Effects of Cognitive Remediation on Cognition in Depression

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### Disclosure: Dr. Christopher Bowie

<table>
<thead>
<tr>
<th>Financial Interest or Affiliation</th>
<th>Commercial Enterprise(s)</th>
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<tr>
<td>Advisory board or similar committee</td>
<td>Abbott Labs, Abbvie, Lundbeck, Otsuka, Takeda</td>
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<td>Clinical trials or studies</td>
<td>Pfizer, Scientific Brain Training Pro</td>
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<tr>
<td>Research grants</td>
<td>CIHR, Brain Canada, NIMH, NARSAD, Pfizer</td>
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Description vs. Behavioural Treatment of Cognitive Impairment in Depression

*memory OR attention OR executive function OR neurocognition*
**What Does Cognitive Remediation Look Like?**

**Three Pillars**

<table>
<thead>
<tr>
<th>Pillar</th>
<th>Techniques</th>
<th>Mechanisms</th>
<th>Example</th>
</tr>
</thead>
</table>
| Cognitive Activation | • Drill and Practice  
• Repetitive Exercise  
• Often Computerized | • Neuroplasticity  
• Retraining  
• Stimulation | ![Image of a simulation tool](Image) |
| Strategic Monitoring | • Identify strategy  
• Develop new  
• Prune ineffective | • Metacognitive monitoring  
• Flexible problem solving | ![Image of a man giving a demonstration](Image) |
| Generalization       | • Discussions  
• Role-plays  
• Simulations of Real World Tasks | • Rehearsal  
• Practice  
• Procedural Memory | ![Image of a person using a calculator](Image) |
Points of View

Where Are You?

Here is the group of geometric objects. Indicate the observation point by clicking the appropriate blue circle on the plan to the right.

Submit

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Remember the orders

Beef Roulades
Cream Of Spinach Soup
Fruit Danish
Chai Tea

Memorize the tour.

St Angelo
St Peter
Piazza Colonna
Piazza Venezia
Piazza St Pietro

Basketball game
Points of View

Where Are You?

Here is the group of geometric objects. Indicate the observation point by clicking the appropriate blue circle on the plan to the right.

Submit
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# Early Evidence for CR Efficacy and Effectiveness in Depression

<table>
<thead>
<tr>
<th>Lead Author</th>
<th>Sample Size (Tx group)</th>
<th>RCT?</th>
<th>Techniques</th>
<th>Treatment Duration</th>
<th>Effects on Cognition</th>
<th>Effects on Behaviour</th>
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</thead>
<tbody>
<tr>
<td>Alvarez</td>
<td>11</td>
<td>Yes</td>
<td>✓</td>
<td>12 weeks</td>
<td>Very Large</td>
<td>Small - Modest</td>
</tr>
<tr>
<td>Elgamal</td>
<td>12</td>
<td>No</td>
<td>✓ ✓</td>
<td>10 weeks</td>
<td>Modest</td>
<td>Not Reported</td>
</tr>
<tr>
<td>Naismith</td>
<td>8</td>
<td>No</td>
<td>✓ ✓</td>
<td>10 weeks</td>
<td>Very Large</td>
<td>None</td>
</tr>
<tr>
<td>Meusel</td>
<td>35</td>
<td>No</td>
<td>✓</td>
<td>10 weeks</td>
<td>Modest</td>
<td>None; but ↑ brain function</td>
</tr>
<tr>
<td>Morimoto</td>
<td>11</td>
<td>No</td>
<td>✓</td>
<td>4 weeks</td>
<td>Large</td>
<td>Not Reported</td>
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</table>
Cognitive Remediation for Treatment-Resistant Depression

Effects on Cognition and Functioning and the Role of Online Homework

Christopher R. Bowie, PhD, Maya Gupta, MSc, Katherine Holshausen, MSc, Ruzica Jokic, MD, Michael Best, BSc, and Roumen Milev, MD
Cognitive Remediation Techniques

Part 1: Group Sessions

• 90 minutes per week for 10 weeks

• Group format; 3:1 Patient:Therapist

• Therapist guided; all 3 Pillars of CR
  – Computer-based drill and practice
  – Strategic monitoring
  – Generalization to real-world goals (discussion)
Cognitive Remediation Techniques:  
*Part 2: Homework*

- 40 min/day (e.g., 2 sessions of 20 min/day)  
  - Same exercises completed in session

- Take notes on strategies and generalization
Learning and Memory

Group x Time Interaction $p = .012$,  $Cohen’s d = 1.07$
Attention/Information Processing Speed

Group x Time Interaction $p = .012$, Cohen’s $d = 0.65$
Cognitive Improvement is Associated with Functional Improvement

\[ R^2 = .25 \]
Action-Based Cognitive Remediation vs. Traditional Cognitive Remediation

Action-Based Cognitive Remediation:

1. Reduce the emphasis on computer training in session
   • Cognitive Activation also done at home, online
2. Promote the development and pruning of cognitive and behavioural strategies to solving problems
3. Remove the abstract nature of bridging by bringing the real world into the session
4. Draw on procedural learning skills that are typically intact
5. Focus on “cognitive confidence” and normalizing struggle
Study Characteristics

ABCR (n=24)  
• Strategic Development and Pruning  
• Simulated Real World Activities

Traditional CR (n=22)  
• Group discussion of strategy  
• Discussion of real world applications

Shared Characteristics  
2 hour sessions, 2x weekly, for 10 weeks  
15-20 minute didactic  
Computerized Homework 40 minutes per day (sbtpro.com)

Sample: Adults with depressive disorders engaged in a vocational rehabilitation program
ABCR Results: Verbal Memory

- Baseline: 36
- Endpoint: 44
- Durability: 46

**T-score**

- ABCR
- Traditional CR
ABCR Results:
Functional Capacity

<table>
<thead>
<tr>
<th>Baseline</th>
<th>Endpoint</th>
<th>Durability</th>
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<tbody>
<tr>
<td>66</td>
<td>74</td>
<td>76</td>
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<td>78</td>
<td>86</td>
<td>86</td>
</tr>
</tbody>
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Bar graph showing Functional Capacity total percentage correct for Baseline, Endpoint, and Durability phases, with ABCR and Traditional CR data points.
ABCR Results:
% Retention in Treatment

\[ \chi^2 = .42, \ p = .03. \]
ABCR Results:
% Working 3 to 6m post-treatment

![Bar Chart]

- ABCR
- Traditional CR

$p = .08$
ABCR Results:
Job Stress 3-months Post-Tx

T-Score (Higher = More Stress)

ABCR

Traditional CR

p=.07
Type I: Stand-alone cognitive training

Cognitive Exercise

Neuroplasticity

Improved Daily Functions
Type II: Three Pillars of CR

Cognitive Exercise → Neuroplasticity

Strategy Coaching

Discuss Everyday Behaviour

Modest Improved Daily Functions
Type III: Three Pillars of CR in an Active Learning Environment

- Cognitive Exercise
- Neuroplasticity
  - Strategy Coaching
  - Simulated or Real World Application
- Everyday Participation in Cognitively Complex Activities
- Cognitive Confidence

Large Improvements in Daily Functions