Cognition and Mental Health: Supporting Recovery after Traumatic Brain Injury

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This doctoral capstone project, developed in partnership with the Brain Injury Association of America (BIAA) and Community Brain Injury Services (CBIS), focused on addressing the often-overlapping challenges and complex needs of cognitive and mental health recovery for TBI survivors. Grounded in OT principles and informed by a comprehensive needs assessment, the project aimed to bridge the gap in accessible, evidence-based resources for both healthcare professionals and the TBI community. Through the development of two complementary tools, a clinician focused handbook and a user-friendly guidebook for survivors and caregivers, the project emphasized practical application, meaningful engagement in daily activities, and holistic care to support long-term recovery and quality of life.

Traumatic brain injury (TBI) affects millions of individuals each year, which often leads to lasting impacts on cognition, mental health, and quality of life. For adults navigating their life after TBI, returning to meaningful roles – at home, in the community, and work – can be challenging. For healthcare professionals, particularly OT practitioners, addressing these complex needs requires accessible, evidence-based tools.

My doctoral capstone project was designed to address a critical gap: the need for practical, evidence-based interventions that support both cognition and mental health in adults post-TBI.

Understanding the Impact

A TBI is an alteration in brain function caused by an external force, possibly affecting memory, mood, communication, and physical abilities (Denslow, 2022). While symptoms may be resolved over time, many adults still experience persistent challenges such as fatigue, headaches, cognitive impairments, and emotional changes. Beyond immediate injury, TBIs can disrupt

nearly every aspect of daily life. Adults may struggle with memory, executive functioning, emotional regulation, and social participation, many years after injury (Giles et al., 2019). These difficulties are interconnected, cognitive deficits can limit participation in meaningful activities, which in turn may negatively affect mental health and self-esteem. Personality changes, such as impulsivity, irritability, or apathy, can further complicate recovery and community reintegration (Howlett et al., 2021). With millions of adults in the United States living with TBI-related disabilities, there is a clear need for comprehensive, long-term rehabilitation approaches that extend beyond physical recovery.

Why Cognitive and Mental Health Interventions Matter

Cognitive functioning and mental health are fundamental to recovery after TBI. Skills such as memory, learning, and problem-solving directly influence an adult's ability to manage their daily routines and engage in meaningful occupations (Giles et al., 2019). At the same time, mental health plays a critical role in motivation, resilience, and overall well-being. When these areas are not adequately addressed, individuals may experience decreased independence, social isolation, reduced confidence, and a decline in quality of life (Howlett et al., 2021). This gap can hinder rehabilitation outcomes and place additional strains on caregivers, reinforcing the need for accessible, practical resources.

The Capstone Project Overview

The OT doctorate capstone was completed in partnership with Brain Injury Association of America (BIAA) and The Mill House (clubhouse for brain injury survivors) with Community Brain Injury Services (CBIS). A needs assessment, guided by informal interviews, observations,

and community outreach, helped capture perspectives from survivors, caregivers, and healthcare professionals (social workers, case managers, and clubhouse staff members).

Findings revealed a strong demand for:

- Practical, easy to use intervention strategies
- Resources accessible to both clinicians and non-clinicians
- Integrated approaches addressing both cognition and mental health

In response, two complementary resources were developed:

- **A clinician handbook** with evidence-based interventions for OT practitioners (and other healthcare professionals)
- **A simplified guidebook** designed for survivors and caregivers

Both resources emphasize real-world application, meaningful activity engagement, and holistic, client-centered care.

Cognitive Strategies and Intervention Ideas

During cognitive rehabilitation, current literature and BIAA emphasizes focusing on these four factors to help guide interventions and sessions; the four factors are memory, attention, communication, and executive functioning.

Memory Strategies

- Use Notes: Write it down or use technology to help. Technology can include different phone apps (reminders, notes), Alexa devices, and Google Home devices. Encourage taking notes during sessions and practicing writing reminders.
- Teach Strategies: Use routines, print out schedules, use mnemonics and common/memorable associations.

- Repeat: Encourage TBI survivors to repeat or rephrase instructions and/or tasks into their own words. Emphasize asking questions when they do not understand the instructions, repeat until they feel comfortable initiating on their own.

Attention Strategies

- Command Attention: Eye contact, minimize stimulation or distractions, highlight and emphasize important information.
- Break Down Information: Talk in short simple sentences, trying to make only one point at a time. Chunk information and instructions into pieces to make it easier to understand.
- Make It Active: Repeat, Rehearse, Recite - repetition is great for memory and attention with brain injury.
- Allow Breaks and Movement: Walk, dance, stretch to maintain attention to therapist and task.

Communication Strategies

- Slow Down: Try to speak at a slower pace to help with processing time and allow additional time to respond.
- Simplify: One idea at a time, break everything into smaller steps, and use familiar language.
- Check In: Ask if repetition is needed, have TBI survivors rephrase instructions in their own words to build confidence in communicating.
- Use External Supports: Choose a quiet environment that is free of distractions, use technology to assist when possible.
- Organize Conversations and Check Comprehension: This helps conversations stay on topic and survivors stay focused.

Executive Function Strategies

- Simplify: Create a clear plan, with small steps (use routines!)
- Prepare: Identify the need before starting, take time to set-up the environment for success, color code items if necessary.
- Declutter: Minimize distractions, provide schedules or visual print outs, and limit multitasking
- Focus: Use visual, auditory, and tactile cues to maintain attention and focus.

Other Novel Cognitive Interventions Found

The interventions included within this section are easy to find and play, they also typically come with their own instructions. Common games can be used to help to improve skills like pattern, color, and number recognition, vision (acuity, depth perception), dexterity (fine motor control), learning, executive functioning, attention span, memory, and different strategizing skills. These games also help to increase social participation as many need more than one player to complete. In addition, playing games with others can provide survivors with an opportunity to navigate the emotions of losing or winning, putting survivors in situations to face and overcome potential conflicts with peers or family members. The skill of appropriately responding to conflicts can be important for different living, social, and employment opportunities that may arise while reintegrating into the community.

Games:

- **UNO:** Pattern recognition, color recognition, number recognition, dexterity, memory, strategic planning (complex thinking)
- **Solitaire:** Pattern recognition, matching, color recognition, dexterity

- **Spoons:** Processing time, reaction time, attention span, dexterity, behavior (potential win or lose quickly, can cause aggravation), memory, pattern recognition
- **Go Fish:** Pattern recognition, memory, dexterity
- **Dominos:** Pattern recognition, number recognition, dexterity
- **Connect Four:** Pattern recognition, color recognition, dexterity, memory
- **Jenga:** Pattern recognition, dexterity, strategy, patience

Optional, more complex options:

- **Monopoly:** Critical thinking, patience, strategy, attention span, dexterity, memory, behavior
- **Sorry:** Critical thinking, patience, strategy, attention span, dexterity, behavior

Other Brain Games (Single-Player):

- Matching games
- Crossword puzzles
- Puzzles
- Word searches
- Sudoku

Other helpful cognitive strategies include problem-solving strategies. A lot of the card and board games listed above will help people solve problems through different tasks, conversations, and possible disagreements. Some problem-solving strategies outlined by BIAA include:

- Identify Potential Problems and Avoid the Problem
    - Think ahead to what outcomes are possible

    - Make a list, table, or diagram to help focus
- Provide Options
    - Give 2-3 potential options or solutions to work through
    - Solve one problem at a time, try to avoid multitasking
- Step-by-Step Teaching
    - Give specific instructions to minimize guessing
    - Link specific strategies to specific actions Backwards chaining (start with the LAST step, and work towards the FIRST step) (McDonnel, 2021)

Learning the American Sign Language (ASL) alphabet

- Hand function, range of motion, and mobility
- Motivation - Learn your favorite words in ASL!
- Try to emphasize using personal technology to search for words and signs on their own, to integrate technology education into sessions (computer literacy)

Pottery or Pool

- Hand function, range of motion, mobility
- Critical thinking skills
- Social interaction

Use Canva (free) *(to create a social media post or blog post of their story)*

- Increasing confidence
- Fosters creativity
- Using imagination and critical thinking/strategizing

- Vision Technology education (computer literacy)

Weight-Bearing and Reaching Activities

- Helps with awareness of one's body in space
- Hand function, range of motion, and mobility
- Vision (depth perception, hand-eye coordination)
- Thinking, reasoning, learning (add memory component into session for more cognitive additions)
- Helps with participation when there is a motivator

White Noise Machine

- Add into a healthy sleep routine to promote a calm environment
- Gives our minds and bodies something to listen to and focus on to distract us from any overwhelming feelings or restlessness

Stroop Effect Games

- Saying the name of the color of the word, instead of the word itself
    - For example: The word RED is written in YELLOW, the point is to say the color, not the word
- Help with focus and attention

Asking Problem-Solving Questions

- Asking real-life questions requires analysis and helps to improve general knowledge
    - Ask questions like, “why do you need to wear a seat belt” or “why do we participate in therapy” to help critically think and problem solve through general topics.
- Focus on Occupation-Based Interventions (tasks that are enjoyable or required to complete in everyday life)
- Help build motivation in daily activities
- Helps to build a regular schedule and confidence
- Helps to engage in activities needed for daily life

Tasks and Habit Training

- Emphasize the use of schedules, checklists, and different visual memory aids to enable participation in daily tasks and activities
    - Examples: WRITE out morning routine and night routine, check off tasks as they are completed.
- Make a weekly or monthly schedule on a calendar
    - Suggest using Google Calendar, it can add daily tasks that can be repeated daily and checked off on one’s phones. It will also send reminders when tasks are left uncompleted for the day. You can also coordinate different appointments or activities (doctor's appointments are blue, therapy is orange, social events are pink, etc.)
- Put labels on medications, and use pill organizers (make sure refilling the organizer is a part of the weekly schedule)

- Make grocery lists, menus for the week, and go-to recipes

Mental Health Strategies and Interventions

Mindfulness

Mindfulness can be described as the act of being present on purpose. This is a way to regulate our nervous system to reduce overly reactive responses to situations or problems that may arise. Research shows that, “mindfulness exercises and mindfulness-based psychotherapies have proven to be successful in enhancing cognitive performance, improving emotional and behavioral regulation, as well as reducing a wide range of psychological symptoms” (Eisenbeck et al., 2018).

Types of Mindfulness Practice

- Seated, walking, standing, and moving - focus on the sensations.
- Short pauses inserted into everyday life
- Merging meditation with other activities (yoga, sports)

Encourage survivors to start the day mindful, starting with a 5–10-minute guided meditation**.** Remind them to use mindful breathing techniques throughout stressful situations and if stress arises. Practice mindful eating or walking: explain that focusing on the senses you are feeling is beneficial to focus and relax. End the day with mindful journaling, using prompts within this handbook or different prompts as fit to the individual

Meditation

Meditation is a great way to help regulate our nervous system. There are easy to find videos of guided meditation that work well because the instructions are read aloud with the music. When going through a meditation session, try to make the environment as sensory friendly as possible.

This looks like, turning off the lights, trying to minimize disruptions or distractions, and trying to cultivate a safe space.

Benefits of Meditation

- Mental Benefits: Meditation can significantly improve mental health and clarity by reducing stress and anxiety. Regular practice can enhance focus and concentration, leading to better productivity and cognitive function.
- Physical Benefits: Physical benefits include reducing heart rate, blood pressure, and improving heart health.
- Emotional Benefits: Meditation is helpful in regulating emotions and increasing self-awareness. It promotes a sense of calm and hopefully inner peace, which can lead to an improved mood and emotional stability.

Focused Breathing

Focused breathing can also be known as mindful breathing or breathing meditation. Much like mindfulness, this exercise centers our focus to something controllable, like our breath work. Research shows that focused breathing is, "positively related to enhanced levels of meta-awareness, non-attachment and mood, and less mind wandering" (Eisenbeck et al., 2018). Additionally, there are several different versions of focused breathing exercises, but they all share the same goal: "to teach the participants to focus their attention on the sensations of the breath and, in case it is compromised, to refocus on it with a quality of kindness" (Eisenbeck et al., 2018). Using focused breathing, along with meditation and mindfulness practices, can help give patients easy and accessible resources to independently combat their negative feelings or overwhelming emotions.

Positive Affect Journaling (PAJ)

Positive affect journaling is a journaling exercise that encourages patients to focus on the positive aspects of life. This can be done over multiple days, in 15–20-minute sessions. Journal topics are easy to find on the internet. Research shows that journaling can benefit mental health by enhancing mental clarity and emotional processing, helps to manage stress and anxiety (Sutton, 2018). Additionally, regular writing can boost self-esteem by encouraging self-reflection and supporting goal setting, creativity, and overall well-being (Sutton, 2018).

Positive Affect Journaling Prompts

- What makes you feel happy?
- What is one thing you have achieved this week that you are proud of?
- What is one thing you love about yourself?
- What makes you a good friend?
- How do you make sure to enjoy life?
- Who are your inspirations and why?
- What are you grateful for?
- What healthy habits do you have?
- Who would you write a thank you letter to right now, and why?
- How do you practice self-care?

Exercise and Mental Health

Keeping our bodies moving and exercising can also be a great way to help combat negative thoughts or feelings, and to help maintain a healthy lifestyle. Participating in regular physical activity, such as yoga, walking, biking, or going to the gym, can significantly enhance mental

health by reducing anxiety, improving mood, and overall well-being! Exercising is also helpful to our hearts, muscles, and bones - to help us live a healthier, longer life.

- Exercise Examples:
    - Walking/Running (15-30 min. a day)
    - Biking
    - Hiking
    - Swimming
    - Seated or standing arm and shoulder workouts
    - Seated or standing leg workouts

Capstone Experiences

The development of these resources was strengthened by extensive real-world experiences that highlighted the broader systems that influence brain injury care. Through participating in **Advocacy Day with CBIS**, I engaged directly with legislators to advocate for an increase in funding and expanding services for adults living with brain injuries. This experience underscored the importance of clinician involvement in policy and advocacy efforts that shape access to services and support. Attendance at the **BIAA National Conference and Brain Injury Awareness Day on the Hill** provided opportunities to continue to advocate and connect with professionals nationwide. Engaging with clinicians, researchers, and organizational leaders offered valuable insight into emerging best practices and reinforced the importance of interdisciplinary collaboration in brain injury rehabilitation.

Clinical site visits further deepened the understanding of the continuum of care. A tour of the brain injury unit at **Sheltering Arms Institute (SAI)**, a nationally ranked hospital, provided exposure to advanced rehabilitation services and educational resources related to sleep hygiene, stoke recovery, and transitional care. Visiting the **Tree of Life (ToL)**, a long-term neurorehabilitation facility, offered perspective on extended recovery and the importance of structured, supportive living environments. Additionally, I collaborated with case management and social workers to present targeted interventions from the handbook and guidebook. These presentations addressed co-occurring mental health conditions, such as anxiety, post-traumatic stress disorder, schizophrenia, depression, and behavioral changes, in adults with TBI or other brain injuries. These experiences emphasized the importance of adaptable, individualized interventions that reflect the complex relationship between cognitive and mental health challenges.

Moving Toward Holistic, Client-Centered Care: A Call to Action

This project reinforces a critical message: recovery after TBI is not solely physical. Cognitive and mental health challenges must be addressed together, to support long-term success. OT practitioners are uniquely positioned to lead this effort by integrating cognitive and mental health interventions into practice, promoting participation in meaningful activities. This supports both survivors and caregivers throughout the recovery journey. By improving access to evidence-based resources and increasing awareness of these often-overlooked needs, healthcare professionals can better support adults with TBIs in rebuilding their lives, with confidence, independence, and purpose.

The path forward demands more than awareness; it deserves action and advocacy. Healthcare and rehabilitation professionals must prioritize integrating cognitive and mental health interventions into standard TBI care, ensuring that treatment plans can reflect the full scope of recovery. Educators and organizations must continue developing and providing accessible, evidence-based resources that empower both clinicians and the communities they serve. At the same time, advocacy remains essential. TBI survivors need increased funding, expanded services and support, and policy support – all are critical to improving long-term outcomes. Clinicians, caregivers, and survivors all have a voice in shaping these changes.

Most importantly, we must continue to listen. Listen to survivors' experiences, to caregiver challenges, and to the gaps that persist in care. Meaningful progress begins with understanding, but it is sustained by collaborating. By taking these steps together, we can move toward a future where every adult affected by TBI has access to the comprehensive support they need, not just to recover – but to thrive.

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