

# Windows To The Brain: Cognitive therapies for mild TBI



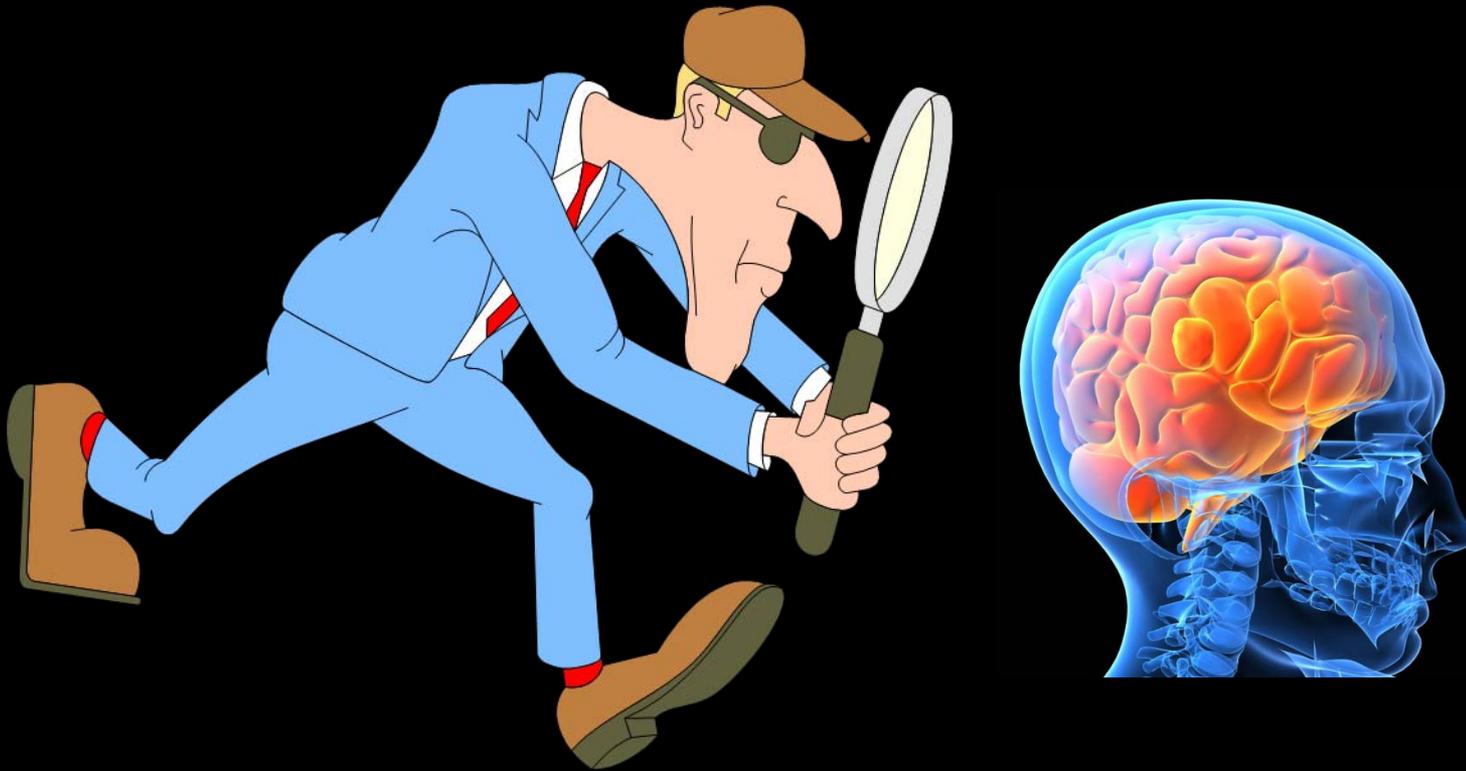
Workshop Coordinators:

Robin A. Hurley, MD and Katherine Taber, PhD, VISN 6 MIRECC

# Disclaimer

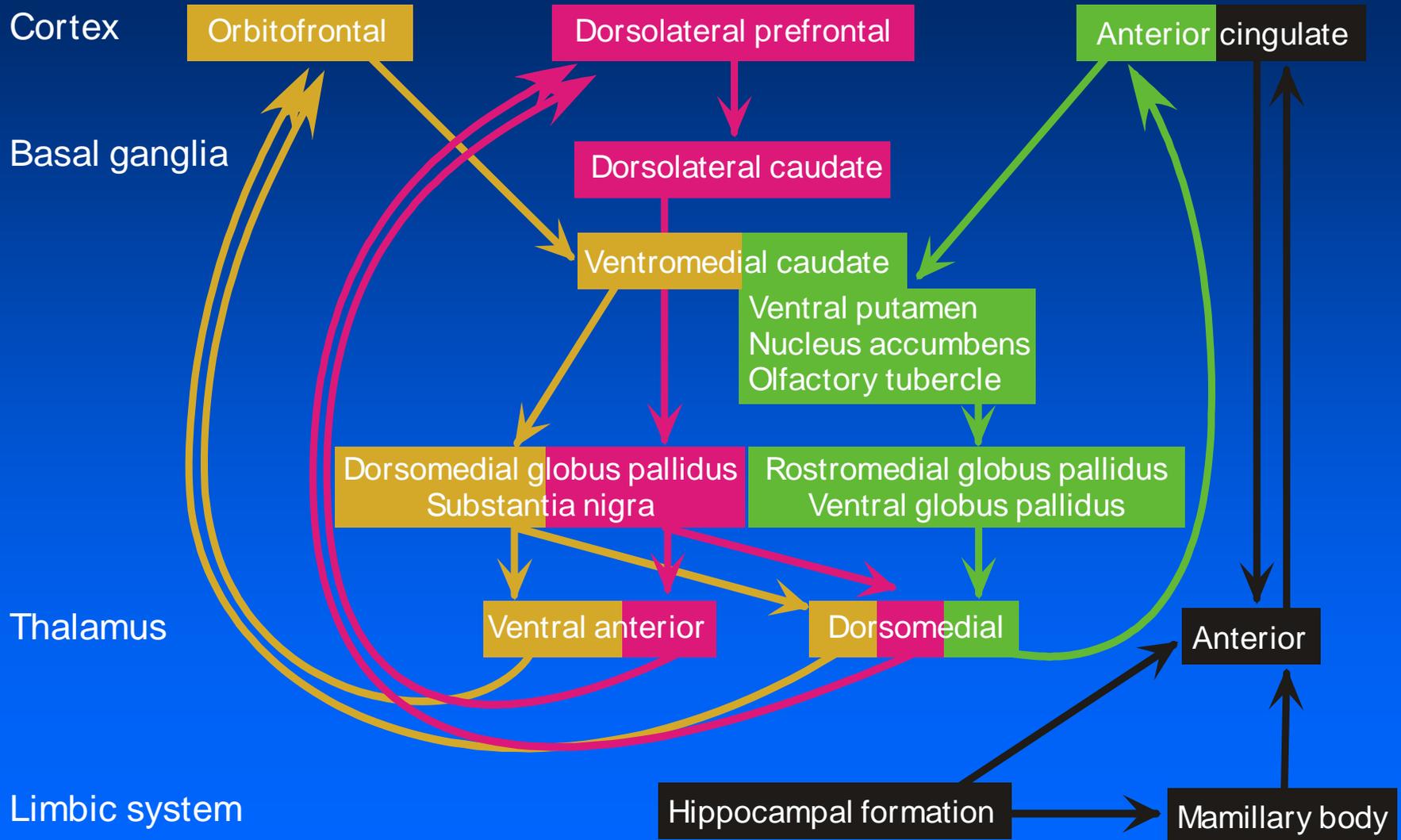
The views expressed in this session are strictly those of the presenters. They do NOT represent those of the Veteran's Health Administration, the Department of Defense, or the United States Government.

# Cognitive Rehabilitation for mild TBI: current understanding and future challenges



- Functional Anatomy of emotion, memory, and behavior circuits
- Examples of 3 successful VA programs
- Questions for future program improvements and where to go from here?

# Frontal Lobe Circuits

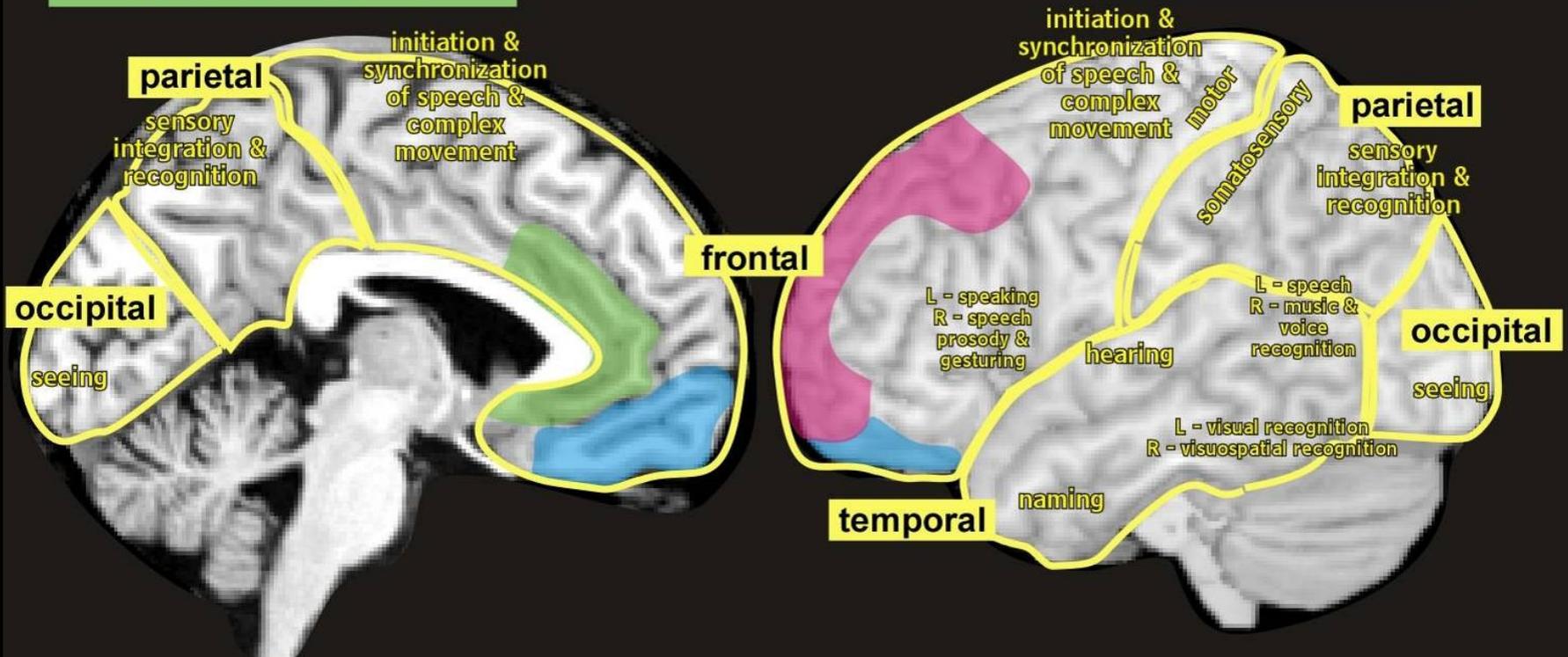


# Major Prefrontal - Subcortical Circuits

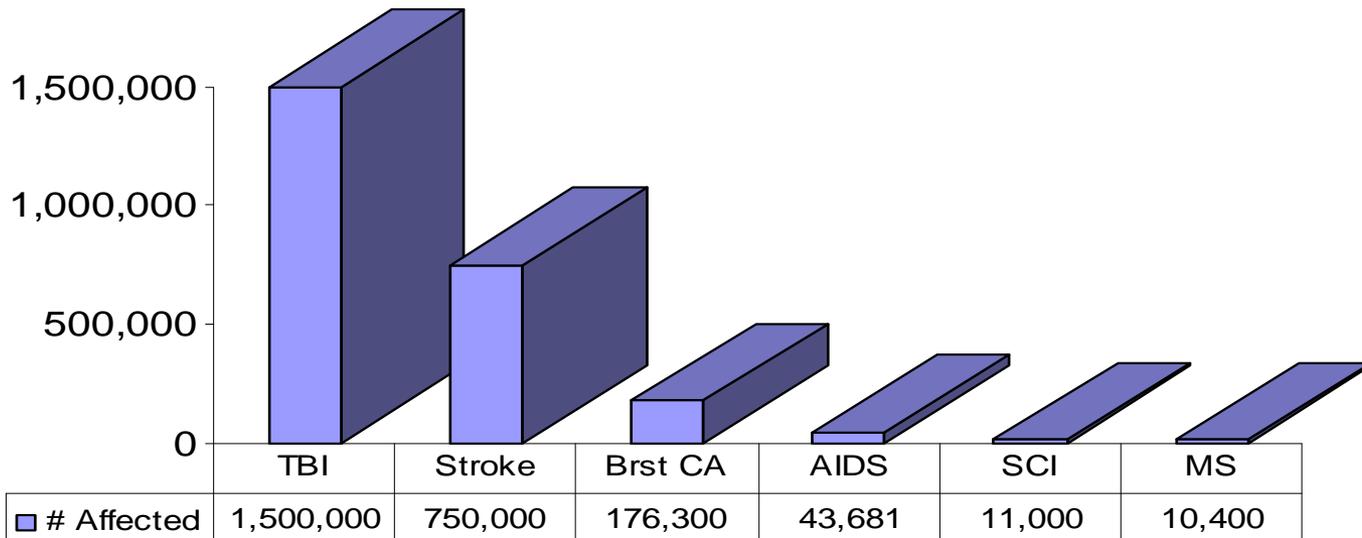
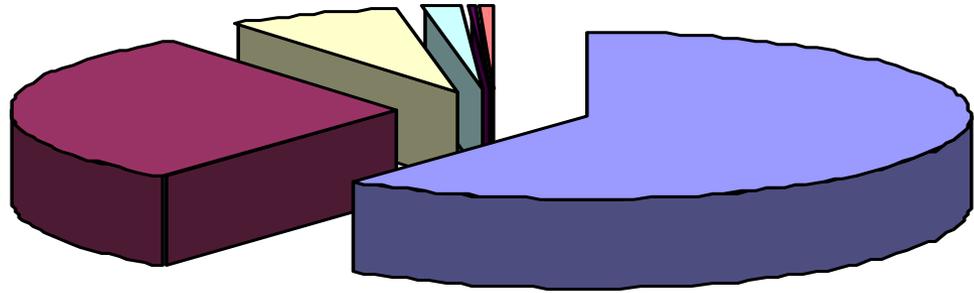
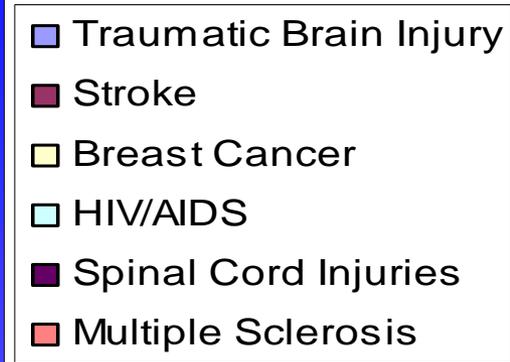
**Anterior cingulate circuit**  
produces motivation by balancing the inhibitory input of the supplemental motor area with its own stimulus that supports wakefulness & arousal

**Orbitofrontal circuit**  
mediates socially appropriate behavior, impulse control & empathy

**Dorsolateral circuit**  
mediates executive functions such as organization, planning & attention



# Comparative Annual Incidence of TBI



(Used with permission - David Arciniegas, MD, UCHSC; Based on data from the Centers for Disease Control and Prevention, American Cancer Society, American Heart Association, and National Multiple Sclerosis Society. TBI: traumatic brain injury; Brst CA: breast cancer; SCI: spinal cord injury; AIDS: acquired immune deficiency syndrome; MS: multiple sclerosis.)

# National focus

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## An Unforeseen Cost of War

Thousands of Veterans Are Returning From War With Traumatic Brain Injuries

Feb. 28, 2007

GOOD MORNING AMERICA

1 comment

Jarod Behee was shot in the head in Iraq. He survived, but is still suffering from the aftereffects of a traumatic brain injury, or TBI.

The Department of Veterans Affairs estimates that Behee is one of several thousand veterans returning from Iraq and Afghanistan with some kind of mental disorder or brain injury, but veterans advocacy groups place that number even higher.

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Posted 3/3/2005 11:12 PM

### Key Iraq wound: Brain trauma

By Gregg Zoroya, USA TODAY

A growing number of U.S. troops whose body armor helped them survive bomb and rocket attacks are suffering brain damage as a result of the blasts. It's a type of injury some military doctors say has become the signature wound of the Iraq war.

Shaun Radhay, a Marine, suffered brain damage and other injuries in a mortar blast.

By H. Darr Beiser, USA TODAY

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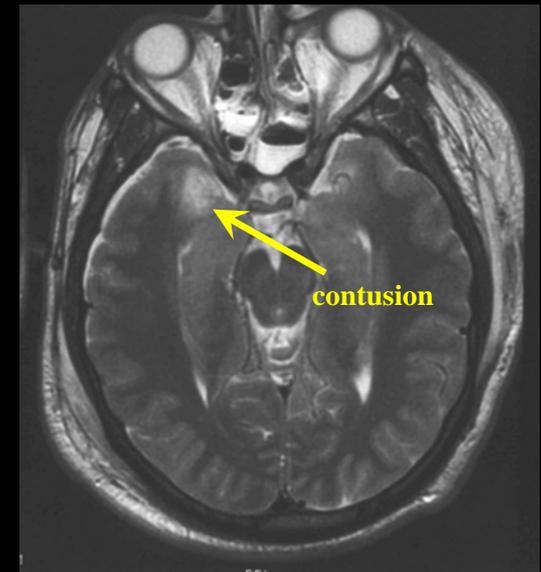
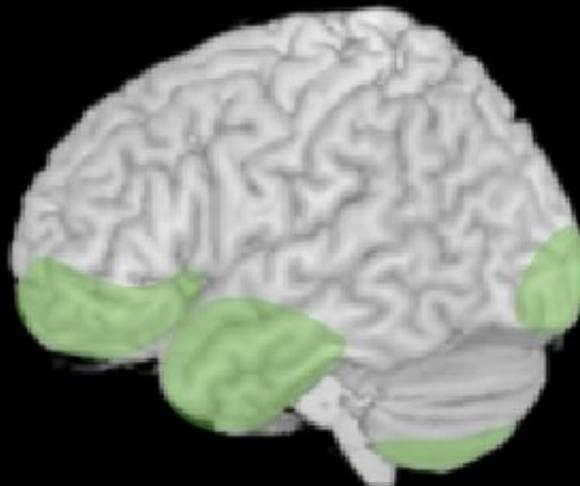
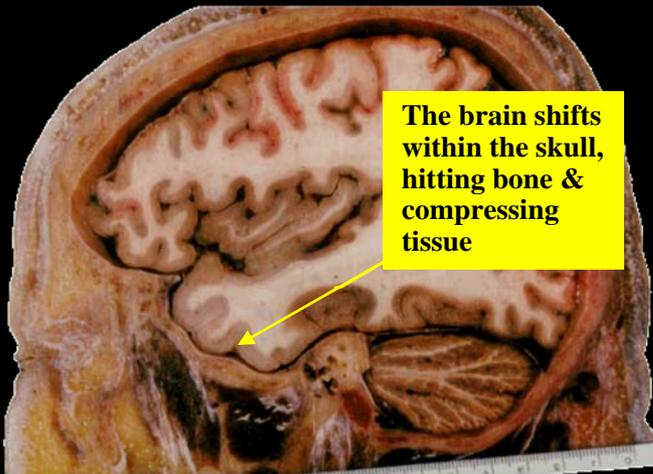
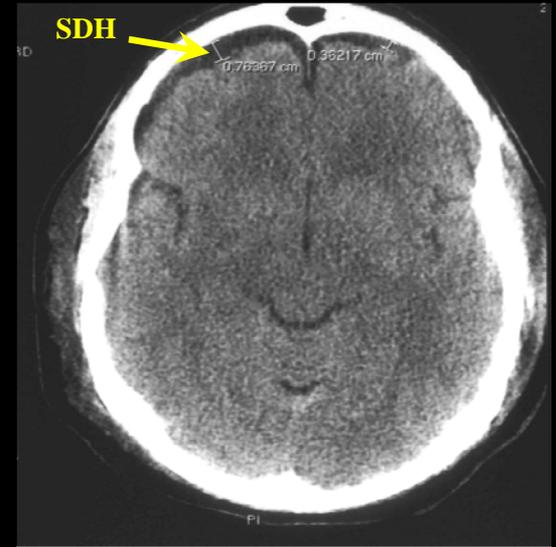
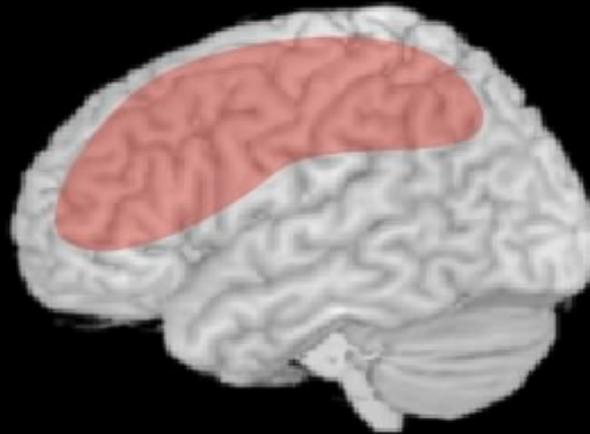
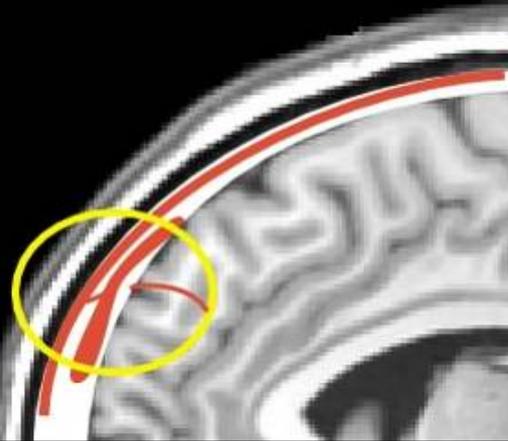
- Secretary's "one-minute" update weekly
- News media focus
- "Signature injury of this war"

# Operations Iraqi Freedom/Enduring Freedom: Are there brain injuries?

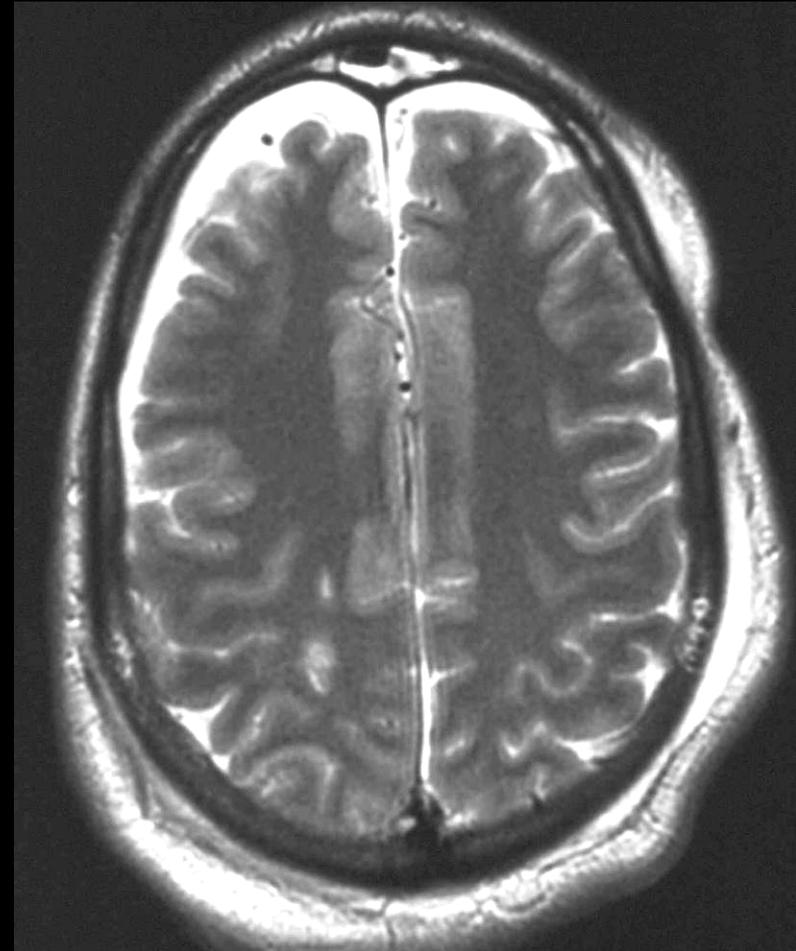
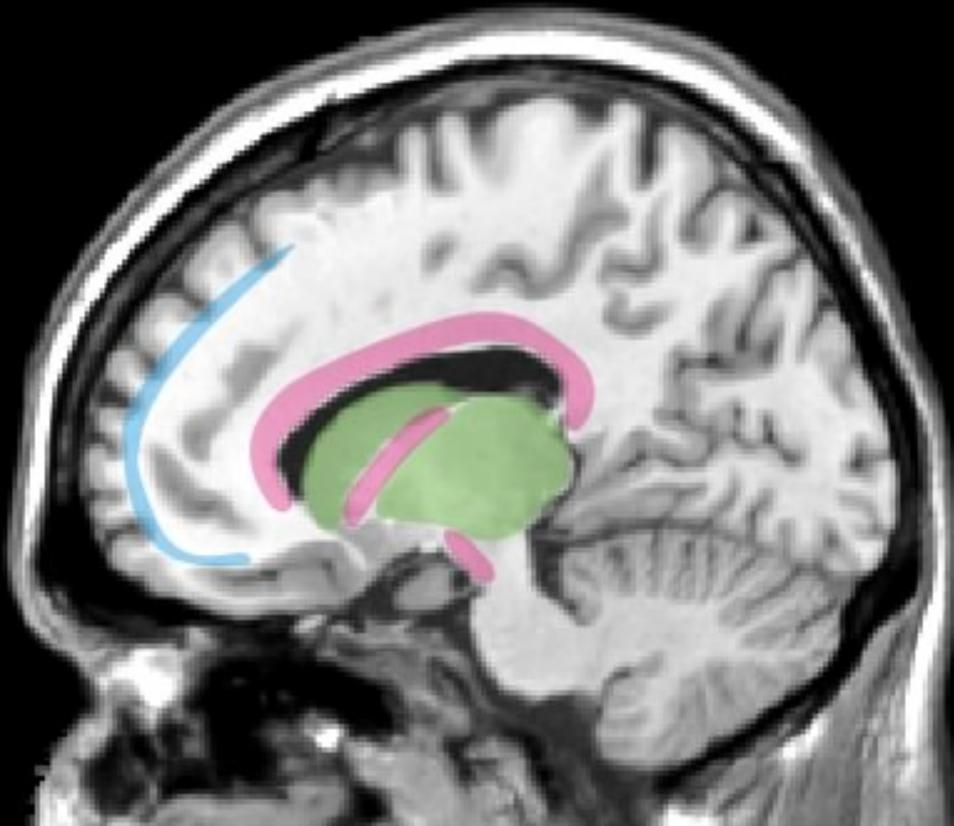


- 88% IED/mortar attack- 47% about the head (Murray & Reynolds, 2005)
- 97% explosions (65% IED's, 32% mines)- 53% head or neck (Gondusky & Reiter, 2005)
- Walter Reed at-risk group, 59% had TBI (Okie, 2005)
- At least 20% of wounded had some degree of brain injury (Okie, 2005)

# Where are the injuries? Subdurals and contusions



# Diffuse Axonal Injury (DAI)





# **CogSMART: Cognitive Symptom Management and Rehabilitation Therapy**

**Elizabeth Twamley, Amy Jak, Kelsey  
Thomas, & Dean Delis**

**Co-Chief, Neuropsychology Unit, CESAMH,  
VASDHS**

**Associate Professor, Department of  
Psychiatry, UCSD**

## Veterans with mild traumatic brain injury present with real-world cognitive problems



**"I don't have any problem remembering the past. I have trouble with now." -- Eric O'Brien, an Army staff sergeant with mild brain injury, to Marilyn Marchione (Associated Press), 9/23/07**

# Background

- ◆ Traumatic brain injury (TBI) can result in cognitive impairments that limit functional recovery, including cognitive readiness for civilian work, school, and independent living
- ◆ 89% of the OEF/OIF veterans with TBI have sustained a mild or moderate TBI, with frequent comorbid PTSD, but little is known about rehabilitation for this population
- ◆ CogSMART (Cognitive Symptom Management and Rehabilitation Therapy) was designed for this population and is being implemented and evaluated in the VA San Diego Healthcare System
  - Previous research on the same compensatory strategies in a psychosis sample has found significant improvements in memory and everyday functioning skills (Twamley, Savla, Zurhellen, Heaton, & Jeste, 2008)
  - VA San Diego has a Cognitive Rehabilitation Clinic within Psychology Service
  - Additional staff paid from DoD grant to study CogSMART in supported employment

# CogSMART Intervention

- ◆ **Eligibility: cognitive impairment in the context of valid neuropsychological testing**
- ◆ **12 week intervention**
- ◆ **1-2 hours per week (individual/group)**
- ◆ **Curriculum (treatment manual) designed so that providers can deliver the intervention without training**
- ◆ **Compensatory strategies target four cognitive domains**
  - **Prospective memory (remembering to do things in the future)**
  - **Attention/vigilance**
  - **Learning/memory**
  - **Cognitive flexibility and problem solving (i.e., executive functioning)**
- ◆ **Domains chosen for their relevance to everyday functioning skills, such as working, attending school, and living independently, and because they have been shown to be modifiable**
- ◆ **Compensatory strategies can be useful regardless of the etiology of the impairment**
- ◆ **Each session focuses on learning and practicing compensatory strategies and application to each veteran's everyday life**
- ◆ **Homework assignments are designed to encourage additional practice outside CogSMART sessions**

# Compensatory Cognitive Training

- ◆ **Theoretical bases for CogSMART**
  - **Cognitive compensation**
    - “Working around” deficits (e.g., using a cane to support a weak leg)
    - Taking advantage of cognitive strengths
    - By using different strategies
    - By using different brain areas
  - **Habit learning**
    - Habits – good or bad – are hard to break and are particularly resistant to forgetting
    - Relies on intact neostriatal pathways rather than declarative memory systems
- ◆ **Different from “restorative” interventions that rely on drills and practice**

# Compensatory Strategies

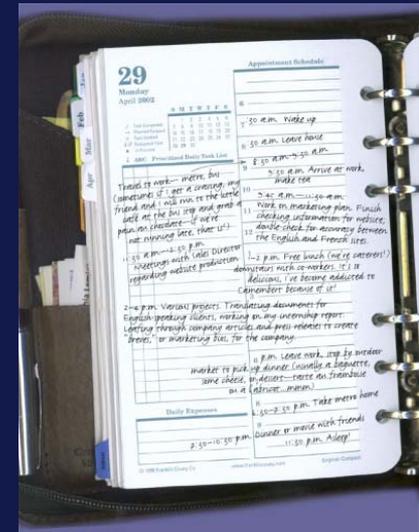
## ◆ Internal

- e.g., acronyms, visualization
- May generalize to other situations, but...
- Must be initiated in real-world situations
- Clients need to know how to recognize that there's a problem

**CONUS**  
**NASA**  
**PDA**

## ◆ External

- e.g., calendars, to-do lists, palm pilots
- Must maintain external cues



# Compensatory Strategies

- ◆ Designed to handle cognitive demands
  - e.g., overlearning
- ◆ Designed to reduce cognitive demands
  - e.g., pillbox, calendar



# Compensatory Strategies

- ◆ Similar to strategies used by most people
  - e.g., writing things down to remember them
- ◆ Different from strategies used by most people
  - e.g., self-talk while working on a task



# CogSMART Sessions

## Week 1-2

### Introduction, Psychoeducation, Stress Reduction

- **Family members** and significant others welcome
- **Psychoeducation** regarding TBI, postconcussive symptoms, and post-traumatic stress disorder
- **Discussion** of individual experiences with TBI
- **Strategies**
  - Progressive muscle relaxation
  - Abdominal breathing
  - Grounding
  - Visualization
  - Meditation
- Additional strategies for:
  - Fatigue
  - Sleep problems
  - Headache

## Week 3-4

### Prospective Memory

#### Strategies

- Calendar systems and programming calendar use
  - Daily checking
  - Weekly planning
  - Entering both events and reminders prior to events
- Linking tasks (new task linked to automatic task)
- Automatic places (keep items in same place)
- Using to do lists and sticky notes with calendars
- Short-term prospective memory strategies
  - Write on hand
  - Leave self a message
  - Use visual imagery
  - "Can't miss" reminders

## Week 5-6

### Attention/Vigilance

#### Strategies

- Preparation (break tasks into steps)
- Energy conservation
  - Reduce distractions
  - Avoid multitasking
  - Pace yourself
  - Take breaks
- Active effort
  - Take your time
  - Double-check work
- Self-talk during tasks
- Conversational vigilance
  - Listen actively, make eye contact
  - Eliminate distractions
  - Ask questions
  - Paraphrase



## Week 7-8

### Learning/Memory

#### Strategies

- Writing things down (in a logical place!)
- Association of to-be-learned information with information already known
- Chunking large amounts of information into smaller chunks
- Categorizing information in meaningful groups
- Acronyms
- Rhymes
- Visual imagery
- Overlearning (can use flashcards)
- Name learning
- Retrieval strategies
  - Relaxation
  - Alphabetic searching
  - Mental retracing
  - Recreating context
- Organization, structure, and routine to aid memory

## Week 9-10

### Cognitive Flexibility and Problem-Solving

#### Strategies

- Brainstorming
- 6-step problem-solving method (DBESTE)
  - Define the problem
  - Brainstorm solutions
  - Evaluate solutions on cost, ease, potential consequences
  - Select one or more solutions
  - Try solution(s)
  - Evaluate the solution(s); if problem is unsolved, select a different solution
- Strategy verbalization (self-talk while solving problems)
- Hypothesis testing by looking for disconfirming evidence
- Set shifting/maintenance

## Week 11-12

### Review and Referrals

- **Family members** and significant others welcome
- **Review** key concepts
- **Answer questions**
- **Troubleshoot** barriers to strategy use
- Discuss **application** of strategies in daily life
- **Referrals** for additional treatment needs (e.g., PTSD)
- Gather **feedback** on CogSMART



# What Clients Think of CogSMART

- ◆ “Made me aware of how to organize things and prioritize.”
- ◆ “It helped with my memory and keeping me relaxed.”
- ◆ “Helped me to remember to do tasks that needed to get done.”
- ◆ “Helped me maintain a regular schedule.”
- ◆ “I can get a lot more done.”

# Outcomes

- ◆ 20 OEF/OIF veterans and 15 other veterans have participated in the CogSMART intervention
  - 19 in groups, 13 individually, 3 set to begin treatment within the next month
  - 15 have completed CogSMART, 6 attended fewer than six sessions, and the rest are currently receiving CogSMART
- ◆ Attendance is improved with reminder calls
- ◆ Some veterans prefer an evening class, after work or school
- ◆ Offering CogSMART at Community-Based Outpatient Clinics has improved access to the intervention
- ◆ Most veterans participating in CogSMART carry a diagnosis of PTSD
- ◆ Studies are ongoing

# Thank you

- ◆ Individual and group CogSMART manuals available: contact [elizabeth.twamley@va.gov](mailto:elizabeth.twamley@va.gov)

# BRAIN BOOSTERS: A Cognitive Enhancement Program

Kathleen Goren, PhD

Mary Lu Bushnell, PsyD

Phoenix VA Medical Center

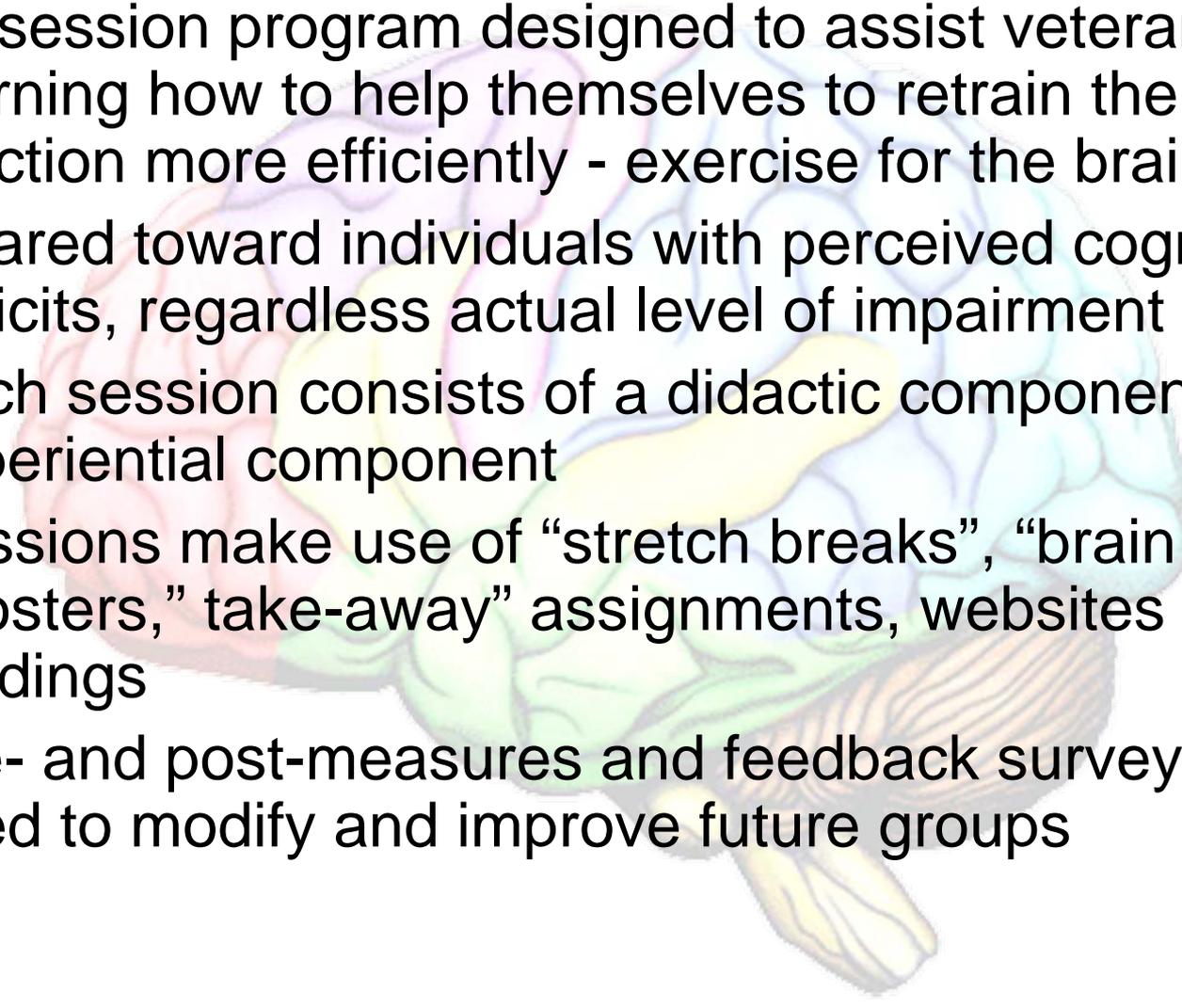


# DEVELOPMENT OF THE PROGRAM

- Neuropsychological evaluations were identifying cognitive deficits with unclear etiologies
- Developed to address the needs of the numerous veterans who were presenting with memory difficulties, regardless of etiology
- Existing treatment programs for mild cognitive problems were found to be lacking
- Originally developed for OEF/OIF veterans returning with blast exposure and has since been expanded to include veterans of all eras



# PROGRAM OVERVIEW

- 10-session program designed to assist veterans in learning how to help themselves to retrain the brain to function more efficiently - exercise for the brain!
  - Geared toward individuals with perceived cognitive deficits, regardless actual level of impairment
  - Each session consists of a didactic component plus an experiential component
  - Sessions make use of “stretch breaks”, “brain boosters,” take-away” assignments, websites & readings
  - Pre- and post-measures and feedback surveys are used to modify and improve future groups
- 

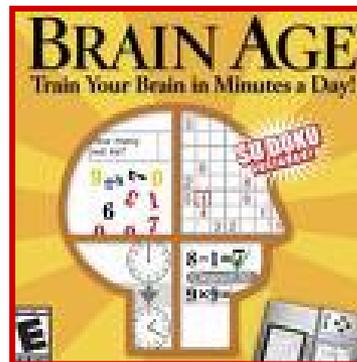
# SESSION OVERVIEW

- I. Introduction / Overview / Education
- II. General Health/Stress Management
- III. Memory/New Learning
- IV. Memory/New Learning, continued
- V. Neuroanatomy/Attention
- VI. Executive Functions / Reasoning
- VII. Sleep Hygiene
- VIII. Posttraumatic Stress Disorder
- IX. Emotions/Personality/Communication Skills
- X. Wrap up group



# PROGRAM GOALS

- To generalize the skills learned to daily activities
- To provide valuable information and education and activities that are also fun!
- To inform veterans about various treatments that are available at the VA (e.g., PTSD, Speech, etc.)
- To present material in an educational group format to reduce stigma and encourage greater participation
- To help participants be able to identify and utilize their strengths by using a strength-based focus



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# STRETCH BREAK EXAMPLE



# REMEMBER THIS



**WRITE DOWN EVERYTHING  
YOU CAN REMEMBER**

**(Don't peak!)**

# HOW DID YOU DO?



# PRELIMINARY FEEDBACK

- Preliminary quality control surveys have been positive and a formal research proposal studying the efficacy of this program is currently being reviewed by the IRB



# FUTURE GOALS

- Distribution of the Brain Boosters program to other VA sites that are interested in implementing the group
- Splinter groups
  - Insomnia and nightmares
  - Computers
  - Memory
  - Humor
  - Relationships/communication Skills
  - Stress Management



# The FACT Program

Functional Adaptation and Cognitive re-Training  
A MIRECC Mental Illness Research, Education and Clinical  
Center program.

David Butler, PhD  
Salisbury, NC VAMC



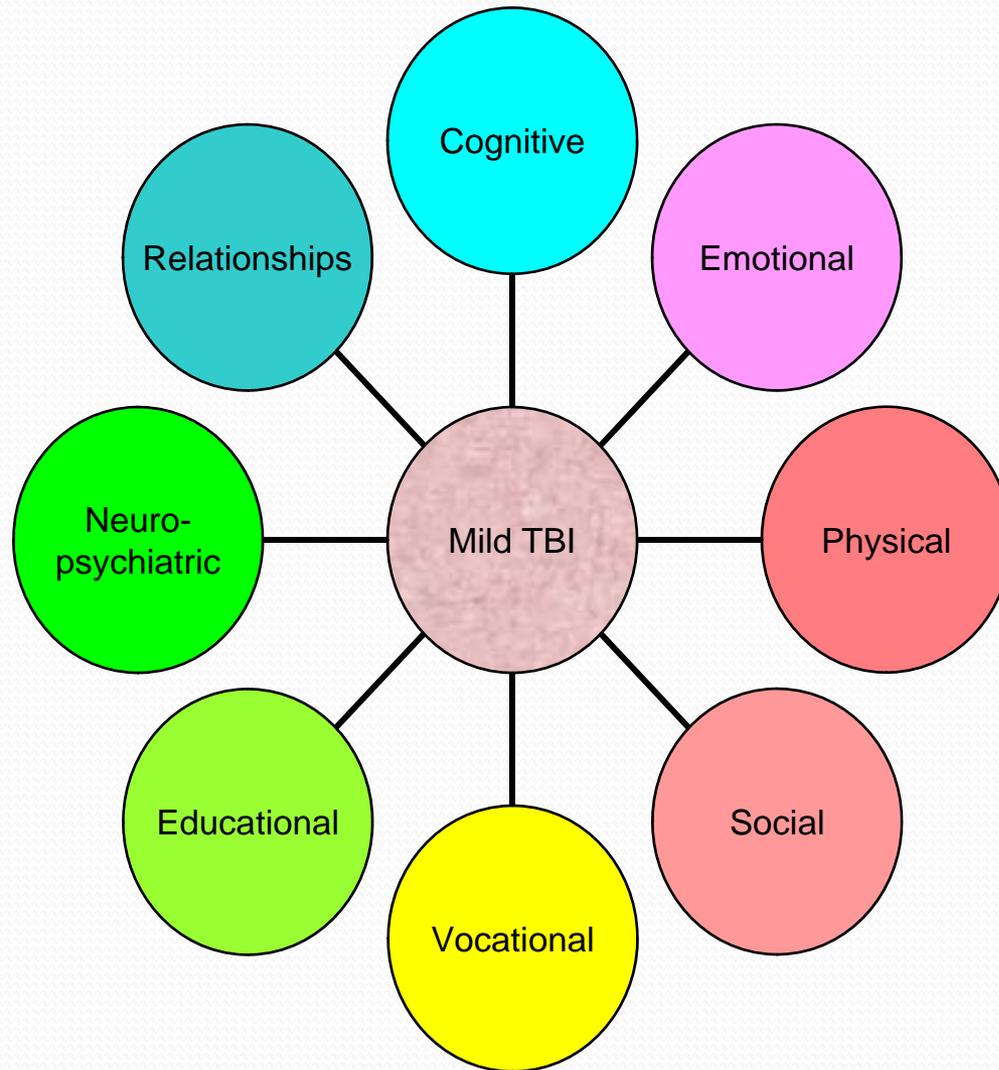
# Philosophy

Mild TBI creates a need for adjustments in life.

Disabilities are created by society and self-perception.

FACT Emphasizes the ABILITIES of the veteran.

# Multidisciplinary Approach





# Team:

Neuropsychologist

Neuropsychiatrist

Psychopharmacologist

Social Worker

Vocational Rehabilitation Specialist

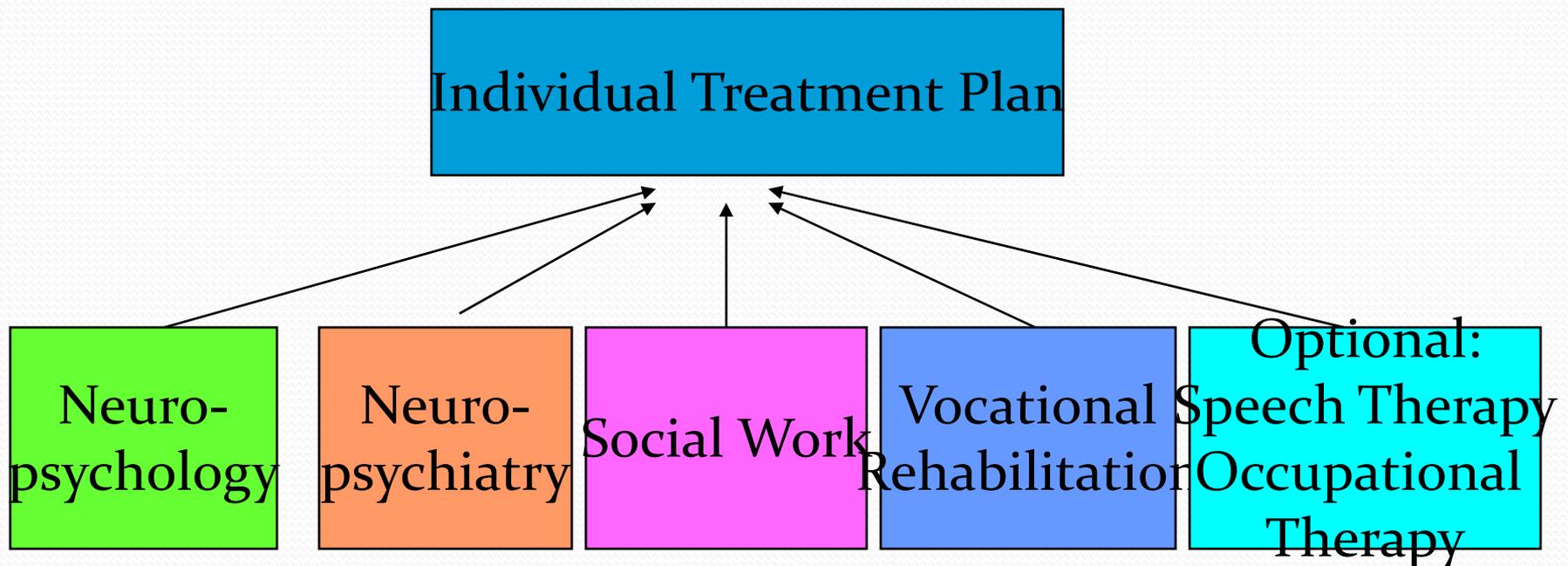
Speech & Language Therapy

Occupational Therapy

Representatives from Polytrauma and OEF/OIF.

# Evaluations

Evaluations assist in formulating an individualized and comprehensive treatment plan for each veteran.





Format:

## Outpatient Program

- 3 hours per day,
- 2 days per week,

for

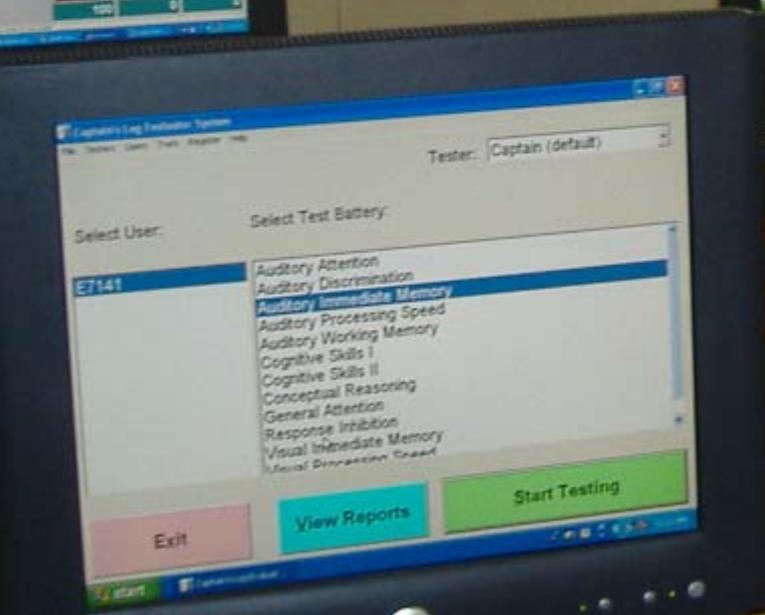
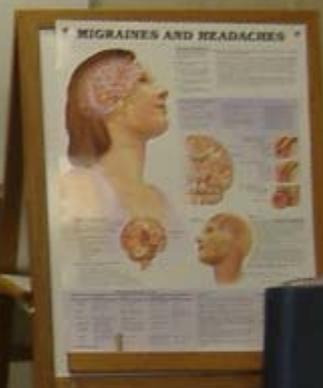
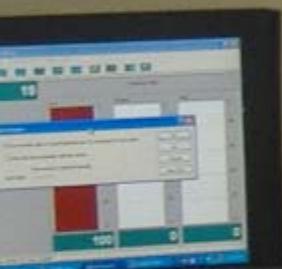
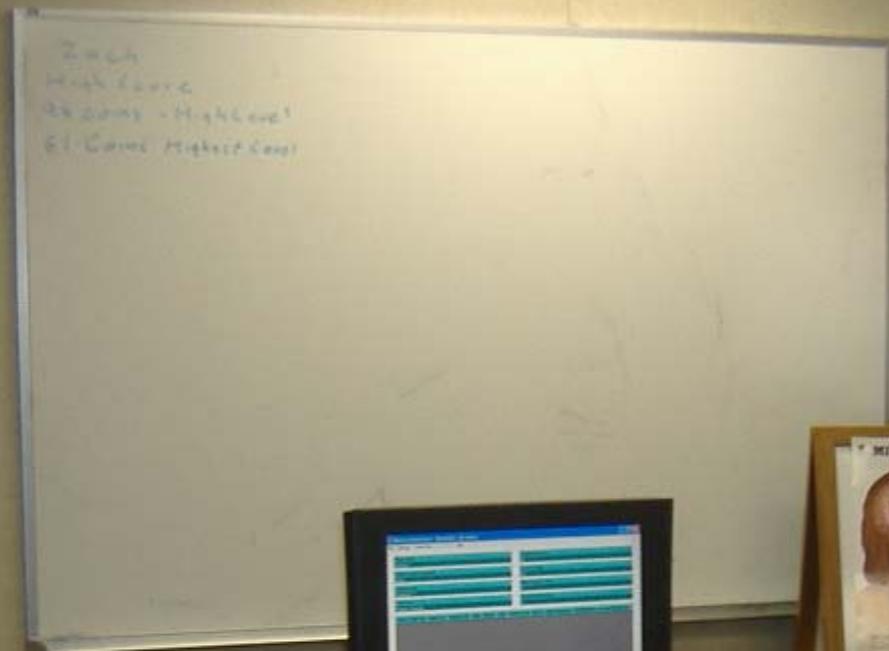
6 weeks.



Format:

## Small Group Sessions

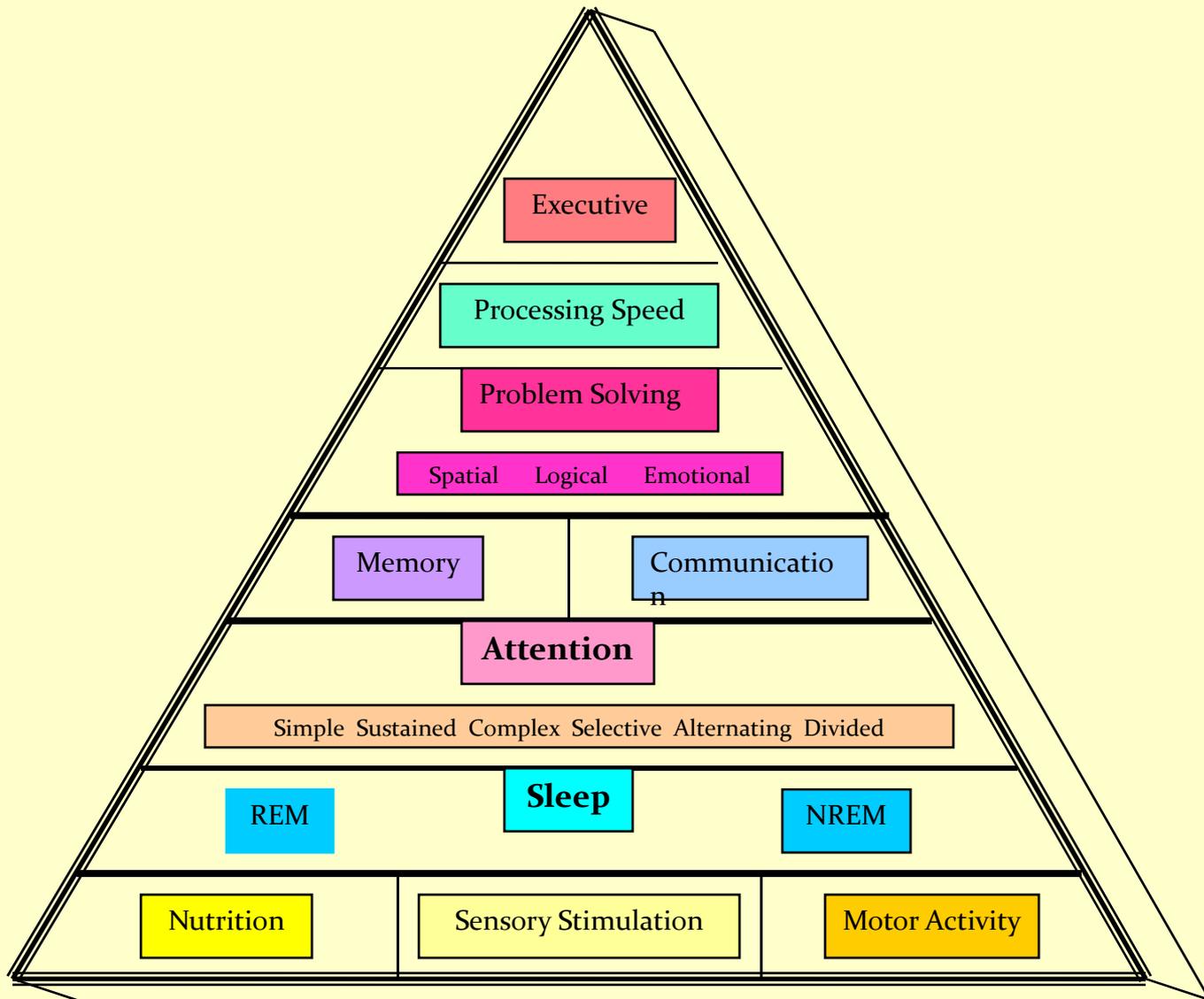
Groups are limited to a maximum of 7 veterans. This allows for individual attention and minimizes the discomfort veterans with PTSD may experience when around others.



# Neuropsychology

The neuropsychologist provides 3 hours per week of educational material, emphasizes the use of adaptive aids and compensatory techniques to assist in memory and attention. The Veterans are also given training on the cognitive retraining software.

Cognitive retraining software includes BrainTrain, Parrot, and CriticalThinking.





## Social Work: Emotional & Adjustment

Group therapy is provided 1 hour per week by a clinical social worker. The group members determine the issues relevant to them, but typically include irritability, anger, depression, self-esteem, self-care, stress management, and relationship issues.

The emWave Stress Relief System facilitates stress management and is used by Social Work and Neuropsychology.

# Social Work Modules

(one module per week)

- Module 1: Introductions and Group Dynamics.
- Module 2: Self-Esteem & Self-Care.
- Module 3: Relationships & Significant Others.
- Module 4: Anger Management & Frustrations.
- Module 5: Panic Attacks, Anxiety, & Depression.
- Module 6: Relaxation, Stress, and Pain Management.



# Pharmacology & Neuropsychiatry

A psychiatrist specializing in TBI or a psychopharmacologist provides 1 hour of group therapy per week.

Veterans are provided with information on the mechanics of brain injury and concussions

Medication related topics include how medications work, side effects, and alternatives to traditional medications.

# Psychopharmacology & Neuropsychiatry

(Veterans select which modules)

- Module 1: Drugs and the Injured Brain – Helping and Hurting.
- Module 2: Drug Mechanisms of Action and Drug Selection.
- Module 3: Everything You Wanted to Know but Were Afraid to Ask! aka Side effects and Adverse Reactions.
- Module 4: Reasonable Expectations.
- Module 5: Herbal, Homeopathic, & Alternative TX.
- Module 6: Drug Interactions.

# Psychopharmacology & Neuropsychiatry

(one module per week)

- Module 7: Alcohol, Recreational Drugs, TBI and Driving?
- Module 8: I'm Taking Too Many Drugs! What Do I Do?
- Module 9: Me and My Doc Disagree. What Do I Do?
- Module 10: How Long and How Do I Stop?
- Module 11: OTC Drugs
- Module 12: Rules for Medical Use of Drugs.



# Vocational Rehabilitation

Vocational Rehabilitation is one of the more challenging group therapies provided.

Each veteran differs in their needs. Some are working and do not need services, others are interested in education while others are interested in employment assistance.



# Vocational Rehabilitation

Information is provided to the veterans regarding the available VA benefits.

Assistance is provided in creating a Resumé, how to interview, practicing an interview, employer expectations, incentive work therapy, and other topics.

# Lessons Learned

1. PTSD is a major issue and must be addressed in the sessions.
2. Substance abuse was anticipated to be a major issue but has not been.
3. Each cohort differs significantly. Cannot use a cookie cutter approach
4. Logistics – Many veterans are working or in school; this makes it difficult for them to come in.



# Lessons Learned

5. Sleep: This is a major issue for most veterans.
6. Attribution: All problems are not a sign or symptomatic of a mTBI, concussion, or PTSD.



Together we can make a difference!

Thank you!