Does Cognitive Bias Modification During Alcohol Withdrawal Reduce Craving?

Dr Victoria Manning
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Background

- Most of AOD-dependent clients relapse after treatment (Marlatt and Gordon, 2005, Boothby, 2005)
- Craving a determinant of relapse (MacKillop & Monti 2007)
- Drug-related cues in environment trigger craving (Witterman et al, 2015; Beck et al, 2012)
- Many patients demonstrate an attentional bias and an approach bias to alcohol-related cues (Field et al, 2005, Wiers et al, 2011; Ernst et al, 2014)
Dual process models (Deutsh & Strack, 2004)

OVERACTIVE
Automatic/Impulsive 'motivational' processes:
- Bottom-up (striatum, amygdala, hippocampus)
- fast/spontaneous
- associative
- evoked by AOD-related stimuli
- Influenced by
  - Attentional bias
  - Approach bias (action tendency)

UNDERACTIVE
Reflective/Executive Control processes:
- Top down (Prefrontal Cortex)
- Slower
- Controlled
- Rational decision-making
- Considers negative consequences
- Considers alternative behaviours/responses
- Considers longer future goals/rewards
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Studies on CBM

- Cognitive bias modification (CBM) can re-train biases
- Approach bias re-training better than attentional bias re-training
  - Wiers et al (2010) 1 AAT session changed approach tendency to avoidance tendency in hazardous drinkers and reduced consumption in a taste test, no effect on subjective craving
  - Wiers et al (2011) 4 sessions switched an ‘approach bias’ to an ‘avoidance bias’ & increased 1-year abstinence rates by 13%
  - Eberl et al (2013) 12 sessions led to an 8% increase in abstinence
Impact on CBM craving

Pre-post training
Interaction of Group X Time
\( (F(1, 194) = 3.4, p = .069) \)

Insights from fMRI research

- Alc cue-evoked activation in amygdala & NA
- Activation correlated with craving & arousal ratings of alc stimuli
- RCT of CBM versus Sham training (n=32)
- Trained group > reductions in activation in amygdala & in behavioral arousal ratings of alcohol pictures
- Decreases in right amygdala activity correlated with decreases in craving in the CBM group only
- No Group X Time interaction on subjective craving score but sig reduction in CBM group only \((p<.01)\) paired t-test

Wiers et al (2011)
Cognitive Bias Modification Training During Inpatient Alcohol Detoxification Reduces Early Relapse: A Randomized Controlled Trial

Victoria Manning, Petra K. Stager, Kate Holt, Joshua B.B. Garfield, Gabriella Palka, Daniel Leung, Laura K. Hughes, Jairad A. D. Jurr, Dan I. Latimer, and Antonio Verdejo-Garcia

Background: Relapse is common in alcohol-dependent individuals and can be triggered by alcohol-related cues in the environment. It has been suggested that these individuals develop cognitive biases, in which cues automatically capture attention, and elicit an approach action tendency that promotes alcohol drinking. The study aim was to examine whether cognitive bias modification (CBM) training targeting approach bias could be delivered during inpatient alcohol detoxification and improve treatment outcomes.

Methods: Using a two-group parallel design (1:1) randomized controlled trial with allocation concealed in the envelope, 55 alcohol-dependent inpatients received either a 4-session CBM training or a control condition aimed at reducing automatic attention to pictures of alcoholic beverages and approach responses in response to pictures of nonalcoholic beverages, or 4 sessions of sham training (control) delivered over 4 consecutive days during the 7-day detoxification program. The primary outcome measure was continuous abstinence at 2 weeks postdetoxication. Secondary outcomes included time to relapse, frequency and quantity of alcohol consumption, and craving.

Results: Seventy-three (97%) participants were consented and assigned, of whom 69 (completed all 4 sessions of CBM training and control condition). In the intervention group, there was a trend for higher abstinence rates in the CBM group relative to controls (84 vs. 47%, p = 0.03). However, a preplanned analysis revealed significantly higher abstinence rates among participants completing 4 sessions of CBM relative to controls (76% vs. 47%, p = 0.02). Craving scores, time to relapse, mean drinking days, and mean standard drinks per drinking day did not differ significantly between the groups.

Conclusion: This is the first trial demonstrating the feasibility of CBM delivered during alcohol detoxification and supportive care research suggesting it may be a useful, low-cost adjunctive treatment to improve treatment outcomes for alcohol-dependent patients.

The Alcohol Approach-Avoidance Task (AAT)

Active Training condition

Landscape image

Pushing joystick shrinks image size (i.e. "avoidance action")
The Alcohol Approach-Avoidance Task (AAT)

Active Training condition

Pulling joystick zooms in on image size (i.e. "approach action")

Portrait image

Sham Training Condition

Pushing joystick shrinks image size (i.e. "avoidance action")

Pulling joystick zooms in on image size (i.e. "approach action")
Results

- Abstinence rates (zero alcohol since discharge)

<table>
<thead>
<tr>
<th>Number of sessions</th>
<th>% abstinent CBM</th>
<th>% abstinent Sham training</th>
<th>( \chi^2 )</th>
<th>( p )</th>
<th>( \text{Eta}^2 )</th>
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<tbody>
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<td>1 - 4 (n = 71)</td>
<td>68.6 (n = 35)</td>
<td>47.2 (n = 36)</td>
<td>3.32</td>
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<td>0.22</td>
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<td>2+ (n = 69)</td>
<td>70.6 (n = 34)</td>
<td>48.6 (n = 35)</td>
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<td>3+ (n = 66)</td>
<td>72.7 (n = 33)</td>
<td>48.5 (n = 33)</td>
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<td>4 (n = 61)</td>
<td>75.0 (n = 32)</td>
<td>44.8 (n = 29)</td>
<td>5.80</td>
<td>0.02*</td>
<td>0.31</td>
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</table>

3 or 4 sessions increases odds of abstinence by almost 3 times (OR=2.8, \( p<.05 \))

Impact on Craving

- CBM
- Controls

\*p<.05, \**p<.01, \***p<.001
### Changes in craving post-training

**Tests of Within Subjects Effects**

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
<th>Partial Eta Squared</th>
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<td>20.264</td>
<td>32.833</td>
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<td>Time * group</td>
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### Changes in craving at follow-up

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Conclusion

- CBM can increase abstinence
- CBM may reduce alcohol craving during acute withdrawal phase and particularly post-discharge.
- Null findings replicate earlier studies (Wiers et al, 2011, 2015)
- May reflect diffs in cued verses un-cued craving?
- CBM likely reduces “wanting” rather than “liking”
- ACQ-R inappropriate/insensitive measure
- CBM recommended as an adjunctive treatment

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Katherine Mroz - Monash

All patients and staff
at both Wellington House and Windana

Prof Reinout Wiers –
University of Amsterdam
Victoria Manning
Senior Research Fellow
Strategic Lead Treatment & Systems
T: +61 03 84138428
victoriam@turningpoint.org.au
victoria.manning@monash.edu