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REHABILITATION MEDICINE

Evidenced-Based Treatments of Attention Disorders

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DISCLOSURES

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Financial Disclosure: Dr. Fraas is an Associate Professor in the Department of Communication Sciences and Disorders at Western Washington University and receives a salary.

Non Financial Disclosure: Dr. Fraas has no relevant non-financial relationships to disclose.

DISCLOSURES

FIRM and ACRM staff have no financial or other interest to disclose.

This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of The Institute for Medical Studies and the American Congress of Rehabilitation Medicine. The Institute for Medical Studies is accredited by the ACCME to provide continuing medical education for physicians.

Behavioral – Learning Objectives

At the conclusion of the activity, participants will be able to:

1. Use a decision-tree to assist in determining which type of cognitive rehabilitation to implement;
2. Describe techniques for improving attention and the steps involved in carrying out treatments;
3. Identify the general guidelines for the use of external memory strategies;
4. Describe a general algorithm and conceptual framework for structuring interventions for awareness, executive functioning and behavioral / emotional self-regulation;
5. Discuss the evidence concerning the effectiveness of cognitive rehabilitation in the selection; and implementation of specific, individualized interventions for cognitive disability.

Obtaining CME Credit

Credit is only given to attendees that sign-in for the course; successfully complete the entire course; and evaluate the course.

At the close of the workshop, you will receive an email with a link to the evaluation system. Please click on the link and begin to evaluate.

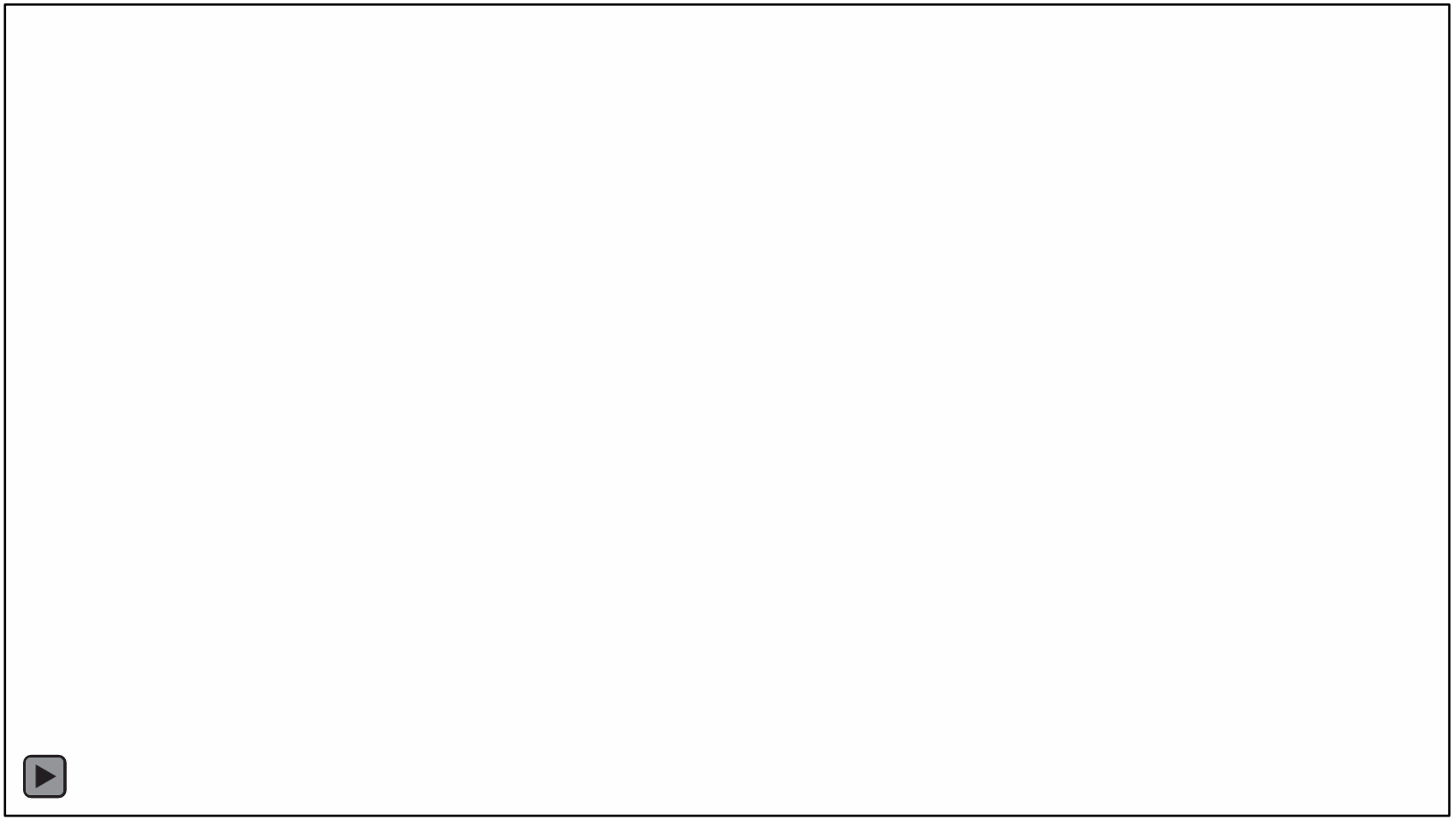
After you have completed the evaluation, an email will automatically be generated to you. In that email, you will be able to click on the link and print your certificate.

The evaluation system will close 30 days after the date of the workshop.

Learning Objectives

- Identify the different components of attention
- Discuss evidenced based options for treating impairments in attention
- Describe techniques for improving attention and the steps involved in carrying out treatments

What is Attention?



Neuroanatomical Model of Attention

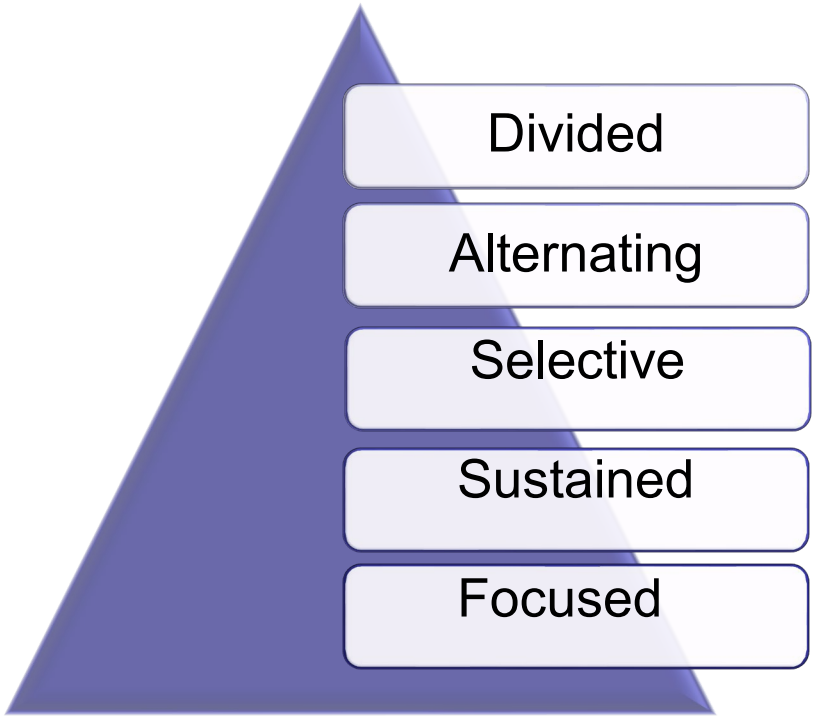
Posner & Peterson, 1990

Neuroanatomy of Attention

BRAIN REGION	ATTENTION NETWORK
Posterior attention system: posterior parietal lobe, superior colliculus, lateral pulvinar nucleus	Orienting of attention in space
Anterior attention system: anterior cingulate gyrus, supplementary motor areas, thalamus	Selection of target information (thalamus); shift/alternate attention (anterior cingulate)
Right pre-frontal cortex and norepinephrine system	Alerting and sustaining attention; maintaining vigilance
Executive system: Dorsolateral prefrontal cortex	Working memory facilitates attention and information retrieval and storage

Clinical Model of Attention

Sohlberg & Mateer, 1987



BI-ISIG Recommendations for the Treatment of Attention Impairments

Practice Standard

- Remediation of attention during *post-acute* rehabilitation after TBI.
- Remediation of attention deficits after TBI should include:

BI-ISIG Recommendations for the Treatment of Attention Impairments

Practice Option:

- Computer-based interventions may be considered as an *adjunct* to clinician-guided treatment for the remediation of attention deficits after traumatic brain injury or stroke.
- Sole reliance on repeated exposure and practice on computer-based tasks without some involvement and intervention by a therapist is *not* recommended.

General Framework for the Rehabilitation of Attention

RECORD-KEEPING

GENERALIZATION

ADAPTATION

HIERARCHICAL ORGANIZATION

REPETITION

THEORETICAL MODEL

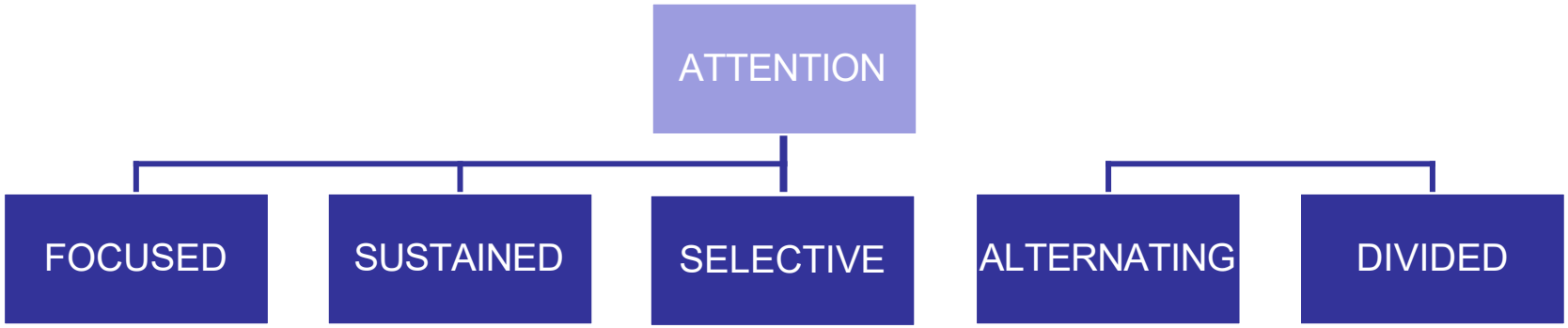
(Sohlberg et al. 2001)

Direct Attention Training

Attention Process Training (APT)

Attention Process Training (APT): Foundation

- Hierarchically organized, clinical theory of attention.
- APT I, II, III
- 5 different tracks:



Attention Process Training (APT): Assessment

GOALS

Assessment of the problem

Identify specific type of attention impairment

Identify tasks for generalization

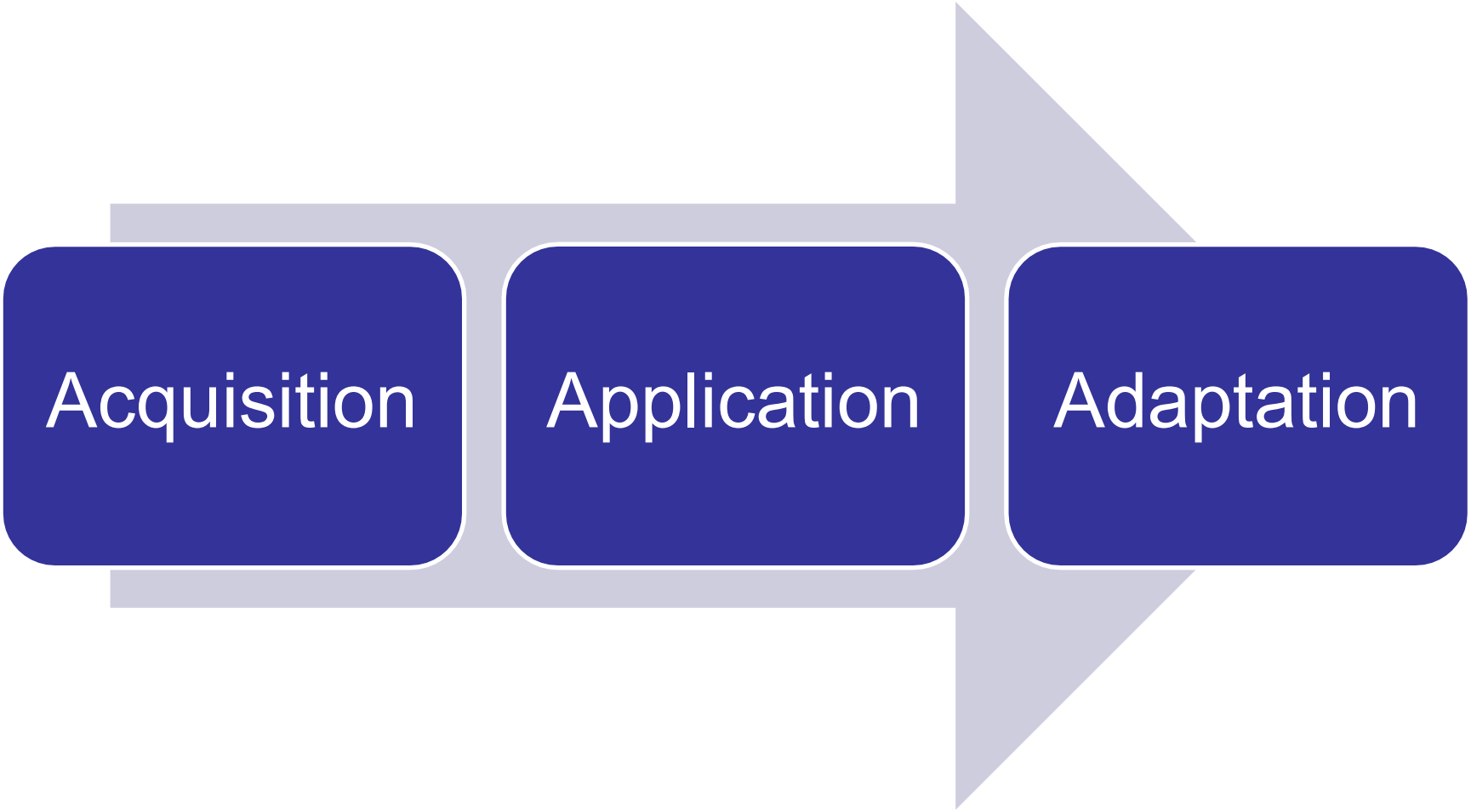
TOOLS

Attention Process Training Test

APT-II Attention Questionnaire

Attention Log

Attention Process Training (APT): Stages of Treatment



Attention Process Training (APT): Materials

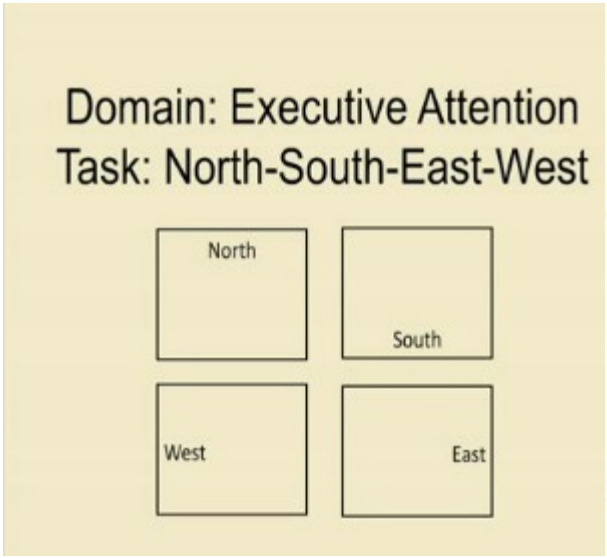
APT-I

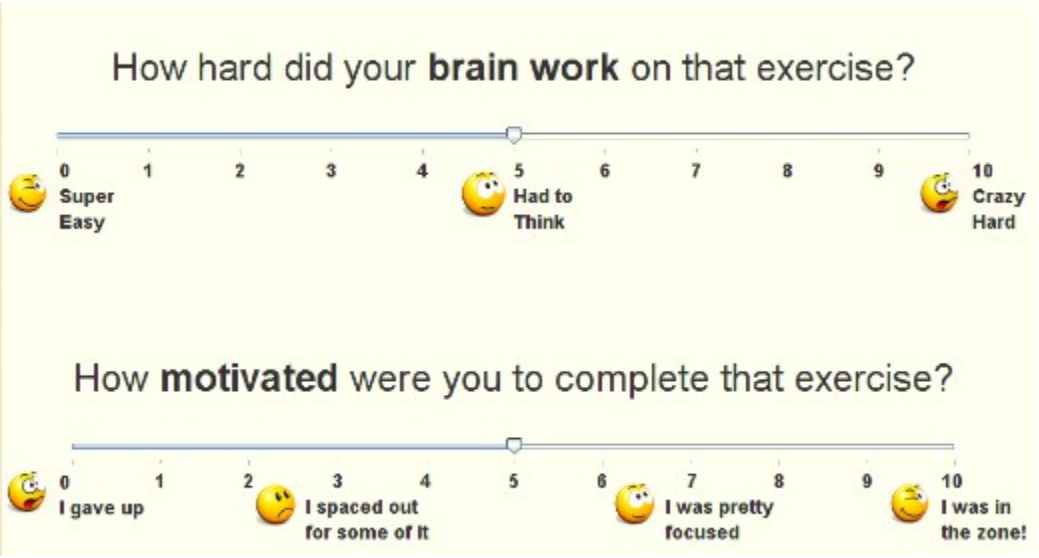
- Cancellation tasks
- Listening for number/letter/words
- Serial numbers
- Mental math
- Sorting cards

APT-II

- Read and scan
- Letter/sentence/ paragraph listening
- Letter/number/word sequencing
- Mental math
- Time monitoring task

APT Task and Assessment





Attention Process Training (APT): Generalization Activities

Example: Alternating Attention

Naturalistic Setting	Functional Task
Residential	Cooking while monitoring the washer/dryer cycles
Vocational	Switching between phone and typing task
Community	Transportation: walking while consulting map

(Sohlberg et al., 2001)

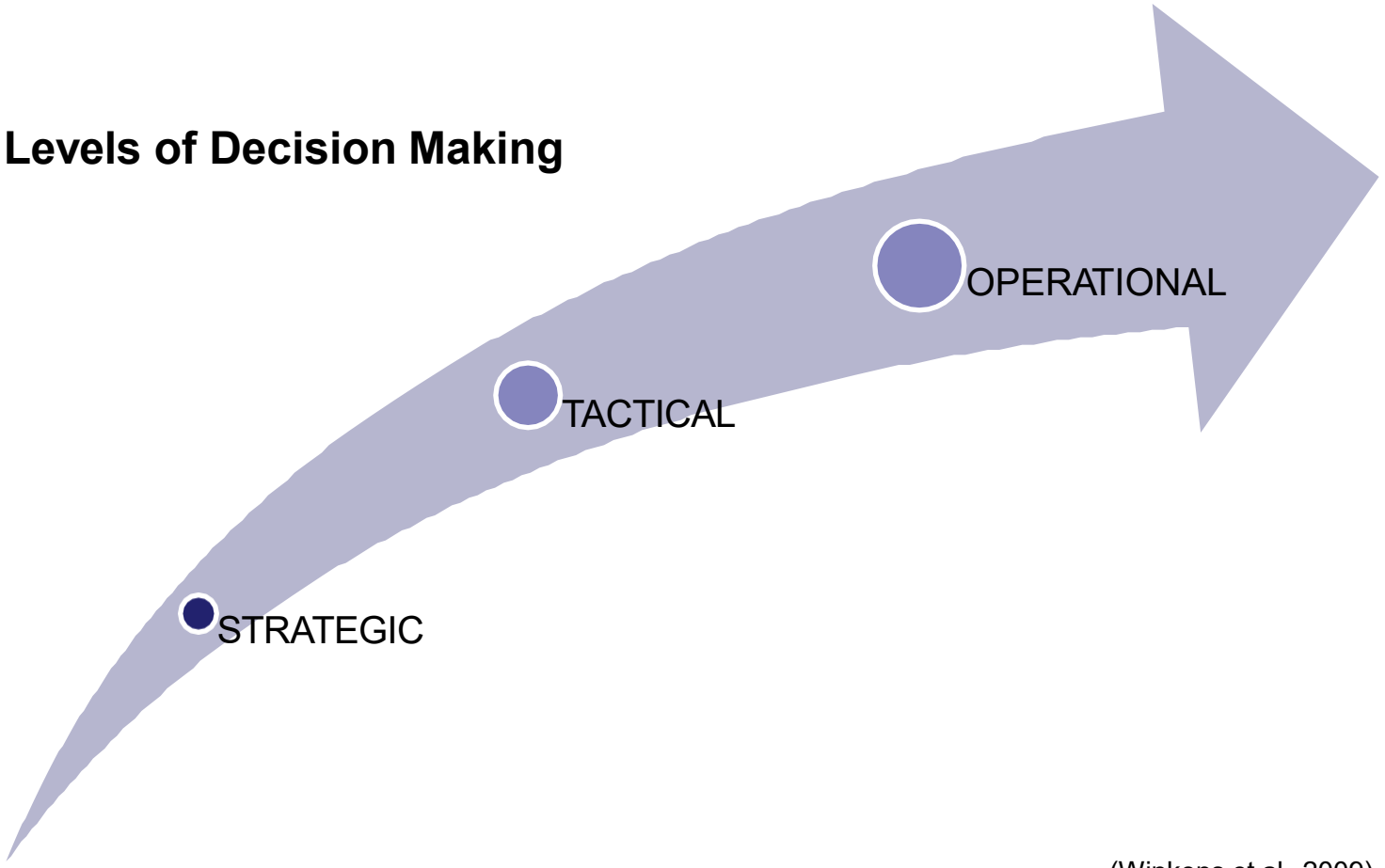
Strategy (Metacognitive) Training

Time Pressure Management (TPM) Training

TPM Training: Foundation

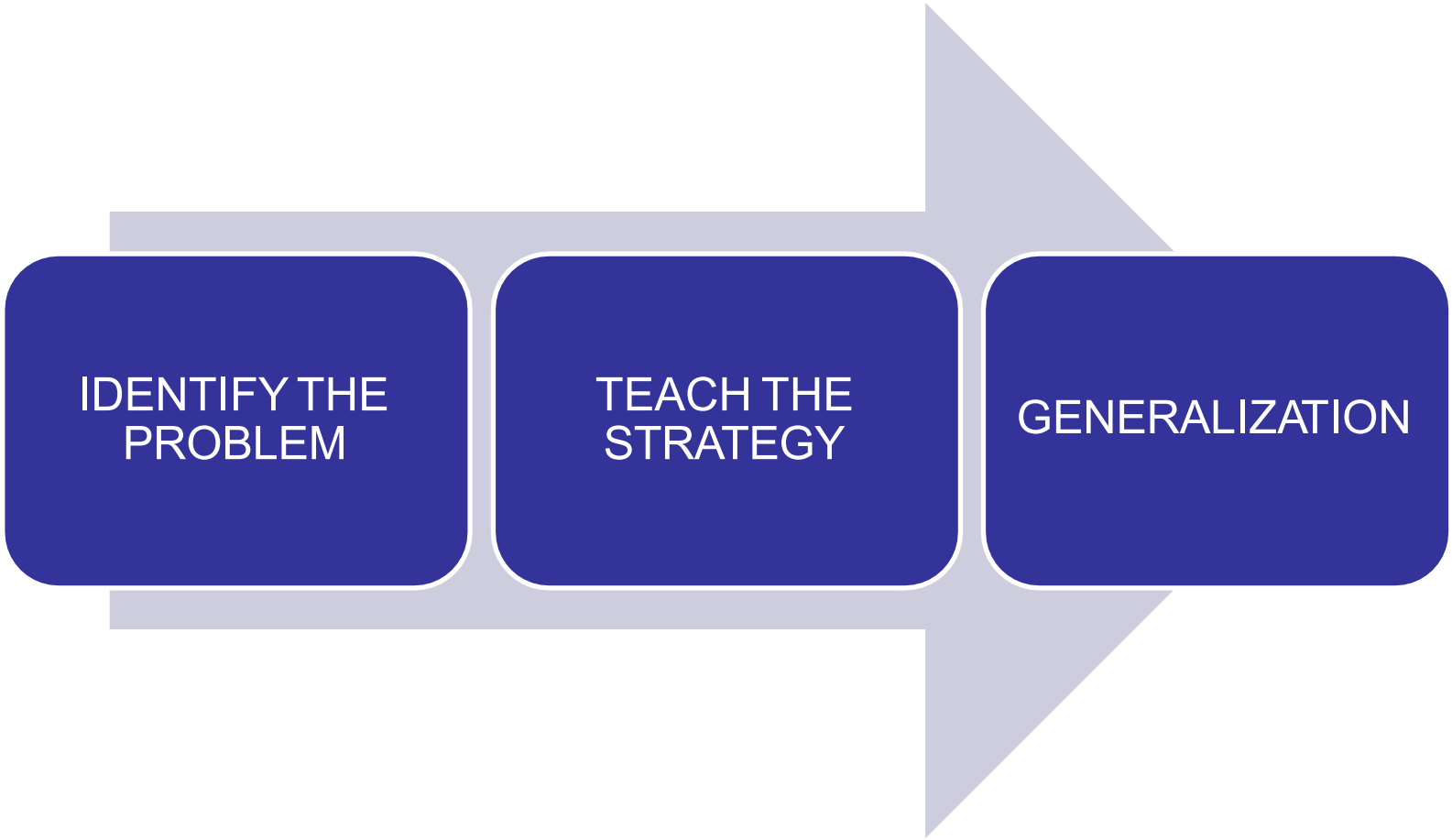
- Compensates for mental slowness.
- Utilizes a structured problem-solving strategy.
- Can be applied to manage multiple cognitive deficits.
- Strategies prevent and manage time pressure.

TPM Training: Strategies



(Winkens et al., 2009)

TPM Training: Stages of Treatment



(Winkens et. al., 2009)

TPM Stage 1: Identify the Problem

COMPONENTS	TREATMENT
Diagnosis of mental slowness	Neuropsychological testing
Patient accepting the problem	Mental Slowness Questionnaire
	Mental Slowness Observation Test
	Practice, feedback, demonstration, explanation

(Van Heugten et al., 2009)

- **Prerequisites**: Awareness of therapist
  Awareness of patient

TPM Stage 2: Teach the Strategy

COMPONENTS	TREATMENT
Awareness of the problem	Analyze task for time pressure
Anticipation and planning	Planning: strategic & tactical
Execution & self-monitoring	Emergency plan
Self-evaluation	Carry out plan using strategies
	Distributed practice, feedback & demonstration

(Van Heugten et al., 2009)

- **Prerequisites**: Awareness (anticipatory & emergent), sufficient cognitive & learning ability, rest, collaboration, understanding that the strategy can be generalized.

TPM Stage 3: Generalization

COMPONENTS	TREATMENT
Apply the strategy in new and more difficult situations	Practice Feedback Demonstration

(Van Heugten et al., 2009)

- **Prerequisites**: Sufficient cognitive skills.

Following A Recipe

- Beef Short Rib Ragu
  - 1½ C beef broth
  - ½ oz dried porcini mushrooms, rinsed
  - 1 T EVOO
  - 1 onion, chopped fine
  - 2 garlic cloves
  - 1 T tomato paste
  - 3 anchovy filets, minced
  - ½ t 5-spice power
  - ½ C dry red wine
  - 1 (14.5 oz) can whole peeled tomatoes, drained with juice reserved, chopped fine
  - 2 lbs boneless beef short ribs
- Creamy Parmesan Polenta
  - 7½ C water
  - Salt and pepper
  - Pinch of baking soda
  - 1½ C coarse-ground cornmeal
  - 4 oz Parmesan chees, grated (2 C) plus extra for serving
  - 2 T unsalted butter

Application of TPM – Meal Preparation

Strategic level

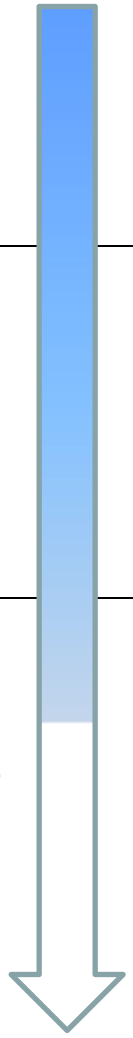
- Preventing time pressure
- Analyzing situation for time pressure
- Anticipation and planning

Tactical level

- Preventing and managing pressure
- Anticipation and planning
- Execution and self-monitoring

Operational level

- Managing overwhelming time pressure
- Execution and self-monitoring
- Emergency plan
- Self evaluation



Actions

- Check pantry for ingredients; make a shopping list; go to the store; anticipate time for travel and shopping, and cooking;
- Locate kitchen equipment/utensils;

- Read recipe thoroughly;
- Decide what things to be done first (e.g. open cans, chop vegetables, grate cheese);

- Begin ragu recipe;
- Stay focused on task; if required to do two things at once, turn off stove while focusing on the secondary task;
- Begin polenta recipe 30 minutes before ragu is finished cooking;
- Plate and serve

Strategy (Metacognitive) Training:

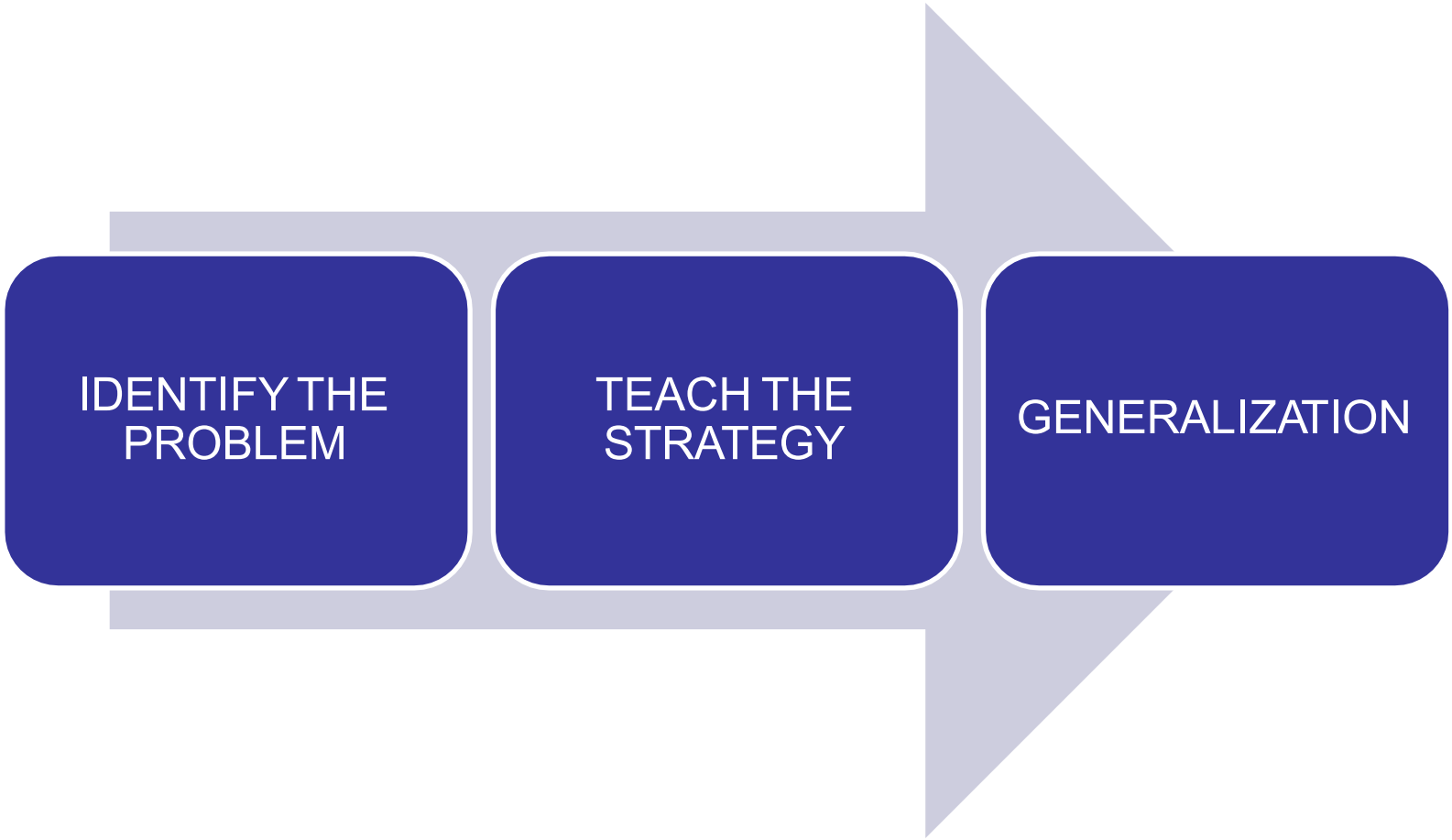
Working Memory Strategy Training

Clinical Assumptions of Working Memory Rehabilitation

- Attention problems become more pronounced in situations that demand attention to rapidly presented information and/or multiple sources of information
- Attention can be improved by addressing underlying problems with working memory
- Patients can be taught to use strategies to help allocate attention resources and manage the rate of information processing

(Cicerone, 2002)

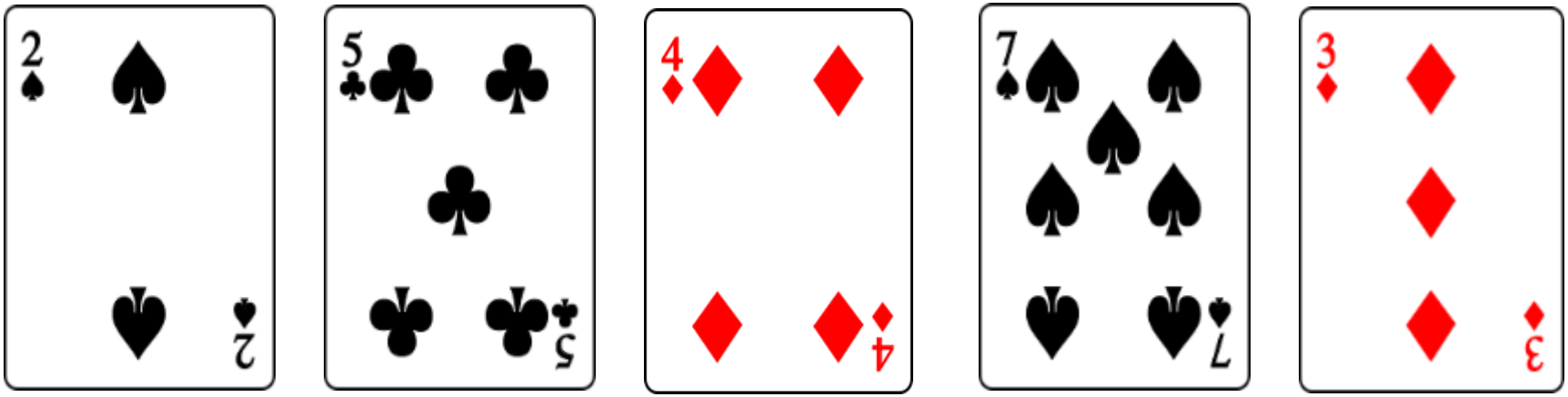
Working Memory Training: Stages of Treatment



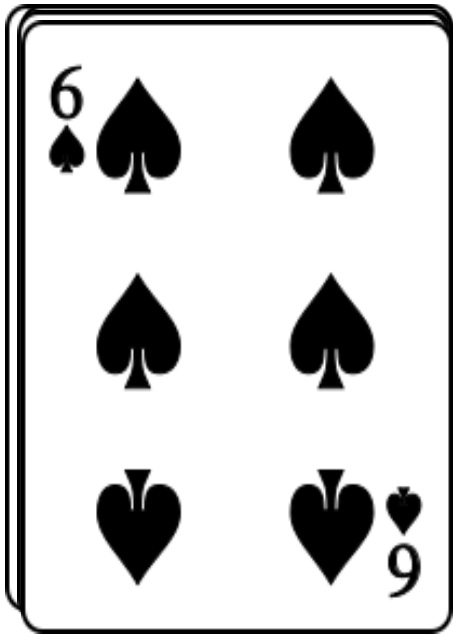
Rehabilitation of Working Memory
General *N-Back* Procedures

- Presentation of a random sequence of stimuli.
- The patient is required to continuously report the stimulus occurring *n* number of stimuli previously
- Current procedure uses a deck of playing cards as stimuli

Level 1: *N-Back* Procedures



Level 1: *N-Back* Procedures



Levels of Working Memory Training

Level 1: Basic 1 & 2 back procedures, manipulations, card sorting task

Level 2: *N*-back with additional working memory demands

Level 3: *N*-back with continuous secondary task

Level 1: Additional Manipulations

- Alternating between naming the number and color of the *n*-back stimulus.
- Name color of card face up prior to naming the number of the *n*-back card.
- Generating an unrelated response.

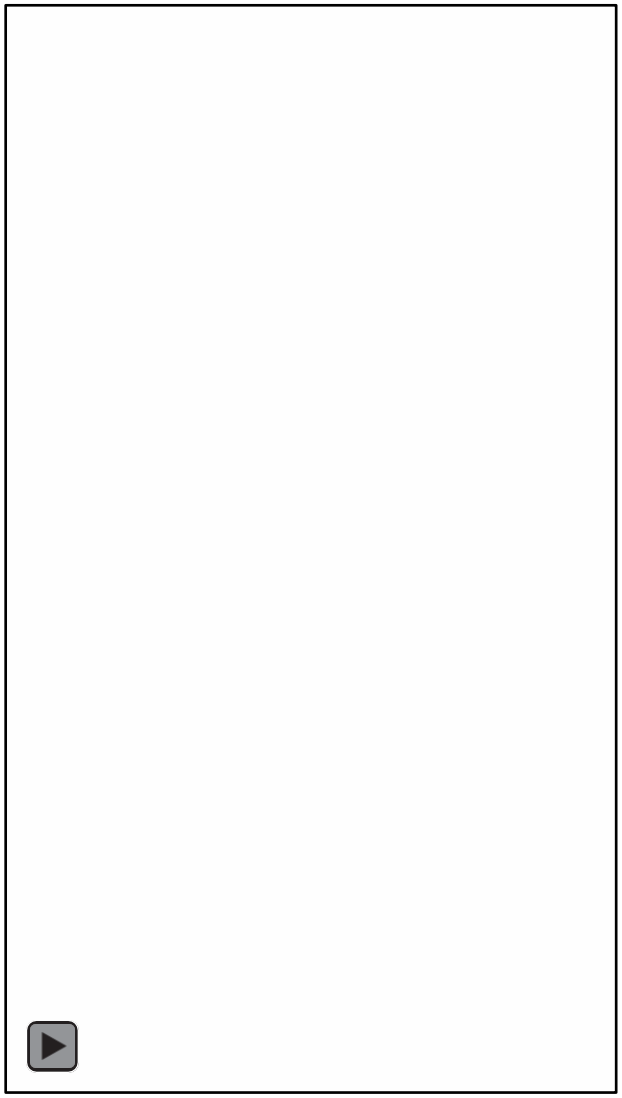
Level 1: Sorting Task

- Participant required to sort cards into four piles by suit while simultaneously reporting the *n*-back card value.
- Four card piles created by participant under the cue card.

Level II: *N-Back* with Additional Working Memory Demands

Condition 1: Generate a response from two or more semantic categories.

Condition II: Patients generate a random letter triad (e.g., AKU)



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

- Primary n-back task along with an ongoing secondary task
- Requires allocation of attentional resources among various task demands
- Designed to simulate ongoing activity and interruption

Working Memory Training: Strategies

Clinical Application

- Treatment implemented in one-hour session; should include:
  - Provide patient feedback on their performance
  - Task variables that influenced performance
  - Strategy development
  - Management of secondary emotional responses
  - Analysis of attention problems in everyday functioning
  - Generalizing strategies from clinic to natural settings

Clinical Application: Dual-Task Considerations

- Patients are instructed to maintain performance on the primary task while ‘sharing’ resources;
- Can instruct patients to place priority on secondary task or shift resources between tasks;
- Foster patient’s self-appraisal and application of strategy use in the context of everyday functioning
- Overall aim is to increase patient’s allocation of attention resources and manage consequences of reduced attention due to fatigue, irritability, or frustration.

Rehabilitation of Attention: Clinical Application -Tracking Progress

Quantitative measures

- Accuracy
- Speed
- Level of cueing

Qualitative measures

- Specific error patterns
- Patient factors
- Environmental factors

Rehabilitation of Attention: Tracking Progress

Factors to consider for goal setting:

- Strategic vs. Tactical Goals
  - Type of task
  - Task complexity
  - Level of cueing
  - Type of strategy
  - Measure of success

Bringing it Together: Sample APT Goals

Long Term Goal: Mr. JK will improve his sustained, selective, and divided attention skills to increase his safety and to facilitate optimal performance on cognitive and functional tasks.

Monthly Goal: Initiate/Continue the acquisition stage of Attention Process Training.

- **Short-term goal:** Mr. JK will perform large shape cancellation tasks with moderate verbal cueing and 75% accuracy

Monthly Goal: Initiate/Continue the application stage of Attention Process Training.

- **Short-term goal:** Mr. JK will perform bimodal small shape cancellation tasks with distracter overlay with 100% accuracy, intermittent verbal cues and time decreased by 25% of baseline

Monthly Goal: Initiate/Continue the application stage of Attention Process Training.

- **Short-term goal:** Mr. JK will independently perform a read and scan task in the presence of natural environmental noise distraction in less than 5 minutes while achieving 90% accuracy for word cancellation and 75% accuracy on reading comprehension.

Bringing it Together: Sample TPM Goals

Long Term Goal: Ms. XX will consistently implement time pressure management strategies in the home environment for complex, multi-step task completion

Monthly Goal: Initiate/continue the acquisition stage of time pressure management training strategy.

- **Short-term goal:** Following clinician review and moderate verbal cueing, Ms. XX will state the four steps for managing complex situations

Monthly Goal: Initiate/Continue the application stage of time pressure management training strategy.

- **Short-term goal:** Ms. XX will generate the components of all 3 levels (strategic, tactical, operational) of a TPM plan for going to the movies with minimum clinician assistance

Monthly Goal: Initiate/Continue the adaptation stage of time pressure management training strategy.

- **Short-term goal:** In functional role-playing scenarios, Ms. XX will appropriately apply the steps of the TPM plan in 80% of opportunities with minimum verbal cues to self-monitor performance.

Bringing it Together: Sample Working Memory Goals

Long Term Goal: Mr. XY will effectively use working memory strategies to improve his complex attention and facilitate increased functional independence on home and work related tasks.

Monthly Goal: Initiate/Continue the acquisition stage of working memory strategy training.

- **Short-term goal:** Following clinician demonstration and practice Pt will perform basic 1-back procedure with 70%acc and max cues to use verbal mediation strategies.

Monthly Goal: Initiate/Continue the application stage of working memory strategy training.

- **Short-term goal:** Pt will perform the 3-back with random generation task in less than 7 minutes, with 75% accuracy and moderate cueing to use verbal mediation strategies.

Monthly Goal: Initiate/Continue the adaptation stage of working memory strategy training.

- **Short-term goal:** Perform 2-back task while following along with audiotaped conversations in less than 5 minutes and with 90 %accuracy.

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