Managing executive functioning difficulties using metacognitive strategy training: Recent advances in stroke rehabilitation

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- with special thanks to all of the study sites and especially the participants -

Outline

Review executive cognitive functions
Overview of meta-cognitive strategy training
  Rationale for use with Executive Function difficulties
Introduce the CO-OPApproach™
  The Evidence
  Key Features & Elements
  Emerging delivery methods
    • Telehealth
    • Interprofessional Practice

PLAN

GOAL

CHECK

DO

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Frontal Lobe Functions

“Terms such as EF, the dysexecutive syndrome, the supervisory system, and frontal lobe functions are challenging to define and measure. The following schema divides what has been loosely termed ‘‘executive functions’’ into four more clearly defined and circumscribed domains that follow anatomy and evolutionary development:

1. Executive cognitive functions,
2. Behavioral self-regulatory functions,
3. Activation regulating functions,
4. Metacognitive processes.”

Cicerone, Levin, Malec, Stuss & Wyte, 2006

Executive Cognitive Tasks: Task Setting (dorsolateral PFC - L)
- Setting correct criterion for response, particularly in early stages of learning, e.g., false positives if impaired, planning ahead, checking watch at start of time sensitive event

Executive Cognitive Tasks: Self-monitoring (dorsolateral PFC – R)
- Monitoring ongoing performance, impairment results in increased variability, increased errors

Meta-cognitive processes (frontal poles – especially Brodmann area 10)
- Self-awareness, personality, humor, social cognition,
- Integrate executive cognitive functions and emotional drive

Energization (superior medial)
- Process of initiating & sustaining a response, e.g., sustaining a response to a warning bell, sustaining production of words in word fluency task over whole task

Self-regulation (orbito-frontal)
- Stimulus - reward processing & associations
- Important when cognitive analysis, habit and/or environmental cues are not sufficient to determine the most adaptive response
- Related to regulating processes required for goal attainment
Executive functioning & rehabilitation

- Engagement in rehabilitation
- Skill acquisition if processes that support learning are impaired
- Goal setting
- Social functioning
- Generalisation of learning
- Coping
- Other?

Assessment and intervention in rehabilitation almost always takes place in controlled, structured environments.

Executive dysfunction manifests itself in unstructured activities of day-to-day life.

How do we manage EF difficulties and enhance performance in daily life?

"Metacognitive strategy training is recommended for deficits in executive functioning ... and as a component of interventions for deficits in attention, neglect and memory."

- Cicerone et al., 2011

...
Examples of interventions using metacognitive strategy training

<table>
<thead>
<tr>
<th>Predict – perform (Goverover et al.)</th>
<th>GMT (Levine et al.)</th>
<th>CO-OP (Polatajko &amp; Mandich)</th>
<th>WSTC (Lawson &amp; Rice)</th>
<th>Problem-Solving (von Cramon)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define goal</td>
<td>Split goal</td>
<td>Goal Plan</td>
<td>What should I be doing?</td>
<td>Orient to problem</td>
</tr>
<tr>
<td>Predict performance</td>
<td>Be in the present</td>
<td>Do Check</td>
<td>Select a strategy.</td>
<td>Define problem</td>
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<tr>
<td>Anticipate problems</td>
<td>State the goal</td>
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<td>Try the Strategy.</td>
<td>Generate alternatives</td>
</tr>
<tr>
<td>Choose a strategy</td>
<td>Split the goal into steps</td>
<td></td>
<td>Check the strategy.</td>
<td>Make a decision</td>
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<tr>
<td>Do it</td>
<td>Check</td>
<td></td>
<td></td>
<td>Do it.</td>
</tr>
<tr>
<td>Evaluate performance</td>
<td></td>
<td></td>
<td></td>
<td>Verify the solution</td>
</tr>
</tbody>
</table>

Theory for use with Impairments in Frontal Processes

We hypothesize that:

- Meta-cognitive or problem solving strategy compensates for impairments in the integrative functions in the frontal poles;
- Strategy provides a buffer between stimulus and response
- May enhance metacognitive skills (self-awareness, self-monitoring, self-regulation).

Theory for applying a metacognitive intervention

“Occurrence of transfer is expected in strategy training as the training programme is not aimed at re-learning specific tasks, but at teaching patients new ways to handle problems resulting from an impairment”

Guesgens et al., 2007
Cognitive Orientation to Daily Occupational Performance Approach

What is CO-OP?
An approach that:
✦ Is client-centred,
✦ Is performance based,
✦ Uses a problem solving approach
✦ Uses (domain-specific) strategies...
✦ identified through a process of guided discovery
...to enable skill acquisition.
Polatajko & Mandich (2004)

CO-OP Objectives
✦ Learning to use a meta-cognitive strategy
✦ Skill acquisition and goal attainment
✦ Generalization and transfer of learning through application of the meta-cognitive strategy
To be considered successful, rehabilitation must result in:

- **clinically significant improvements in performance of and participation in everyday roles and activities;**
- **generalization of effects to untrained roles and activities;**
- **maintenance of gains over time.**

(Sander, 2010; van den Broek, 2005)

**The Evidence**
(in adults with stroke)


**Key Features & Elements**

- Cognitive Orientation to daily occupational performance
- CO-OP
- Client-Oriented Goals
- Dynamic Performance Analysis
- Cognitive Strategy Use
- Guided Discovery
- Enabling Principles
- Parent Significant other involvement
- Intervention Format

Polatajko & Mandich, 2004
Key Feature 1: Client Chosen Goals

- Goals must be personally meaningful
  - Increases motivation
  - Produce higher levels of performance
  - Help to focus behaviour
  - Encourage participation in tasks & task completion
  - Give client hope!

Facilitative Techniques for Goal Setting

- Be direct
  - “Tell me, is there anything you would like to do that you are not doing now?”
- Ask open ended questions about specific tasks.
  - “How are you managing your grocery shopping?”
- Allow sufficient time (10 sec)
  - Remember the person is processing the information.
- Acknowledge and affirm
  - “OK”, “Mmm”
- “Summarize
  - “So, from what you’ve told me, it sounds like ….”

Hunt, Dawson et al, 2015, British Journal of Therapy.

Key Feature 2: Dynamic Performance Analysis

- Ongoing analysis with client of their performance.
- Use of activity analysis to identify performance problems or areas of breakdown
- Iterative
- Intervention guided accordingly.
Key Feature 3: Cognitive Strategy Use

**Global Strategy:** Goal-Plan-Do-Check

**Domain Specific Strategies (DSS):**
- Strategies that are specific to a particular task & situation (cognitive and/or other strategies).
- Introduced to solve specific performance issues as they arise.

(Polatajko & Mandich, 2004)

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Key Feature 4: Guided Discovery

Guided discovery is a way of using language to “guide” the participant to “discover” strategies and make plans to solve their problems or to make plans to work toward their goals.

(Polatajko & Mandich, 2004)

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Guided Discovery

**Scenario:**
Mr. Smith is getting ready to transfer and has not put the brakes on his wheelchair.

**Direct Intervention:**
“Don’t forget to put your brakes on!”

**Guided Discovery – Make it obvious technique:**
“Your chair seems to be moving”
What do you say?

Scenario 1: Jon has trouble getting to therapy appointments on time. At present therapists need to come and find him in his room, and bring him to therapy.

Scenario 2: Mary is getting out of bed at night to use the washroom, and the team is worried that without assistance she might fall.

Posited Active Ingredient 6: Enabling Principles

+ Make it fun.
+ Promote learning.
+ Work towards independence.
+ Promote generalization & transfer.

Intervention format & Emerging Delivery methods

Interprofessional Collaboration
Executive functioning difficulties are common post-stroke & vital to participation in rehab and daily life; Rehabilitation must consider not only what we do but **how** we intervene to support skill acquisition / learning; Meta-cognitive interventions are recommended as a practice standard for adults with executive function difficulties; The CO-OP Approach is one intervention that uses meta-cognitive strategy training, improves performance in everyday life, & is currently being implemented as an interprofessional practice intervention; Exciting time to get involved- stay tuned for emerging evidence!

**Thanks for your attention!**

- NB: Often CO-OP training workshops run in Toronto
- For details visit CO-OP Academy Website: [http://co-opacademy.ca/](http://co-opacademy.ca/)

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