



## A Focused Mind: Shaping Attention through Collaborative Programming

Amelia Miller, CCC-SLP, CBIS  
Jimmy Moody, PT, NCS, CBIST

## | Course Objectives



1. Understand the key differences between the types of attention
2. Understand the conceptual frameworks involved in attention training from a cognitive-motor perspective
3. Understand assessment and treatment of attention from a cognitive-motor perspective
4. Identify how to apply concepts into a collaborative approach within your brain injury rehabilitation programming

## Mr. Jones

- Receiving PT, OT, SLP, Voc, Rec, Nursing, Counseling in a residential setting
- Discharge Goal is to transition home with spouse and 2 adolescent children
- Patient goals are:
  - ‘I want to be able take care of myself’
  - ‘I want to be able to work’
  - ‘I want to be able to drive’
  - ‘I want to be able to golf again’

## | Therapist Goals

- PT- Ambulate community distances at mod I
- OT- Perform self-care skills at mod I
- ST- Will sustain attention to auditory task for 30 minutes with 80% accuracy
- Rec- Complete 9 holes golf game
- Psych- Apply at least 2 coping strategies to increase frustration tolerance
- Nursing- Manage medications at mod I
- Voc- Participate in simulated work tasks at min A

## | It Takes a Village (Program)

- How do we share goal attainment efforts across multiple disciplines (transdisciplinary approach)?
- How do we prove that tests and interventions relate to real-world performance (ecological validity)?
- How do we prove that in vitro skill training generalizes to other skills in a complex, heterogeneous environment (clinic-to-community)?
- Learning begins with **Attention**; and attention is continuously called to show up and perform.

## | Limits of Discussion

- Limited to concepts of Attention (ex. not working memory, executive function, etc.)
- Limited to theoretical and practical concepts (ex. not program operations, state practice act, etc.)
- Limited to persons with partially intact language systems (ex. Not global aphasia)
- Limited to persons with mild – moderate attention impairment from acquired brain injury (ex. Not highly distractible, IDD, congenital disorders)

# | Five Cognitive Domains



**Memory**

**Executive Function**

**Attention**

**Language and Communication**

**Sensorimotor Function**

# | Attention

“Everyone knows what attention is.”

“... is the taking possession by the mind in clear and vivid form, of one of what seem several simultaneously possible objects or trains of thought. Focalization, concentration of consciousness are of its essence.”

-William James



## | Types of Attention

- Focused Attention- basic level; acknowledge specific sensory information
- Sustained Attention- maintain focus on target information over a prolonged period in a relatively distraction-free environment
- Selective Attention- process target information with the presence of non-target information
- Alternating Attention- focus is shifted to more than one source of information
- Divided Attention- processing more than one event, or target of information simultaneously

# Cognitive Rehabilitation Treatment Approaches

- **Attention Process Training**
  - Hierarchally organized
- **Time Pressure Management**
  - Assists with mental slowness
  - Decreases cognitive overload
  - Problem-solving training
    - problem orientation, anticipating problems, compensate, moment-to-moment adjustment
- **Strategy Training of Working Memory in mTBI**
  - *N-back* procedure
  - Reverse recall
    - (card order 2678594, name card that is 1-back/2-back until done)

# | How Do Cognitive and Motor Learning Relate?

## Motor Learning

- Fitts and Posner
  - Cognitive
  - Associative
  - Autonomous

## Cognitive Learning

- ACRM Cognitive Manual
  - Acquisition
  - Application
  - Adaptation

## | Training the Cognitive and Motor Systems as One

- Demo greater improvements in motor performance
- Greater improvement in tasks not directly trained (i.e. generalization)
- May reproduce tasks more similar to “real world” experiences, thereby facilitating specific neuroplastic recovery (what fires together, wires together)

## | Dual Task: A Definition

*The concurrent performance of two tasks that can be performed independently, measured separately and have distinct goals*

- Walking while texting
- Driving while generating mental directions
- Dressing while listening to the news
- Walking and carrying cup of water

# Dual Task Effect

## Dual Task Effect (DTE)

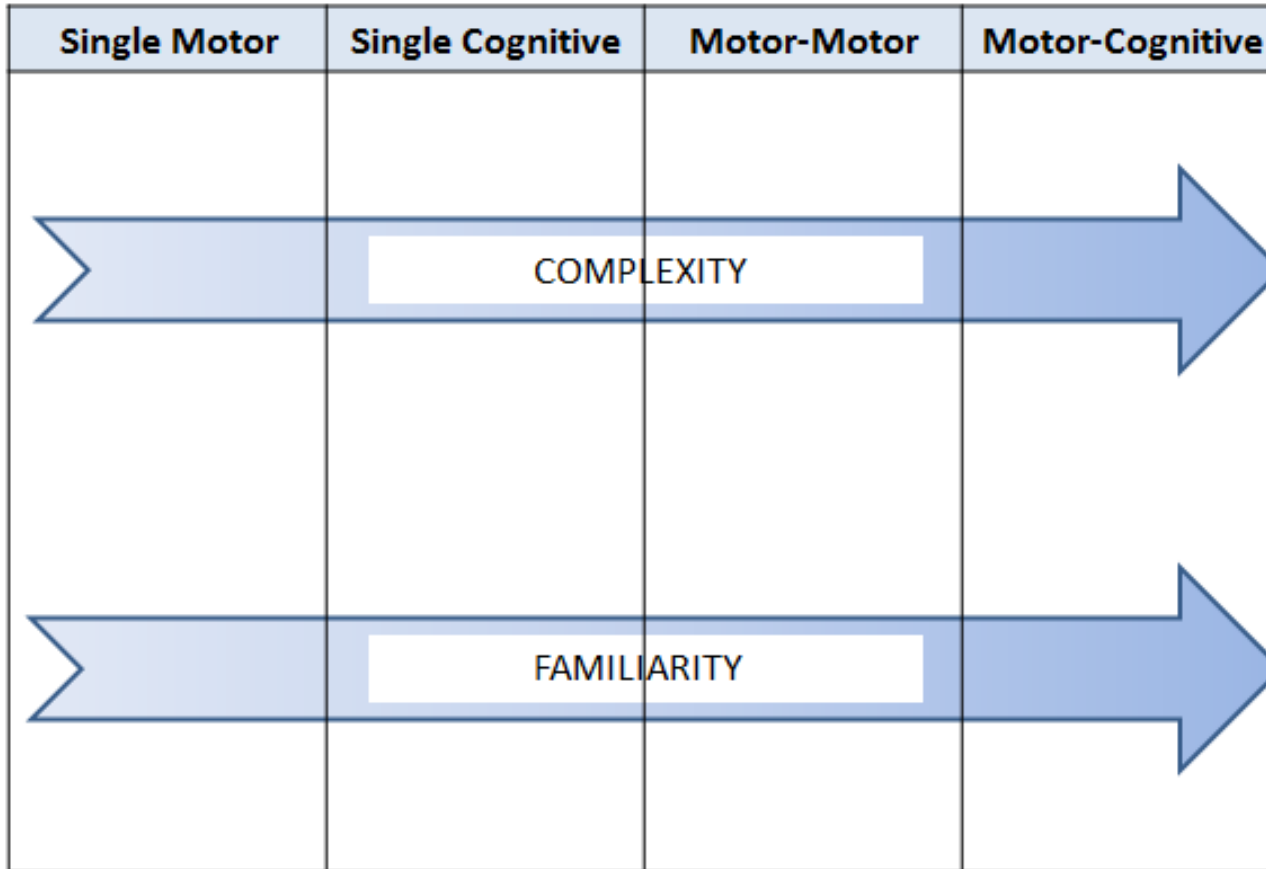
$$\text{DTE walk} = \frac{(\text{DTwalk} - \text{STwalk})}{\text{STwalk}}$$

$$\text{Ex. } \frac{26.2\text{sec} - 15.4\text{sec}}{15.4\text{sec}} \times 100$$

$$\text{DTE} = -70.1\% \text{ (slower)}$$

1. Measure Single task walk (10 MWT)
2. Measure single task cog (serial 7's); accuracy/errors; typically sitting
3. Measure dual task- time and cog accuracy/errors
4. (+) multiplier for positive influence
5. (-) multiplier for negative influence

# Dual-Task Taxonomy



# Cognitive-Motor Interference: An Outcome Classification

	Cognitive Performance		
	No Change	Improved	Worsened
Motor Performance			
No Change	No dual-task interference	Cognitive facilitation	Motor-related cognitive interference
Improved	Motor facilitation	Mutual Facilitation	Motor-priority trade-off
Worsened	Cognitive-related motor interference	Cognitive priority trade-off	Mutual interference



## | Cognitive Pairing Tasks

- Word generation
- Mental arithmetic
- Verbal repetition (“repeat after me”)
- Auditory discrimination
- Visual discrimination (e.g. Stroop)
- Subtraction of Numbers (serial 7s)
- Visual imagery (tell me how to get to Wal-Mart)
- Recitation of Numbers
- Backward Spelling
- Recall from Story Telling
- Description of opposite directions of actions

## Walking and Serial 7's



### **Video 1 - Counting Backwards by 7s:**

<https://www.youtube.com/watch?v=XqR5eODjqfM>

### **Video 2 - Walking:**

<https://www.youtube.com/watch?v=YgJpq5C74D0>

### **Video 3 – Walking and Counting Backwards by 7s:**

<https://www.youtube.com/watch?v=N4LaVNMQFrc>

# Dual Task Data Sheet

Dual Task Data Sheet

Single Task Motor	STM Note	Single Task Cognitive	STC Note	DTE

# How to Record

Single task Motor (time)	Single task motor note	Single task Cognitive (accy)	Single task cognitive note	DTE
Trial 1 10 MWT 17.5sec	No path dev, no speed change	Serial 7's	8 digits= 17.5sec, no err	22.5s, slight speed red, recall 4 digits, no err <u>DTE</u> $22.5 - 17.5 / 17.5 \times 100\% =$ $5 / 17.5 = .285 (-) \times 100$ $= -28.5\% \text{ (slower)}$ $4 - 8 / 8 = -4 / 8 = -50\% \text{ (accy)}$
Trial 2 10 MWT 17.5sec	Same	Same	Same	$20.5 - 17.5 / 17.5 \times 100\% =$ $3 / 17.5 = .171 (-) \times 100$ $= -17.1\% \text{ (slower)}$ $6 - 8 / 8 = -2 / 8 = -25\% \text{ (accy)}$
Outcome	Mutual Interference			

# | Considerations for Attention Shaping

## Personal Characteristics

- Identify attentional capacity
  - Mild, moderate, severe deficits
- Identify intrinsic distracters (ex. pain, thought, fear)
- Identify areas of interest
- Identify areas of knowledge strength and weakness
- Identify physical capacity
  - Mild, moderate, severe deficits
- Identify areas of physical strength and weakness
- Assess person's attitude and motivation toward rehabilitation

# | Considerations for Attention Shaping

## Environmental Characteristics

- Familiar vs. Unfamiliar
- Lighting
- Auditory stimuli
- Visual stimuli
- Surface variety
- The instructor as an auditory/visual/tactile stimuli

# Considerations for Attention Shaping

## Task Characteristics

- Engage the patient with eye contact, tactile stimulation
- Establish instruction features (Risks of providing concurrent feedback)
- The familiarity (or novelty) of the task will affect quality of performance
- Identify effective cues for redirecting patient to task (may be collaborative with patient/caregivers)
- Request the instruction to be repeated to confirm understanding (Teach back technique)
- Reinforce the importance to participate with best effort
- Strike a balance between success and failure (optimal challenge point)

## | Application of Dual-task Training: Assessment and Treatment

- Select functional and meaningful task(s)
- Measure motor task independently
- Measure cognitive task independently
- Measure combined motor and cognitive task
  - Quantitative vs. Qualitative data
- Note: Demands on clinician



## | Informing Collaborative Programming

- Establishing team approach to training
  - Ex. Bathing
  - Ex. Eating in distracting environment
- Establishing effective tactics
  - Ex. Cognitive Facilitation
- Establishing optimal environments for best performance
- Creative perspective that grounds the team and patient into a common approach

## | Questions & Answers



If you have questions after the presentation, please email us at [institute@neurorestorative.com](mailto:institute@neurorestorative.com) and someone will follow up with you.

