DOES COGNITIVE BIAS MODIFICATION DURING ALCOHOL WITHDRAWAL REDUCE CRAVING?

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APSAD Conference
Oct 30th - 2nd Nov 2016

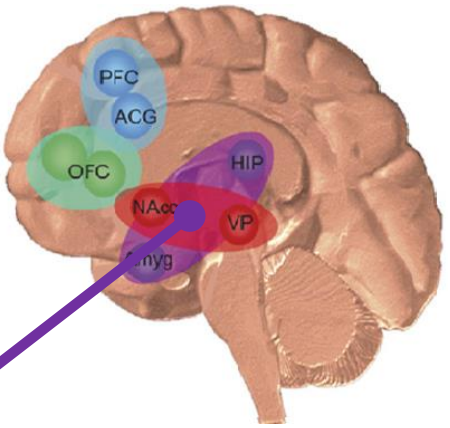
Background

- Most of AOD-dependent clients relapse after treatment (Marlatt and Gordon, 2005, Boothby, 2005)
- Craving a determinant of relapse (MacKilliop & 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, amgydala, hippocampus)
- fast/spontaneous
- associative
- evoked by AOD-related stimuli
- Influenced by
  - Attentional bias
  - Approach bias (action tendency)



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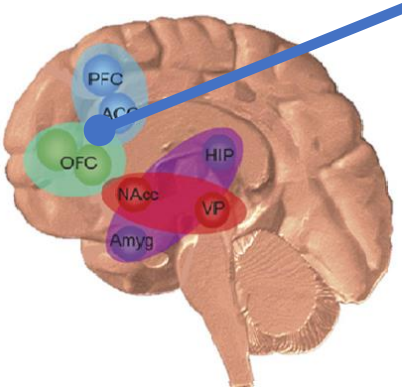

UNDERACTIVE
Reflective/Executive Control processes:

- 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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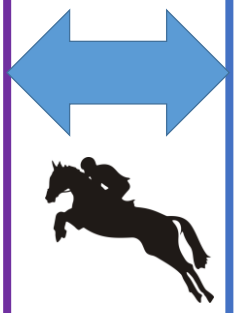

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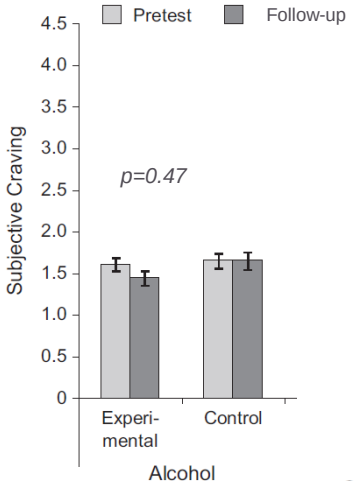
Studies on CBM

- 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



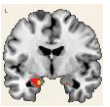
Pre-post training
Interaction of Group X Time

($F(1, 194) = 3.4$, $p = .069$)

Wiers et al (2011)

Fig. 3. Mean subjective craving scores for alcohol and soft drinks at pretest and posttest for participants in the two groups (experimental and control). Error bars indicate ±1 *SEM*.

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 (2015)

Alcoholism: Clinical and Experimental Research
Vol. **, No. *
** 2016

Cognitive Bias Modification Training During Inpatient Alcohol Detoxification Reduces Early Relapse: A Randomized Controlled Trial

Victoria Manning, Petra K. Staiger, Kate Hall, Joshua B.B. Garfield, Gabriella Flaks, Daniel Leung, Laura K. Hughes, Jarrad A. G. Lum, Dan I. Lubman, 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 seeking. The study aim was to examine whether cognitive bias modification (CBM) training targeting approach bias could be delivered during residential alcohol detoxification and improve treatment outcomes.

Methods: Using a 2-group parallel-block (ratio 1:1) randomized controlled trial with allocation concealed to the outcome assessor, 83 alcohol-dependent inpatients received either 4 sessions of CBM training where participants were implicitly trained to make avoidance movements in response to pictures of alcoholic beverages and approach movements in response to pictures of nonalcoholic beverages, or 4 sessions of sham training (controls) delivered over 4 consecutive days during the 7-day detoxification program. The primary outcome measure was continuous abstinence at 2 weeks postdischarge. Secondary outcomes included time to relapse, frequency and quantity of alcohol consumption, and craving. Outcomes were assessed in a telephonic follow-up interview.

Results: Seventy-one (85%) participants were successfully followed up, of whom 61 completed all 4 training sessions. With an intention-to-treat approach, there was a trend for higher abstinence rates in the CBM group relative to controls (69 vs. 47%, $p = 0.07$); however, a per-protocol analysis revealed significantly higher abstinence rates among participants completing 4 sessions of CBM relative to controls (75 vs. 45%, $p = 0.02$). Craving score, time to relapse, mean drinking days, and mean standard drinks per drinking day did not differ significantly between the groups.

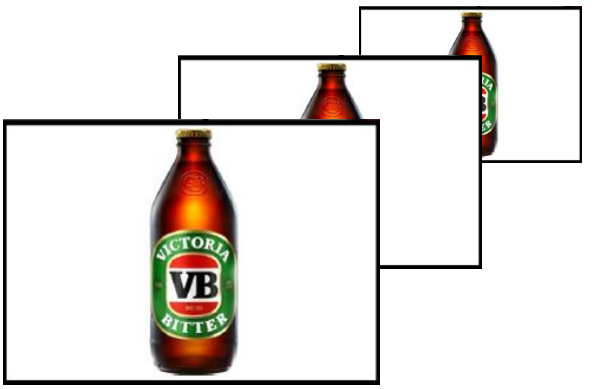
Conclusions: This is the first trial demonstrating the feasibility of CBM delivered during alcohol detoxification and supports earlier research suggesting it may be a useful, low-cost adjunctive treatment to improve treatment outcomes for alcohol-dependent patients.

Key Words: Abstinence, Alcohol, Cognitive Bias Modification, Inpatient Withdrawal, Randomized Controlled Trial.

The Alcohol Approach-Avoidance Task (AAT)

Active Training condition

Landscape image



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

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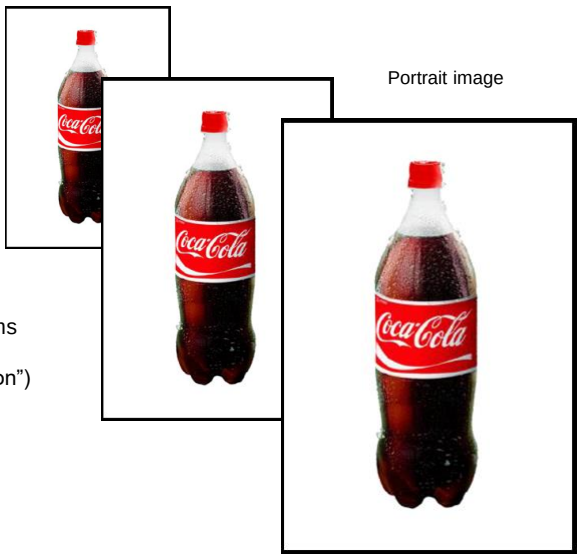
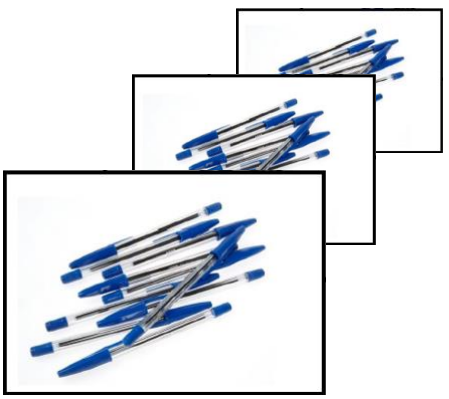


Portrait image

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

Sham Training Condition



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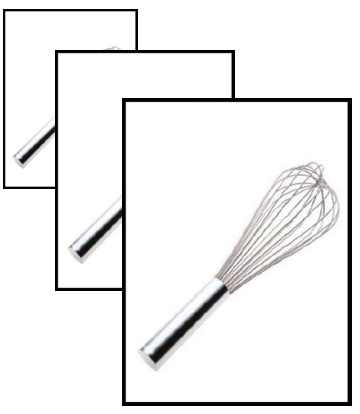

Pulling joystick zooms in on image size (i.e. "approach action")

Results

- Abstinence rates (zero alcohol since discharge)

	CBM	Sham training			
Number of sessions	% abstinent	% abstinent	χ^2	p	Eta^2
1 - 4 (n = 71)	68.6 (n = 35)	47.2 (n = 36)	3.32	0.07	0.22
2+ (n = 69)	70.6 (n = 34)	48.6 (n = 35)	3.47	0.06	0.22
3+ (n = 66)	**72.7 (n = 33)**	**48.5 (n = 33)**	**4.06**	**0.04***	**0.25**
4 (n = 61)	**75.0 (n = 32)**	**44.8 (n = 29)**	**5.80**	**0.02***	**0.31**

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

Impact on Craving

*p<.05, **p<.01, ***p<.001

Changes in craving post-training

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
time	Sphericity Assumed	20.254	1	20.254	32.833	.000	.346
	Greenhouse-Geisser	20.254	1.000	20.254	32.833	.000	.346
	Huynh-Feldt	20.254	1.000	20.254	32.833	.000	.346
	Lower-bound	20.254	1.000	20.254	32.833	.000	.346
time * group	Sphericity Assumed	1.857	1	1.857	3.010	.088	.046
	Greenhouse-Geisser	1.857	1.000	1.857	3.010	.088	.046
	Huynh-Feldt	1.857	1.000	1.857	3.010	.088	.046
	Lower-bound	1.857	1.000	1.857	3.010	.088	.046
Error(time)	Sphericity Assumed	38.247	62	.617			
	Greenhouse-Geisser	38.247	62.000	.617			
	Huynh-Feldt	38.247	62.000	.617			
	Lower-bound	38.247	62.000	.617			

Changes in craving at follow-up

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
time	Sphericity Assumed	5.471	1	5.471	4.527	.037	.068
	Greenhouse-Geisser	5.471	1.000	5.471	4.527	.037	.068
	Huynh-Feldt	5.471	1.000	5.471	4.527	.037	.068
	Lower-bound	5.471	1.000	5.471	4.527	.037	.068
time * group	Sphericity Assumed	.410	1	.410	.339	.563	.005
	Greenhouse-Geisser	.410	1.000	.410	.339	.563	.005
	Huynh-Feldt	.410	1.000	.410	.339	.563	.005
	Lower-bound	.410	1.000	.410	.339	.563	.005
Error(time)	Sphericity Assumed	74.926	62	1.208			
	Greenhouse-Geisser	74.926	62.000	1.208			
	Huynh-Feldt	74.926	62.000	1.208			
	Lower-bound	74.926	62.000	1.208			

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

Acknowledgements

Co-Investigators
A/Prof Antonio Verdejo-Garcia – Monash
A/Prof Petra Staiger – Deakin
Dr Kate Hall – Deakin
Prof Dan Lubman – Turning Point

Researchers
Dr Joshua Garfield – Turning Point
Dr Jarrad Lum - Deakin
Ms Pinar Thorn – Turning Point

Students
Daniel Leung – Deakin
Laura Hughes – Deakin
Holly Francheschi – Deakin
Adam Ferronato - Deakin
Ben Castine – Melbourne Uni
Gabriella Flaks - Monash
Katherine Mroz - Monash

All patients and staff
at both Wellington House and Windana

Prof Reinout Wiers –
University of Amsterdam

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