

NEUROPSYCHOLOGICAL INTERVENTIONS AND COMPLEX TBI

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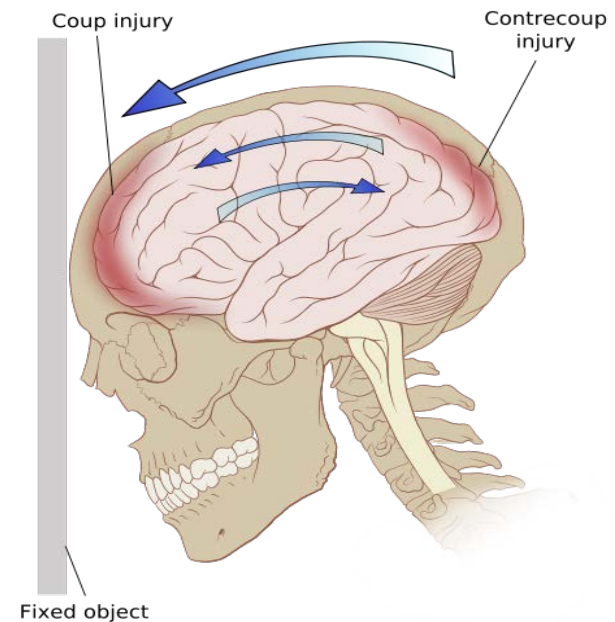
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NEUROPSYCHOLOGICAL / NEUROBEHAVIORAL OVERVIEW

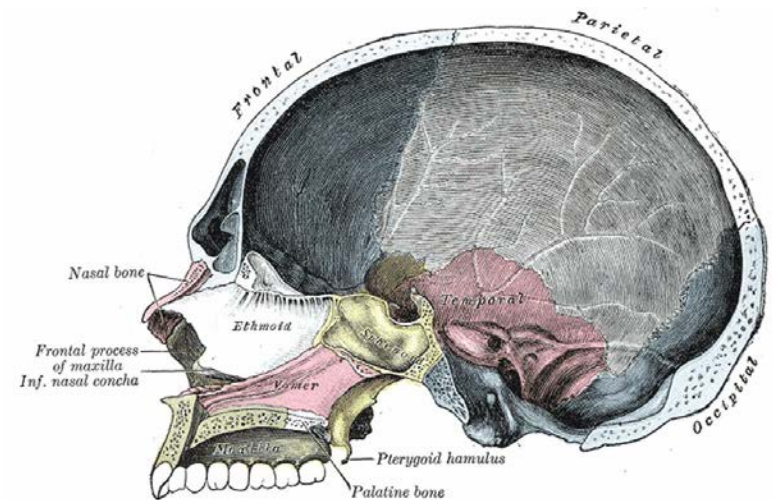
TBI Events and Complications

- Disruption of brain function due to trauma, blast, or acceleration/deceleration
- Penetrating (e.g., gunshot), depressed, or closed head injury
- Contusion/swelling
- Coup/Contrecoup
- Traumatic axonal injuries
- Hematoma
- Seizures



Neuroanatomy and Relationship to Symptoms

- Although the whole brain is susceptible to damage, the frontal and temporal lobes are most commonly injured due to bony protrusions
 - Orbitofrontal cortex
 - Anterior temporal lobe
 - Posterior of the superior temporal gyrus



Frontal Lobe Syndrome: Dysexecutive Syndrome

- Lesions to the dorsolateral prefrontal cortex
- Concrete thinking
- Poor insight and judgment
- Memory problems
- Temporal problems
- Can have blunted/apathetic affect
- Emotional lability and outbursts

Frontal Lobe Syndrome: Pseudopsychopathy

- Lesions to the orbitofrontal or inferior ventral frontal
- Disorganized
- Disinhibited
- Impulsive
- Emotionally dysregulated

Frontal Lobe Syndrome: Pseudodepression

- Lesions to the mesial frontal/anterior cingulate
- Lethargy
- Lack of initiation
- Impaired explicit memory
- Akinesia
- Blunted affect

INTERVENTIONS AND SYMPTOM MANAGEMENT

Externalizing Behaviors: Agitation

- Behavior/contingency management
- Environmental management
- Interpersonal communication

- Restraints
 - Contrary to ethical standards
 - Increase behaviors
 - May cause additional injuries

Behavior Management Intervention

- Learning theory/applied behavior analysis
- Contingency management (operant procedures)
- Skill acquisition
- Cognitive behavior therapy (CBT)
- Cognitive rehabilitation

Contingency Management

- Operant conditioning process
 - Positive reinforcements
 - Token economies
 - Time out
 - Response cost
-
- Ylvisaker et al. (2007) found contingency management treated verbal repetitive behaviors
 - Medd and Tate (2000) revealed that CBT strategies (e.g., education, anger management, etc.) treated anger problems

Environmental Management

- Can be used to manage some behaviors
- Quiet treatment environment
- Label items to limit confusions/agitation
- Limited number of patients
- Familiar staff
- Limited stimulation (e.g., noise, light)

Interpersonal Communication

- Consistency and familiarity
- Regularly introduce name, profession, and purpose of contact
- Monitor rate of speech
- Mindful of information overload
- Redirection than correction
- Forced choice to limit cognitive demands

Internalizing Behaviors

- Lesions in the mesial frontal lobe and anterior cingulate
- Basal ganglia (BG) injuries can lead to problems with motor and speech
- Less studied as these patients are not as problematic (“squeaky wheel”)
- Important to regularly engage
- Structured activity to aide in initiation
- Burke et al. (1991) used self-initiation checklist to address initiation and apathy problems

Intensive/Integrated/Holistic

- Cicerone et al. (2008) found intensive therapeutic approaches improve quality of life and community integrations; maintained over 6 months
- Contrast to specific retraining/remediation
- Specific interventions sometimes administered via computer
- Computerized training NOT to be efficacious (Rees et al., 2007)

Family/Caregiver

- Caring for individuals with moderate/severe TBI places significant burden on caregivers
- Psychologists and other members of the team spend time to educate, train, and treat their adjustment to caregiving role
- Caregiver roles may increase in time (Brooks et al., 2003)
- Families/caregivers will need to learn and later implement behavior management strategies

NEUROPSYCHOLOGICAL REHABILITATION

Primary Issues in Behavioral Change After TBI

Cognitive Issues:

- Executive function deficits
- Attention/concentration deficits
- Slowed processing speed
- Memory deficits

Psychological and Psychosocial Issues:

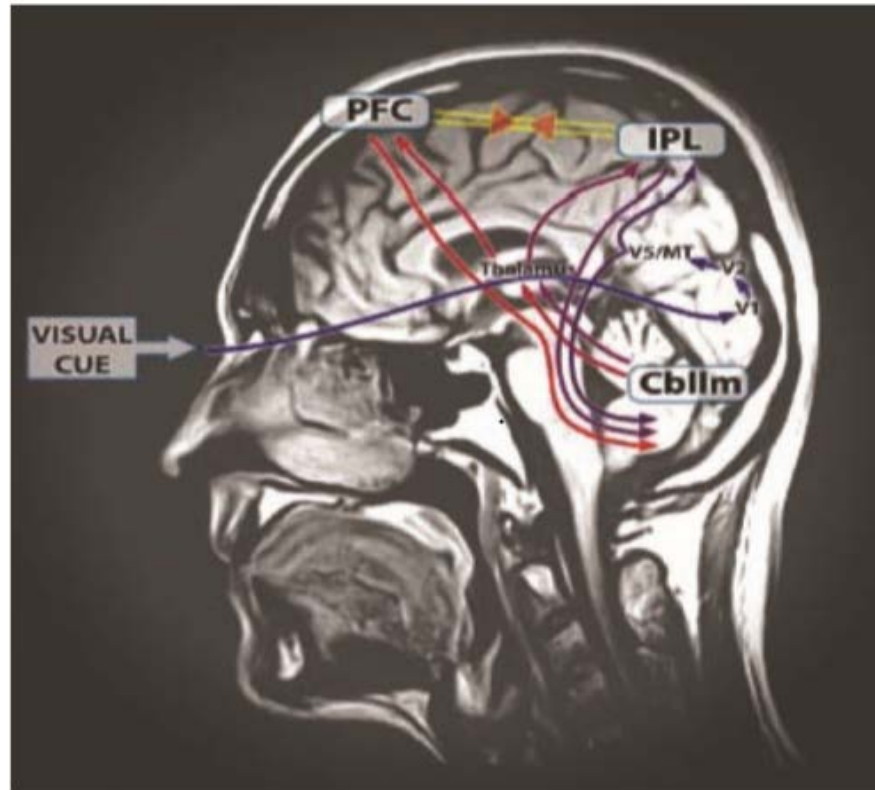
- Social communication deficits
- Emotional dysregulation or flat affect
- Decreased work/school/social interactions
- Depression
- Anxiety

Evidence-Based Practice

Sackett et al., 1996



The Predictive Brain: Anticipatory Neural Network



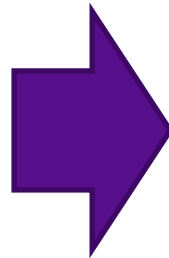
Ghajar & Ivry, 2008

Physical Medicine & Rehabilitation

Prediction Paradigm

Key Factors In Rehabilitation

- Awareness
- Feedback



Use Prediction Paradigm

- Perceive
- Predict
- Perform
- Prove

A General Algorithm for Treatment of Executive Dysfunction

- Awareness and goal setting
- Anticipation and planning
 - Predict and state strategy
- Execution and monitoring
- Feedback and revision

Goal, Plan Do, Review

Ylvisaker & Feeney, 1998

- **Goal**: What do I want to accomplish?
- **Plan**: How am I going to accomplish the goal?
List all the steps.
- **Do**: Execute the plan
- **Review**: How did I do? What worked? What didn't?

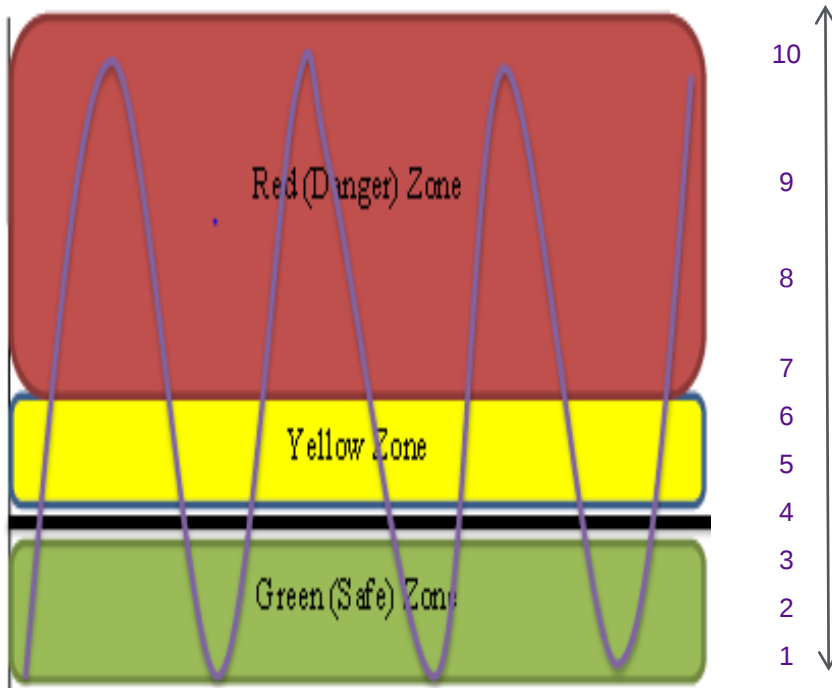
Cognitive Energy Scale (CES)

1	2	3	4	5
Not paying attention		Able to focus		Distractible
Mind is Blank		Mind is sharp		Mind Overwhelmed
Inactive		Engaged		Irritable-Aggressive

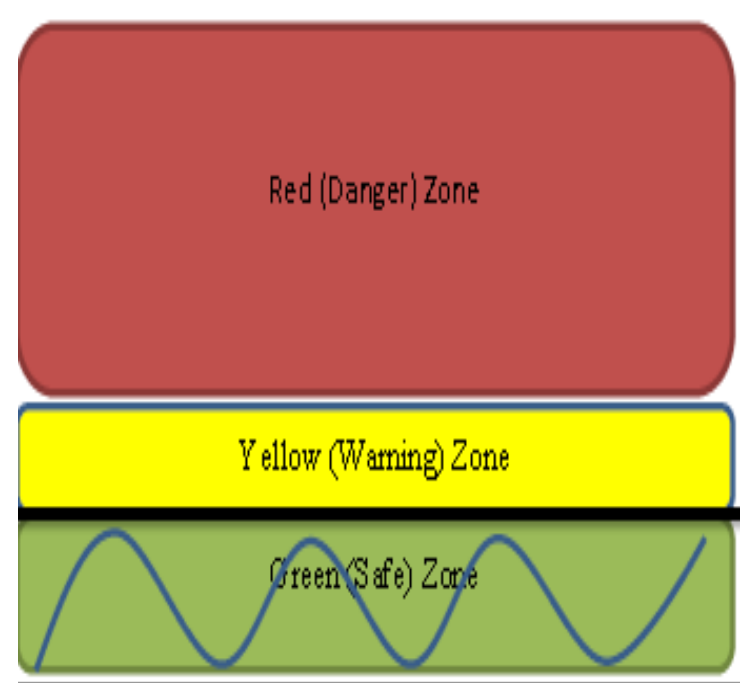
Cicerone, 2015

Building Emotional Awareness

Danger Zone Function

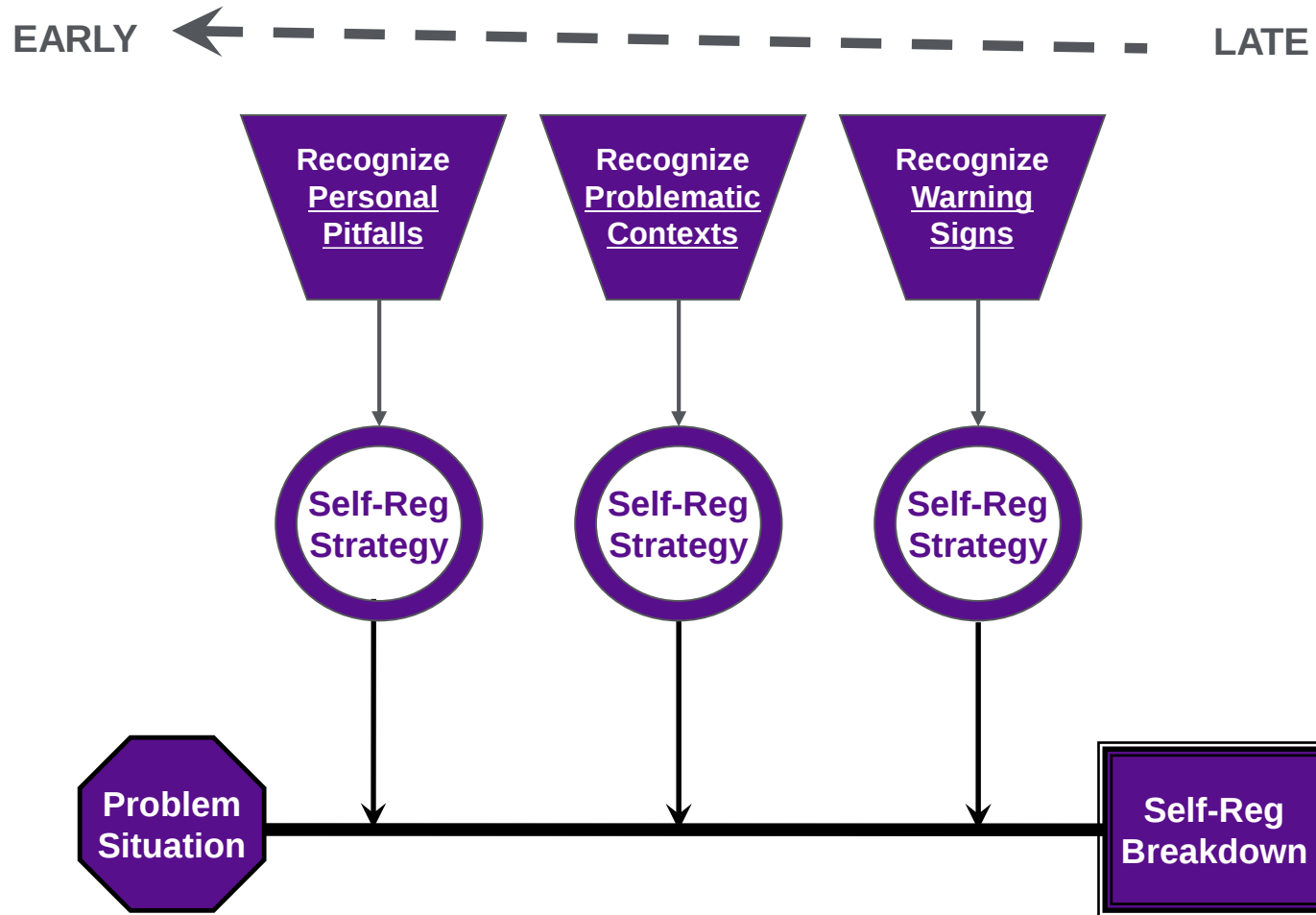


Safe Zone Function



Lee & Matsuzawa

Emotional Self-Regulation



Rath et al., 2003

Components of Effective Problem-Solving



Rath et al., 2003

Treating Deficits in Emotion Perception

Bornhofen & McDonald, 2008a, 2008b

Decreased social communication may reflect an inability to appreciate and monitor social cues

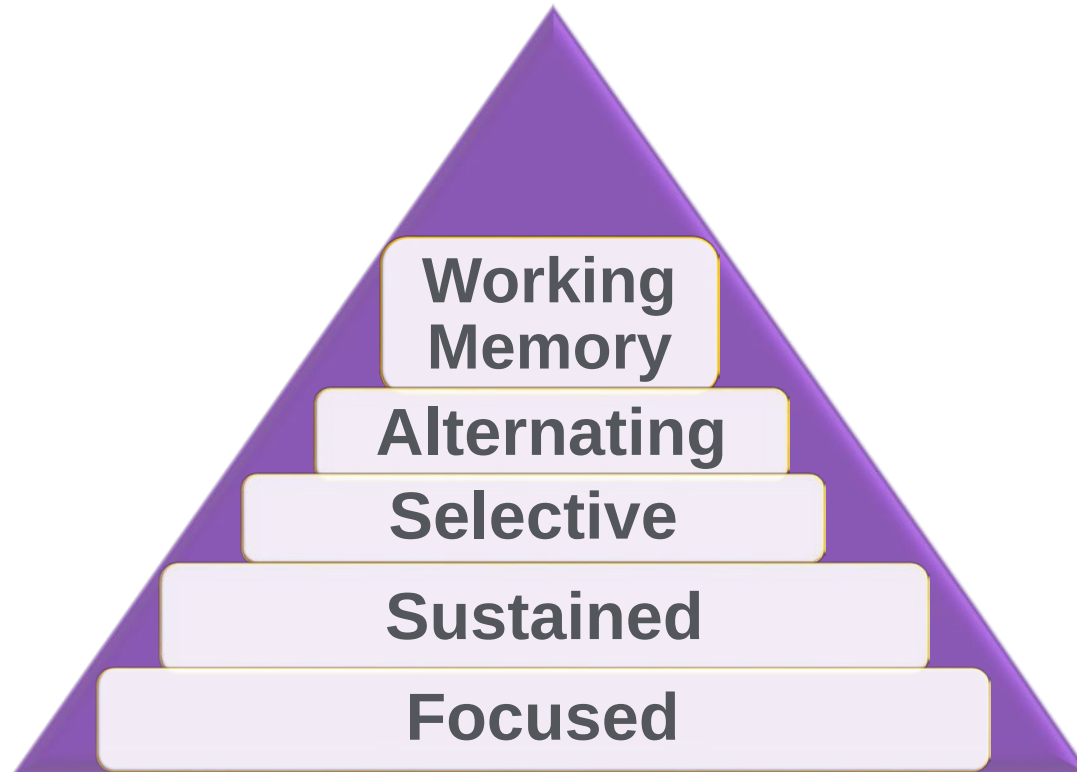
- Small groups of 2 or 3 participants
- Interpreting conventional emotional contexts (birthday party)
- Judging static visual emotion cues
- Judging dynamic emotional cues
 - Therapist modeling
 - Role play and videotaping
- Making social inferences based on emotional demeanor & situational cues



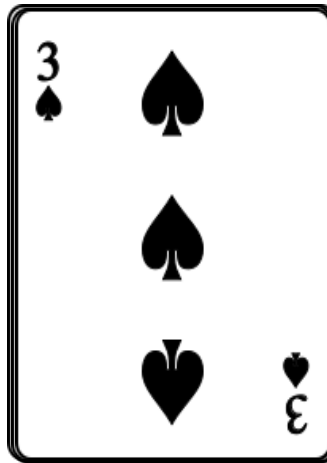
Structured Group Treatment

- Attendance & Announcements
- Review & feedback
- Skill exercise
 - Voice qualities
 - Facial expression / Body posture
 - Sharing time
 - Starting and maintaining conversations
 - Assertiveness and conflict resolution
 - Empathy
- Summary of new learning
- Assignment

Hierarchy of Attention



Attention Training: N-Back



Cicerone, 2002

Level I: Sorting Task

- Participant required to sort cards into four piles by suit while simultaneously reporting the *N*-back card value
- Generate a response from semantic category before naming the card

Level II: *N*-Back with Additional WM Demands

- Generate a response from two or more semantic categories
- Generate a random letter triad (e.g., PZT)

Level III: *N*-Back with Continuous Secondary Task

- Primary *N*-Back task along with an ongoing secondary task

Cicerone, 2002

Time Pressure Management

Stage	Training
Strategic	Planning and organizing step-by-step procedures <i>before task activity</i> ; Developing an emergency plan
Tactical	Making decisions <i>while performing the task</i> to reduce or prevent subsequent problems
Operational	Managing stress <i>when facing problems in the moment</i> using techniques; using emergency plan

Winkens et al., 2009

Components of Memory



Sohlberg & Mateer, 2001

Types of External Devices

- Notebooks
- Other written planning systems
- Electronic planners, PDA's
- Smart cell phones
- Computerized systems
- Auditory or visual systems
- Task-specific aids



Errorless Learning

- Presents information in a way that minimizes the possibility of making mistakes.
- Therapist presents simple information, and requests the patient to immediately repeat.
- More effective when combined with spaced retrieval or with chaining techniques.

Evans et al., 2000

Prospective Remembering with Visual Imagery

Self-imagination Effect (SIE)

- Individual imagines the event from his/her own personal perspective with as much detail as possible for 45 seconds

Grilli & McFarland, 2011

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THANK YOU

