Metacognitive Strategies for Adolescents with an FASD

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Learning Objectives

1. Gain an understanding of metacognition and how it relates to executive functioning

2. Gain an understanding of the importance of encouraging metacognitive strategy use for adolescents with FASD

3. Review context of present study

4. Review metacognitive strategies used by adolescents during executive functioning intervention

5. Discuss how strategies can be applied outside of intervention
What is metacognition?
(Flavell, 1979)

- Thinking about our thinking
- Conscious monitoring of our learning and planning and increased awareness of thinking processes
- Knowledge of one’s cognitive functioning; knowledge of demands of different tasks; monitoring and regulation of functioning
- Commonly used in reading and other academic domains – strongly associated with academic achievement
- Necessary for self-regulation – an area of difficulty with individuals with FASD
What is executive functioning?
(Zelazo & Muller, 2002)

- EF refers to higher-order cognitive processes under conscious control, necessary for thought and action in complex goal-directed behavior and adaptation to environmental changes and demands.

- EF includes:
  - Flexible thinking: the ability to monitor and change behaviour when necessary.
  - Strategy employment: planning future behaviour when faced with new situations and tasks.
  - Initiation and stopping actions, inhibition, fluency, and planning.
Metacognition and Executive Functioning?

(Bewick et al., 1996)

• Executive functions assist in the interplay between multiple cognitive processes, such as memory, problem solving, inhibition, planning, etc.
  • Therefore they may be depicted as *cognitive directors*

• Metacognitive functions oversee the thinking processes
  • Therefore they may be depicted as *awareness directors*

• Executive and metacognitive abilities incorporate the highest levels of cognition

• Metacognitive processes might be at the core of executive functioning

• “Therapeutic approaches that provide explicit metacognitive and self-regulatory techniques appear to be the most efficacious avenue for executive function training with brain injured patients”
Metacognition, executive functioning, and FASD? (Kodituwakku, 2009)

- Individuals with FASD are impaired on many aspects of EF, including:
  - Inhibition
  - Abstract thinking
  - Working memory
  - Deductive reasoning
  - Problem solving
  - Planning
  - Sustained attention

- Metacognitive literature promotes building students’ metacognitive strategies as a means to improve performance

- Few studies have examined such potential in adolescents with FASD and even fewer have done so in the context of executive functioning
Study Context

- Metacognitive study fits within larger EF intervention study
- Cognitive Carnival: a computerized training program designed by University of Victoria
- Combines elements of working memory, inhibitory control, and attention training
- 3 mini games – levels are organized hierarchically by difficulty and can be re-tried as many times as necessary
- Game play was supported by trained interventionists who provided one-to-one coaching by utilizing scaffolding techniques and teaching metacognitive strategies
Study Context

2010
- Children ages 6-12 (all with confirmed FASD diagnosis)
- Metacognitive and self-regulative strategies observed during administration of intervention – but not empirically documented
- Children were observed to not only use strategies when the interventionists suggested, but also on their own

2011
- Included adolescents – up to 16 years (all with confirmed FASD diagnosis)
- Systematic documentation of metacognitive strategy use
- Wanted to capture whether participants were able to use and adopt strategies so that we could relay helpful strategies to parents and teachers to use at home and in the classroom
Study Purposes

1. Provide a descriptive account of the metacognitive/executive function strategies that children and adolescents with FASD could use during tasks that engaged executive function abilities.

2. Differentiate participants’ abilities to use these strategies with help (prompting) or on their own (spontaneous) and see whether there were changes in how they used these strategies over the course of the intervention.
**Sample**

- Began with 11 children and adolescents
- 7 completed the larger intervention study and were included in the present sample
- 5 male / 2 female
- Younger group (n=3): ages 8, 9 & 11
- Older group (n=4): ages 12, 14, 15 & 16
- Mean IQ: 69 (WRIT)
Measuring Metacognitive Strategies

A checklist was used to record the strategies participants used during the intervention. Each session, interventionists recorded when (which game) and how (with help or on their own).

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Taught</th>
<th>Prompted</th>
<th>Spontaneous</th>
<th>Mastered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chunking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive self talk</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rehearsal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rehearsal and pause</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Metacognitive Results – By Strategy

<table>
<thead>
<tr>
<th>Most Participants Spontaneously Used</th>
<th>Few Participants Spontaneously Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clarify directions ✔</td>
<td>Elaboration</td>
</tr>
<tr>
<td>Rehearsal ✔</td>
<td>Goal setting</td>
</tr>
<tr>
<td>Touch screen ✔</td>
<td>Deep breathing</td>
</tr>
<tr>
<td>Nonverbal memorization ✔</td>
<td>Put controller down</td>
</tr>
<tr>
<td>Substitution ✔</td>
<td>Chunking</td>
</tr>
<tr>
<td>List/stack ✔</td>
<td>Compare to where they started</td>
</tr>
<tr>
<td>Discriminate whether to memorize or not ✔</td>
<td>Delay speaking in order to concentrate</td>
</tr>
<tr>
<td>Use of available resources ✔</td>
<td>Count on fingers</td>
</tr>
<tr>
<td>Visualization</td>
<td>Cover screen/eyes</td>
</tr>
<tr>
<td>Make safe choices</td>
<td></td>
</tr>
<tr>
<td>Spatial memorization</td>
<td></td>
</tr>
<tr>
<td>Shorten span</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very effective when used through prompting</td>
</tr>
</tbody>
</table>
Metacognitive Results – By Age

- Hypothesis: Adolescents (ages 12-16) would need fewer prompted strategies than children (ages 8-11)
- Results: Significant difference
- Hypothesis: Adolescents would use more spontaneous strategies than children
- Results: Supported but not significant
- Discussion: Adolescents began and consistently used more spontaneous strategies than younger children – intervention may have been less cognitively demanding for adolescents and/or interventionists may have deemed adolescents to require fewer prompts because they started off using more strategies on their own
## Metacognitive Results – By Time (Adolescents Only)

<table>
<thead>
<tr>
<th>Time</th>
<th>Prompted M</th>
<th>Prompted SD</th>
<th>Spontaneous M</th>
<th>Spontaneous SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1</td>
<td>3</td>
<td>1.83</td>
<td>10.25</td>
<td>2.06</td>
</tr>
<tr>
<td>0-180 mins</td>
<td>2</td>
<td>1.41</td>
<td>11.75</td>
<td>3.30</td>
</tr>
<tr>
<td>Time 3</td>
<td>3.25</td>
<td>2.36</td>
<td>13</td>
<td>2.16</td>
</tr>
<tr>
<td>361-540 mins</td>
<td>1.25</td>
<td>0.50</td>
<td>13.25</td>
<td>3.59</td>
</tr>
<tr>
<td>Time 4</td>
<td>541-720 mins</td>
<td>1.25</td>
<td>0.50</td>
<td>13.25</td>
</tr>
</tbody>
</table>
Some Conclusions…

• Adolescents with FASD can use a number of strategies to aid working memory, inhibition, and attention

• Confirms research showing rehearsal as an available strategy to individuals with FASD (Loomes et al., 2008) – this time in an intervention-based setting

• Participants used 21 working memory strategies. This is important given documented deficits in both visual and verbal working memory

• Can’t conclude that using these strategies directly resulted in improvements in EF, however, they were helpful in the moment, by decreasing task frustration and increasing task success for participants
Real world application for adolescents

Process

- See what strategies they are already using
- Demonstrate **think aloud** process for what strategies you would use
- **Role play** how to use strategy
- **Praise** use of strategy
- **Share** what works with teachers, bosses, mentors

Tasks

- Remembering routines
- Remembering to bring home homework
- Doing chores that have multiple steps
- Planning assignments
- Problem solving at work
- Following directions on the job
References

- Marnie Hutchison’s Master’s thesis on ProQuest:
  - Executive Function Strategies used by Children and Adolescents with Fetal Alcohol Spectrum Disorder


Thank you!

For more information about this work please contact:
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