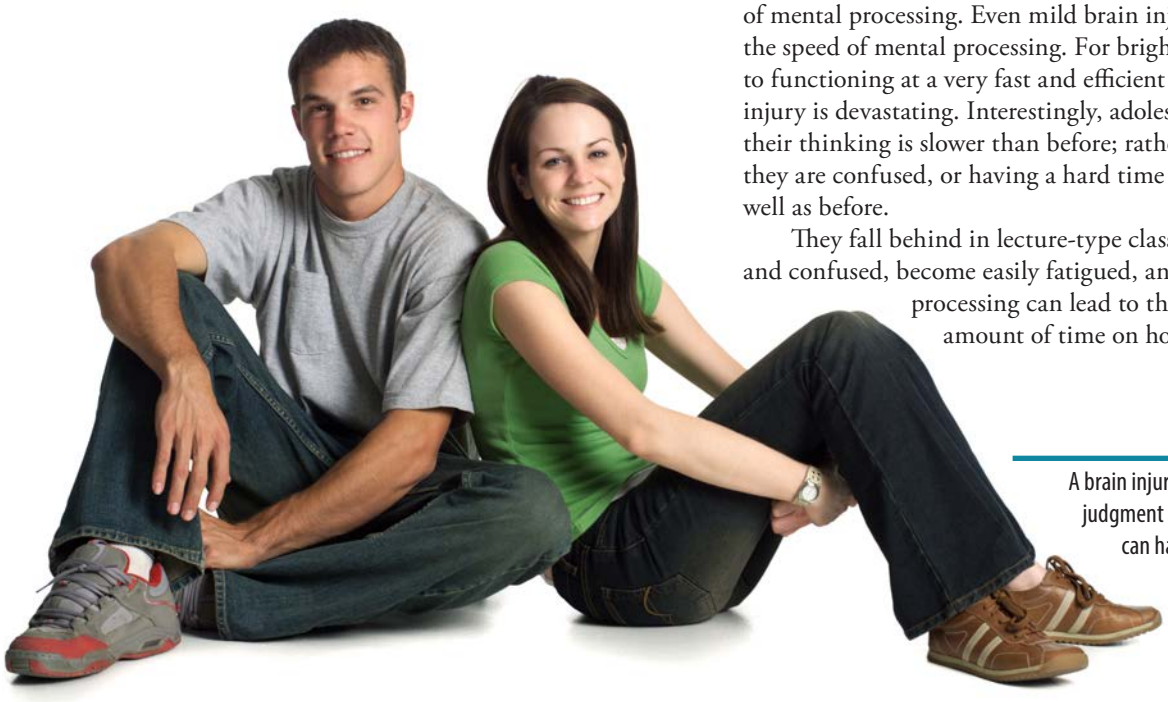
Usually, the older teenager is aware that his thinking is not as sharp as it was previously. He does not think well "on his feet;" he makes errors, feels vulnerable, and is afraid of making more mistakes in front of peers. He feels unsure of his ability to function independently, and when people correct or try to help, he feels humiliated and despondent.

The safest course, he may feel, is to withdraw from everyone, concentrate on schoolwork, and avoid social settings.

They may require more supervision and protection than is normally felt appropriate for youngsters of this age. They often put themselves in dangerous situations; for example, a young woman may accept a date with a male she does not know, without hesitating to think about the potential risks. Others may withdraw and avoid the dating scene entirely, putting off intimate relationships until later in adulthood.

In school, academic problems typically come from slow rates of mental processing. Even mild brain injuries drastically reduce the speed of mental processing. For bright teenagers, who are used to functioning at a very fast and efficient pace, this aspect of brain injury is devastating. Interestingly, adolescents rarely realize that their thinking is slower than before; rather, their experience is that they are confused, or having a hard time understanding things as well as before.

They fall behind in lecture-type classes, feel overwhelmed and confused, become easily fatigued, and frustrated. Slow mental processing can lead to the child spending a huge amount of time on homework and trying to



A brain injury can seriously interfere with social judgment and personal development and this can have ramifications for dating and the development of sexual identity. Adolescents with brain injury are prone to misinterpret the subtle cues sent out by others.

complete unfinished class work.

They do not have the reserve energy to think about working on projects or to involve themselves in extra-curricular activities, because they are exhausted from their efforts on the basics of schoolwork.

Older adolescents have a solid store of learning and experiences, from which to draw following a brain injury. They also have a solid sense of who they are, their likes and dislikes, their goals and aspirations. They have a history of friendships, relationships, and involvement with others through sports, hobbies, and school-related activities.

The need to plan deliberately, the inability to resume job and schoolwork immediately with success, and concern about the meaning of this injury on the rest of their lives, creates added stress and frustration.

They are often unable to keep up with the pace of former activities, and that of peers. Often the adolescent is aware of the difference between abilities before the accident and current status. For this reason, the adolescent with a sustained injury is at risk for serious depression, hopelessness and suicidal thinking.

Developmental Disruptions Following Brain Injury: 16 to 19 Years

- New learning deficits (e.g., memory for numbers)
- Mental processing speed deficits
- Inability to organize complex tasks
- Conflict between specific challenges and career goals
- Interference in developmental drive toward independence/separation
- Social awkwardness
- Fatigue
- Defensiveness regarding emotional/cognitive problems
- Depression
- Body image/social image

Chapter Summary Points

A child's brain is not fully formed at birth. In contrast to adults', children's brains undergo active development, growth and reorganization from birth through adolescence.

- These developmental changes result in qualitative changes in thinking, emotional maturity, social understanding and behavior.
- Development takes place in stages, which proceed in a generally universal order, and which build upon each other. Abilities developed at one stage form the foundation for more complex skills developed at later stages.

The impact of a brain injury on cognitive, emotional and social abilities depends largely on the stage of development at which the injury occurs.

- Abilities, which are in the process of development, are the most likely to be disrupted by a brain injury.
- The earlier in development a brain injury is sustained, the more it will affect the basic developmental processes.
- Sometimes the major impact of a brain injury is not obvious until a later stage of development.

CHAPTER 3

Changes in Learning and Intervention Strategies

This Chapter Allows the Reader to:

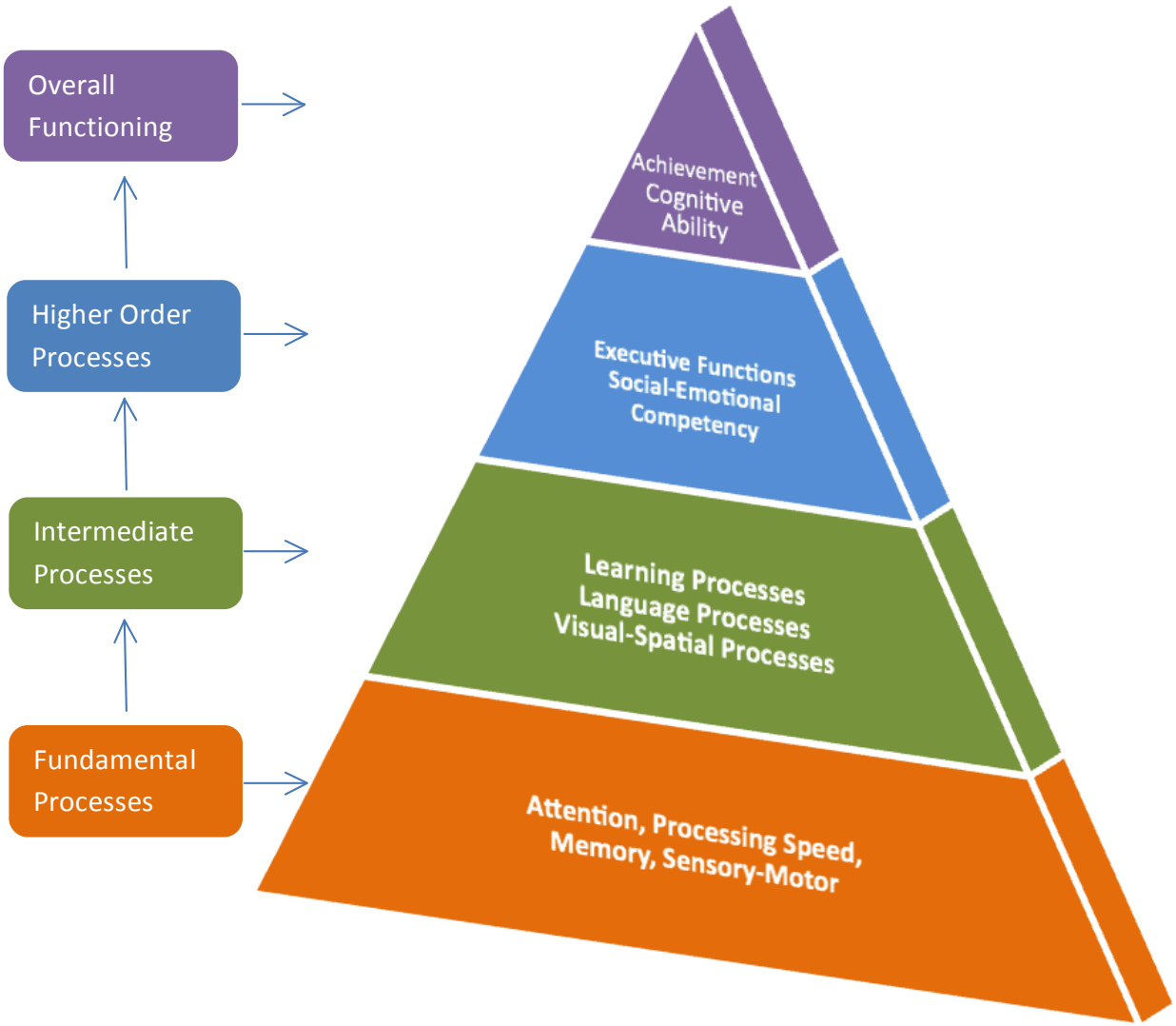
- Understand the definition of the different cognitive processing areas that may be impacted by a brain injury.
- Gain a basic understanding of the brain structures associated with the various cognitive processing areas.
- Identify strategies to support students in the home and school settings.

This chapter is focused on 15 of the 16 domains indentified by the Colorado TNT (TBI Networking Team) Steering Committee to be most impacted post brain injury. Chapter 3 focuses on the 16th most effected domain – Social/Emotional and Behavioral.

This chapter is organized in the hierarchy of neurocognitive functioning – from the more basic, fundamental skills up to the more higher-order cognitive skills.

Common problems and potential intervention strategies are reviewed for students with long-term impacts from multiple (mild TBI's a.k.a. concussions) brain injuries as well as those with moderate or severe injuries. For support with implementing concussion identification and management within your school or district, please see the Colorado Department of Education Concussion Guidelines **www.cde.state.co.us/HealthAndWellness/download/BrainInjury/CompleteConcussionGuidelines2011-2012.pdf**

Hierarchy of Neurocognitive Functioning



Adapted from Miller, Halstead-Reitan

No matter how a brain injury is medically classified – mild, moderate or severe – it is likely that the student will experience some degree of change in ability in several of the areas described in this chapter. Students' awareness of these changes and their perception of the need for the compensatory strategies suggested in this chapter will vary from student to student. As a parent or teacher, you will need to evaluate the child's ability to work independently with compensatory strategies. Younger students, and those injured at early developmental stages, are least able to learn and implement techniques independently.

To help students identify what works best for them, they will require opportunities to learn strategies repeatedly with feedback from others concerning successfulness. Even if self-awareness is reduced, there is benefit to helping the student identify and understand which tasks are easy and hard, which are liked and disliked, and ways to make tasks easier. Building this awareness and implementing approved interventions will assist the student in generalizing these strategies to other areas of their life. Learning self-advocacy and maximizing independence are essential to life success following brain injury.

In order to effectively support the student in all settings, the school team needs to communicate and collaborate with each other, as well as, with the student, parents, rehabilitation team and other individuals or agencies that may be involved in intervention support. The way the student presents at school and the needed accommodations/interventions may vary between home and school as well as from classroom to classroom. This does not mean that one environment or person is better able to provide support for the child, instead it suggests that the environments have different cognitive demands, expectations or build upon different strengths. In order to discover the most effective strategies, teachers and parents can experiment by introducing interventions gradually and allowing considerable time to assess effectiveness. Because change is inherent in the situations students encounter, as well as in their developmental process, strategies will need to be evaluated periodically and fine-tuned or altered throughout the student's school and adult life.

As a general rule, interventions used with children who have brain injuries should not be punitive. Depending on where in the brain the injury occurred, traditional consequence-based interventions may not always be successful with children who have experienced a brain injury. For example, if a student with a brain injury is behind on their work, keeping them in for recess or taking up their lunch period is not an appropriate alternative. Other interventions and accommodations need to be put into place to address the work completion and/or work overload issues. Removing recess or lunch time only punishes the student for having a brain injury and places more cognitive strain on their ability to learn and perform in the classroom. This approach eliminates the time that they have to rebuild their social skills, as well as the time they have to be away from the cognitively-taxing demands of academics.

To set the stage for success in any setting and to optimize consistency of performance on a daily basis, students need to have a regular routine both at home and school. As part of this routine, students need to get plenty of sleep, eat a well-balanced diet and regularly participate in medically-approved exercise activities. Depending on the needs of the student, parents might want to consider consulting with a health care professional who has knowledge of brain injury, about pharmacological and alternative treatment options. These approaches have been successful for some students who have attention, sleep and behavior issues related to the brain injury.

When questions of ability persist, a neuropsychological evaluation, including standardized tests and informal observations, may clarify which strategies would be most effective. This neuropsychological evaluation can help to identify cognitive strengths and weaknesses, and can help determine how much support the student will need. The Colorado Department of Education, along with partners such as the TBI Trust Fund and the Brain Injury Alliance of Colorado have put together a website: www.cokidswithbraininjury.com. This website outlines the 16 most common neuropsychological effects of a brain injury and assists school district personnel in conducting school-based assessments and interventions. By using this website, more school-based professionals should be able to provide functional school-based neuropsychological assessments detailing the effects of the brain injury.

Sensory and Motor

A brain injury may contribute to a weakness in perceiving sensory information, integrating one sensation or sensory system with another, and responding to sensory information. As a result, children may be over or under sensitive to sensory input. Some children are often hypersensitive to sounds, touch, or light after a brain injury and do not habituate to the incoming information. Other children have difficulty perceiving light touch to the hands and fingers, and they cannot interpret sensation clearly based on touch alone. Children who have trouble perceiving and/or responding to sensory input obviously will be at a disadvantage when they have to integrate information coming from different sources.

Generally speaking, the parietal lobe of the brain processes most sensory information and integrates it to construct a picture of one's environment. The parietal cortex helps with attentional awareness and is involved in comprehending what objects are and where objects are located in space. The parietal lobe is located at the top and back of the brain. Damage to the parietal lobe may interfere with body awareness, cause attention problems, and the accurate processing of auditory, olfactory, taste, tactile, and visual information.

In the motor area, children often have a hard time correctly grading their responses. This inability to grade their motoric responses sometimes causes them to over-respond or under-respond. You can see this in written work at school: a child may sketch his letters; apply so much pressure that the paper tears; rework some letters so that they are dark and overdrawn; or scribble the letters. It may be impossible for the student to apply consistent pressure and smoothly grade the fine motor responses in order to produce a more acceptable product.

Motor movements involve a circuit between the frontal areas of the brain and a fist-sized structure at the very back and bottom of the brain called the cerebellum. The upper frontal and top regions of the brain (called the motor-strip) and deeper neurological areas (called subcortical areas) generally control fine motor movements. Fine motor movements include writing, playing a musical instrument, or picking up small objects. Injury to the motor-strip (top) and/or the cerebellum (base of the brain) can cause motor difficulties such as jerky movements, poor posture, walking difficulties and coordination problems. Disturbances in the sensory and motor systems, besides requiring intervention in their own right, also affect the child's energy and availability for higher order cognitive activity.

Sensory and Motor Changes that may be Observed

Sensory (observed behaviors may vary based on whether the student is over or under sensitive to sensory information)

- Increased distraction during activities.
- Sensitivity to lights and sounds.
- May appear emotional or oppositional due to behaviors related to sensory overload.
- Appears overwhelmed particularly in over-stimulating or crowded environments (e.g. lunchroom, assemblies).
- Student may exhibit unusual behaviors (frequently out of seat, claps hands, stands up, makes noises, etc.) when overwhelmed.
- Doesn't like to be touched, picky about clothing, always touching other people or things.
- Always has something in mouth.
- Is picky about food textures.
- Loves swinging, climbing, running, and crashing into things.

Motor

- Poor coordination.
- Shaky hands/tremors.
- Poor handwriting or messy written work, with lots of erasures or reworking.
- Takes a long time to produce written work or avoids tasks involving writing.
- Difficulties cutting, drawing, dressing, feeding.
- Has awkward pencil grip.
- Difficulties shifting from workbook/textbook or board to writing answers on paper.
- Poor balance-clumsy, jerking movements, stumbling or bumping into things.
- Can't move easily from sitting to standing.
- Stands up to read or write.
- Leans heavily on desk or walls, rubs hands along walls in hallways.

Sensory and Motor Changes: Strategies for Intervention

Sensory and motor issues may both require consultation and/or services with an occupational therapist and/or physical therapist as well as an assistive technology evaluation.

Motor

- Encourage participation in recreational and sports activities that develop motor coordination and use both sides of the body. Usually, individual sports, such as swimming, bowling, tae kwon do, bike riding, jogging, track and field activities, and skiing are much easier and more successful for students with a brain injury. Among the team sports, baseball is the best, as the child can practice individual skills and routines. Be cognizant of activities that the student previously enjoyed and excelled at that may be difficult and frustrating due to motor deficits as a result of their brain injury
- Allow the student to stand up and lean on the table when reading or lie on the floor to do work.
- Encourage heavy work activities (e.g. standing pushups against wall, carrying boxes or books, stacking chairs). These activities give deep pressure to the joints, help reduce sensory defensiveness, keep the child alert, and assist in the development of controlled, graded movements.
- Be sure that the student's table and chair provide optimal support to reduce the amount of energy devoted to maintaining balance. A firm seat with arm rests and table at elbow level are often optimal.

- In physical education class, the following activities can help children with sensory and motor weaknesses:
  - activities involving hanging or climbing.
  - jumping on a trampoline or a hard surface.
  - catching and throwing heavy balls.
  - climbing, pulling and hanging activities.
- Strategies for written work.
  - Break written work into chunks.
  - Reduce the amount of written work.
  - Provide multiple choice test format.
  - Allow student to use computer or other typing devices for written work.
  - Provide student with slantboard to facilitate writing.
  - Provide copy of class notes or guided notes and outlines.
  - Allow cursive or print-whichever is easier for the student.
- Have the student warm up their hand and finger muscles before doing fine motor tasks.
- Reduce the number of problems or visual stimulation on the page/worksheet.
- Use a line ruler to assist with visual tracking.
- Student may need to transition in the hallways before or after class ends or be provided with someone to help support them in physically navigating the crowded halls.
- Student may need to be provided with a key for their locker instead of having to try to remember or physically maneuver a combination lock.

Sensory *(interventions vary based on whether under or over sensitive to sensory information)*

- Preferential seating away from visual and auditory stimulation.
- Limit visual (clutter) and auditory stimulation in the classroom-consider the impact of lights, noise, movement, etc.
- Provide a quiet space/area for breaks or to allow the student to complete work.
- Provide student with the opportunity for physical and cognitive rest breaks during the day (lunch and recess are not rest breaks for a student with a brain injury).
- Monitor whether the student can handle the lunchroom or if a less stimulating area should be provided where they can eat with their friends.
- Permit use of headphones when over-stimulated/sensitive to auditory stimulation.
- Allow them to chew gum, hard candy or crunchy foods such as crackers or baby carrots.
- Use therapy balls, seats or wedges at their desks.
- Provide squeeze ball, Koosh ball or other objects/fidgets for hands.
- Allow student to wear comfortable clothing, remove tags.
- Allow use of sunglasses and hats when outdoors for students with light sensitivity.
- A number of the motor interventions are also appropriate for sensory deficits.

Attention and Concentration

Attention and concentration involve holding information such as events, words and visuals in ones' awareness. It is the ability to focus on the information necessary to learn and complete a task. Students must be paying attention in order to perform higher level cognitive processing and to store incoming information into memory. Following injury, the brain is generally not as alert and is less able to sustain focus or filter sensory information. Combined with the mental effort of using injured pathways and the now challenging task of shifting external focus from one thing to another, many students have problems with attention and concentration. Difficulty with attention may also be impacted by or indicate problems with processing speed, organization, memory, language abilities, emotional issues or fatigue.

There are several different types of attention abilities. It is important to determine which type(s) of attention are impacted to gain an understanding of the student's difficulties and to provide targeted interventions and support.

- Arousal and alertness involves being awake and alert to incoming information.
- Sustained attention is the ability to maintain attention over a period of time. Students with difficulty in this area may only be able to maintain attention on an activity for a few minutes or even seconds.
- Selective attention is the ability to focus on what is important while ignoring competing stimulus and information in the environment. Students with difficulties in this area are easily distracted by the noises, sights, sounds and activities occurring around them. They might also be distracted by their own thoughts occurring inside their minds.
- Shifting attention is the ability to maintain focus while changing from one activity to another. Difficulties in this area can lead to challenges with switching activities or even continuing on the same task as the cognitive demands change.
- Divided attention involves being able to focus on more than one task at a time. An example of this is listening to the teacher while simultaneously taking notes. These are over-learned tasks that enable us to complete more than one activity at once. Children with a brain injury may have to give complete attention to learning or completing just one thing and therefore are not able to provide divided attention. Divided attention becomes particularly difficult when the task is new and not an automatic process.

Neuroimaging studies suggest many upper and lower areas of the brain are involved in different types of attention. Despite the variability of brain regions that assist one's ability to pay attention, most studies appear to implicate the right frontal lobe of the brain and a deeper structure called the cingulate gyrus.

Regulating the environment, and modifying the content and pace of assignments, will be particularly important in addressing challenges in this area. In extreme cases, medication supervised by a physician specializing in brain injury may be effective.

Attention and Concentration: Changes That may be Observed

- Difficulties concentrating or focusing on one task-easily distracted.
- Can appear spacey and forgetful.
- Jumps from one activity to another without finishing.
- Has inconsistent performance at school.
- Can't keep up with the rest of the class.
- Gives up on tasks and hands in incomplete assignments or homework.
- Struggles with following instructions or comprehending lessons.
- Difficulties with following multiple step instructions.
- Makes careless mistakes with schoolwork.
- Difficulties shifting attention from an earlier event or topic or from one activity to another.
- Takes poor notes.
- Does not follow class discussions.
- Makes comments that are off topic or not related to the situation.
- Difficulties staying in one place and sitting still.
- Talks excessively, blurts out or talks about inappropriate or irrelevant topics.
- Disorganized and loses things.
- Can appear to have memory difficulties.

Attention and Concentration: Strategies for Intervention

- Schedule most important work during times when the child has displayed their greatest concentration abilities.
- Seat nearest the location of instruction and away from distractions (e.g. doors, windows, high traffic areas, and other off-task children).
- Seat next to positive peers with age appropriate attention abilities to help with redirection and understanding of instructions.
- Clear desk and area of everything expect what needed for task at hand.
- Reduce background noise by experimenting with ear plugs, ear muffs/headphones, or introducing background sound such as, white noise or a music device with soft music.
- Eliminate interruptions as much as possible. Once students are focused on a task, it is very difficult to get them restarted if interrupted.
- Allow student to complete work or test in alternate settings where there are fewer distractions.
- Make sure to get student's attention when giving directions or cue them when information is really important.
- Use verbal and visual cues to refocus student as well as frequent checks for understanding.
- Provide opportunities for the student to take breaks throughout the day.
- Alter classroom activities to provide movement and hands on learning opportunities after periods of sitting, listening and working at their desk. Increase interest with new, stimulating activities.
- Connect new learning to prior knowledge or with areas of interest.
- Break assignments into smaller and shorter steps and present information in short and concise segments.
- Limit the amount of information on worksheets, notes, etc.
- Remind and teach them how to check their work.
- Provide copies of guided classroom notes or outlines.
- Use a written or picture organizers and check off progress.
- Experiment with using timers and a motivating reward for on-task behavior and work completion.
- Use visual system to support student on staying on-task (e.g. stop light, stop sign, put a sticky note on their desk to cue them to refocus, etc.).
- Teach self-monitoring strategies and focusing strategies (self talk to remind brain to stay focused, saying the steps out loud when doing a task, etc.).
- Use technology (e.g. Interval Minder I-Pad app) to teach self monitoring. Have the student identify if they are on or off-task every time the application makes a beeping noise. Teachers can also do a whole classroom attention training where all of the students in the classroom mark if they were on or off task when it randomly beeps. Teachers can then "randomly" target students with issues and the student or entire class can earn privileges based on the number of times the teacher and student both agree they were on task. Teachers will need to do training up front of what good attention skills look like.
- To check for focus, have the student teach concepts that were just taught.

Processing Speed

Processing speed is the speed with which we take in, understand, integrate and respond to information. It is a mental function that is highly sensitive to brain injury. Even for children whose intellectual ability returns to average or above average following a brain injury, typically the processing speed index is below the 15th percentile. If the brain injury has been mild or if the student is an adolescent, slow processing speed may be missed in the typical school-based assessment. An adolescent will often adjust their behavior to "cover up" cognitive problems following a brain injury, so it appears that they are "fine." Teens are rarely aware of a decrease in their processing speed; rather, their experience is that they are confused or having a hard time understanding everything as well as before. Especially for students who are in fourth grade or beyond, slow processing speed can be devastating to school performance. In earlier grades, teachers tend to give directions and information in single-statement form, with long pauses between statements, so the student can process what has been said. They repeat information often. From about fourth grade on, however, teachers give students longer amounts of information at a time, the information is not repeated as often and the student needs to take notes and listen at the same time. The student with slow processing speed is still working on one piece of information, while the teacher has gone on to the second, third or fourth points. By the time the student tunes in again, they have missed so much that the information they hear is out of context. They begin to develop a spotty information base, and have a set of notes that are incomplete and hard to reconstruct afterwards.

Slowed information processing impacts a person's ability to think efficiently and may hinder the effectiveness of other abilities such as attention, memory, organization, language or executive functioning. Although there are different reasons for slowed processing after an injury, one major reason is that the "wires" of the brain (neurons) can no longer communicate with each other efficiently. When the brain cannot communicate with itself, (different areas talking to each other and sharing information) thinking becomes sluggish. The breakdown in communication is largely caused by damage to the neuron's insulation. Like the plastic insulation of an electrical wire that helps in transmitting a signal, if that insulation is damaged the signal loses energy. Another reason for slowed processing speed is that the brain might have to re-route signals around the damaged area, which takes a longer time to send a message from one point to another.

Processing Speed Changes that may be Observed

- Failure to carry out instructions.
- Delay in response and slow at completing work.
- Spotty learning of new information.
- Difficulty making transitions from one activity to another.
- Difficulties multitasking or doing more than one activity at a time.
- Difficulty remembering details from a conversation (the details were never learned in the first place).
- Difficulty integrating information from several sources.
- Poor task persistence.
- Unwillingness to engage in multi-step activities.
- Confusion or student looks "blank."
- Irritability and poor frustration tolerance.
- Unwillingness to engage in conversation.
- Motivational or initiation deficits - may appear lazy or spacey.
- Resistance to novel tasks.
- Difficulty translating thoughts into flexible, responsive and appropriate behavior.
- Fatigues easily.

Processing Speed: Strategies for Intervention

- Give instructions one at a time and focus on the essential or most important parts.
- Give time between parts of a direction for the child to process and provide a response.
- If the child appears "blank" or is not doing what you have asked, repeat the main points. Do not elaborate or add details.
- Provide written directions and combine verbal information with visuals.
- Frequent checks for understanding.
- Reduce other distractions, so your student does not have to screen them out or share his/her focus with anything but your words.
- Try not to pressure your student, urge them to "hurry up", or get exasperated. If you need something done quickly, better not to assign it to the student.
- Allow extra time for processing and providing their responses as well as on assessments and assignments, including standardized tests.
- Limit the number of tasks the student is required to complete at one time.
- Provide a copy of classroom notes or guided notes/outline.
- Provide or teach the use of graphic organizers and checklists.
- Teach the student how to highlight dense text material and use study hall time to highlight and outline lecture or text material with the student.
- Teach student to advocate for themselves and to ask others to slow down or repeat information.
- Reduced workload- focus should be on whether student is learning the overall concepts not on whether they are completing all the required homework and class work.
- Well established daily routines and classroom expectations/rules.
- Address cognitive fatigue issues.

Memory

Memory and learning involve the storage and organization of information for later use. Often memory of past information and events (long-term memory) is retained following a brain injury. Initially this may be perceived as a sign of little or no loss of memory. However, the memory for new learning and experiences (short-term memory) is frequently affected. Because of the impact on short-term memory, the loss of ability to organize new information so that it can be effectively recalled is common. Working memory, which is the ability to use information in the memory systems in order to problem solve and/or complete a task, can also be impacted. Working memory is typically short in duration and requires rehearsal and repetition in order to remember information for more than a few seconds. Verbal learning, verbal memory and working memory tend to particularly be impacted by brain injuries (Semrud-Clikeman, 2001). Memory skills can be further diminished by the presence of fatigue, pain and stress.

The general memory process is complex and entails memory creation, storage of information and retrieval. Additionally, there are several types of memory, with each type having a different brain structure associated with it. For example, some primary types of memory are short-term, working, visual, auditory, procedural and declarative memory. A detailed neurological explanation of the types of memory and its process is beyond the scope of this manual, but a simplified account is provided.

Memories are created in very deep areas of the brain called the limbic system, especially a specific part called hippocampus. The hippocampus is very sensitive to oxygen deprivation. For example, people who suffer near drowning events might develop difficulties with memory formation.

Memory storage is spread out throughout the brain. The medial left temporal lobe is an area of significant memory storage, but not all memories are stored there.

The frontal lobe of the brain helps to retrieve stored memories. The frontal lobe is also a vital region for working and short-term memory processes.

Working memory is a critical type of memory that helps a person solve multi-step problems and is associated with academic performance.

Damage to any brain area that assists in the formation, storage or retrieval of information can degrade memory. There are multiple ways to damage the memory system.

Memory Changes that may be Observed

- Student understands only parts of instructions or statements.
- Has difficulty following two or three step directions.
- Does work incorrectly or incompletely.
- Forgets what homework is assigned.
- Does not turn in homework, or turns it in incomplete.
- Has difficulty recalling information recently learned.
- Repeatedly asks the same questions.
- Splintered learning and inconsistent performance.
- Doesn't recall participation in activity or events.
- Recalls pre-injury or over learned information or activities.
- Wanders or loses their way in the school, home or community.
- Requires multiple repetition of instructions, information, activity.
- Disorganized.
- Can look spacey.

Memory: Strategies for Intervention

- Break instructions and assignments into manageable pieces-limit amount of information give at one time.
- Present information in several ways (verbal, written, visuals, modeling).
- Left hemispheric damage: Use visuals, graphic information, sticky notes and encourage students to form a mental visual picture of verbal information.

- Right hemispheric damage: Use verbal prompts and auditory modalities.
- Use self-questioning, "wh" questions during reading and discussion (who, what, when, where, why, how).
- When possible use thematic learning across content areas.
- Teach the concept and then ask the student to teach you or others - having them teach others activates numerous areas of the brain.
- Incorporate repetition/ practice of new material - allow rest breaks between repetitions.
- Provide copies of guided notes or overheads.
- Allow use of notes and books during assessments.
- Modify test format to multiple choice to reduce the need for total memory recall. Give recognition tests not recall tests.
- Teach note taking techniques such as highlighting essential information.
- Regularly summarize information and ask the student to paraphrase or repeat it back.

- Teach memory strategies: visual imagery, chunking information, mnemonics, connecting with information with what the student already knows.
- Ask students what they "see" in their minds eye after they read a brief passage.
- Increase memory by making emotional connections and activating the limbic system.
- Competition games may active emotional systems that enhance memory.
- Provide verbal or visual cues to help trigger and aid in memory recall-single key word cues.
- Have student rehearse new information by reciting it out loud.
- Use errorless learning to teach concepts. See projectlearnet.org and brainline.org. Errorless learning does not encourage guessing so the student never has the chance to learn or remember the information incorrectly.
- Check for understanding and have student repeat what they understood.
- Identify peer helpers to assist with strategies and understanding of directions/content.
- During classroom discussions, call on student with brain injury first (if their hand is up) so they do not forget their responses and are able to then focus on the rest of the discussion.
- Encourage student to self-advocate to have information repeated or presented in a different manner.
- Provide student/parents with upcoming topics, notes and materials so they can preview and reinforce concepts at home.
- Provide examples of homework problems/assignments to aid in memory when at home.
- Develop a homework only folder.
- Designate a bag or pack in which to keep materials that go to and from school.
- Provide an extra set of textbooks for home.
- Teach the student to use picture schedules, daily planner or electronic organizer.
- Develop checklists to help the student remember schedules, routines, etc.
- Use technology to set up automatic reminders. Use Google e-mail/calendars, computers and/or smart phone to send reminders.
- Depending on extent of memory concerns, student may need to use a memory book.
- Limit the number and frequency of changes in routine-keep routine as consistent as possible.

Visual-Spatial

Visual-spatial processing involves the ability to generate, retain, retrieve and transform well-structured visual images. After a brain injury, the visual-spatial abilities are frequently more impacted than verbal and tend to remain at lower levels after recovery (Semrud-Clikeman, 2001). Visual-spatial difficulties include: copying figures, constructing block designs and facial discrimination. Speed of visual processing and visual-motor skills have also been found to be sensitive to brain injuries (D'Amato, Fletcher-Janzen & Reynolds, 2005).

Visual-spatial processes are largely associated with the occipital lobe of the brain, which is located at the back of the brain. When visual information is processed in the occipital lobe, it divides the information and sends it to the lower left part of the brain (temporal lobe) or to an upper part called the parietal lobe. Visual information that can be identified with a word (what) is the domain of the occipital-temporal region, where visual information that is identified in location (where) falls within the domain of the occipital-parietal realm. Damage to the back and left side of the brain can degrade a person's ability to process images of known objects. Injury to the back to upper regions of the brain may cause problems with spatial and location tasks.

Visual-spatial Changes that may be Observed

- Difficulties organizing materials.
- Reading difficulties.
- Difficulties organizing written work and handwriting difficulties.
- Difficulties with mathematics/geometry.
- Difficulties with understanding numbers and pictorial representations.
- Depth and distance perception difficulties.
- Spatial perception and orientation difficulties.
- Difficulties understanding up-down, near-far and other spatial concepts.
- Difficulties with mental rotation and object construction.
- Can experience behavior difficulties due to frustration of not understanding visual materials and expectations.

Visual-spatial: Strategies for Intervention

- Verbal focus on learning-provide directions and content verbally.
- Provide precise and clear verbal directions.
- Frequent checks for understanding.
- Highlight what visual information needs to be focused on.
- Visual planners (webs, diagrams) may be too confusing.
- Enlarge written materials.
- Reduce the amount of written work.
- Consider if visual presentation of worksheets needs to be modified.
- Provide support in aligning math problems.
- Provide support in organizing writing from left to right and organizing/expressing thoughts.
- Teach verbal strategies to interpret visual information such as maps, charts and graphs.
- Reduce clutter on student's desk.

Language

Children's language abilities are still developing and an injury to this area can have a significant impact on their receptive and/or expressive abilities as well as their academic performance. Receptive language difficulties interfere with the understanding of language and communication (words and sentences) of others. Children may perform well on measures of receptive language soon after the injury, but over time their performance decreases because they are not obtaining new concepts and vocabulary at a rate consistent with their peers (www.asha.org). Understanding spoken language is typically associated with the left hemisphere of the brain. A small specific area of the left temporal lobe, called Wernicke's area, is vital to processing incoming language-based information. Young children typically understand what is told to them before they can express themselves, but damage to the left side of the brain hinders their ability to understand language.

Expressive language skills involve a child's ability express their own thoughts and ideas. After a brain injury, expressive language difficulties are frequently observed as a word finding issue. This is particularly evident in situations of stress, such as providing responses in the classroom setting. These children typically know the answer but cannot think of the word when needed. The ability to speak logically and express oneself using language involves the left hemisphere of the brain. A specific area within the left temporal lobe, called Broca's area, activates and communicates with other areas of the brain to produce speech. Damage to Broca's area, located at the middle to front side of the left hemisphere, hinders expressive language.

Language Changes that may be Observed

Receptive

- Looks or acts confused by conversations or verbal directions
- Delayed or does not respond at all to directions
- Says "huh" frequently.
- Appears inattentive.
- Can be socially withdrawn or acts out behaviorally.
- Does not understand dual meaning of words, inferential, figurative and more complicated abstract language.
- Takes longer to understand directions or what is being said.
- Answers wrong question or gives strange answers.
- Delayed reading and poor reading comprehension.
- Difficulty understanding homework assignments.
- Difficulties with math word problems.
- Poor short or long term memory for conceptual and linguistic information.
- Struggles with understanding social rules.

Expressive

- Uses poor grammar or immature speech.
- Difficult to follow in conversations.
- Can do well with conversational speech but struggles with expressing academic topics.
- Difficulties staying on topic – child may make sudden shifts in the topic or may have difficulty generating novel messages associated with the conversational topic.
- Lack of specific language in academic work.
- Trouble writing essay questions or re-telling stories.
- Difficulties participating in classroom discussions.
- Appears to understand more than they can say.
- Difficulty asking and answering questions.
- Can be easily frustrated.
- Can be socially withdrawn or acts out behaviorally.
- Struggles with negotiating social rules.
- Has difficulty with word finding or uses non-specific vocabulary (e.g., "that lady" rather than "Mrs. Smith").
- Difficulties with written expression.
- Lack of truthfulness or made-up stories due to memory or attention impairments.

Language: Strategies for Intervention

Receptive

- Give directions slowly and one at a time-use short simple sentences.
- Have child repeat back instructions.

- Reinforce verbal concepts with visual cues.
- Identify targeted vocabulary and integrate throughout classroom lesson.
- Reading to the child and discussing provides language models and exposes children to a variety of aspects of language.
- Teach listening comprehension strategies to help expand understanding of social and academic language situations.
- Teach students to advocate and ask for clarification, repetition or for information to be presented more slowly.
- Provide guided notes or outlines-filling in key words can help build listening comprehension skills.
- Start with concrete concepts and then introduce related abstract concepts.
- Avoid using sarcasm and figures of speech; explain the meaning of abstract or figurative language forms in others' oral or written language.
- Allow wait time for processing what is being said and to form their own responses.
- Ask student to repeat back directions.
- Cue the student that what you are about to say is important.
- Teach language memory strategies such as chunking, visual imagery and verbal rehearsal.
- Develop cues with the child to promote carryover of memory skills and independence, with fading of support as child increases language comprehension and memory .

Expressive

- Ask open ended questions and ask for elaborations.
- Model and encourage participation in natural conversations.
- Teach the student to rehearse silently before replying.
- Allow child to dictate thoughts prior to writing; provide feedback and modeling regarding grammar forms or word choice
- Provide word banks if word finding is difficult.
- Provide picture cues to support memory for details and sequencing information when telling or retelling a story or event.
- Encourage expression through nonverbal means such as art and music.
- Frequent repetition and review of concepts to create automaticity.
- Allow plenty of time for response and do not pressure child.
- Role play potential real life conversations.
- Prepare ahead of time for classroom presentations.
- Student may need the benefit of "errorless learning", in which learning is highly structured (e.g., use of word banks, models for written work, etc.) and the production of incorrect responses is minimized, thus decreasing frustration.

Social Pragmatics

Pragmatics are the verbal and nonverbal rules of social language and interactions. Keep in mind that pragmatics vary significantly between different cultures.

Social Pragmatics Changes that may be Observed.

- Difficulties greeting others, taking turns in conversation and maintaining topic.
- Difficulties with inferential reasoning-confused by sarcasm and figures of speech.
- Struggle with reading facial cues and body language.
- Use inappropriate eye contact, tone of voice, and proximity (personal space).
- May say too little or too much, overuse certain phrases, or demonstrate repetitiveness in speech or communicative gestures.
- May appear overemotional and overreactive or they may seem flat and without emotional affect.
- Have little insight or awareness how their behaviors are inappropriate.

Social Pragmatics: Strategies for Intervention

- Use pictures, photographs, visuals and modeling to teach recognition of emotions based on facial expressions, nonverbal cues, tone of voice, etc. Help the child understand that sometimes their facial expressions do not match the emotion(s) expressed in the verbal message.
- Take advantage of naturally occurring situations to practice and reinforce social skills (e.g. greetings at the beginning of a day, requesting materials to complete a project, starting and maintaining conversations with peers during free time, etc.).
- Role play and model how to behave and communicate appropriately in common social situations.
- Use social stories to support learning appropriate and inappropriate verbal and nonverbal behaviors in different situations.
- Provide visual cues such as pictures, objects, or a story outline to help tell a story in sequence.
- Help build sequences by asking what did you do first, what happens next, etc.
- Work with the student to develop a social language dictionary with the words, definitions and pictures. Students can add more words as they come across ones that are confusing.
- Teach the different types of space (public, social, personal, intimate) and the distances related to each (visuals and modeling). Provide scenarios/role plays to identify what type of space is needed in each situation.
- Teach conversation starters that they can use when talking to others (e.g. What is your favorite television show?, What did you do this summer?, etc.).
- Encourage rephrasing or revising an unclear word or sentence. Provide an appropriate revision by asking, "Did you mean .... ?"
- Teach social problem solving skills of problem identification, generating possible solutions, determining the best solution, implementing the solution, and evaluating the effectiveness of the solution. Provide opportunities to practice these skills in realistic environments whenever possible.
- Provide detailed and direct feedback on social skill development to assist the child in gaining insight into appropriate social interactions.

New Learning

When an individual sustains a brain injury, the abilities that come back most quickly and strongly are those that were securely established before the injury. One reason for this is that after something is learned, practiced, and remembered, it is stored in many different parts of the brain. When individuals try to recall it, they have several different avenues to try; if for some reason the usual approach fails, the information can be accessed in another way.

In order for information to be encoded in memory initially, certain pathways and centers in the brain must be intact. These centers are very vulnerable to being injured. Following brain injury, learning will be most efficient if it occurs in a multi-sensory or multi-modal fashion. That is why thematically organized curricula work best for the student with a brain injury.

If the student is exposed to the same theme repeatedly, engaging different skills (writing, counting, collecting, and drawing), they will be constantly rehearsing the newly learned information throughout the day. The student will be coming at the information slightly differently in different classes (language arts, math, science, art), and these variations will create multi-modal learning situations.

In some instances, multi-modal presentations of complex new information may over-tax the limited resources of the brain-which decreases learning. This is particularly true of students who are overwhelmed and struggle with filtering out sensory information. In addition, although not commonplace, some students have difficulty with processing multiple streams of information at once. These students may learn best through blocking off one sensory stream while focusing on the other. An example of this is to have the student close their eyes, while listening to what is being said. This way they can focus the majority of their cognitive energy on listening.

Receiving and processing new information to create learning is a remarkably complex neurological phenomenon. A novel academic task requires several brain areas working in concert to produce understanding. From a broad and simplistic perspective, new learning typically activates the right hemisphere of the brain. Many times, children with right hemisphere brain damage have difficulty understanding new concepts if taught by traditional techniques. Once new information is processed by the right hemisphere, the new information is sent to other areas of the brain so the information can be comprehended on a deeper level. A critical neurological region that is necessary for comprehension is centered near the juncture of the three major lobes, (called angular gyrus), which is located at the back of the brain.

New Learning Changes that may be Observed

- Academic testing and overall intellectual ability are often "average" with poor performance on assignments and class work.
- Verbal intellectual ability is higher than Performance (nonverbal).
- Rote learning may be unaffected, students can memorize but cannot apply the information in a meaningful way.
- Skills learned in one setting do not generalize to other settings or the student overgeneralizes.
- Learning is impaired and student does not remember information has been taught.
- Student does not go beyond the information given to make inferences or predictions.
- Student does not put facts together to see the big picture.
- Can be a literal, concrete thinker.

- Student is capable of demonstrating skills or mastery one day but not the next.
- May appear forgetful or spacey.
- Easily frustrated and overwhelmed.
- Student puts a lot of effort into work but receives poor results.

New Learning: Strategies for Intervention

- Teach outlining and highlighting of most important concepts.
- Provide copies of guided notes and outlines.
- Extra time to complete tests and assignments.
- Encourage student to review what has been learned daily.
- Provide student/parents with upcoming topics, notes and materials so they can preview and reinforce concepts at home.
- Use real world examples to make new learning meaningful-make connections between new learning and information student already knows.
- Teach the concept and then ask the student to teach you or others-having them teach others activates numerous areas of the brain.
- Use errorless learning to teach concepts- see projectlearnet.org and brainline.org. Errorless learning does not encourage guessing so the student never has the chance to learn or remember the information incorrectly.
- Provide multimodal learning opportunities (visual, verbal, modeling, hands on).
- Teach thematically across disciplines-provides student with many opportunities to apply learning.
- Repeat directions and provide repetition of materials.
- Present one skill or piece of information at a time and break tasks and projects down into steps.
- Allow child to master a concept prior to introducing additional new learning.
- Focus on factual and concrete information when teaching new concepts.
- If available, schedule a study hall class as another opportunity to reinforce new learning.
- Students may have slow rise time in that they do better when they have a chance to work with the materials to warm up to the requirements of the activity. Provide one or two practice items before beginning a test or an assignment.

Executive Function: Initiation

Initiation involves a student's ability to begin tasks independently and in a timely manner. It may appear that the student is uninterested, unmotivated or oppositional, when in reality the issue is difficulty knowing how to get started. Once started, most children will be able to continue until the task is completed while others become stuck again as the demands of the task changes. Difficulties with initiation can also be associated with organization issues, memory difficulties or depression

Since the frontal regions of the brain are largely responsible for action and movement, it is not surprising these same areas are responsible for initiation. It is also not surprising that emotions help start actions, so the deeper emotional centers of the brain are implicated in initiation. A specific part of the brain that acts as a neurological communication cable between the frontal area and the emotions area is called the cingulate gyrus. Damage to the frontal areas, the cingulate gyrus, and deeper brain structures may cause initiation and emotional problems.

Initiation Changes that may be Observed

- Can appear lazy, spacey and/or unmotivated.
- Can state what they are supposed to do but does not get started.
- Does not complete homework or seatwork.
- Difficulties with starting school work.
- Turns in poor quality work.
- Difficulties managing long-range projects.
- Requires constant cueing and reminders even on the most routine of tasks.
- Follower.
- Introverted/passive.
- Rarely expresses opinions or desires spontaneously.
- Often gets overlooked because they do not cause problems in the classroom.
- Does not make plans to get together with friends.
- Appears aloof or disinterested to peers.
- Lagging in independent living skills.

Initiation: Strategies for Intervention

- Provide assistance with getting started on school tasks - have the child then identify the first thing they are going to do.
- Provide more frequent check-ins to ensure student is completing work and to provide "jumpstarts" as the task demands change.
- Seat next to a positive peer to help them get started or if they get stuck as the task changes.
- Provide a written routine with an outline of tasks and time frame.
- Break large projects or tasks into smaller steps.
- Help student develop planning skills.
- Teach organization strategies: checklists, graphic organizer or a series of pictures indicating steps needed in task.
- Develop routines at home and school and teach those routines until well learned – continue to use cues if needed to support student in getting started on tasks.
- Teach self advocacy skills: "Can you help me get started?" "Could you help me get started at this time?"
- May need lunch groups or support building relationships if initiation is interfering.

Executive Function: Planning

Planning involves identifying and completing the steps necessary for task or goal completion. Planning also includes determining the time requirement for each step of the process, deciding what is and is not important to focus on, and what resources are needed for successful task completion. Students with planning issues may approach tasks impulsively which leads to difficulties in completing each step of the process or in developing a product that is disorganized and irrelevant to the assignment (Meltzer, 2007).

As students develop, planning demands increase significantly. Planning in young children may involve completing an activity that involves one to two steps, but by the time they are middle school, it involves having to break down long term projects and essays. The planning involved in larger projects can be overwhelming for students and may lead to them giving up because they are unable to break down the steps or figure out the amount of time needed to complete each step.

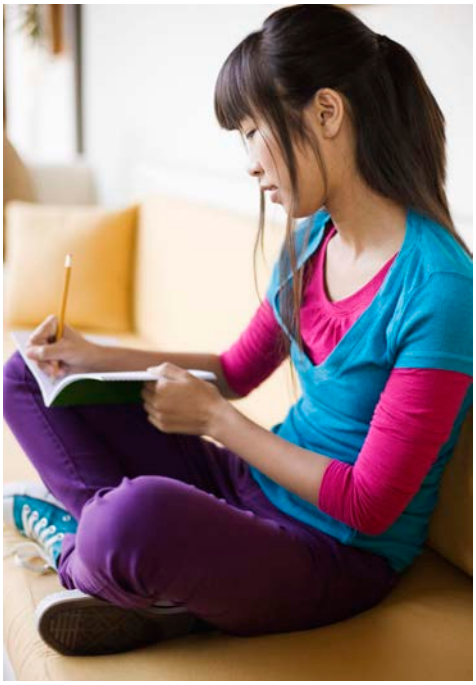
Planning is a future-oriented process requiring forethought, estimation and problem solving. Similar to the same neurological structures involved with regulation, organization, and problem solving, the upper frontal lobe is intimately tied to planning.

Planning Changes that may be Observed

- Difficulties with problem solving and identifying the steps needed to complete a task.
- Rigidity of thinking -- cannot think of more than one way to complete a task.
- Doesn't brainstorm.
- Difficulties organizing thoughts in writing or organizing the steps necessary to complete math problems.
- Struggles with doing more than one activity at once.
- Difficulties organizing thoughts and completing assignments.
- Difficulties completing long term or larger assignments.
- Gives up if their first attempt at something does not work.
- Difficulties getting started on tasks or impulsively jumps in and has a disorganized and/or incomplete end product.
- Often late and unprepared for class.
- Difficulties with time management.
- Difficulties with sequential tasks.
- Difficulties making plans with friends.

Planning: Strategies for Intervention

- Teach the student how to develop a step-by-step guide for problem solving by identifying the problem, considering relevant information, listing and evaluating possible solutions, creating a plan of action, and evaluating the plan of action.
- Provide step-by-step visual directions and instructions.
- Provide student with "Planning Sheets" (see Dawson and Guare, 2010, Executive Skills in Children and Adolescents for a variety of different planning sheets).
- Teach use of graphic organizers and other planning strategies to organize their thoughts.



- Model appropriate planning by verbalizing your own step by step process as you complete a task.
- Teach planning by helping child break down each step necessary to complete task:
  - Have student first visualize and then verbalize each step.
  - If child appears stuck, verbalize "What should you do first?" or "What happens next?"
  - After task is completed, evaluate whether each step was effective and how much time each step actually took. Process what went well, what didn't and what needs to be done differently next time.
  - Break large or long-term projects down into clear steps-teach planning by helping child through this process.
  - Help them identify each step and estimate how long each one will take. Start with when the project is due and work backwards to determine when each step needs to be completed.
  - Help them identify materials and resources needed for each step.
  - Write down steps on planning worksheet or calendar.
  - Check planning worksheet or calendar every day to see that steps are being completed.
- Teach time management and prioritizing.
- Teach how to develop short term and long term goals.
- Support student in connecting new information with what they already know.
- Develop and practice schedules and routines when possible.
- Plan ahead and prepare student for changes in these routines.
- May need written or picture schedule. Prepare the student ahead of time if schedule is changed and make the changes on their written or picture schedule.
- If they are not planning social times with friends, they may need help with planning their social and free time.
- See Organization and Reasoning/Problem Solving strategies.

Executive Function: Mental Flexibility

Mental flexibility is the ability to easily shift from one idea, train of thought, activity or way of looking at things to another (Dise-Lewis, Calvery, Lewis, 2002). Mental flexibility also involves being able to change the approach to problem solving as the task changes or being able to successfully transition from one task to another. As part of the process one needs to be able to consider new information as well as feedback from mistakes and setbacks (Dawson and Guare, 2004). Mental flexibility allows us to adapt to changing conditions and unfamiliar or unexpected situations (Meltzer, 2010).

Controlling the thoughts and actions of the brain falls under the function of the frontal lobe. Although there are different brain areas that also help with initiation, organization, planning and flexibility, these four "executive functions" are primarily regulated by the upper brain areas located behind the forehead. Individuals with damage to the frontal lobe may become more rigid in their thinking and less adaptable to change.

Mental Flexibility Changes that may be Observed

- Rigid and/or concrete thinkers-difficulties with abstract thinking.
- Difficulties with transitions or with deviating from a schedule.
- Perseveration-gets stuck on one train of thought.
- Difficulty taking feedback.
- Resistant to try new things.
- Difficulties coming up with solutions.
- Struggles with switching gears.
- Difficulties following directions and doing what was asked.
- Appears to not learn from mistakes.
- Can appear stubborn and/or argumentative.
- Difficulties making friends and can appear socially awkward.
- Appears to lack empathy and has difficulties seeing others' points of view.

Mental Flexibility: Strategies for Intervention

- Develop and practice schedules and routines when possible.
  - Plan ahead and prepare student for changes in these routines.
  - May need written or picture schedule-prepare student head of time if schedule is changed and make the changes on their written or picture schedule.
  - Rehearse or do a dry run of unfamiliar situations or schedules.
- Prepare and give reminders of upcoming transitions.
- Plan for situations that require mental flexibility.
- Plan ahead and do not introduce too much novelty at once.
- Teach student how to analyze directions, break down problems, self-check and self correct.
- Allow for previewing of class notes or materials.
- Break tasks down into smaller steps. Make sure directions are clear and concrete.
- Teachers should evaluate their assignments, worksheets and tests to see if they are requiring too many shifts in the type of questions the student is required to complete. Either reduce the different types of questions required of the student or help support them as the task demands change.
- Teach coping strategies.
  - Use social stories to help teach solutions or coping strategies to different situations.
  - Structured social skills groups to help identify, practice and learn more flexible coping and problem solving strategies.
  - Teach thought stopping, relaxation or coping strategies (e.g., taking deep breaths, calming self-talk, leaving the situation until calm, etc.).
- Help them understand why strategies used in one setting or for one task may not work for another. Role-play situations ahead of time to help generate more than one outcome and more than one potential solution.

Executive Function: Reasoning

Reasoning is the use of deliberate and controlled mental operations to solve novel and on the spot problems (www.cokidswithbraininjury.com). Reasoning involves the consideration of evidence and drawing of conclusions based on the exploration of all possibilities, consideration of positive and negative outcomes and combining knowledge from past experiences (Savage & Wolcott, 1994). Reasoning is the foundation for problem solving and ultimately overall intelligence (D'Amato, Fletcher-Janzen, Reynolds, 2005).

Many aspects of reasoning are similar to the process of new learning (see the description under new learning). Higher order reasoning involves the effective integration and processes of the entire cerebral (brain) structure. Since the frontal cortex is considered the "manager" of the brain, this region is typically needed in reasoning as it orchestrates how information is processed. Other specific areas that are needed for deep thinking are the middle left temporal lobe and the occipital-temporal-parietal juncture (the junction of the three lobes located in the back of the brain).

The frontal lobes are typically associated with changes in function of these skills. However, it is impossible to isolate problems to this area of the brain when a number of other capacities contribute to it, for example, comprehension and memory. Reasoning, problem solving, and judgment affect the student behaviorally and socially as well as academically. Safety may be a particular concern because when the above factors are not present, the student may place himself or others in potentially dangerous situations.

Reasoning, Problem-Solving and Judgment Changes that may be Observed

- Concrete thinker-difficulties with abstract information and language.
- Difficulties generalizing strategies to new situations because they fail to see relationships between the settings.
- Difficulties learning from experiences because they do not see connection between past experiences and current situation.
- Become frustrated because they cannot think of alternative solutions and uses the same ineffective approach in multiple situation.s
- Appears to comprehend material, but has difficulty answering open-ended questions, making generalizations, or formulating rules.
- Does not get the big picture.
- Does well with true-false and multiple choice but not essay tests.
- Does not understand figures of speech, metaphors or sarcasm.
- Has difficulty identifying essential information or drawing conclusions-for example, solving word problems in math.
- Does not ask for help.
- Argues with adults or peers and can appear oppositional.
- Acts without thinking of the consequences and has difficulties taking the perspective of others.
- Makes poor or unsafe choices of friends or activities-tends to be a follower.
- Behavior or language not suitable to the situation.
- Does not think well on their feet.
- Reacts adversely to changes in routine or unexpected problems.
- When faced with an unexpected situation may respond by becoming upset.

Reasoning, Problem-Solving and Judgment: Strategies for Intervention

- Teach the student how to develop a step-by-step guide for problem solving by identifying the problem, considering relevant information, listing and evaluating possible solutions, creating a plan of action, and evaluating the plan of action.
- When considering solutions, review at least two different alternatives then let the student select one of the solutions. The goal is to eventually move them to developing their own possible alternative solutions.
- Teach use of self-monitoring questions- "What else could I do?"
- Present information in concrete and concise manner- avoid language using puns, sarcasm, and double meanings.
- Check for understanding and the need for assistance.
- Give consistent, neutral feedback.
- Break tasks into smaller and shorter segments.
- Use graphic organizers to show relationships.
- Provide copy of guided notes or outlines with most important points highlighted.
- Use multiple choice tests instead of essay format.
- Connect information to past knowledge/experiences and find other ways to make content meaningful for the student.
- Teach generalization and application across concepts.
- Discuss, plan and prepare student for changes in routine.
- Teach the child what to expect and appropriate behaviors in each setting. If they are struggling with appropriate behavior in a setting, prepare them before entering the setting and keep providing verbal reminders of the expected behavior while in the setting.
- Prepare the student with a set of activities that they can do during unstructured times to reduce the chance that they will engage in impulsive, aggressive, or unsafe behaviors.
- Remember that the student is likely to be more defiant, irritable, and resistant when confused. At such times, provide more structure and fewer choices.
- Be clear on expectations and consequences of risk taking behaviors (sex, drugs, alcohol, etc.).
- Expect the student to participate in group discussion about real-life situations: explore pros and cons and alternatives.
- Help the student identify cues (responses or actions of others) from the environment to use as a guide for behavior.
- Foster friendships with positive role models.

Executive Function: Organizational Skills

Difficulty organizing behavior or thoughts is one of the most common results of a traumatic brain injury. The student's ability to organize his or her behavior and thinking is rarely assessed in a school-based evaluation. Intelligence tests and other tests present the information to the student in an already-organized fashion, directing the student's attention to the materials in front of him and describing the response requested of the student. Real-life situations are rarely so organized and structured. Organizational skills can also be impacted by difficulties in memory, attention and language.

Students who have difficulty paying attention to the most important features of their environment, logically organizing and planning their behavior, and following through often have grave difficulty behaving reasonably in situations which do not provide intense external support and structure. When a very young child (under the age of 3) experiences a brain injury, the result typically is a severe disruption in the ability to organize incoming information and to behave in a way which is planned and "sensible." Older children and adolescents who suffer a traumatic brain injury also demonstrate deficits in organizational abilities; these difficulties show up in more subtle aspects of their behavior and in their academic achievement.

The upper frontal region of the brain, behind the forehead, controls planning and organization of thoughts and activities. The ability to sequence thoughts in a logical fashion and translate those thoughts into action to organize a person's environment involves communication between the frontal cortex and left hemisphere of the brain. Damage to the front and/or the left hemisphere of the brain may cause disorganized thinking and ordering of materials.

Organization Skill Changes that may be Observed

In Young Children Birth to 4 Years

- Difficulty with transitions.
- Outbursts or tantrums over a change in activity or during unstructured times.
- Difficulty changing activities or dealing with unexpected changes in the routine.
- Impulsive and/or aggressive behavior, particularly in new, complex or unpredictable settings.
- Inability to change thinking based on new information.

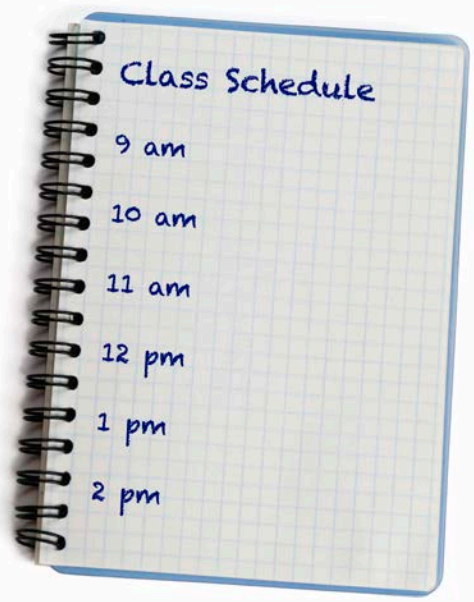
In Older Children and Adolescents

- Inability to do two things at once or pay attention to several things at once.
- Difficulties with multistep activities.
- Completes tasks out of order.
- Does not do well with independent learning activities and has difficulties getting started on tasks.
- Struggles with taking notes in class; notes may be illegible, undecipherable or simply not very helpful.
- Written work appears sloppy, dashed-out and poorly organized on the page.
- Difficulty following through with long-range assignments.
- Difficulty entering assignments into planner.
- Homework is incomplete or is not turned in.
- Difficulties listening to and learning from lectures in class.
- Difficulties following or participating in classroom discussions.
- Struggles with seeing the big picture.
- Appears to have memory difficulties and loses things easily.
- Spaces out or daydreams in class.
- Difficulty learning new information and understanding abstract information.
- Difficulties with transitions or changes in routine.
- Does not apply information learned to new situations.
- Poor social judgment. Copies the behaviors of others-requires more adult supervision.
- Easily frustrated.

Organizational Skills: Strategies for Intervention

To help a student who does not have normal ability to organize information independently, parents and teachers must provide more structure for the student than is ordinarily necessary for a student their age. Increasing structure can include any of the following:

- Establish a daily routine as much as possible. Particularly for young students, the ability to predict what is going to be happening will help them to organize their behavior better.
- Teach the student how to develop a step-by-step guide for problem solving by identifying the problem, considering relevant information, listing and evaluating possible solutions, creating a plan of action, and evaluating the plan of action.
- Use picture schedules, planners, checklists, or electronic organizers to help them organize their day and prepare themselves for transitions.
- Use a "check-in/check-out" system to ensure that student has assignments and materials.
- Help the student break down long-term and larger projects. Start with the due date and then work backwards to determine when the smaller steps need to be completed. Mark those dates in their planner or on a calendar.



- Identify a counselor, teacher, or paraprofessional at school who is aware of the schedule of required assignments and long-range projects and who can work with the student on a regular basis so that assignments can completed and turned in on time.
- Help the student develop and learn organizational strategies that work for them and can be supported between home and school. Examples: homework folder, color coded class system, morning and afternoon classroom binders, written or visual checklists of everything need for each class or need to take home, etc.
- Use organizational checklists (see Dawson and Guare, 2010, Executive Skills in Children and Adolescents for a variety of examples).
- Require the use of spiral or composition notebooks to avoid the loss of information on loose leaf paper.
- Establish a communication notebook or email routine for school-home communication.
- Provide student/parents with upcoming topics, notes and materials so they can preview and reinforce concepts at home. Provide parents with a list of required projects and assignments as well as the due dates.
- At school, teach routines and provide times for organizing desk and locker.
- Teach time management skills to help the child determine how much time an activity, assignment, or part of an assignment will take to complete.
- Provide step by step instruction and present information in small, concise, concrete steps.
- Provide a copy of guided classroom notes or outlines.
- Use graphic organizers and teach students to prepare written work by using a series of drafts-beginning with a listing of main ideas and then elaborating on each in outline form.
- Teach the student to highlight text and to make an outline of the important information from textbook material.
- Teach the child to answer "wh" questions while reading a paragraph: Who, What, When, Where, Why, How does this event impact me or the world?
- Cue child as to what information is really important and when needs their full attention.
- Preferential seating near the area of instruction and next to a positive peer who can help with understanding of instructions and content.
- Follow the SPELL IT OUT rule to increase structure and organization for the child.
  - Simplify the task
  - Parts-break it down
  - Enlarge it
  - Layout-does the page allow room for working the problem?
  - Link skills that are already mastered
  - Identify the relevant concepts
  - Teach a strategy
  - One skill at a time

  - Underline and highlight
  - Tell the student what to look for
- Provide an extra set of textbooks for use at home.
- At home, teach child how to check and organize backpack every night. Prepare everything child needs for next day the night before and put it by the front door. Use a checklist for organizing morning routine and materials.
- Teach the child what to expect and appropriate behaviors in each setting. If they are struggling with appropriate behavior in a setting, prepare them before entering the setting and keep providing verbal reminders of the expected behavior while in the setting.
- Prepare student for changes in routine-let them know what to expect and how to behave.
- Prepare the student with a set of activities that they can do during these unstructured times to reduce the chance that they will engage in impulsive, aggressive, or unsafe behaviors.
- Remember that the student is likely to be more defiant, irritable, and resistant when confused. At such times, provide more structure and fewer choices.

Uneveness

The single hallmark of a brain injury on a child's performance is unevenness in abilities across different settings, over time, and across different content areas. Most people are consistent across settings, time, and skill domains, so this extreme variability can be highly confusing to family, teachers, and friends. It is not unusual for a student with a brain injury to have performance on cognitive measures ranging from below the 1st percentile to the 95th percentile. This large variability means that certain types of performance will come easily and automatically for the student, while other areas of performance are labored or highly unsuccessful.

The pattern of strengths and deficits may not be sensible or logical, given what we know about the normal development of academic skills. Thus, a student may be above grade level in some areas (i.e., knowledge of facts) and behave like a child several years younger in other areas (contributing to a class discussion). This unevenness can also be observed in a student being able perform a task one day but is unable to do the same task on another day. Wide variability among skill domains is particularly true of students injured as adolescents, and therefore these students often are misread as being unmotivated, disinterested, or not working hard enough.

Unevenness in the cognitive and learning profile is often revealed on testing performed by school personnel. Examiners need to consider if there is wide scatter either within subtests or across subtests. Keep in mind that unevenness in performance may also be related to fatigue, medical issues or as a side effect and/or change in medications.

Uneveness: Changes that may be Observed

- Failure in certain school subjects with success in others.
- Good performance on tests, but poor performance on homework or class work or vice versa.
- Inconsistent classroom participation or performance across days.
- Student seems involved and motivated in one class but not another.
- Lack of common sense or failure to generalize.
- Teachers cannot reach a consensus about the best ways to assist the student in school.
- Student is not succeeding at a level expected based on their intellectual ability.
- Student is frustrated by and/or avoidant of certain situations or classes.

Uneveness: Strategies for Intervention

- Multidisciplinary assessment of the child's cognitive abilities from a team of individuals with expertise in pediatric acquired brain injury. If needed, ask your school psychologist, contact the brain injury team in your district or consult with individuals in the private community who have this expertise.
- Parents and school staff need to work together to better understand the student's profile to discover ways to build upon strengths and work around areas of challenge.
- Educate student about their own areas of personal strength and weakness. Students often are very distressed and frustrated by their inability to perform.
- Develop schedule to have a good mixture of non-academic subjects and a focus on the student's cognitive strengths.
- Use real materials and hands-on activities to supplement written or lecture material.
- Create learning opportunities that bring the information into the child's brain in different modalities.
- Encourage the child to read aloud when studying text. This gets the information processed by different centers of the brain without taking more time.

Fatigue/Endurance

Fatigue and endurance issues following brain injury is another hallmark of brain injury and it occurs in several ways. The primary source of fatigue is cognitive fatigue and is the direct result of disrupted pathways in the brain described in previous chapters. Once axons in the brain are broken or stretched, immense effort is required to complete even simple functions. Sensory and motor changes, for which the student is constantly compensating, are common. Thinking, movement, and speech may take longer and be less accurate. The brain tires much more quickly and is less able to process the stimulation of what is heard, seen and felt.

There are other components of fatigue as well. Headaches, often persistent and severe, are also common with brain injury. Endurance in physical activity may be seriously reduced and there frequently is pain associated with injury to other areas of the body. Sleep patterns are often disrupted by changes in brain chemistry related to the brain injury. There may be side effects to current medications or newly introduced medications of which school staff may not be aware. All of these can contribute to greatly increased levels of fatigue that may improve, but can persist indefinitely.

Fatigue can impact the ability to attend or even to perform the most familiar of tasks. Adequate rest, regular breaks, and modifying the workload are especially important in addressing fatigue. The student may have difficulty self-monitoring their level of fatigue before it has become severe. Ignoring or inadequately treating fatigue may lead to a downward spiral for the student.

Fatigue/endurance Changes that may be Observed

- May appear to be spacey or daydreaming.
- Complains of feeling like they are in a fog.
- Student is just not themselves.
- Displays slower performance of tasks.
- Reports having headaches or other pains.
- Poorer memory than usual.
- Displays symptoms of fatigue (yawns, dozes, etc.) or illness (pale, listless, etc.).
- Participates in disruptive behaviors or is unusually emotional.

Fatigue/endurance: Strategies For Intervention

- Reduce cognitive overload in the first place by providing the academic accommodations and supports presented in the above cognitive processing areas.
- Keep track of observed symptoms of fatigue such as poor posture, excessive fidgeting, glassy stares, etc. Discuss these with the student and parents.
- Send to health clinic if complaints of headaches and other pain. Communicate this information with parents.
- Incorporate brief breaks throughout the day to rest or quiet the brain. Depending on needs of the student, this may be able to occur in classroom or they may need to go to a quiet, darkened environment like the health clinic.
- Break and rest time does not mean silent reading. This activity is still cognitively taxing to the brain. Break time also does not mean recess, physical education, or other exploratory classes. Break time involves resting the brain and the body.
- Be aware of the student and when they appear to need a break. The student might not always realize they are fatigued or they might try to push themselves too far.
- Consider whether the length of the school day needs to be shortened. Schedule their day when they have the most energy and ability to focus.
- If the student is at school for a full day, schedule academic and more cognitively challenging classes at times when student has the most energy. Schedule exploratories, study hall or free times when student has less energy.
- Reduce or modify workload expectations-reduce the assignment requirements or focus on the most important learning opportunities and excuse the student from other assignments.
- Break down directions, assignments and projects into one to two steps.
- Allow additional time to complete assignments and tests-consider if tests need to be eliminated and the number of assignments reduced.
- Offer headphones, earmuffs, or earplugs.
- Reduce stimulation in the environment as much as possible (sound, movement, bright light, clutter or number of objects around their desk).
- Build quiet activity and slowed pace times into the curriculum.
- Assess sleep patterns, evening and weekend activities and responsibilities with the student and their parents.
- Assure that the student is eating protein-rich meals and snacks (it has been found that protein with each meal is valuable in preventing swings in energy levels). Bananas and almonds (if no allergies) have been identified as good brain foods (nasponline.com, 2010).

Transitions

Transitions are periods of time in which children with brain injuries, no matter what their profile of cognitive strengths and weaknesses, may struggle and need additional support. Students are required to make multiple transitions from an early age. They are expected to transition from activity to activity in the classroom setting several times a day. Secondary students also have the additional demands of transitioning from classroom to classroom. The transition that occurs at the end and beginning of every school year also must be addressed and a plan put into place.

From Activity to Activity within Class Transitions

Current teaching practices often incorporate rapid transitions in the classroom setting to keep the attention of all of the students. Unfortunately, students with brain injury often struggle with these changes from one activity to the next. Having a student with a brain injury in a classroom does not mean teachers can no longer implement this teaching style. A few accommodations for the student with the brain injury can make the difference between frustration and facilitating their ability to learn.

Activity to Activity Transition Issues that may be Observed

- A student's processing may be slowed due to the injury which creates difficulties in transitioning from one activity to another.
- Transitions may be overwhelming to the student with a brain injury and may cause them to overreact to the overabundance of auditory and visual input.
- Fatigue can be an issue and if there are rapid transitions with few or no breaks in between activities.
- When doing in-class activities, which are active in nature, the student may have difficulty filtering out noises (e.g.,other students talking).

Activity to Activity Transition: Strategies for Intervention

- Provide a visual or picture schedule. Break down what will be occurring within the class with approximate time frames.
- Prepare the student ahead of time that the task is about to change to allow them time to wrap up what they are currently working on before the next activity begins.
- Allow enough time for the student to put away materials needed for one activity and to get out materials for the next activity.
- As much as possible prepare student ahead of time for the presence of a substitute teacher.

From Class to Class Transitions

Transitioning from class to class may become more problematic as the student with a brain injury moves through the various grade levels. When students are in middle and senior high school, they usually change classes a minimum of every 45-90 minutes. Not only does the subject matter change, the student must also figure out the rules, expectations, organization structure and unique teaching style of several different teachers. On top of that, they must negotiate their locker and then find their way around a large building and to their next classroom through a potentially confusing maze of hallways and other students. It is important to note that as early as second and third grade, students may be changing classrooms and teachers up to three to four times a day.

Class to Class Transition Issues that may be Observed

- Processing speed delays can impact the student's ability to transition between subjects.
- The process of getting to the next class, with a barrage of external stimuli such as noise and congestion in the hallways, may be very overwhelming for the student.
- May experience difficulty remembering a particular teacher's expectations and style due to memory deficits.
- Struggle with teachers giving several instructions at once (e.g., "take out your homework assignments and turn to chapter 3, page 150.").
- Difficulties remembering to bring all of the necessary items to the appropriate class.

Class to Class Transition: Strategies for Intervention

- Picture or visual schedule of each class and the time frame for each class (make sure lunch, recess and other non-classroom activities are included on the schedule).
- Prepare student ahead of time for changes in the regular schedule (e.g., assembly days).
- Prepare student ahead of time that class is about to end to allow them to wrap up what they are working on and pack up to head to their next class.
- Accommodate or reduce warm up activities since the student struggles with transitioning from class to class and with getting started on new tasks.
- Allow the student extra time between classes and/or an earlier passing time to retrieve materials from their locker and to avoid crowded, loud hallways during transitions.
- Create a checklist of all necessary materials for each class so that the student does not forget them. Checklists may need to include pictures of all the items needed for class.
- Create a checklist of all subjects and write a brief description of expectations of each teacher so that the student has something to refer to in writing.
- Work with the student to create an organizational system that works for them.

Grade Level-to-Grade Level Transitions

"Every September I feel like we have to start over again. Things that helped my child in school last year have to be worked out again."
Parent (Wolcott, Lash, Pearson, 2000)

The above quote exemplifies the struggle parents and students with a brain injury face when transitioning from grade to grade and from school to school. Although a special education IEP or 504 plan may be in place, it often does not translate into functional, hands-on interventions, which will assist the student with day-to-day activities. Communication and teamwork are essential before the student even steps foot into the new classroom or school to create a supportive and effective learning environment.

Grade-to-Grade Transition Issues that may be Observed

- Limited communication from one teacher to the next, especially as the student reaches the secondary level.
- Limited time or resources for teachers to become educated in working with students who have a brain injury.
- As students move through the grade levels, they may struggle with the increased academic challenges and increased cognitive demands.
- The increase in the level of responsibility may be beyond the capabilities of the student with a brain injury.

Grade-to-Grade Transition: Strategies for Intervention

- Hold a transition meeting every time the student moves onto the next grade level. Make sure the student, parent(s), current and future teachers, IEP or 504 case manager and IEP-related services providers are involved.
- Hold frequent review and planning meetings-IEPs and 504 Plans need to be functional and flexible.
- Consider the teacher(s) who would be a good match for meeting the needs of the student. If the student requires a great deal of structure, schedule with a teacher that meets those needs.
- Before school starts, have the student meet their teacher(s), tour the school, run through their schedule, and practice opening their locker.
- Provide parents with information ahead of time about the structure of the school day. Provide a bell schedule so they can prepare their child.
- Provide parents with classroom expectations ahead of time so they can prepare their child.

CHAPTER SUMMARY POINTS:

The above recommendations are suggestions to help support students with brain injuries in the classroom and home settings. A team approach is needed to ensure the most effective interventions are being provided to meet the individualized and unique needs of each student who experiences a brain injury. A team approach is highly recommended even if a 504 or special education plan is not in place. Parents and school staff should consider including the school psychologist, and depending on the areas of need, also involve the speech language pathologist, occupational therapist and/or physical therapist to help with intervention planning. If the school district has a brain injury team, explore whether or not the team's involvement would be appropriate or beneficial. The goal of any team, no matter who is involved, is to focus on supporting the student in recovery and in being successful in both the home and school settings.

CHAPTER 4

Social/Emotional Competency

This Chapter Allows the Reader to:

- Gain an appreciation that the "function" of social/emotional behavior is often the most difficult to understand and easiest to be misidentified as "bad behavior".
- Learn how to use a Functional Behavior Assessment (FBA) to detect the problem and a Behavior Intervention Plan (BIP) to intervene with the problem.
- Become familiar with the Neuropsychological Observation Form and identify behaviors/actions that may indicate the need for intervention.

Emotions, Social Skills And Behavior:

Changes in emotional, social skills and behavior are common following brain injury. These changes may be organic, or they may be an emotional response to the changes brought about by the injury, or both. Behavior changes occur across environments and can be triggered by minor events. Impulse control is frequently reduced by injury to the brain. Added to this may be frustration over failing at tasks that once were automatic, or dealing with an environment that is overwhelming (for example too stimulating or fast paced). Depression may be due to chemical changes in the brain resulting from injury or a side effect to medication. Or it may be a reaction to the many losses that accompany brain injury (friends, activities, academic abilities, career goals, etc.).

Changes in cognition contribute to changes in emotional regulation, behavior, and social skills. Injury to the brain may substantially alter ability to assess a problem and find a solution. The inability to think in a flexible manner often makes a student argumentative or unmotivated. If the student is unaware of changes in his ability, or does not pick up cues from others, these will be important factors in the teacher's choice of strategies.

Whether the student is in school, at home, transitioning to employment, or out in the community, emotional control and social skills will determine success in life. They profoundly affect not only the injured person, but also all the people around. Particular priority must be given to compensatory strategies to address these changes.

Interventions (behavioral strategies) that work with students with attentional, learning, emotional or behavioral disabilities may not work as effectively for a student with acquired or traumatic brain injury. The areas of the brain that allow the student to use feedback, consequences, and experience to alter future behavior may have been injured. If this is so, the approach is to alter the environment so that the student learns control and positive behavior through errorless learning.

Emotions, Social Skills and Behavior Changes Teachers May Observe

- Immaturity
- Perform poorly in complex, unpredictable or stressful situations (playground, PE, etc.)
- Misbehavior
- Rapid mood changes
- Emotional expressions out of proportion to the situation (response to changes in activity, etc,)
- Impulsive laughing, crying or anger
- Interruptions
- Easy agitation, upset or loss of control
- Demanding, seeks attention
- Inability to grasp concepts of behavior norms
- Limited insight into own abilities and behaviors, denies problems, externalizes blame
- Inability to correct behavior after feedback
- Inappropriate social or sexual comments or actions
- Argumentative
- Says or does the first thing that comes to their mind
- Inability to pick up on social cues
- Unpleasant eating habits
- Takes dangerous risks
- Fearlessness
- Avoidance or refusal to participate in discussion or activity
- Withdrawal from activities or other interactions
- Flat, passive or unmotivated affect
- Disregard for clothing or hygiene
- Appearance of depression or anxiety
- Repeatedly does or says one thing
- Has few or no friends
- Has difficulty seeing other points of view
- Misinterpretation of actions or intent of others
- Discusses suicide

Interventions For Younger Students

- Give clear and simple direction
- Avoid time outs (the student is not likely to independently regroup or calm down)
- Label the emotion and direct the student to show the acceptable behavior.

Interventions For Older Students

- Teach strategies and how to use them rather than offering assistance
- Discuss and practice age-appropriate behaviors in real life situations
- Create structured social activities (a school/community friendship group focused on the student, for example)
- Assume limited ability to generalize from one setting to another

Interventions Generally:

- Identify the origin of the difficulty to the student
- Assess the age of the exhibited behavior and select strategies suitable
- Build on existing strengths
- Build in peer feedback and modeling (the student may be more receptive)
- Minimize verbalizations and logical explanations
- Maximize hands-on demonstrations
- Create organized desk, cubby and locker areas
- Reduce environmental and situational triggers (changes in routine, structure, noise, clutter, activity, fatigue, stress frequent transitions, etc.)
- Create predictable and consistent routines
- Gradually reduce structure and determine "comfort zone"
- Prepare the student for transitions or changes in routine
- Be flexible about expectations
- Build on sharing in one-on-one, small group and full class setting
- Reward positive behavior
- Discuss and practice what is expected prior to events
- Teach skills to master new routines and activities
- Contact community recreation programs for adaptive, integrated recreation for youth with disabilities
- Find or start a support group for youth with brain injuries
- Seek medical/psychological consultation regarding depression/suicide
- Designate a case manager or counselor whom the student to talk with (a diary may help the student focus on challenges and successes)
- Develop a team of parents, teachers and support staff (have a game plan and meet weekly/monthly/as needed) Focus on success – what the student can do rather than what he/she cannot do (emphasize strengths and needs rather than disabilities and deficits)
- Teach from the student's strongest learning modality
- Incorporate breaks from the setting to regroup, calm and rest
- Suggest and model alternate words and actions
- Use a buddy, especially during unstructured activities like recess, cafeteria, etc.
- Build awareness of how words and behaviors affect others
- Educate and involve all adults and peers
- Give the student a choice between two or more things rather than many
- Help the student identify what is wrong and possible solutions
- Offer positive ways to express feelings (discussion is not always productive or possible)
- Change the activity or subject to something positive

Function of the Behavior

Functional analysis is a way to break down and examine the individual components of an activity. Understanding the "function" or the reason for the behavior helps the school team know how to intervene with the behavior; how to strengthen positive behaviors and how to change disruptive, dysfunctional behaviors. The purpose of conducting a functional analysis when working with a student with a brain injury (or any student, with or without a disability) is to determine where in the process of beginning, maintaining or completing an activity the breakdown occurs, and where the weak links are in the learning chain.

Social emotional competence is the awareness of social issues and one's emotional status. Behavioral self-regulation, control and self-monitoring are also part of this domain. A student with a brain injury may be struggling with a skill deficit in any of the other 15 domains, but the struggle may be expressed behaviorally, socially or emotionally. As a result, the student with a brain injury may be labeled as "bad or poorly behaved" when really he/she lacks the underlying skills necessary to demonstrate better behavior. How to make a student with a brain injury do more of X or less of Y is usually the most common reason for consultation. Often behind the request for consultation is the underlying assumption that the student with the brain injury is "willfully" engaging in bad behavior.

When attempting to understand why a student is not learning or behaving like other students, the teacher needs to become a detective. What is causing the student to struggle? To act out? On the surface the student may:

- Get failing grades on papers and tests
- Angrily refuse to do work, throwing materials on the floor,
- Space out in class. Does not turn in work,
- Does not pay attention

When working with a student who has a brain injury, it is important to understand how to analyze the tasks the student will be asked to perform. With all students with a disability, we start from the premise that there is a deficit in a skill that results in the manifestation of the behavior (skill). We do NOT start from the assumption that the student has the ability to do the task but is simply refusing (will). For example, if a student with a brain injury refuses to do work when asked, we first might wonder:

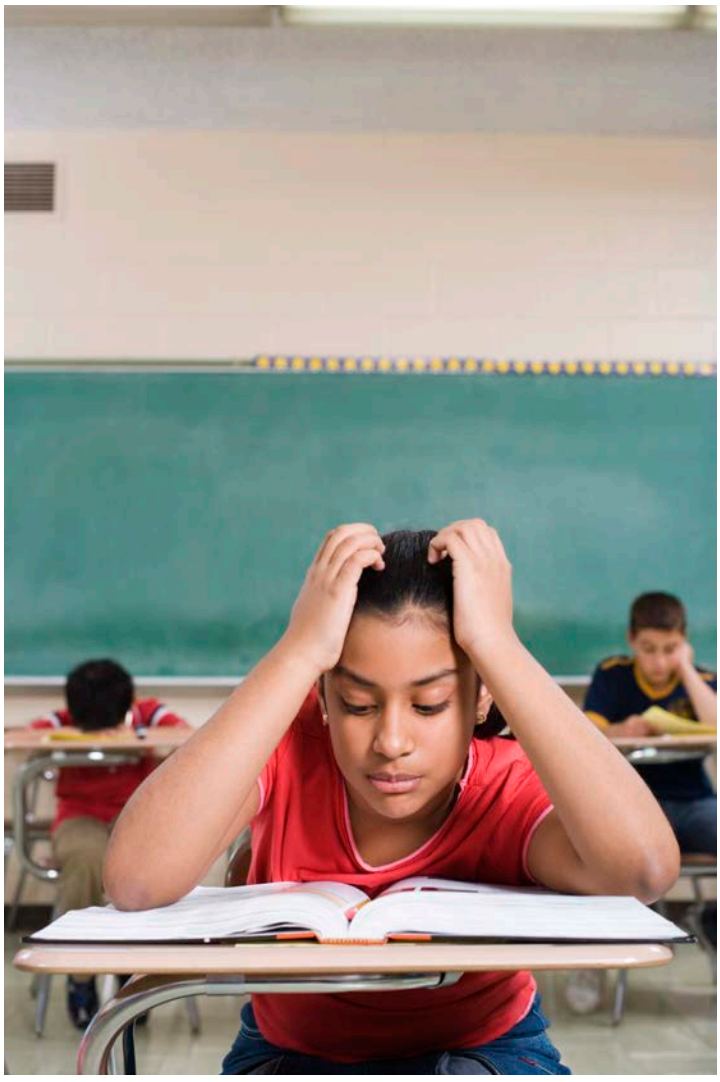
- Does the student understand the directions? (possible receptive language skill deficit or possible lapse in attention when the teacher was explaining)
- Does the student know how to do the work being asked to do? (possible learning/memory skill deficit)
- Does the student have the materials needed to do the work? (possibly lacking supplies or possible poor organization or poor initiation skills)
- If the student cannot do the work, does he/she have the skills to appropriately ask the teacher to re-teach the material? (possible expressive language skill deficit)

A student with a brain injury may be lacking any one of the 16 domains, or any combination of domains, that could be resulting in the external behavior. It is the job of the teacher to figure out which 1 or 2 or 3 skill deficits are most likely at issue and create a plan to teach "to the skill deficit" so that the student can eventually produce the work asked.

Students with brain injury often appear to have characteristics similar to those students who have been identified as having learning disabilities, attention deficit disorder, emotional/behavioral disorders or sensory overstimulation disorders (eg spectrum disorders) and may be misdiagnosed as a result.

Because of the potential for being misdiaganosed, it is crucial that the teachers become skilled at "playing detective" and try to understand where the student's ability to complete an activity is breaking down and identify steps that will help the student be more successful. There are no easy "cookie cutter" interventions for students with brain injury. Some interventions that are effective for students with learning disabilities or ADHD or emotional/behavioral disabilities may be effective with students with students with brain injury but not when applied with a broad brush. Professionals working with a student with brain injury may find that a particular intervention to increase attention in students with ADHD can be effective in increasing attention in students with brain injury. However, the skill deficit must be identified carefully and the intervention must be applied strategically.

Once the "function" of the behavior has been determined, the appropriate intervention can be applied with fidelity, progress monitored, adjusted, re-applied and so on until the end result of the desired behavior/learning is achieved. The task analyses of understanding the behavior is called the "Functional Behavior Assessment FBA" and the intervention plan for addressing the skill deficit is called the "Behavior Intervention Plan BIP".



STEP 1:

Functional Behavior Assessment (FBA)

When attempting to understand the function behind any behavior, the "detective" must take a period of time to "study" the stimulus immediately before the behavior and the consequences (positive or negative) immediately after the behavior. This data will provide clues to what is initiating the behavior and keeping it in place.

Before rushing to a conclusion, take a day or two to study the patterns. Ask teachers or para professionals to just take note of these columns - Do your ABC's:

Antecedent

- What happens immediately before the behavior.
- Also note: When does this happen?
- Where does this happen?

Behavior of concern

- This can be doing too much of something or not enough of something.
- The child with the brain injury (or insert any other disability label here) is doing too much of X behavior or not enough of Y behavior

FOCUS ON B first

- For one or two days, simply have your staff "play detective". Start by noting behavior first:
- Johnny puts head down on desk and will not do work.
- Asked again to do work, he refuses, he begins to yell, throw papers.
- Johnny is taken out of the room and taken to the hallway to calm down.
- If he cannot calm down, which is most of the time, he is taken to the special education room.
- Continue to just note behaviors for a day or 2 before feeling the need to "fix" behaviors.

Consequence

- What happens immediately after the behavior?
- This can be some type of reward for the behavior or it can be some type of consequence for the behavior.

STEP 2:

Now begin to figure out the pattern by noting **A and C**.

- **Noting A's** will help you drill down your assessment of the **"function"** of the behavior.
- **Noting C's** will help you understand if there is a **stimulus** in the **environment** that is inadvertently keeping that behavior in play or keeping the desired behavior out of play.

A	**Antecedants** (what comes immediately before the behavior)
B	**Behavior**
C	**Consequences** (what comes immediately after the behavior)

Antecedent	Behavior	Consequence
This happens in the general education math class at about 10:15 am every day.	**Johnny puts head down on desk and will not do work.**	▶ Para-professional Teacher's Aide goes over to Johnny and asks him to get started on work. ▶ Para starts to help Johnny get out his work and start working. ▶ As Johnny gets louder, the para gets louder. ▶ Para asks Johnny to leave the classroom and calm down in the hall.
Hypotheses: ▶ Is Johnny over tired (mental fatigue)? ▶ Does Johnny not understand the directions to the work (receptive language deficit)? ▶ Was Johnny paying attention when it was taught (attention deficit)? ▶ Did Johnny learn it but could not covert it into new learning (new learning/working memory deficit)? ▶ Did Johnny learn it but forgot it (long–term memory deficit/ memory consolidation deficit)? ▶ Does Johnny know how to do the work but he can't get himself started (initiation or organization skill deficit)? ▶ Does Johnny have the skills to let the teacher know he does not know how to do the work (expressive language deficit)? ▶ Does Johnny have the social competence to be in this classroom (social skill deficit)?	▶ Asked again to do work, he refuses, he begins to yell, throw papers. ▶ Johnny is taken out of the room and taken to the hallway to calm down. ▶ If he cannot calm down, which is most of the time, he is taken to the special education room.	

STEP 3:

- Analyze and decide the potential "function" of the behavior. **Focus on A**.
- Analyze and decide how consequences (good or bad) are affecting the outcome of the behavior. **Focus on C.**

Antecedent

This happens in the general education math class at about 10:15 am every day.

Hypotheses:

- Is Johnny over tired (mental fatigue)?
- Does Johnny not understand the directions to the work (receptive language deficit)?
- Was Johnny paying attention when it was taught (attention deficit)?
- Did Johnny learn it but could not covert it into new learning (new learning/working memory deficit)?
- Did Johnny learn it but forget it (long –term memory deficit/ memory consolidation deficit)?
- Does Johnny know how to do the work but he can't get himself started (initiation or organization skill deficit)?
- Does Johnny have the skills to let the teacher know he does not know how to do the work (expressive language deficit)?
- Does Johnny have the social competence to be in this classroom (social skill deficit)?

End result of A Column:

- Based upon your data, what is your best guess about which ONE hypothesis fits?
- Does this problem happen always at 10:15 in the am? – Perhaps it is mental fatigue?
- Does this problem happen every time Johnny hears new directions from this particular teacher? – Perhaps it is a receptive language problem
- Does this problem happen only in Math class? – Perhaps new concepts in Math are not being consolidated into in Johnny's new or long-term memory
- Does this problem happen in all classes? – Perhaps it is inattention
- Does this problem only happen in this class? Perhaps it is a social issue
- What if it is a combination or 2 or more issues most affected by a brain injury?

It is best to try to figure out the #1 probable function of the problem behavior. However, it is not at all unlikely that there are a number of skill deficits affecting any one problem behavior.

B

Consequence

- Para goes over to Johnny and asks him to get started on work.
- Para starts to help Johnny get out his work and start working.
- As Johnny gets louder, the para gets louder.
- Para asks Johnny to leave the classroom and calm down in the hall.

End result of the C column:

- Johnny is removed from the math class.

If Johnny:

- does not like Math or
- does not know what to do in Math or
- does not know how to ask for help in Math or
- does not want to be in the social environment of the math class

He has now been negatively reinforced by being removed from the class and positively reinforced by being put in a smaller class where he may feel more comfortable socially, he may be more comfortable with the teacher and may be more successful asking for help/clarification in a smaller classroom with a familiar teacher.

No matter which 1 or 2 or 3 hypotheses fit best, in the meantime, Johnny has very successfully removed himself from what feels like a negative situation for him. His behavior is exquisitely *adaptive*. It is functional for him even though it may be dysfunctional, annoying, or disruptive to the adults.

Depending upon which hypothesis you determine to be the primary function of the behavior, pick that one deficit and design a plan to start "teaching to the skill deficit". However, before you move to the "fix", keep in mind… an educator cannot place too much emphasis on the "function" of the behavior. If there is not enough time spent on the function, the intervention may not be correct or effective.

The Behavior Intervention Plan BIP

The BIP is the roadmap to changing the behavior. While the behavior is functional for Johnny in the short run, it will not bode him well in the long run. He will not learn Math, he will not be with his typical peers, he will strain relationships with teachers and he will begin/continue to generate a negative ("I can't do") perception of himself.

Behavior of Concern:	Happens When:
▶ Refusing to do work; melting down in class	▶ General Ed Math Class 10:15 am

Hypothesized "function" of the problem:

Johnny cannot understand the directions from the teacher. Teacher moves too quickly (combination of inattention/ receptive language issues and slowed processing speed)

and/or

Johnny is not comfortable asking her for clarification in front of the whole class (combination of expressive language deficit and social embarrassment)

Replacement behavior	Who/When	Progress Monitor
We want Johnny to do work in math when asked so we will teach him to: 1. Listen carefully to the teacher during instructions:		
For attention: teach skills that sharpen " focusing skills"	**For attention:** Special Ed teacher and Para teach Stop/Relax/Think Skills to promote better focus. 3X/week	**For attention:** Track Johnny's ability to use the SRT skills to pay better attention to directions.
For receptive language: check for comprehension of instructions before starting work	**For receptive language:** Para can discreetly check in with Johnny before starting the task. Have him repeat the instructions as he understood them and correct distortions in his understanding of directions. Teach this skill: Daily (An environmental accommodation may be that the teacher and para do some pre-teaching of the math material)	**For receptive language:** Track Johnny's ability to appropriately utilize the check-in from para.
2. Teach Johnny to raise his hand and ask for clarification. *Johnny needs to experience reward by being successful academically in the math class. He needs to experience reward by being successful socially in the math class. He needs to experience reward by staying in math class.	Teacher and para teach Johnny to raise his hand and appropriately ask for clarification via role play. Teach this skill: 3X week	Track number of times Johnny can appropriately raise his hand and ask for clarification. Track the decline in number of times that Johnny refuses to do work and is removed from the classroom.

The BIP is focused on *teaching*. It requires:

- identification of the problem behavior (the dysfunctional behavior in the eyes of the adult), including baseline data
- understanding of the skill deficit underlying the behavior. This will determine which intervention needs to be put in place—eg. which skill needs to be taught.
- identification of the "replacement behavior" (the more "functional behavior" in the eyes of the adult)
- a plan to teach the replacement behavior including a way to objectively measure presence/growth of the replacement behavior or absence/decline of problem behavior
- a plan for who will teach the replacement behavior, when, where, how often.
- a reasonable timeframe to progress monitor the presence/increase of the replacement behavior or the absence/decrease of the problem behavior.
- a way to objectively and genuinely assess the effectiveness of the teaching plan, re-visit the original hypothesis, revise the plan if needed and adjust the teaching.

Suppose we decide there is a different "function" of the behavior. The BIP will change drastically:

Behavior of Concern:	Happens When:
Refusing to do work; melting down in class	General Ed Math Class 10:15 am

Hypothesized "function" of the problem:		Solution
Johnny is exhausted by 10:15 a.m. in the morning (mental fatigue).	This is not a skill deficit, this is a physical symptom that needs to be addressed with an environmental adjustment.	Allow Johnny to take a scheduled rest break at 10:00 am.

Setting Events:

Setting events refer to internal factors that can disrupt a student's attention, motivation, mood, physical feeling – and ultimately disrupt their ability to learn. These events are often unknown to the student, in other words, these events are often on an unconscious level and unrecognizable to the student. As such, they are often also completely unknown to the adults observing behavior externally.

Examples of setting events:

- Hunger
- Fatigue
- Medication reactions
- Pain
- Seizures
- Gastrointestinal Problems
- Metabolic Problems
- Sensory overload
- Allergies

These physiological responses are quite common in students with brain injuries, spectrum disorders, and developmental disabilities. They may feel discomfort "in their skin" acutely and may struggle with being able to label or express the discomfort. As a result, these students may be so distracted by their internal state, that they are, at best - unavailable for learning, and at worse – expressing their internal discomfort with external acts of behavior.

When working with a student with a brain injury, adults must be hypervigilant to the fact that some internal processes may indeed be setting off behavior or disrupting learning. The most exquisitely designed BIP will not be effective if the student is having petite mal seizures numerous times a day. It will not be effective if the student is having gastrointestinal discomfort as a result of food allergies or metabolic concerns. With many young students (pre-language), with students who have disabilities and with students who are non-verbal, a staffing team will rarely have direct confirmation of "setting events" and will have to guess about their presence.

If you are sure you understand the function of the behavior, if you are sure you have designed a well-crafted BIP and yet the student's response is quite inconsistent, first consider all possible setting events. Secondly, reassess potential other "functions" underlying the behavior and objectively revise your behavior intervention plan.

Many educators will immediately determine the "function" of the behavior to be "control, power or attention." Those functions place blame and responsibility on the student. Remember, it is best to start from the premise of a skill deficit, not from the assumption that the student is trying to gain "control, power or attention."

Behavior Intervention Plan versus a Behavior Contract:

One of the most common mistakes in working with students with disabilities is the misunderstanding and misuse of behavior contracts. A behavior contract is exactly that – a contract. Two people, with informed consent, enter into an agreement of their own free will, accepting parameters and consequences. For example, "I will give you A if you give me B." A contract assumes equal power in the relationship between the two participants and it assumes the ability of both parties to make sound decisions based upon total disclosure of information. To enter into a contract is to exercise total free will and free choice.

With students with brain injuries or disabilities, the common mistake is this:

The behavior consultant is called in to consult on challenging behavior in a student with a brain injury. When asked what has been tried, the teacher says, "Everything, I tried a sticker chart and it did not help" or "I have tried everything! I told him to stop acting that way or he would not go out to recess." A sticker chart or restricted recess plan is a behavior contract, not a Behavior Intervention Plan. The difference is: A behavior contract rewards or punishes for behavior that is assumed to be present but willfully withheld, whereas, a BIP - teaches to behavior that is assumed to not be present (a skill deficit).

Sticker charts and consequence-based programs are behavior contracts. They assume that the student has the ability to stop the behavior, or start the behavior, but is simply making a choice not to. Therefore, when the behavior doesn't change (perhaps because the behavior is actually a skill deficit), the teacher/parent is frustrated. A student cannot do more or less of a skill that is not learned. Rewarding or punishing a skill that has not been learned is, at the least, frustrating and ineffective, and at most, cruel.

Is there a place for a Behavior Contract with students with a brain injury or disability?

Absolutely! In 2 circumstances:

When a school team is 100 percent sure that the behavior in question is NOT a skill deficit, but is in fact a choice then a behavior contract is appropriate. In this circumstance, the staff/parent must be 100 percent confident that the student has the behavior in his/her repertoire and is 100 percent sure that the student is making a choice to risk a reward or consequence for engaging in inappropriate behavior. Every student, whether affected by a brain injury or not, should have the opportunity to "test the limits" occasionally. Seeing how far one can get away with a oppositional behavior, without getting caught, is a natural part of growing up. Students with disabilities need and want to have typical experiences as well.

The second circumstance is when a new behavior is being taught, the way to strengthen the new skill is to reinforce (reward) it. Therefore, it is appropriate to intermittently reward a student for new behaviors being learned and demonstrated. In those cases, a behavior sticker chart can strengthen skills being taught, and eventually, generalized. That is how an educator/parent can blend the BIP and the behavior contract. First teach, then reward whenever the behavior begins to appear (successive approximations - the concept of reinforcing closer and closer approximations of the desired behavior until the full behavior is demonstrated). In addition, reward for generalizations of the behavior to other settings and finally, wean tangible rewards. You can see that rewards and consequences can be important parts to helping to shape desirable behavior in all students, even students with disabilities.

Antecedent Management versus Consequence-Based Management:

Figuring out what the student needs to learn to succeed at school is the premise of antecedent management. Helping the student and helping the staff understand how the student can show the desired behavior and avoid having the student show the undesirable behavior, is the goal in antecedent management. In antecedent management, more time and effort is spent on the "front end" (setting up the environment for success) rather than on the "back end" (having to give the student a consequence for bad behavior). With all students, especially those with disabilities, antecedent management is the best way to set up learning and behavior environments. It allows the student and the adult to figure out the underlying skill deficit, allows the adult to teach the child, allows the student to be successful and allows for positive interaction between the student and the teacher. This is definitely a better way to spend time with a young person – focusing on teaching, on positives and experiencing success.

Consequence-based management presupposes that the student has learned the desired behavior but chooses not to show it. As a result, the adult in the relationship must then provide a reward to increase the desired behavior or a consequence to decrease the undesirable behavior. In this type of management, there is little teaching on the front end, just an expectation that the skill is present and then (usually) a negative interaction on the back end, when "bad" behavior warrants a consequence.

Whenever possible, use antecedent management instead of consequence-based management. It is often said – "A student with an ABI/TBI CANNOT learn from consequences." This is not totally true. All living/learning creatures can learn from consequences. However, a better statement might be – "All students, especially students with ABI/TBI and other disabilities, learn ***better*** with antecedent management."

Brain Injury Observation Form

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 board appropriately					
Responds to questions with on-topic answers					
Resists subtle classroom distractions-noise, lights					
SUSTAINED					
Focuses for long periods of time					
Completes in-class assignments					
Looses train of thought when talking or writing					
Looses place when working on task or when reading					
SHIFTING/DIVIDED					
Can multitask-note taking while listening					
Can attend to more than one task at a time appropriately					
Switches from activity to activity appropriately					
Responds when watching audio or video activities					
OTHER					
Overall attention capacity					
Energy level when performing long academic tasks/tests					
Organized with materials					
Organized thoughts- (analyze writing samples)					
Initiates tasks without prompts					
Time management (e.g. keeps schedules /dates)					
Impulsivity					
Talking / Verbal interruptions					

Brain Injury Observation Form

Less positive ..... **More Positive**

MEMORY	1	2	3	4	5
SHORT TERM MEMORY (When student appears to be paying attention rank the following)	**Significantly Below Average**	**Slightly Below Average**	**Average**	**Slightly Above Average**	**Significantly Above Average**
Can repeat back simple information just presented					
Can copy from board without frequently looking up					
Asks for statements to be repeated					
Can complete simple 2-step problems					
Follows directions correctly					
Can repeat/explain simple activities previously learned on same day					
WORKING MEMORY					
Completes thought process in writing assignments					
Summarizes story/text (names characters, setting, details)					
Multi-tasks with accuracy					
Completes multistep problems- especially in math/science					
Copy from board/note-taking while being taught					
LONG TERM MEMORY					
Explains previously learned material / facts					
Recalls school events from previous week					
Remembers where classroom materials are stored					
Remembers routines					
Remembers vocabulary words					
Draws / recognizes previously learned pictures or diagrams					
OTHER					
Auditory: short term-repeats back 4 words in order (>8 years old)					
Working Memory: repeats back 3 given numbers in reverse order (>7 years old)					
Visual: student can name pictures / objects that are exposed for a 5-6 seconds					

Brain Injury Observation Form

Less positive ..... **More Positive**

PROCESSING SPEED	1	2	3	4	5
PROCESSING SPEED	Significantly Below Average	Slightly Below Average	Average	Slightly Above Average	Significantly Above Average
Responds to verbal directions/questions quickly					
Keeps pace with class					
Slow reading (control for comprehension)					
Completes tests/tasks on time					
Quickly finishes timed tasks accurately					
Recalls simple information quickly					
Writing or drawing speed					
Speech rate					
Physical movement					
Sometimes seems confused after simple information is provided-not due to attention or memory					
Other:					
COGNITIVE FATIGUE **Note change of ranking criteria**	Observed Frequently	Observed sometimes	Average Compared To Peers	Not Observed Often	Never Observed
Completes morning / earlier academic tasks easier than later tasks					
Simple word retrieval consistent throughout day					
Attention capacity consistent throughout day					
Behavioral changes after moderately difficult test/task					
Cognitive changes after moderately difficulty test/task					
Reports of fatigue/physical complaints after long tasks					
Blank starring					
States feeling in a “fog” or feeling “sluggish”					
Sensitive to lights / noise after moderate exposure					
Other:					

Brain Injury Observation Form

Less positive ..... **More Positive**

EXECUTIVE FUNCTIONS (EF)	1	2	3	4	5
PLANNING, ORGANIZATION, COMPREHENSION, FLEXIBILITY	Significantly Below Average	Slightly Below Average	Average	Slightly Above Average	Significantly Above Average
Organization of materials					
Organization of thoughts in writing / speech					
Shifts appropriately from subject to subject					
Is able to keep and utilize planner or schedule					
Transitions well to different activities					
Writes or draws a basic outline of process (ex. logical paragraph)					
Difficulty learning new concepts					
Difficulty understanding simple stories or concepts					
Can explain plans to meet an assignment, task, deadline, or activity					
After a short assigned problem, can explain logic used in problem solving					
Focuses for appropriate period of time					
When engaged in a problem solving task, uses feedback to help in the process (monitors progress)					
Can quickly adjust to changes in routine					
Keeps track of place when working on task or when reading					
EF RELATED BEHAVIOR					
Motivation					
Impulsivity					
Transitions from school activity to activity appropriately					
Common sense/judgment					
Perspective taking/empathy					
Follows rules					
Overall attention					
Emotional/behavioral regulation					
Creativity/concept formation					
On-topic reciprocal dialog					
Sudden / inappropriate emotions					

Brain Injury Observation Form

Less positive ..... **More Positive**

Sensory/Tactile/Visual/Motor	1	2	3	4	5
SENSORIMOTOR	**Significantly Below Average**	**Slightly Below Average**	**Average**	**Slightly Above Average**	**Significantly Above Average**
Posture					
Walking / running difficulties					
Fine motor (pencil grip / graphomotor) Picking up small pieces					
Gross motor					
Balance / muscle tone					
Touches each finger separately					
Mimics simple body movements (hand gestures, knock and taps)					
Traces or copies figures					
Identifies simple objects placed In hand with eyes closed					
If clumsy , awkward, unusual movements mark box					
VISUAL-SPATIAL / PERCEPTUAL					
Skills puzzles / blocks					
Understands right vs. left and Up vs. Down					
Ignores one side of paper while writing or drawing/coloring					
Grossly distorted drawings that are directly copied					
Spatial breaks in drawing					
TACTILE/AUDITORY/VISUAL					
Light Sensitivity					
Noise Sensitivity					
Touch Sensitivity					
Color Blindness					
Hearing (ex. Responds to name)					
Sees details/writing on board from back of room					
Sensitive to temperature					
Complains of numbness or odd Sensations					
Other:					

CHAPTER SUMMARY POINTS:

- Task Analysis allows for understanding of social/emotional/behavioral components in any given activity.
- Multi-Disciplinary Teams should use an FBA and a BIP to help individualize replacements behaviors for students with an TBI and/or ABI manifesting maladaptive behaviors.
- The Neuropsychological Observation Guide is a tool to assist teachers in determining which areas are prime targets for intervention strategies.

SUMMARY POINTS FOR AN FBA AND BIP:

It is best practice to assume, first, that underneath the behavior of a student with a brain injury is a skill deficit that needs to be carefully assessed, pinpointed and taught a replacement skill. When the FBA has led to a successful BIP, the new, more adaptive behavior should then be generalized to various settings. In order to strengthen the new learning, a sticker chart (a behavior contract) can then be used to reward the behavior at its new level. This external reinforcement will hopefully give way shortly to the internal good feeling of success and will become an intrinsic reward.

- If a school team is finding that they are having to excessively reward the new behavior to keep it in place, they need to go back and review #1) whether the new skill was truly learned, and/or #2) whether the new skill has been generalized to various settings and/or #3) the new skill is being affected by setting events.
- If a school team is 100 percent sure that a new skill has been learned, but once in a blue moon, the student makes a choice not to use it, a one time consequence may be given. This is just "typical" kid behavior.
- If a school team is finding that they are having to excessively consequence a student for not practicing the new "learned" behavior, then again, the team needs to go back and review if #1) the skill was truly learned, and/or #2) if the new skill has been generalized to various settings and/or if #3) the new skill is being affected by setting events. The need to rely heavily on rewards or consequences is a RED FLAG that the school team needs to go back to the FBA and BIP.

When doing an FBA/BIP:

- Assume that beneath disruptive behavior is a skill deficit.
- Know your ABC's: Take time to study the antecedents (A) that lead to the behavior (B) and the consequences (C) – circumstances that maintain the undesirable behavior or prevent the desirable behavior.
- Do an analysis of the behavior.
- From that analysis, figure out and take your best guess about the function of the behavior (Functional Behavior Assessment FBA)
- Design the intervention plan that will teach a more adaptive replacement behavior (create the Behavior Intervention Plan BIP)
- Strengthen the desirable behavior with successive approximations and intermittent rewards. Generalize the behavior to other settings. Wean tangible rewards when behavior is strongly established. If you find you are having to use rewards excessively, it is likely that the desired behavior has not yet been adequately taught or there is a setting event that prevents the appropriate use of the behavior. Go back to your ABC's: go back to the FBA and BIP drawing board.
- Use consequences sparingly. If you find you are having to use consequences frequently, it is likely that the desired behavior has not yet been adequately taught or there is a setting event that prevents the appropriate use of the behavior. Go back to your ABC's: go back to the FBA and BIP drawing board.

CHAPTER 5

Section 504, Response To Intervention (RTI), Multi-Tier System of Support (MTSS) and IDEA

This Chapter Allows the Reader to:

- Understand the process of assessment of brain injury – and the intervention of a 504 Plan, a Response-to-Intervention Plan and an Individualized Education Plan (IEP).
- Learn about the newly developed Colorado Exceptional Children's Education Act (ECEA) definition for **"Traumatic Brain Injury"**.

As soon as school personnel become aware that a student has sustained a brain injury, traumatic or acquired, mild or severe, recent or old, the student needs to be watched for any possible negative impact on their ability to learn as well as any health-related needs at school.

Traumatic Brain Injury (TBI) often results in diverse impairments that may be either temporary or permanent, and ranging from partial to total disability. Pre-existing maladaptive behaviors or disabilities may be intensified and/or there may be a host of new problems arising in cognitive, communicative, affective, and/or physical functioning.

There needs to be consideration and planning made for all transitions that occur for the student with a brain injury. These transitions occur when the student: returns home after the injury; returns to school; room-to-room or teacher-to-teacher; grade-to-grade; building-to-building; upon graduation or leaving the school environment. However, several key factors need to be kept in mind as school personnel plan for transitions.

- Multidisciplinary decision-making
- Parent involvement
- Frequent reviews
- Planning for every transition
- Involving personnel from all involved agencies
- Identification of a case manager

Implications for Schools

Traumatic brain injuries have not been seen as a common occurrence and school districts may not have an adequate process in place for identification of these students and their educational needs and/or provision of needed services. As more students with mild to moderate TBI are identified, school districts must adapt and change to meet the need of these students. New legislation regarding the impact of concussions on students and athletes has raised the level of awareness and concern of even minor brain injuries.

Each administrative unit should review their district plans and procedures to ensure that there are mechanisms in place to meet the needs of students with traumatic brain injuries, including those students covered by special education laws and those covered by Section 504 of the Rehabilitation Act.

District Level

Included are strategies a district should consider when assessing the adequacy of the programs to address the needs of students who have sustained a traumatic brain injury:

Develop district policies and procedures for responding to the various categories of needs that may follow a traumatic brain injury. This includes having a district policy in place for mild TBI's, often referred to as "concussion."

Senate Bill 11-040 requires private and public schools with students ages 11 to 19 years who possibly sustain concussions in sports-related activities to be familiar with Senate Bill 11-040 and have a District Concussion Identification and Management protocol in place. The CDE Guidelines for concussion can be found on the CDE website. The CDE Concussion Guidelines provide in depth support and guidance to school districts to be in compliance with SB 11-040_ **www.cde.state.co.us/HealthAndWellness/download/BrainInjury/CompleteConcussionGuidelines2011-2012.pdf**

- Create brain injury expertise from educational, health, and support services who can serve as resources to the student, family, and teachers.
- Be prepared to provide assistance for crisis and long-term situations.
- Provide awareness training for all teachers and administrators about brain injuries and the impact on the educational process.

- Determine that your buildings are physically accessible for individuals in wheelchairs or limited ability to ambulate.

Building Level

- Assign a case manager to the student as soon as possible after the injury occurs, prior to returning to school is best.
- Develop collaborative relationships with the parents, students, all agencies and health care providers involved. Secure releases of information so agencies can communicate adequately.
- Utilize a multidisciplinary team, assess the student's current level of functioning and environmental constraints, and identify the needs of the student.
- Make the necessary adjustments to schedule and environment to accommodate the needs of the students.
- Determine what the student needs to meet district graduation requirements if in high school.
- Provide specific training for staff and teachers regarding the student's specific needs.

The Assessment Process

Response To Intervention (RTI) and/or Multi-Tier System of Support (MTSS)

Before a student is identified as having a disability or placed in special education, school staff must look at how the student is performing in the general curriculum. Interventions may be recommended that will benefit the student and improve performance. Data is recorded during this process to assess how well interventions are working. This Process is called RTI or MTSS. Initially, the student may be referred to the Problem Solving Team. This team consists of both general and special education staff and should include the parents of the student. This team will review the student's records, including current academic performance, to recommend interventions or accommodations. A complete health history with particular attention to the history of a brain injury is important including any medical documentation that is available. The team may find strong evidence that the student's injury is significant enough to warrant an assessment for special education or the team may offer recommendations on intensive interventions and then evaluate the student's response to those interventions.

If a student sustains a moderate to severe brain injury that has the student returning to school from a prolonged or intensive rehabilitation or hospital stay, with permanent brain damage, a school team can immediately assess the need for placement in special education and can forgo the RTI process. If the TBI is serious and warrants immediate placement, programming or services, the school staff can make that decision. RTI cannot be used to hold a student with a TBI out of services or placement if it is obvious that the student needs a significant amount of intervention and programming at school to succeed.

Special Education

Traumatic Brain Injury is a category of disability under the Individuals with Disabilities Education Act ("IDEA"). Under the IDEA, a child (aged 3 through 21) is an eligible child with a disability if he or she has a qualifying condition/disability and, by reason thereof, is unable to receive reasonable educational benefit from general education without additional supports. In Colorado, the Exceptional Children's Educational Act (ECEA) closely aligns with IDEA and includes traumatic brain injury as an eligibility category. School districts are required to report students who qualify for special education with a TBI in the Dec. 1 count.

IDEA Definition:

Traumatic brain injury means 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 impairment in one or more areas, such as cognition; 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 inducted by birth trauma. § Sec. 300.8(c)(12) of IDEA 2004

A student with an Acquired Brain Injury may qualify for special education under Other Health Impairment (OHI).

The process for identification of traumatic brain injury is triggered whenever it is thought that a student with a TBI is unable to receive reasonable benefit from general education alone and might need special education services. The process begins with a referral from a parent, guardian, teacher, student, or other school staff members. The parent/guardian is required to provide a medical diagnosis of traumatic brain injury. If one is not available, the family needs to provide strong and credible information that the student has sustained a head injury. This might be due to hitting a windshield in a car accident, getting hit in the head from an external force, or sustaining repeated injuries over a period of time during participation in sports and/or recreational activities such as football or skateboarding. Once the traumatic brain injury has been determined to be true, the school team MUST demonstrate that the TBI is having an impact on the student's ability to learn at school. The Determination of Disability criteria below is from the Procedural Manual: The Colorado State Recommended IEP. These factors outline the criteria

used to determine if a student can be identified as a student with a traumatic brain injury.

There are not any specifically mandated assessments required during the special education evaluation for TBI. The Rules for the Administration of the Exceptional Children's Educational Act (ECEA Rules) requires that the initial evaluation is sufficiently comprehensive to appropriately identify all of the child's special education and related services needs, whether or not commonly linked to the disability category in which the child has been classified. It is up to the multidisciplinary team and qualified personnel to determine what assessments should be done for a particular child according to their needs.

The multidisciplinary team will conduct appropriate assessments to determine if the student is in need of special education services. Special Education services indicate that the student requires "specialized instruction, and/or specialized programming, and/or specialized placement and/or a modification of the general education curriculum". If the team agrees that the student's TBI requires this level of service, an Individualized Education Program or IEP is drafted. If the student does not qualify for special education services, the assessment team might determine the appropriateness of referring the student for the development of a 504 Plan, a Health Plan, an Individualized Learning Plan or a Response to Intervention Plan.

In the state of Colorado, a website named TBI Networking Team Resource Network (**www.cokidswithbraininjury.com**) has been developed to help educators navigate these complicated waters. It provides multi-disciplinary teams with a Matrix of the 16 most commonly effected domains post-brain injury and the tests school personnel can use to assess those domains. It also provides a flow chart to help guide school staff on whether a student with a traumatic brain injury needs an Individualized Education Plan (IEP), a 504 Plan, or no special accommodations. See Appendix for attached process and forms.

For students aged 15 years and older but not later than the end of ninth grade, a Transition Plan will also be needed if the student has an IEP. A Transition Plan identifies those services needed to prepare students to enter the community after high school.

Section 504

A student who does not need special education services but may need "accommodations" (adaptations to the learning material or environment) in order to access their regular education curriculum may be eligible for a 504 Plan. School districts of 15 or more employees are required by federal legislation to have a 504 coordinator. The 504 Plan is a formal process for providing the student with accommodations. The process of developing a 504 Plan is a function of the regular education staff with consultation from appropriate related service personnel.

Section 504 is the part of the Rehabilitation Act of 1973 that guarantees specific rights in federally funded programs and activities to people who qualify as disabled. Section 504 state: "No otherwise qualified individual with a disability in the United States…shall, solely by reason of her or his disability, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance…". The ADA's definition of "disability" as an impairment that substantially limits one or more major life activities, a record of such an impairment, or being regarded as having such an impairment is required. In 2008, The Americans With Disabilities Act Amendment Act of 2008 was passed and expanded the definition of "major life activities." It also states that mitigating measures shall not be considered in assessing whether an individual has a disability and clarifies that an impairment that is episodic or in remission is a disability if it would substantially limit a major life activity when active.

A student with a 504 Plan may continue to need academic and/or workplace accommodations after high school. Even though a Transition Plan is not required for students with a 504 Plan, the success of the student with a TBI after high school can be enhanced if school personnel take the time to work with the students and their family regarding appropriate accommodations the student will need after leaving high school.

Regardless of the extent of the head injury, every student who has sustained a head injury needs to be evaluated to determine the impact this injury has on the ability to access an educational program. Early identification with ensuing assessment, identification of needs, and appropriate interventions and transition planning are major factors in facilitating the successful integration into school and the community and insuring the academic success of students who have sustained a traumatic brain injury.

APPENDIX

Traumatic Brain Injury Eligibility Definition

2.08 (10) (a) To be eligible as a child with a Traumatic Brain Injury, there must be evidence of the following criteria:

2.08 (10) (a) (i) Either medical documentation of a traumatic brain injury, or a significant history of one or more traumatic brain injuries reported by a reliable and credible source and/or corroborated by numerous reporters; and

2.08 (10) (a) (ii) The child displays educational impact most probably and plausibly related to the traumatic brain injury.

2.08 (10) (b) Additionally, to be eligible as a child with a Traumatic Brain Injury, the traumatic brain injury prevents the child from receiving reasonable educational benefit from general education as evidenced by one or more of the following:

2.08 (10) (b) (i) A limited ability to sustain attention and/or poor memory skills, including but not limited to difficulty retaining short-term memory, long-term memory, working memory and incidental memory.

2.08 (10) (b) (ii) An inefficiency in processing, including but not limited to a processing speed deficit and/or mental fatigue.

2.08 (10) (b) (iii) Deficits in sensory-motor skills that affect either one, or both visual or auditory processing, and may include gross motor and/or fine motor deficits.

2.08 (10) (b) (iv) Delays in acquisition of information including new learning and visual spatial processing.

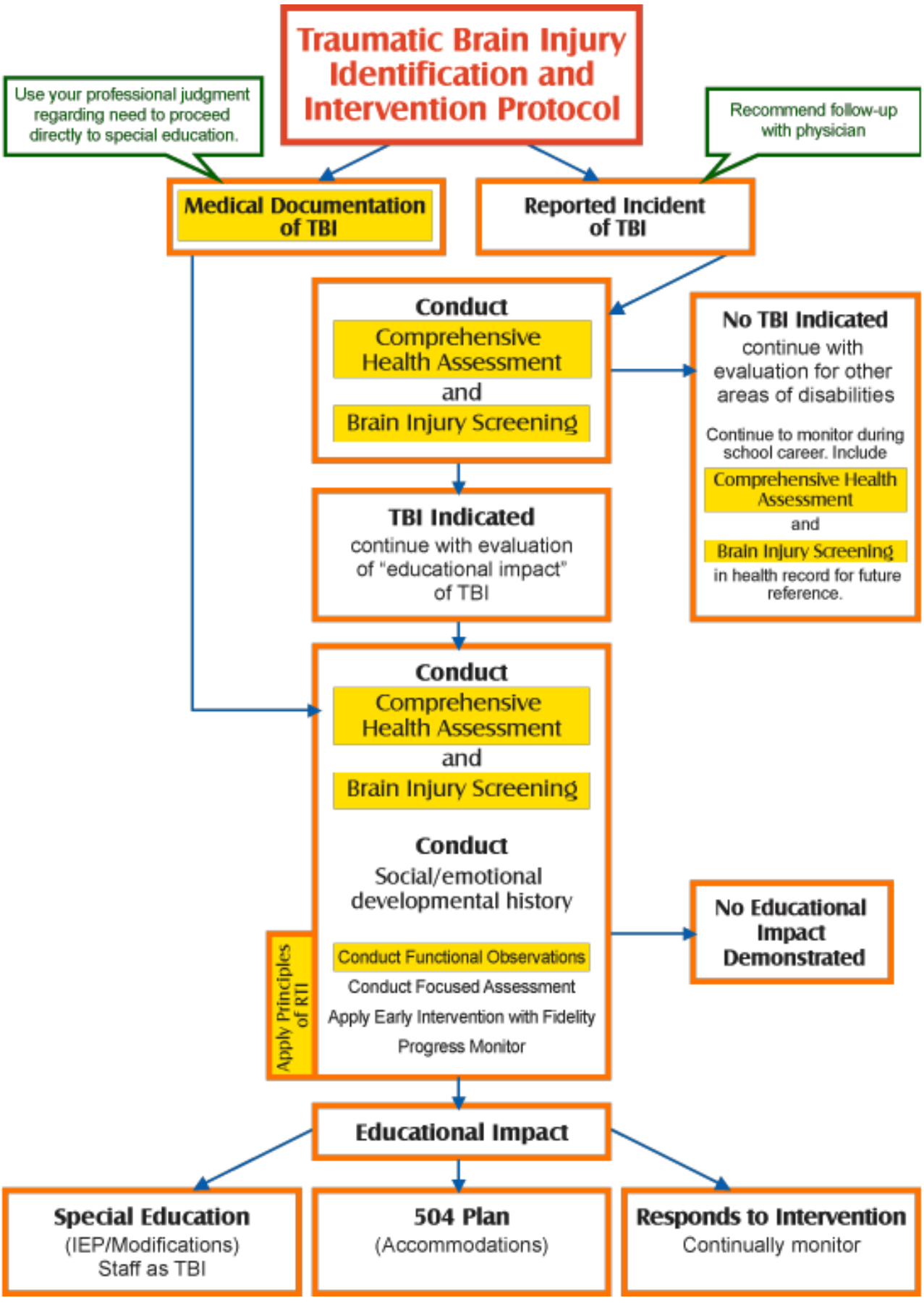
2.08 (10) (b) (v) Difficulty with language skills, including but not limited to receptive language, expressive language and social pragmatics.

2.08 (10) (b) (vi) Deficits in behavior regulation, including but not limited to impulsivity, poor judgement, ineffective reasoning and mental inflexibility.

2.08 (10) (b) (vii) Problems in cognitive executive functioning, including but not limited to difficulty with planning, organization and/or initiation of thinking and working skills.

2.08 (10) (b) (viii) Delays in adaptive living skills, including but not limited to difficulty with activities of daily living (ADL), and/or

2.08 (10) (b) (ix) Delays in academic skills, including but not limited to reading, writing, and math delays that cannot be explained by any other disability. They may also demonstrate an extremely uneven pattern in cognitive and achievement testing, work production and academic growth.


Traumatic Brain Injury Identification and Intervention Protocol
Use your professional judgment regarding need to proceed directly to special education.
Recommend follow-up with physician
Medical Documentation of TBI
Reported Incident of TBI
Conduct
Comprehensive Health Assessment
and
Brain Injury Screening
No TBI Indicated
continue with evaluation for other areas of disabilities
Continue to monitor during school career. Include
Comprehensive Health Assessment
and
Brain Injury Screening
in health record for future reference.
TBI Indicated
continue with evaluation of "educational impact" of TBI
Conduct
Comprehensive Health Assessment
and
Brain Injury Screening
Conduct
Social/emotional developmental history
Apply Principles of RTI
Conduct Functional Observations
Conduct Focused Assessment
Apply Early Intervention with Fidelity
Progress Monitor
No Educational Impact Demonstrated
Educational Impact
Special Education
(IEP/Modifications)
Staff as TBI
504 Plan
(Accommodations)
Responds to Intervention
Continually monitor

Medical Documentation of Traumatic Brain Injury

Best practice is to establish traumatic brain injury through medical documentation via hospital records and/or from a doctor or clinician who has knowledge of the Center for Control (CDC) requirements for TBI. These classifications are based on a severity rating of mild, moderate and severe. Most often individuals who fit these classification for moderate to severe TBI will have sought medical attention and therefore, the chances are greater that documentation will exist.

Mild TBI (mTBI) is a much more difficult classification to establish via medical documentation. The **conceptual definition** of mTBI (as per TNT) is an injury to the head as a result of blunt trauma or acceleration or deceleration forces that result in one or more of the following conditions:

- Any period of observed or self-reported:
- ☐ Transient confusion, disorientation, or impaired consciousness;
- ☐ Dysfunction of memory around the time of the injury;
- ☐ Loss of consciousness lasting less than 30 minutes.

- Observed signs of neurological or neuropsychological dysfunction, such as:
- ☐ Seizures acutely following injury to the head;
- ☐ Among infants and very young children: irritability, lethargy, or vomiting following head injury;
- ☐ Symptoms among older children and adults such as headache, dizziness, irritability, fatigue or poor concentration.

In the United States, mTBI is often synonymous with "concussion". Over 1.6 to 3.8 million concussion occur per year according to the CDC. Follow-up with a medical professional, either in the emergency department at the time of the injury or later by a medical clinic, varies widely. It is thought that more children are not seen by a medical professional following mTBI/concussion which can make medical documentation very difficult. The good news is that over 80% of mTBI resolve without complication or need for special education. However, when a complex concussion presents and/or a child with multiple concussions is struggling, establishing medical documentation can be nearly impossible.

The Colorado Department of Education encourages school districts to first and foremost attempt to establish the presence of a TBI via medical documentation.

NOTE:
Medical documentation simply confirms the **presence** of the TBI. It does not and cannot automatically establish the "impact" of the TBI. Confirming that an injury has occurred does not shed light upon the affect of the injury on subsequent physical, educational, behavioral, emotional, social outcome. Once medical documentation has been established, CDE requires that school teams continue to proceed through to collect a Body of Evidence to establish "educational impact".

Credible History of Traumatic Brain Injury

A recent study found that 42% of persons who indicate they had incurred a TBI as defined by the CDC did not seek medical attention (Corrigan & Bogner, 2007). Obtaining medical documentation of TBI for those individuals who have sought medical attention poses a greater challenge for school district personnel. CDE and the TBI Networking Teams (TNT) Steering Committee recognizes that the inability to obtain medical documentation for students moving toward special education eligibility has lead to misidentification and underidentification of children with TBI in the state of Colorado.

In the case when medical documentation either can not be obtained or when the individual did not seek medical attention, the following elements will help school personnel to establish a credible history of TBI.

1. The "gold standard for determining prior TBI is self/parent report as determined by a structured or in-depth interview" (Corrigan & Bogner, 2007).
    - Corrigan indicates that screening and structured interviews need to incorporate more than two items related to TBI. These questions should be asked in a variety of ways.

    CDE includes a Comprehensive Health Form. This form serves as a template by which a school nurse, social worker or psychologist can interview and ask questions of a parent/caretaker. A school district may choose to use their own district health interview as long as there are multiple questions about head injures, brain injuries and/or neurological concerns.

    Any version of a comprehensive health history used by a school district is meant to be administered in **interview** format only; it is not intended to be given to a parent/caretaker for independent completion and return. Credible history of a TBI requires a skilled interviewer to know how to ask certain questions, to ask pointed questions multiple times and in a variety of ways, to establish the details of the TBI(s).
    Questions should include:
    - ☐ Where
    - ☐ When
    - ☐ How
    - ☐ Medical intervention(s) sought at the time, later, through the recovery
    - ☐ Are answers medically plausible?
    - ☐ Be aware of assumptions – for example, the report of a "scalp laceration" does not automatically cause a "brain injury"

2. There needs to be a **reported incident(s)** as well as on-going symptoms/behaviors that persist beyond the incident (Corrigan & Bogner, 2007).
    - During the health interview, details of the incident should be clear and consistent. The description of the injury should not vary widely from report to report, from reporter to reporter (if there are multiple reporters of the same incident).
    - If there are multiple injuries, specifics about **each** injury should be well-detailed and consistent.

- The interviewer should be familiar with the acute symptoms related to TBI at the time of the injury. These symptoms are not limited to physical symptoms but may also include cognitive symptoms, emotional symptoms, sleep/energy symptoms and social skill deficit symptoms.

- The interviewer should also be familiar with the symptoms of TBI that emerge, develop, morph after a TBI has been sustained, especially if misdiagnosed or underdiagnosed. These symptoms are often related to on-going, chronic physical conditions (headaches) or to behaviors that look like learning problems, behavior problems, emotional problems, social skill deficits, executive function deficits.

- The interviewer should drill down into a comparison between the child pre-injury versus post-injury. Are there changes in all/some areas? Has there been skill regression since the injury? Has there been a change in the student's personality? Social skills? Executive function skills? Behavioral skills?

3. Finally, a screen or in-depth interview is not enough to determine a TBI. These tools are simply to "screen" for potential TBI. If a screen or in-depth interview suggest there has been a credible history of TBI, a thorough assessment/evaluation is suggested (Corrigan & Bogner, 2007).

    - If the comprehensive health history interview yields a very strong case of credible history, CDE recommends confirming this assessment with the Brain Checklist Screen. This checklist, developed and validated through Colorado State University, provides a more specific screen of the TBI. The Brain Checklist is included on this website and can be downloaded and given directly to the parent/caretaker for written completion. If the Brain Checklist also confirms the presence of TBI, then earlier assumption of credible history is confirmed. There is no scoring key to the Brain Checklist. It is not intended to be administered and then given a "cut-off" score of "yes vs. no" of TBI. It is intended to be administered and analyzed "wholely" within the context of potential TBI.

NOTE:
As in the case of medical documentation, simply establishing credible history does not and cannot automatically establish the "impact" of the TBI. Confirming that an injury has occurred does not shed light upon the affect of the injury on subsequent physical, educational, behavioral, emotional, social outcome. Once credible history has been established, CDE requires that school teams continue to gather a Body of Evidence to establish "educational impact".

INITIAL HEALTH ASSESSMENT

IDENTIFYING INFORMATION:

LEGAL NAME OF CHILD: _____

BIRTHDATE: _____ AGE: _____ SEX: _____ GRADE: _____

ADDRESS: _____

This form is completed by: _____ Relationship to Child: _____

MOC PHONE: Home _____ Work _____ Cell _____

FOC PHONE: Home _____ Work _____ Cell _____

Message Number: _____ Best time to call: _____

Child lives with: Both Parents ____ Mother ____ Father ____ Other (explain) _____

Language spoken in home: English: ____ Spanish ____ Other (list) _____

My child has the following health care coverage: Medicaid: ____ CHP+ _____ Private:_____ None: _____

PREGNANCY AND BIRTH:

Month into pregnancy that medical care began: _____ Length of pregnancy: _____

Were there any medications taken while pregnant?

Explain: _____

Length of labor: _____ Birth Weight: _____

Did baby come home with mother? Yes ____ No ____

Explain: _____

Did the baby need oxygen after birth: Yes ____ No ____

Explain: _____

Did baby turn yellow enough to be treated? Yes ____ No ____

Explain: _____

DEVELOPMENTAL HISTORY:

Did your child crawl by 9 months? Yes ____ No ____

Did your child walk by 18 months? Yes ____ No ____

Did your child say words by 15 months? Yes ____ No ____

Was your child toilet trained by 3½ years? Yes ____ No ____

Were there problems with balance coordination? Yes ____ No ___

Were there problems with fine motor skills? (buttons, handwriting, picking something up) Yes ____ No ____

Do you have other concerns about your child's development? Yes ____ No ____

Explain: _____

ILLNESSES, HOSPITIALIZATIONS, SURGERIES, AND/OR ACCIDENTS:

Major Illnesses: _____

Hospitalization/Surgeries: _____

Accidents/Injuries: _____

Child's Doctor: _____ Date of Last Visit: _____ Reason: _____

BODY SYSTEMS HISTORY:

TEETH:

Are there any dental concerns? Yes ____ No ____

Explain: _____

Date of Last Dental Exam: _____ Dentist: _____

EARS:

Does your child have any known hearing problems? Yes ____ No ____

Explain: _____

Do you have any concerns about your child's hearing? Yes ____ No ____

Explain: _____

Ear Infections? No ___ Yes ___ Age when started? _____ How many per year? _____

Within last year? No ___ Yes ___ Were PE tubes placed? No ___ Yes ___ Number of sets? _____

EYES:

Does your child have any problems seeing? Yes ____ No ____

Explain: _____

Does your child wear glasses/contacts? Yes ____ No ____

When? _____

Date of last eye exam? _____ Doctor's Name: _____

CARDIAC:

Does your child have any heart problems? Yes ____ No ____
Explain: _____
Does your child fatigue easily, or have poor endurance? Yes ____ No ____
Explain: _____

RESPIRATORY:

Does your child have any breathing problems? Yes ____ No ____
Explain: _____
Is he/she prone to upper respiratory infections? Yes ____ No ____
Explain: _____
Does your child have asthma? Yes ____ No ____
Triggers: _____
Uses inhaler, nebulizer, or medication? Yes ____ No ____

GASTROINTESTINAL AND URINARY:

Does your child have any problems going to the bathroom? Yes ____ No ____
Explain: _____
Bedwetting: Yes ____ No ____
Constipation: Yes ____ No ____
Difficult to train: Yes ____ No ____
Does your child have dietary/food needs or concerns? Yes ____ No ____
Explain: _____
Does your child have frequent stomach aches? Yes ____ No ____
Explain: _____

SKELETAL AND MUSCULAR:

Has your child ever had a broken bone? Yes ____ No ____
When and which one? _____
Does your child have any physical disabilities? Yes ____ No ____
Explain: _____
Are there any restrictions for activity? Yes ____ No ____
Explain: _____

NEUROLOGICAL:

Has your child ever had seizures? Yes __ No __ Date of last seizure:_____
Does your child have frequent headaches? Yes __ No __ Explain: _____
Has your child ever had a head injury or concussion? Yes __ No __ If unconscious, how long? _____
After injury: Dizziness?___ Memory problems? ___ Headaches?___ Fatigue?___
Was a physician seen? Yes __ No __ Who? _____
Hospitalized? Yes__ No__ Where? _____
Does your child have sleeping/bedtime concerns? Yes __ No __
Explain: _____
Does your child have a limited attention span? Yes __ No __
Do you think your student is distractible? Yes __ No __
Is your student impulsive? Yes __ No __

ALLERGIES: (Identify and explain)

Medications allergies? Yes __ No __ What/Reactions: _____
Food Allergies? Yes __ No __ What/Reactions: _____
Insect/wasp/bee sting allergy? Yes __ No __ What/Reactions: _____
Environmental Allergies? Yes __ No __ What/Reactions: _____
Seeing an Allergist? Yes __ No __ Who/When?: _____

MEDICATIONS:

Is your child currently taking medications (prescription and/or over-the-counter)? Yes ____ No ____
List Name, Dose, and Time: _____
_____

_____ _____
Signature of person completing this form Date

Interpreter (if applicable): _____

Code: _____ Date Received: _____

Colorado State University

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Brain Check: Screening Tool Project

Parent/Guardian Survey

Student Information

Today's Date: ___/___/___ Child's Age: _____

Child's Date of Birth: ___/___/___ Child's Gender: ☐ Male ☐ Female

Child's race: (circle one or more)	1: American Indian/Alaska Native 2: Asian 3: Native Hawaiian or Other Pacific Islander	4: Black or African American 5: White 6: More than one race Please describe:_____
Child's ethnicity: (circle one)	1: Hispanic or Latino 2: Not Hispanic or Latino	3: Unknown or Not Reported

Injuries or Illnesses

Injury or Illness	Age	Outcomes
Please check all that apply		
☐ **Blow to Head** (from sports, playing, biking, falling, getting hit by an object, etc.)	At what age?____	Check all that apply: ☐ Concussion ☐ Loss of consciousness, *for how long?_____ ☐ Coma, *for how long? _____ ☐ Confusion or altered mental state ☐ Missed school ☐ Resulted in no problem
☐ **Whiplash**	At what age?____	Check all that apply: ☐ Concussion ☐ Loss of consciousness, *for how long?_____ ☐ Coma, *for how long? _____ ☐ Confusion or altered mental state ☐ Missed school ☐ Resulted in no problem
☐ **Car accident** (resulting in any degree of injury or lack of injury)	At what age?____	Check all that apply: ☐ Concussion ☐ Loss of consciousness, *for how long?_____ ☐ Coma, *for how long? _____

APPENDIX

Code: _____

Injury or Illness	Age	Outcomes
Please check all that apply		
☐ **Assault/Violence (child abuse, fights, firearm injury)**	At what age?____	Check all that apply: ☐ Concussion ☐ Loss of consciousness, *for how long?_____ ☐ Coma, *for how long? _____ ☐ Confusion or altered mental state ☐ Missed school ☐ Resulted in no problem
☐ **Sustained High Fever**	At what age?____	Check all that apply: ☐ Loss of consciousness, *for how long?_____ ☐ Coma, *for how long? _____ ☐ Confusion or altered mental state ☐ Missed school ☐ Resulted in no problem
☐ **Brain Tumor**	At what age?____	Check all that apply: ☐ Loss of consciousness, *for how long?_____ ☐ Coma, *for how long? _____ ☐ Confusion or altered mental state ☐ Missed school ☐ Resulted in no problem
☐ **Anoxia** (definition: lack of oxygen; caused by such events as a near-drowning experience or suffocating experience)	At what age?____	Check all that apply: ☐ Loss of consciousness, *for how long?_____ ☐ Coma, *for how long? _____ ☐ Confusion or altered mental state ☐ Missed school ☐ Resulted in no problem
☐ **Meningitis**	At what age?____	Check all that apply: ☐ Loss of consciousness, *for how long?_____ ☐ Coma, *for how long? _____ ☐ Confusion or altered mental state ☐ Missed school ☐ Resulted in no problem
☐ **Encephalitis**	At what age?____	Check all that apply: ☐ Loss of consciousness, *for how long?_____ ☐ Coma, *for how long? _____ ☐ Confusion or altered mental state ☐ Missed school ☐ Resulted in no problem
☐ **Seizures** (example: epilepsy)	At what age?____	Check all that apply: ☐ Loss of consciousness, *for how long?_____ ☐ Coma, *for how long? _____ ☐ Confusion or altered mental state ☐ Missed school ☐ Resulted in no problem

Code: _____

Injury or Illness	Age	Outcomes
Please check all that apply		
☐ **Overdose of** drugs or alcohol, or inappropriate use of prescription drugs or over the-counter medication?	At what age?____	Check all that apply: ☐ Loss of consciousness, *for how long?_____ ☐ Coma, *for how long? _____ ☐ Confusion or altered mental state ☐ Missed school ☐ Resulted in no problem
☐ **Other:** _____ _____	At what age?____	Check all that apply: ☐ Concussion, *for how long? _____ ☐ Loss of consciousness, *for how long?_____ ☐ Coma, *for how long? _____ ☐ Confusion or altered mental state ☐ Missed school ☐ Resulted in no problem
☐ **Other:** _____ _____	At what age?____	Check all that apply: ☐ Concussion, *for how long? _____ ☐ Loss of consciousness, *for how long?_____ ☐ Coma, *for how long? _____ ☐ Confusion or altered mental state ☐ Missed school ☐ Resulted in no problem

Has your child ever been to the emergency department? ☐ *Yes* ☐ *No*
If YES, at what age?_____ Please explain:

Behaviors that can affect learning

Please tell us about your child's learning styles and behaviors

Learning Style or Behavior	Not Applicable? (check)	Circle the number on the scale which best describes your child: No Problem ⟺ Extreme Problem
	€ N/A	**1 2 3 4 5 6**
Focusing and maintaining attention	€ N/A	1 2 3 4 5 6
Getting started on activities, tasks, chores, homework and the like, on his or her own	€ N/A	1 2 3 4 5 6
Being understood (speech is easy to understand, speaks clearly)	€ N/A	1 2 3 4 5 6
Understanding others	€ N/A	1 2 3 4 5 6
Coping with change or transitions	€ N/A	1 2 3 4 5 6
Maintaining family and friend relationships	€ N/A	1 2 3 4 5 6
Letting go of one activity to attend to another	€ N/A	1 2 3 4 5 6
Reaction to simple problems	€ N/A	1 2 3 4 5 6

APPENDIX

Code: _____

Learning Style or Behavior	Not Applicable? (check)	Circle the number on the scale which best describes your child: No Problem ⟺ Extreme Problem
Monitoring own progress on homework, assignments, chores, and the like	€ N/A	1 2 3 4 5 6
Solving everyday problems (example: thinking of different options when something is not working for him/her.)	€ N/A	1 2 3 4 5 6
Waiting for his or her turn in a game	€ N/A	1 2 3 4 5 6
Learns from past mistakes or behavior	€ N/A	1 2 3 4 5 6
Thinks before speaking or acting	€ N/A	1 2 3 4 5 6
Listens without interrupting others often	€ N/A	1 2 3 4 5 6
Handles a change in plans	€ N/A	1 2 3 4 5 6
Demonstrates good judgment	€ N/A	1 2 3 4 5 6
Learns new things easily	€ N/A	1 2 3 4 5 6
Remembers lists	€ N/A	1 2 3 4 5 6
Remembers day-to-day events	€ N/A	1 2 3 4 5 6

Symptoms

If your child has experienced any of the following symptoms, rank the severity of those symptoms.

Please check all that apply:

Symptom	Not Applicable? (check)	Circle the number on the scale which best describes your child: No Problem ⟺ Extreme Problem
	€ N/A	**1 2 3 4 5 6**
Headaches and/or Migraines (sudden, not responsive to medications, can last for more than a day)	€ N/A	1 2 3 4 5 6
Loss of muscle coordination (can look like awkward movements, problems with balance, slowed reactions, uncoordinated running and catching)	€ N/A	1 2 3 4 5 6
Blackouts/ Fainting	€ N/A	1 2 3 4 5 6
Confusion	€ N/A	1 2 3 4 5 6
Blank staring/Day dreaming	€ N/A	1 2 3 4 5 6
Dizziness	€ N/A	1 2 3 4 5 6
Change in vision (blurred vision, double vision, depth perception)	€ N/A	1 2 3 4 5 6
Fatigue (tires easily, is often tired)	€ N/A	1 2 3 4 5 6
Seizures	€ N/A	1 2 3 4 5 6
Slurred speech	€ N/A	1 2 3 4 5 6
Has trouble finding the “right” word when talking	€ N/A	1 2 3 4 5 6
Noise sensitivity (can be easily upset by loud noises or specific sounds like a ticking clock.)	€ N/A	1 2 3 4 5 6

Code: _____

Symptom	Not Applicable? (check)	Circle the number on the scale which best describes your child: No Problem ⟺ Extreme Problem
Light sensitivity (can be easily upset by bright or strobe lights)	€ N/A	1 2 3 4 5 6
Sleepiness (has trouble staying awake during the day)	€ N/A	1 2 3 4 5 6
Mood swings (unusual and/or quick changes between sadness, happiness, depression, anxiety, anger and the like; irritability)	€ N/A	1 2 3 4 5 6

Educational Services

*Is your child having difficulties with school performance? Please describe:*_____

_____

*What does your child do best at in school? Please describe:*_____

_____

Is your child currently receiving any of the following services?

Check all that apply (If "yes", please check if they are provided through school and/or being provided privately).

Service	*Child's Status (please check)*	
Occupational therapy	€ **No**	€ **Yes** If Yes, please check whether these services are delivered by: ☐ *school-supported specialists* (the school pays for the specialist); and/or ☐ *by private specialists* (you and/or your insurance pays)
Physical therapy	€ **No**	€ **Yes** If Yes, please check whether these services are delivered by: ☐ *school-supported specialists* (the school pays for the specialist); and/or ☐ *by private specialists* (you and/or your insurance pays)
Speech-Language therapy	€ **No**	€ **Yes** If Yes, please check whether these services are delivered by: ☐ *school-supported specialists* (the school pays for the specialist); and/or ☐ *by private specialists* (you and/or your insurance pays)
Other: _____	€ **No**	€ **Yes** If Yes, please check whether these services are delivered by: ☐ *school-supported specialists* (the school pays for the specialist); and/or ☐ *by private specialists* (you and/or your insurance pays)

Has your child ever been evaluated for special education services? € YES € NO

If Yes, at what age was your child first evaluated? _____

Does your child have a 504 plan? € YES € NO

If Yes, are the accommodations helping your child's school performance? € YES € NO

Does your child have an IEP, Individualized Education Plan?

Code: _____

€ **No**

€ **Yes** → if YES, please answer 1 & 2 immediately below:

1. Is the IEP helping your child's school performance? € YES € NO
2. Please check all categories listed on the IEP:
   - € Autism
   - € Hearing Disability
   - € Multiple Disabilities
   - € Physical Disability - Conditions such as, but not limited to, attention deficit disorder, attention deficit hyperactivity disorder, and cerebral palsy may qualify as a physical disability
   - € Pre-School Child with a Disability
   - € Significant Identifiable Emotional Disability (SIED)
   - € Specific Learning Disability (SLD)
   - € Speech-Language Impairment
   - € Significant Limited Intellectual Capacity (SLIC)
   - € Traumatic Brain Injury (TBI)
   - € Vision Disability
   - € Other_____

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