Targeting cognitive dysfunction: Metacognitive Therapy for depression

Jennifer Jordan¹, Janet Carter², Virginia McIntosh, Kumari Fernando, Richard Porter, Cameron Lacey, Roger Mulder, Peter Joyce

¹ University of Otago, Christchurch, NZ
² University of Canterbury, NZ
³ University of Otago, Dunedin, NZ
The most well evaluated psychotherapy for depression is cognitive behaviour therapy (CBT) however only around half achieve remission and relapse is common.

Metacognitive therapy (MCT) is one of the more recent innovative therapies developed to attempt to improve treatment outcomes.
Metacognitions (cognitions re cognition) are responsible for healthy and unhealthy control of the mind. Metacognitions control thoughts and determine whether we can dismiss them or whether we “sink into prolonged and deeper distress” Wells (2009)
MCT model

- Psychological disorder results from (and is maintained by) dysfunction in attentional processes
- Cognitive biases are not automatic
- Instead, individuals intentionally activate perseverative processing strategies that prioritise threat in an attempt to deal with distressing emotion: the Cognitive Attentional Syndrome
- Metacognitive control allows disengagement from these processes for better emotional regulation
  - metacognitive beliefs, attentional capacity, choice of strategy
    - executive control (e.g. attention flexibility)
- Attention training task (ATT) was developed to increase attentional flexibility to enable detachment from the CAS
  - auditory attention exercise
  - selective attention, switching attention, divided attention
Triggers

Depressive Symptoms

Metacognitive beliefs

Positive beliefs
Beliefs about the need (and benefit) of choosing certain strategies

Negative beliefs
Beliefs re uncontrollability of thinking and harm

Depression continues

CAS
Rumination
Worry
Threat monitoring
Avoidance (cognitive, emotional, behavioural)
Unhelpful coping behaviours

Depressive Symptoms
Triggers

CAS

Rumination
Worry
Threat monitoring
Avoidance (cognitive, emotional, behavioural)
Unhelpful coping behaviours

New strategies to disengage from the CAS
Attention training task
Detached mindfulness
Attention refocussing

Depressive Symptoms

New strategies
Challenge MC beliefs
Resume more effective strategies

Depression continues

Metacognitive beliefs

Positive beliefs
Beliefs about the need (and benefit) of choosing certain strategies

Negative beliefs
Beliefs re uncontrollability of thinking and harm
MCT for depression - the evidence so far

- Dammen, Papageorgiou & Wells (2014)
  - Open trial n=11, referred
  - Group MCT for major depressive disorder (10 x 90 min weekly sessions)

- Wells et al (2012)
  - Platform trial MCT for treatment resistant depression (n=10)

  - Multiple baseline (n= 4)
  - MCT for severe and recurrent depression

- Nordahl (2009)
  - RCT (MCT n= 15, CBT n=13)
  - Outpatient clinic- mixed anxiety/depression sample
MCT—other relevant studies

- Papageorgiou & Wells (2000)
  - Single case series (n=4)
  - ATT for recurrent depression

- Siegle, Ghinassi & Thase (2007)
  - RCT (Cognitive control training n=19, TAU* n=12)
  - 6 x 35 min intervention over 2 weeks for depression
    - Computerised version of Attention Training Technique (ATT)
    - Paced Auditory Serial Attention Task (activates the DLPFC)

- Siegle, Price, Jones, Ghinassi, Painter, & Thase (2014) sequential assignment
  - n= 43 severely depressed patients 6 sessions over 2 weeks
  - CCT and TAU both effective in reducing depression level but NS difference
  - BUT CCT > TAU reducing rumination and subsequent year service utilisation
  - Pupillary oscillation (task engagement before RX) → positive response

- Calkins, McMorran, Siegle & Otto (2014)
  - RCT n=48 with depression recruited from community, (BDI-II 17-35 range)
  - Cognitive control training vs control (Peripheral Vision Training)
  - 3 x 1 hour sessions over 2 weeks
  - CCT>PVT (ES .73) Moderate → mild depression
Neuropsychological changes after ATT for post traumatic symptoms

- Callinan, Johnson & Wells 2014
- N=60 RCT
- University students reporting a traumatic event
- ATT – 12 mins, 4 sessions vs attention filler task
- Recorded trauma narrative played pre-post Rx
- Findings:
  - Reduced intrusions + self-focussed attention
  - Improved emotional set shifting task + attentional flexibility
Aim

- Pilot study of a planned RCT

- Key research questions
  1) is MCT more effective than CBT in reducing depressive symptoms at end treatment (12 weeks)?
  2) does MCT work more quickly than CBT (change at 4 weeks)?
  3) Will MCT be more effective than CBT in improving executive function and attention (at 4 weeks and end treatment)
The COMET study

METHODS
## Participants - referred

### Inclusion criteria
- Adults (18-65 years)
- Unipolar depression or Bipolar II depressed phase
- Able to converse and answer questionnaires in English
- Informed consent

### Exclusion
- Bipolar I
- Schizophrenia
- Severe substance abuse
- Major physical illness
- Psychotropic medication
- Recent adequate course of CBT or MCT
Procedure

Comprehensive baseline assessment

- **Clinician rated**
  - SCID I, depression severity, global assessment of functioning (GAF)

- **Self-report**
  - Quick Inventory of depressive symptomatology (QIDS-C)
  - Penn State Worry Questionnaire

- **Neuropsychological assessment**
  - Groton Maze Learning Test (GMLT)
  - Controlled Oral World Association Test (COWAT)
  - Rapid Visual Information Processing Test (RVIP)
Therapy phase

- 12 weeks of therapy (range 8-15 sessions)
  - 6 sessions in the first 4 weeks
- Weekly self-report mood monitoring
- If mood or risk status deteriorated, participants were referred for other treatment

Therapies:

All four therapists did both therapies
- Clinical psychologists (2-18 yrs experience)
- Training: attended workshops, followed treatment manuals and were closely supervised (but not by trained MCT therapists)
Statistics

Depression outcome

Primary outcome variable (a priori)
- % change in independent clinician-rated depression, LOCF
- Quick Inventory of Depressive Symptomatology–Clinician
  - (QIDS–C-16 item)
- Three time points
  - Weeks 0 (baseline), 4 and 12 (end treatment)
- Independent t tests, paired t-tests, chi-square, Cohen’s $d$

Neuropsychological outcome

- ANCOVA
  - Neuropsychological test change: Week 0-4, and Week 0-12
  - Therapy as fixed factor
  - Baseline depression as a covariate
Results
## Descriptive data

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>37.2 years</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td>Males 51% Females 49%</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td>74% Caucasian 7% Maori 19% Other</td>
</tr>
<tr>
<td><strong>Employment</strong></td>
<td>74% employed</td>
</tr>
<tr>
<td><strong>Age onset</strong></td>
<td>Age of onset: 19.8 years</td>
</tr>
<tr>
<td><strong>Prior MDD episodes</strong></td>
<td>3.7</td>
</tr>
<tr>
<td><strong>Past suicide attempt</strong></td>
<td>33%</td>
</tr>
<tr>
<td><strong>Penn State Worry Q</strong></td>
<td>63 (range 27-78)</td>
</tr>
<tr>
<td><strong>GAF</strong></td>
<td>55.1 – moderately impaired</td>
</tr>
</tbody>
</table>
## Lifetime Axis I comorbidity

<table>
<thead>
<tr>
<th>Disorder</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>Alcohol abuse/dependence</td>
<td>43%</td>
</tr>
<tr>
<td>Cannabis abuse/dependence</td>
<td>31%</td>
</tr>
<tr>
<td>Panic dis</td>
<td>37%</td>
</tr>
<tr>
<td>Social phobia</td>
<td>37%</td>
</tr>
<tr>
<td>PTSD</td>
<td>33%</td>
</tr>
<tr>
<td>OCD</td>
<td>10%</td>
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</tbody>
</table>

NS differences but imbalance in burden of comorbidity disadvantaging MCT
Baseline assessment

Randomisation n=48

Metacognitive Therapy
MCT n=23

Cognitive Behaviour Therapy
CBT n=25

Post-treatment assessment
12 weeks

Follow-up assessments
6 months

2 years

MCT 19/23
2 early dropout
3 No end data
18 completed

CBT 21/25
2 early dropout
6 No end data
17 completed

(Metacognitive Therapy was assessed by Neuropsych n=16)

(Cognitive Behaviour Therapy was assessed by Neuropsych n=18)
## Depression severity level

**Overall mean (SD)** 15.1 (4.29)  
**Range** 6-23

<table>
<thead>
<tr>
<th>QIDS-C</th>
<th>Severity range</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not depressed</td>
<td>&lt;5</td>
<td>0</td>
</tr>
<tr>
<td>Mild</td>
<td>6-10</td>
<td>12.5</td>
</tr>
<tr>
<td>Moderate</td>
<td>11-15</td>
<td>45.8</td>
</tr>
<tr>
<td>Severe</td>
<td>16-20</td>
<td>31.3</td>
</tr>
<tr>
<td>Very severe</td>
<td>21+</td>
<td>10.4</td>
</tr>
</tbody>
</table>
Changes in depression scores by Week 4
(QIDS\textsubscript{16-C})

<table>
<thead>
<tr>
<th></th>
<th>MCT n=23</th>
<th>CBT n=25</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 0</td>
<td>15.3 (4.1)</td>
<td>15.0(4.5)</td>
<td>.24</td>
<td>.81</td>
</tr>
<tr>
<td>Week 4</td>
<td>10.8 (6.0)</td>
<td>10.0 (5.5)</td>
<td>.50</td>
<td>.62</td>
</tr>
<tr>
<td>% change</td>
<td>27%</td>
<td>28%</td>
<td>-.06</td>
<td>.96</td>
</tr>
</tbody>
</table>

NS difference at baseline or at week 4 between therapies
## Change in depression scores by Week 12 (QIDS$_{16}$-C)

<table>
<thead>
<tr>
<th></th>
<th>MCT n=23</th>
<th>CBT n=25</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 0</td>
<td>15.3 (4.1)</td>
<td>15.0 (4.5)</td>
<td>.24</td>
<td>.81</td>
</tr>
<tr>
<td>Week 12</td>
<td>8.1 (6.7)</td>
<td>7.5 (5.9)</td>
<td>.34</td>
<td>.74</td>
</tr>
<tr>
<td>% change</td>
<td>45%</td>
<td>47%</td>
<td>-.14</td>
<td>.89</td>
</tr>
</tbody>
</table>

NS difference between therapies at week 4
## Other measures of response (clinician)

<table>
<thead>
<tr>
<th>QIDS</th>
<th>MCT</th>
<th>CBT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-post effect size (ITT)</td>
<td>1.03</td>
<td>1.03</td>
</tr>
<tr>
<td>Pre-post effect size (completers)</td>
<td>1.12</td>
<td>1.44</td>
</tr>
<tr>
<td><strong>Self-report</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-post effect size (ITT)</td>
<td>1.12</td>
<td>0.96</td>
</tr>
<tr>
<td>SR Pre-post effect size (completers)</td>
<td>1.33</td>
<td>1.09</td>
</tr>
<tr>
<td>Non-depressed range at end treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(QIDS-C)</td>
<td>44%</td>
<td>44%</td>
</tr>
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6 month follow-up - changes maintained  
Still n.s. difference between treatments
Neuropsychological test results

- **Pre-treatment**  ns diffs

- **Change Weeks 0-4**  ns diffs
  - Small or no change on any test

- **Change Weeks 0-12**
  - Controlled Word Association test
    - Both groups improved but ns diffs
Neuropsychological results

The MCT group made fewer errors while CBT group did not change ($p=0.03$)
Large effect size difference between therapies; Cohen’s $d = 0.77$
Trend (p=0.07) for advantage for MCT for mean correct latency (time taken to reach a correct response)
MCT became faster while CBT became slower
Moderate effect size between therapies (0.65)
Discussion

Depression outcome

- Both therapies were effective in reducing depressive symptoms by end treatment, noteworthy as there was greater comorbidity in the MCT group and MCT was applied independently of the originators
  - Treatment gains were maintained at 6 month follow-up

Neuropsychological outcome

- Minimal change detectable at 4 weeks
- Appears to be an advantage for MCT in improving some aspects of executive function e.g. attention
- Changes in depression severity and neuropsychological function were independent
  - No significant correlations for any tests with the QIDS-C
Re depression outcome

- Failure to detect differences between therapies
  - Similar to Nordahl et al study
  - Consistent with Lambert, Wampold - Dodo effect
- Smaller effect size for this independently applied MCT study vs Well’s MCT studies
- Adds to accumulating support for the efficacy of MCT

Re neuropsych outcome

- Cognitive remediation literature suggests that changes tend to be focal rather than global
  - ATT improved attentional aspects
- Provides support for the purported mechanism of action of MCT
- Given the independence of change in neuropsychological function and mood seen here… what are the clinical implications of changes in neuropsychological function?
Limitations
- Small sample (power)
- Imbalanced comorbidity

Strengths
- Standardised measures
- Independent raters
- Follow-up data
- Participants were drug free
- Largest study so far
- First study of neuropsych in MCT for depression
- Independent application of MCT
Conclusions

- Although our initial analyses suggested little overall difference between MCT and CBT, post hoc analyses suggest that there may be some interesting differences.

- The emphasis in MCT on attention training and flexible control of thinking may have a beneficial effect on neuropsychological functioning, consistent with the purported mechanism of action.

- Supports increasing calls to add cognitive remediation elements to psychotherapy.

- This study requires replication with a larger sample.
Acknowledgements

- NZ Lottery Health grant
- University of Otago Research grant
- University of Summer studentship

- Clinical Research Unit staff
  - Julia Martin, Robyn Abbott, Bridget Kimber, Andrea Bartram, Steff Watts, Megan Tapper, Amanda Baird, Jo Vallance

- And of course, the participants
### Therapy components

<table>
<thead>
<tr>
<th>CBT</th>
<th>MCT</th>
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<table>
<thead>
<tr>
<th><strong>KEY FOCUS = thought content</strong></th>
<th><strong>KEY FOCUS = thinking style</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CBT model</strong></td>
<td><strong>MCT model</strong></td>
</tr>
<tr>
<td>Behavioural activation</td>
<td><strong>Attention training technique</strong></td>
</tr>
<tr>
<td>Activity scheduling</td>
<td><strong>Attentional (external) refocusing</strong></td>
</tr>
<tr>
<td>Pleasant and mastery events</td>
<td><strong>Addressing the Cognitive attentional syndrome</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Detached mindfulness</strong></td>
</tr>
<tr>
<td>Evaluating and challenging</td>
<td><strong>Challenging positive and negative</strong></td>
</tr>
<tr>
<td>automatic thoughts</td>
<td><strong>metacognitions</strong></td>
</tr>
<tr>
<td>Behavioural experiments</td>
<td><strong>Behavioural experiments</strong></td>
</tr>
<tr>
<td>Relapse prevention</td>
<td><strong>Therapy blueprint</strong></td>
</tr>
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