

Traumatic Brain Injury—What College Disability Specialists and Educators Should Know about Executive Functions

DO YOU KNOW that deficits in executive functions, attention, and learning and memory are the most common cognitive problems after a traumatic brain injury (TBI)? *In this document we explain what **executive functions** are, how they interfere with college life, and the support students with TBI need to have equal access in college.*

2 million people sustain a traumatic brain injury (TBI) annually in the US. A TBI is any injury to the brain caused by external mechanical force, and can result from car accidents, falls, sports injuries, or blows to the head. Most TBIs are mild (i.e., concussions), but many students with TBI experience permanent cognitive changes that can **negatively affect college success**. Each injury is unique; students may also have physical, speech and language, and emotional and social challenges.

Executive functions are commonly disrupted after TBI—even in mild injuries—but are the least understood. They are a group of complex cognitive abilities that depend heavily on the prefrontal cerebral cortex, the most “advanced” portion of the brain. Working in concert with the rest of the brain, executive functions coordinate and regulate cognitive and emotional activity so as to meet moment-to-moment demands of everyday life and sustain goal-directed behavior.

Executive Functions

1. **Attention Control** - Deciding what to pay attention to, what to ignore, how long to attend, & when to switch attention. Students may:
 - Get too focused on one part of an assignment
 - Be easily distracted in class, during exams, & while studying
 - Not be able to stay focused on long
2. **Memory Control** - Holding information in one’s mind in order to manipulate it; retrieving details when needed; remembering to do something at a later time. Students may:
 - Not be able to follow a threaded discussion or lengthy instructions
 - Have trouble multi-tasking (e.g., listening & taking notes)
 - Make decisions based on limited information
 - Forget to plan for & complete assignments
 - Forget important details

3. **Initiation** - Acting & following through on one's intentions. Students may:
 - Appear lazy or unmotivated
 - Have trouble starting or restarting an assignment
 - Not seek help from others
 - Appear to procrastinate
4. **Inhibition & Impulse Control** - Withholding the urge to say or do something that doesn't fit the circumstance or seems out of place. Students may:
 - Make snap decisions, jump to conclusions
 - Complete assignments quickly without checking
 - Say what comes to mind without considering the situation
 - Respond quickly, 'in the moment' instead of 'wait & see'
5. **Problem Identification & Goal Setting** - Knowing when there is a problem, deciding on goals, & creating smaller goals/tasks in order to meet the goal. Students may:
 - Not recognize when a problem exists
 - Identify general problems (e.g., having trouble with writing), but not identify why, or the steps to solve it
 - Generate lots of goals, but not sequence them into logical steps, especially for large assignments
6. **Flexibility of thinking and behavior** - Being able to switch one's viewpoint, behavior, or way of thinking. Students may:
 - Not perceive that a different way of thinking or behaving could help remedy a problem situation
 - Get stuck in a routine, especially when studying & socializing
 - Appear self-centered
7. Emotional Regulation - Managing and bouncing back from everyday ups and downs without over-reacting. Students may:
 - React emotionally in ways that are out of proportion to the situation
 - Get upset or overly discouraged when given feedback
 - Have fluctuating emotions or "mood swings" over a short period of time
 - Get easily irritated if someone disagrees with them
8. Cognitive Self-regulation - Monitoring the need for strategies; selecting & implementing strategies. Students may:
 - Underestimate their need to study and to use strategies for learning
 - Underestimate the amount of time & effort it takes to complete assignments and to study for exams
 - Not adjust or change study strategies even when current ones are ineffective
 - Know about a number of study strategies that could be useful, but not use them

Executive functions are especially difficult to manage because they make all of the above skills more difficult, but they also interfere with problem-solving to figure out how to overcome the problems. That is, these types of deficits can't be readily fixed because our innate problem-solver, the brain, is itself injured! This makes your support for college students with TBI all the more important.

Three Important Considerations

1. Executive functions are developmental. Human brains do not reach maturation until the late 20's or 30's. All students face the challenges of college workload and independence, but those with TBI cannot rely on their executive functions to help them anticipate and manage these challenges. Students with TBI need a plan or roadmap to follow. Unlike others who can 'get by,' students with TBI need support and accommodations without which they could fail.
2. Executive dysfunction is often an invisible disability. When it does appear, it is easily misunderstood. It's easy to see when a student needs a hearing aid or interpreter. Executive problems are subtle; they often occur in people with no physical limitations. Students can be viewed as being unmotivated or careless. And executive dysfunction does not only affect school work...
3. ...Social and work problems can result from executive dysfunction too. Peers and employers may view these students as being unreliable if they miss social activities or are late for work. They may appear socially awkward at times, saying something at the wrong time or lacking in subtlety.

Disability Specialists: What Can You Do to Help?

Accommodations for students with executive dysfunction after TBI are more complicated than many of the 'traditional' accommodations we're accustomed to:

1. **First**, students with TBI may not know what accommodations they are going to need and they do not have the executive functions to anticipate and plan for what could be the biggest challenge they have faced since being injured.
2. **Second**, recovery from TBI continues for years, so accommodations should change as students and their difficulties change.
3. **Third**, as students with TBI experience college, they may have emotional responses for which they need additional support.

What can Disability Specialists do during the semester?

Once classes are underway, consider using a **coaching approach**, a supportive approach that **models executive functions** (Kennedy & O'Brien, 2016). As a coach, you partner with students to create goals, identify strategies, develop and implement

plans, monitor progress, identify barriers, and make adjustments as needed. Coaches use conversations to discuss weekly progress and emerging concerns during regular meetings.

It is especially important to assess the usefulness of traditional accommodations with students with TBI. For example, a notetaker will be helpful to a student with slow processing, but may not help another student who needs to be attentively engaged in class by taking their own notes. Monitoring the outcomes of accommodations is critical.

Together, coaches and students:

- Develop systems to organize materials and map out a schedule;
- Discuss whether or not accommodations are being implemented in class; if not, create a self-advocacy plan;
- Prioritize workload and organize materials;
- Identify large goals and create smaller steps for meeting them;
- Develop systems to track progress on tasks/goals;
- Identify strategies & other resources if instruction is needed;
- Review performance (e.g., grades, instructor comments) and make adjustments to the plan.

Additional Resources May Help: Students with TBI benefit from having a 'team' of individuals supporting them. This may include campus psychological services, academic assistance centers, and study skills courses. Additionally, vocational and medical rehabilitation may be available through community and university clinics.

Universal Design (UDL): All students have equal opportunity to learn, especially students with disabilities, when the elements of UDL are implemented by instructors. Information about UDL, including theory and guidelines for practice, can be found online at the [UDL Center](#).

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Logo for the National Institute on Disability, Independent Living, and Rehabilitation Research.