Cognitive Changes Following Brain Injury: Understanding Cognition & Developing Accommodations

Wendy Ellmo MS CCC/SLP, BCNCDS, CBHP
Brain Injury Specialist, Brain Links
Certified Brain Health Professional

Brain Links
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Brain Links

Who we are
Statewide team of brain injury specialists

What we do
We equip professionals to better serve people with TBI with current research-based training and tools.

- Family-friendly educational materials
- Resources for return to school and work settings
- Toolkits for Healthcare Providers, School Nurses, Survivors and Families, and Service Professionals: tndisability.org/brain
- YouTube Training Channel: youtube.com/@brainlinks830/playlists
Agenda

- What Cognition is
- Cognitive Domains or Subtypes
- How ACEs Change the Brain
- Cognitive Interventions
- Communication Suggestions
- Case
- Resources
Cognition

- Attention
- Memory
- Awareness
- Problem Solving
- Judgment
- Flexibility
- Organization
- Reasoning
Attention – not a unitary skill
- Visual
- Verbal
- Task-specific

- How long (duration)
- How much (density)
- How hard (complexity)

- What environment
  - Distractions/no distractions
  - What type of distraction

Breaking it down:
- Sustained Attention
- Divided Attention
- Alternating Attention

- Get their attention first
- Include the modality that is best – add pictures, model the behavior, describe
- Shorten the length of time
- Give less information
- Simplify
- Control the environment
- Reduce visual distractions
- Reduce noise
Memory

- Short-term
- Long-term
- Working Memory
- New learning
- Episodic
- Procedural
- Declarative
- Semantic
- Verbal Memory
- Visual Memory

- Write things down
- Repeat information
- Use lists, planners, pictures, cue cards, timers
- Cue where needed
- Use spaced rehearsal – reviewing the same info several times over time
- Create procedures and routines
- Use their strengths – visual or verbal
- Pause for processing before moving to the next step
Simplified Brain Behavior Relationships

**Frontal Lobe**
- Initiation
- Problem solving
- Judgment
- Inhibition of behavior
- Planning/anticipation
- Self-monitoring
- Motor planning
- Personality/emotions
- Awareness of abilities/limitations
- Organization
- Attention/concentration
- Mental flexibility
- Speaking (expressive language)

**Parietal Lobe**
- Sense of touch
- Differentiation: size, shape, color
- Spatial perception
- Visual perception

**Occipital Lobe**
- Vision

**Temporal Lobe**
- Memory
- Hearing
- Understanding language (receptive language)
- Organization and sequencing

**Cerebellum**
- Balance
- Coordination
- Skilled motor activity

**Brain Stem**
- Breathing
- Heart rate
- Arousal/consciousness
- Sleep/wake functions
- Attention/concentration
Executive Functions

• The brain skills you need to achieve a goal.
• Includes higher order skills of
  • Initiation, planning, organization
  • Impulse control, self-monitoring
  • The **flexibility** to change strategies as needed
Stop, Think and Plan, then Evaluate later

- Ask leading questions: Will anything be difficult, do you have anything that could help you, Will you need my help...
- Make a plan with strategies in place for any anticipated problems
- Then during Evaluation: how did it go, could anything or anyone have helped to make it go better, what would you do differently next time...
- Give feedback gently, always with a way to make it better

Crosson et al, 1989
Metacognition

The Greatest Gift

Helping someone to become aware of the way they think:
- Strengths
- Weaknesses
- Strategies/Tools
Initiation
- Make a schedule with clear start times
- Use a timer or Alexa
- Get agreement to remind them when to start
- Follow a routine

Planning
- Use a planner or wall calendar
- Write down steps with a check-off
- Routinely consult the plan
- Use drawings or pictures if helpful
Organization

- See above
- Everything has a place and is put back in it’s place
- Color coding
- Categories
- Pictures to show what goes where
- Write all the steps down, then put in right order

Completion

- Check off all steps
- Photo of what done looks like
- Cues to keep going

Charlie’s daily tasks didn’t get done... Why?
Flexibility
- Allow the inflexibility when it’s not hurting anything/anyone. Sameness can be comforting
- Remember it’s the brain
- Brainstorm different ways beforehand

Reasoning/Problem Solving
- Use questions to assist
- Encourage thinking it through: what would happen if we did it that way
- Write each part down to help with memory

Extreme “Stuckness” → Perseveration

Ex: Autism, but also Brain Injury
Judgment

- First identify all options
- Then weigh all options
- Help to think them through to the end
- Put it down on paper

Perception

- Make sure they are “seeing” things clearly

Abstract Thinking (a very high level skill)

- May need to make things more concrete
- Watch figurative language and idioms
- May need it explained
Adverse Childhood Experiences (ACEs)

Big study showed:
Potentially traumatic events can have negative, lasting effects on health and well-being

ACEs are things like:
- Economic hardship
- Divorce or separation
- Victim or witness of violence
- Physical, emotional or sexual abuse
- Growing up in a family with mental health or substance use problems
- A family member who is incarcerated
• The PFC & Amygdala are activated.

• How quickly the messages stop between the PFC & Amygdala = how quickly you recover from that stress.

• Greater resilience = greater connections between Amygdala & PFC and greater activity in the PFC in general.

• The greater the PFC activity, the greater recovery.

• The quieter the Amygdala, the better the PFC can plan and act without negative emotions in the way.
This chronic stress literally causes changes in the brain. Can lead to negative behavioral and health outcomes as an adult.
ACEs

Children with ACEs much more likely to develop

- Mood disorders
- Poor executive functioning
  - Decreased decision-making skills
  - Poor judgement
  - Poor impulse control
• Cognitive changes impact language
• Language itself may not be disrupted after TBI (but it might be after a stroke)
Receptive Language

**Speed**
- Talk slower
- Pause more

**Duration**
- Use less information and/or words

**Complexity**
- Simplify vocabulary
- Simplify grammar
- Simplify the overall topic
- Control distractions
- Make sure they have understood
Receptive Language

Also need to consider:

- Distractibility – what type of environment do they need?
- Won’t necessarily ask questions – may not realize they didn’t understand
Expressive Language

- Amount of talking – too much/too little
- Organization
- Tangential (sidetracking)
- Finding Words
- Complexity
- Prosody (change in tone)
- Perseveration

- Provide structure
  - Talks too little: “Tell me two things”
  - Talks too much: “Tell me one thing”
- Organization cues: What happened first, next;
- Tangentiality: “That’s interesting, but go back to where you started with…”; “I want to make sure we answer your first question…”
- Word finding: Get agreement about whether you can fill in the word for them or not, cue them to what usually works for them – try to picture it, think of the first letter
- Complexity
- Prosody
- Perseveration: redirect when needed, engage them in their topic when possible, add new info to their topic (remember it’s the brain)
Look at cognitive problems and see how they impact language

**Receptive Language Example:**
Cognition: Attention and Awareness problems
Result: Not understanding, but don’t ask questions because they don’t realize

**Expressive Example:**
Cognition: Disorganized and perseverative
Result: Retell of day jumps all over and tends to keep coming back to one event
Building Blocks of Brain Development

Overall Functioning

Higher Order Processes

Intermediate Processes

Fundamental Processes

Achievement/Cognitive Ability/Reasoning

Social Emotional Competency

Executive Functions

Language Processes

Learning Processes

Visual-Spatial Processes

Memory

Processing Speed

Attention

Inhibition

Sensory-Motor

Complexities Increase with Maturation

CO Brain Injury Steering Committee: Adapted from Miller, 2007; Reitan and Wolfson, 2004; Hale and Fiorello, 2004
Dig Deeper into Problem Areas

Charlie is “Forgetting”

- Memory
- Attention
- Depression
- Lack of organization
- Initiation
- Something else?
Behavior

Keep in mind:
The cognitive challenges along with the behavior
The cognitive challenges may be the reason for the behavior

- Identify triggers
  - Always look at **communication** and **cognitive demands**
- Is the behavior a communication? What is it communicating?
- Involve them in solutions and methods
- Practice alternative behaviors/responses
Learn People’s Patterns
Won’t vs Can’t
Things that Make Cognition & Behavior Worse

- Tired
- In Pain
- Stressed
- Sick
- Emotional
- Under the Influence of Drugs or Alcohol

See Personal Guide to Everyday Living w/ a Brain Injury
Gathering Information

• Observation (looking for patterns)
• Case notes/file
• Medical file
• Neuropsychological testing – the “Gold Standard” for cognition
• Cognitive Linguistic testing by a Speech Language Pathologist
Determining Strengths & Challenges

Use:

- Speech and Language Evaluation
- Neuropsychology Evaluation
- Other Evaluations
- And the Brainstorming Solutions Tool

See more on YouTube

[Brainstorming Solutions Tool]

Current Challenge: (Describe as completely as you can: what circumstances, what the difficulty is, what the environment is like)

What goal of theirs will solving this help them achieve?

Directions: Write what you know about each area. Give examples if helpful. Consider how the environment (the situation around them) impacts them. For each area, write what helps them. Fill out only the areas that make sense for this challenge or this person. After completing this Brainstorming Solutions Tool (BST), use the Strategies and Accommodations Tool (SAT) to help decide which strategies will help the person.

Abilities

| Attention (consider visual, verbal, how long the person can pay attention) |
| Memory Storage (consider visual, verbal, ability to learn new information, remembering short term or long term) |
| Memory Retrieval (what helps the person pull information out of their memory) |
| Processing Speed (how fast or slow does someone need to talk for the person to best understand) |
| Initiative (is the person able to start things on their own or do they need help getting started) |
| Awareness (does the person know they have a problem with something, do they know what it is happening, can they predict when it will happen) |
| Impulse Control (can the person stop themselves from doing or saying something) |
Brainstorming Solutions Tool

**Cognitive Areas:**

- Attention
- Memory (storage & retrieval)
- Processing speed
- Initiation
- Awareness
- Impulse control
- Flexibility
- Understanding language
- Speaking
- Organization
- Planning
- Problem solving
- Judgement
Brainstorming Solutions Tool

- Vision
- Hearing
- Motor Ability
- Fatigue
- Social
- Emotional State
- Environment

Recent Changes

<table>
<thead>
<tr>
<th>Medication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injuries/Illnesses</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

Did a problem start or get worse when the change was made?
## Brainstorming Solutions Tool

### Solutions (Things to try) / Strategies

<table>
<thead>
<tr>
<th>What I need to do to support them? (Ex: cue the person when they forget, point to a picture reminder, do the step they can’t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Strategies the person can use (repeating it to themselves, asking themselves a question when they get stuck, a rhyme)</td>
</tr>
<tr>
<td>External Strategies the person can use (a calendar, a checklist, pictures, a timer, an app, their phone, a notebook, organizing bins)</td>
</tr>
<tr>
<td>Environment Changes (close doors, get rid of noise, get rid of clutter, put what they need near the door)</td>
</tr>
</tbody>
</table>

- Share the proposed solutions/strategies with the person, listen to their suggestions and concerns and get their okay to try the new approach.

- The person should always be included in developing a plan- esp. a behavior plan.

- Evaluate
- Plan for next time
Strategies & Accommodations Tool

Used along with the Brainstorming Solutions Tool

Matches area for area plus Assistive Technology

Initial Key – who can help

Lots of choices of strategies to try

See more on YouTube
Cognitive Rehab (in a Nutshell)

- Understand their cognition*
  - Through NP testing, observation and reports of people who know them
  - Strengths and weaknesses
- Form an alliance – (Person Centered Practices help build this alliance)
  - Build relationship
  - Get agreements around goals/outcomes and strategies
- Determine level of support needed (for each task)
- Develop strategies*
  - Internal
  - External
Case: Doug

TBI sustained in a car accident. Usually very pleasant, but has angry outbursts at times for unknown reasons.

Outbursts often happen in the kitchen during meal prep with others, and out in the community. The radio is often on during meal prep to keep things light and fun. Doug often needs cueing to complete tasks to the end.

Directions often have to be repeated and he is slow to respond with his answer when asked questions. He has weakness in his right arm and hand.
Frustration Scale

Calm/Happy
1

Getting Upset/Frustrated
2

Too Late/I’m Gone
3
Personal Guide

Purpose
- For raising understanding/metacognition
- Good for the older child/teen and their caregiver; adult

Content
- States that make performance worse
- Strategies to help
- Situations that will challenge them
- Understanding what distracts you
- Eliminating distractors
- Use old strategies

**Purpose**

For raising understanding/metacognition

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**Content**

States that make performance worse

Strategies to help

Situations that will challenge them

Understanding what distracts you

Eliminating distractors

Use old strategies

**CONDITIONS** likely to make symptoms worse:

A. Being TIRED
B. Being EMOTIONAL — sad, frustrated, excited, angry, etc.
C. Being UNDER PRESSURE, being RUSHED, STRESSED or ANXIOUS
D. Being DRUNK/UNDER THE INFLUENCE of drugs (Prescription or not)
E. Being in PAIN
F. Being SICK

**STRATEGIES** to consider for each state:

A. Tired: Do not allow yourself to become tired. Plan things that you need to do and complete them early whenever possible. Slow down and check your work. Stick to a fairly regular sleep schedule and make sure you get enough sleep at night.

B. Emotional: If you become emotional, slow down and think before you speak or act. Remember that being tired can make you become more emotional. If you know that you are going into a potentially emotional situation, plan as much as possible so that you are ready.

C. Stress/Pressure: Avoid being rushed, stressed or under pressure by planning. Lay out things to do in a planner (calendar), allowing plenty of time for each task. Especially when you are rushed, slow down to allow yourself time to think clearly and look for missed details. Take the time to make checklists so nothing is missed. Check off each step as it is completed.

D. Alcohol/Drugs: Do not drink alcohol or take drugs. Period. Many people with brain injuries report feeling out of control enough without adding it with alcohol or drugs. Know that your symptoms are likely to be enhanced while you are under the influence. Know also that drugs and alcohol have been reported to lower seizure threshold, making your chances of having a seizure greater.

E. Pain: Avoid getting in pain in the first place. Do pain management exercises as recommended. Take medications as prescribed. Use proper body mechanics, etc. When avoiding pain is not possible, attempt to relieve it as soon as possible. Keep expectations realistic when you are in pain. Know that pain medications may affect your thinking ability. Allow more time to do things when in pain. Plan ahead. Check your work.
Staff TBI Skill Builder

Build Knowledge and Skills to Support People with Brain Injury

Staff TBI Skill Builder is a 14-module, on-line training program designed for frontline staff new to working with adults with brain injury across a range of settings (e.g., residential support programs, day programs). Skill Builder can also be used as a refresher course for staff with more experience working with this population.

https://learn.cbirt.org/1/course/view.php?id=15
Other Resources

• Service Coordinators – TN’s TBI Program
  • Will provide help
  • No cost
    http://www.braininjurytn.org/service-coordination.html

• Virtual Support Groups

• TN Family Support Program
  https://www.tn.gov/didd/for-consumers/family-support.html
NEXT WEBINAR

February 8, 2024
10:00 - 11:30 Central Time

Behavioral & Psychosocial Changes Following Brain Injury: Tips, Strategies & De-escalation

REGISTER TODAY!
Thank you and survey

Take the 1 minute survey!
Get a certificate of attendance