

# Losing Control: Investigating the role of behavioural control in heavy drinking

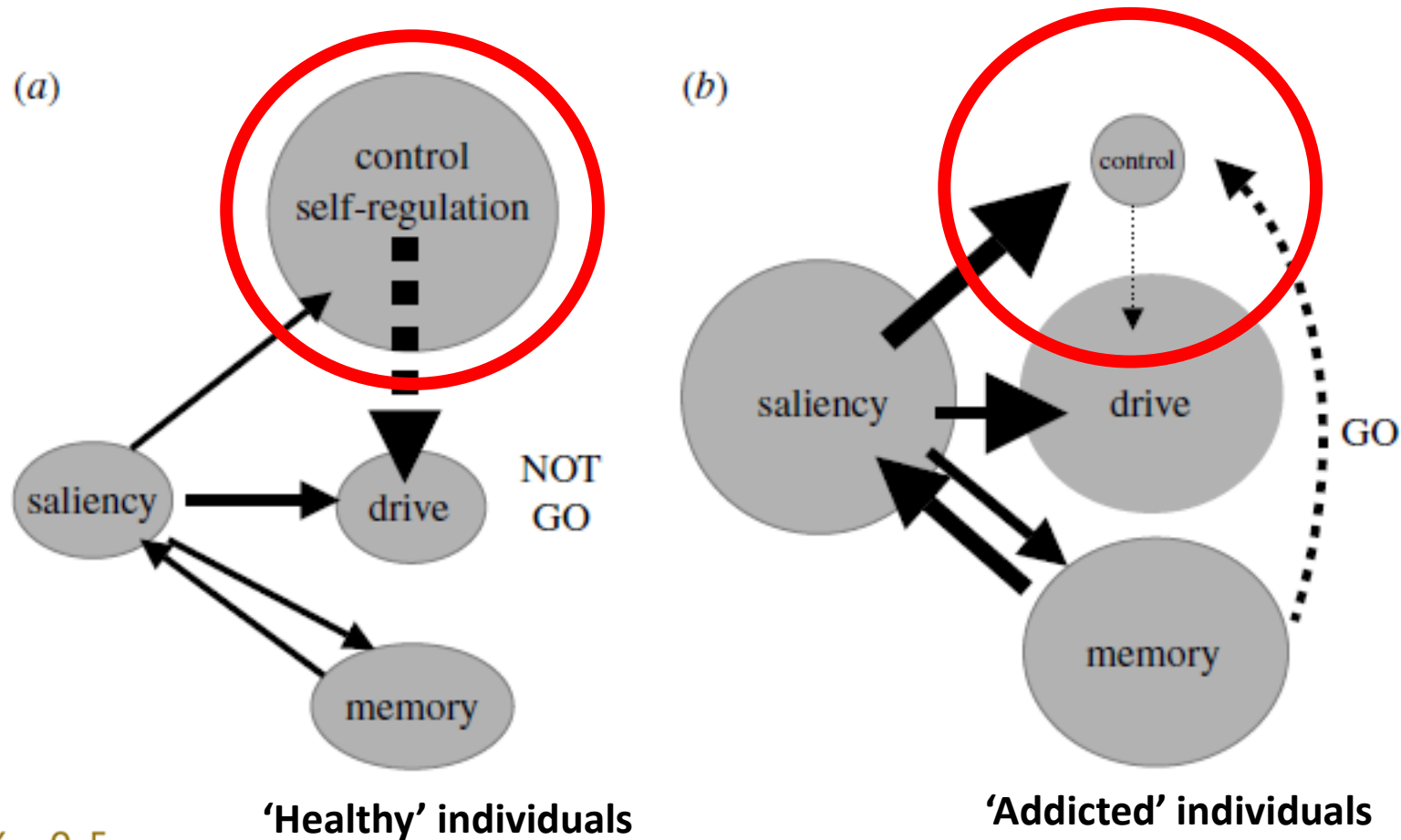
Andrew Jones  
University of Liverpool  
Psychological Sciences

[ajj@liv.ac.uk](mailto:ajj@liv.ac.uk)

@ajj\_1988

# Behavioural control

Addiction is characterized by a *'loss of control'*, or a failure of our self-control



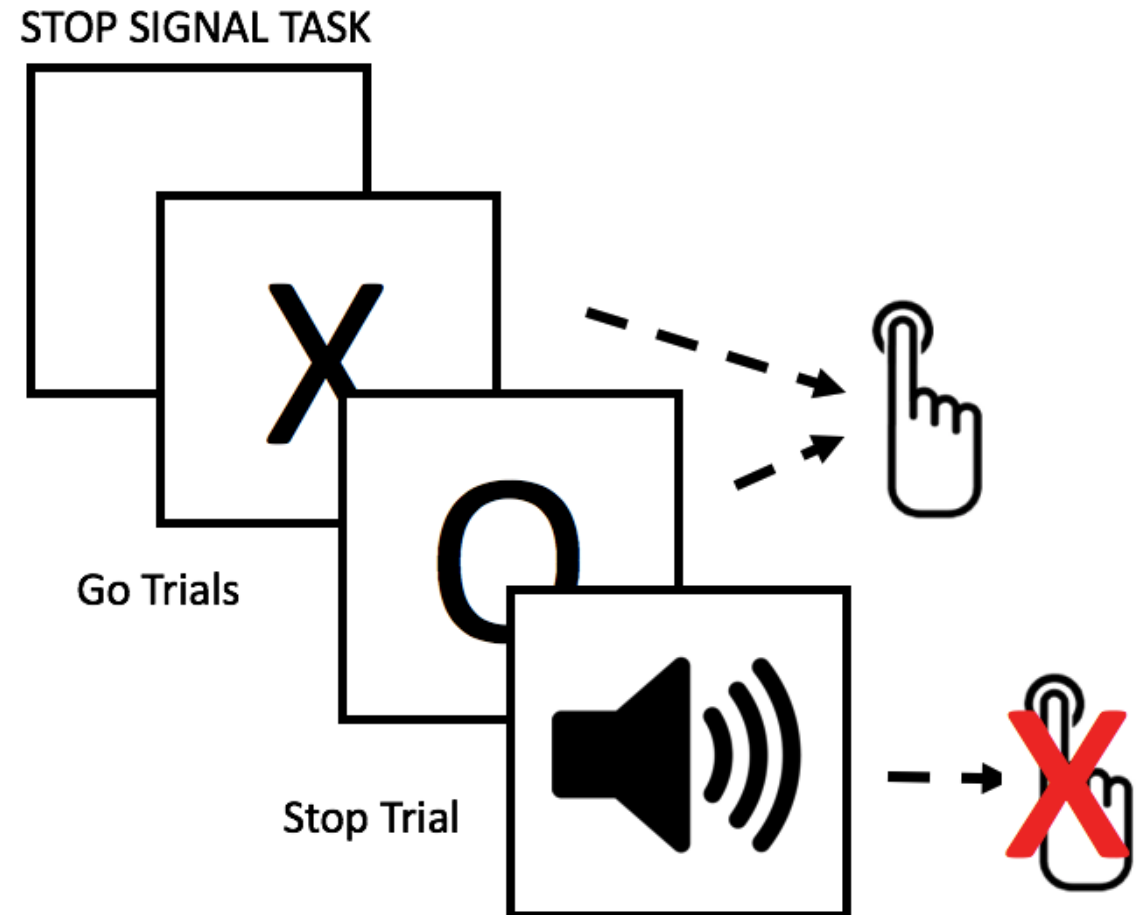
'Healthy' individuals

'Addicted' individuals

# Operationalising 'control'

Inhibitory control – 'the (in)ability to stop, change or delay a response that is no longer appropriate'

A key role in 'Impulsivity' and  
'Executive Functioning' (Bickel et al, 2013)



# *What is the role of inhibitory control?*

- Deficits in IC in alcohol dependence ( **$g = .40$** ) and heavy drinking ( **$g = .25$** ) (Smith et al 2014)
- Predicts Hazardous Drinking (Christiansen et al., 2013; Houston et al., 2015)
- Treatment success / relapse (Rupp et al., 2016)
- Escalation of drinking: Heavy > Dependence (Rubio et al., 2008)
- Likelihood of alcohol involvement in adolescence (Fernie et al., 2013)

# Over-simplistic view... fluid control?

*... abrupt environmental, physiological, or emotional events may cause transient “state”*

Drug-related cues  
Acute alcohol effects  
Ego-depletion

EVENT



CONTROL



DRINKING

Cue-specific training  
Self-control training  
Motivational Biases  
Moderate Stress/Arousal

# *Direct manipulations of inhibitory control (motivational biases)*

CONTROL

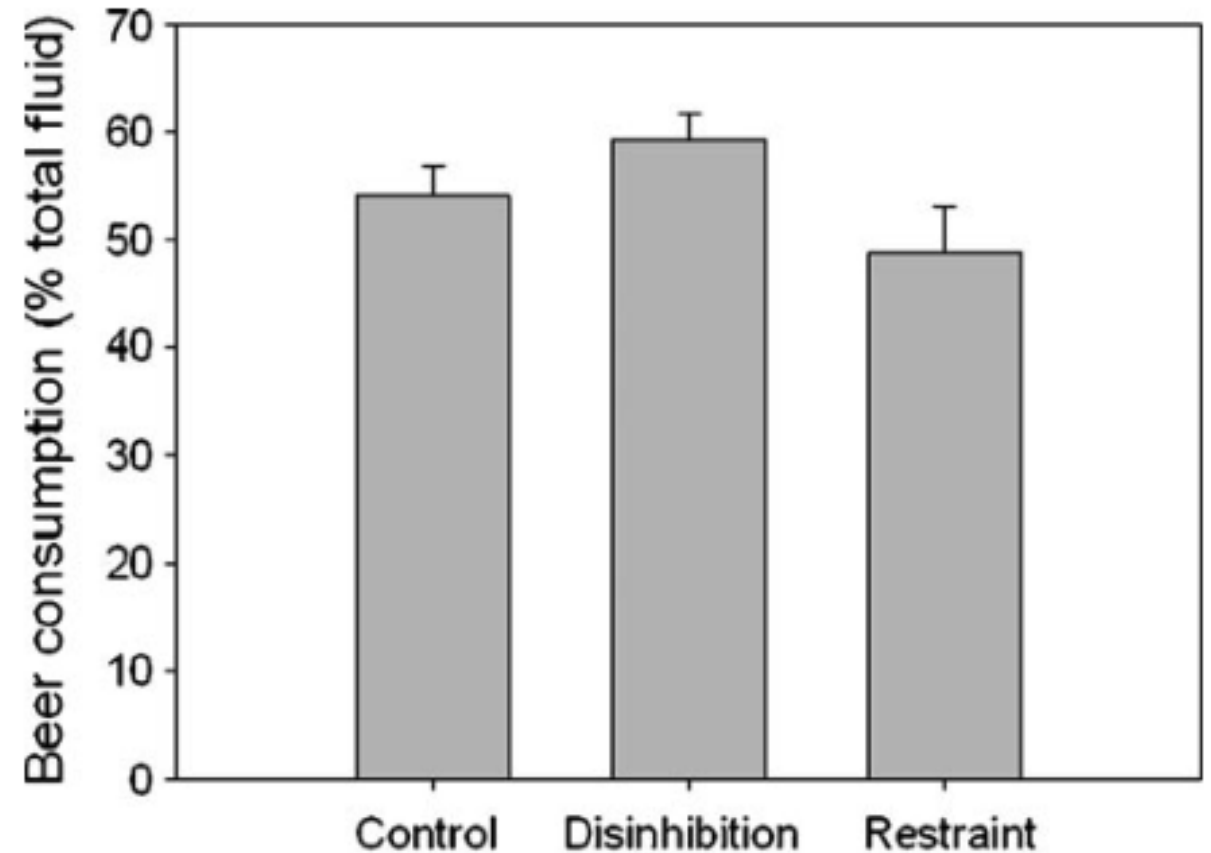
GO! STOP!

DISINHIBITION

GO! STOP!

RESTRAINT

GO! STOP!



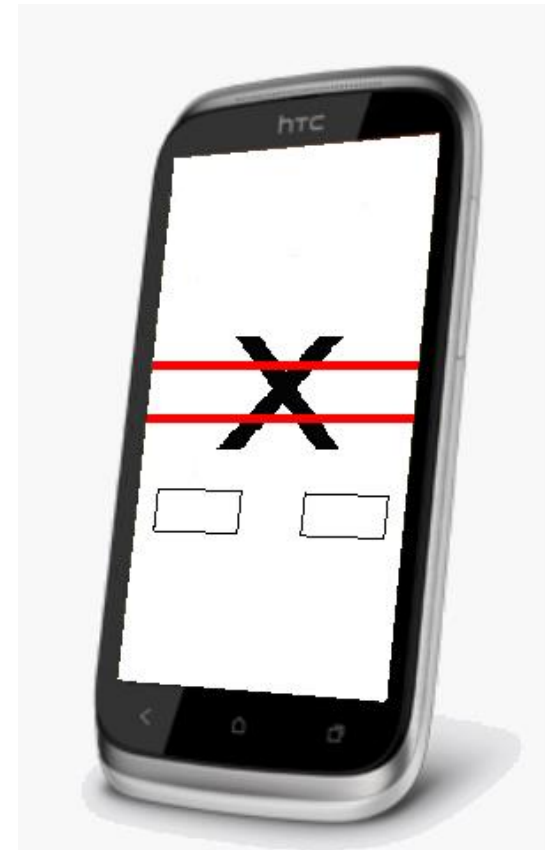
*Jones et al (2011; 2011b)*

# *Intra-individual fluctuations in Inhibitory Control*

## *Daily level*

Planned	.859 (.027)*	.766 -.870
Craving change	.025 (.005)*	.015 -.035
SSRT change	.008 (.002)*	.004 -.012
Energetic change	-.008 (.007)	-.022 -.005
Sad change	-.017 (.006)*	-.029 -.005
Drowsy change	-.003 (.005)	-.013 -.003
Happy change	.007 (.008)	-.007 -.021

*Jones et al (submitted)*



# Exposure to alcohol-related cues

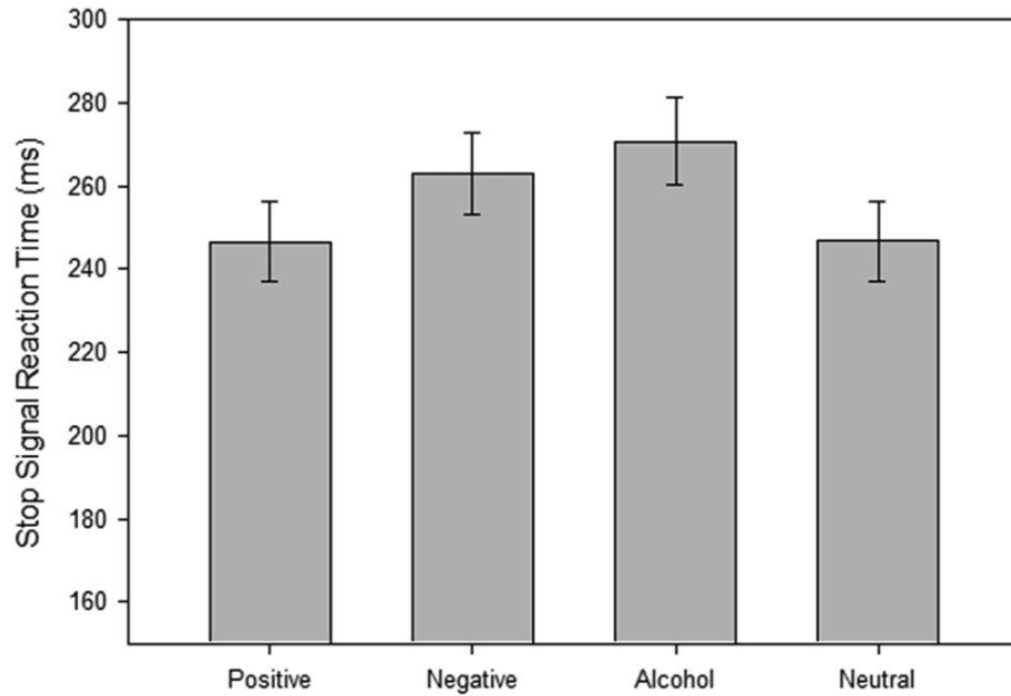


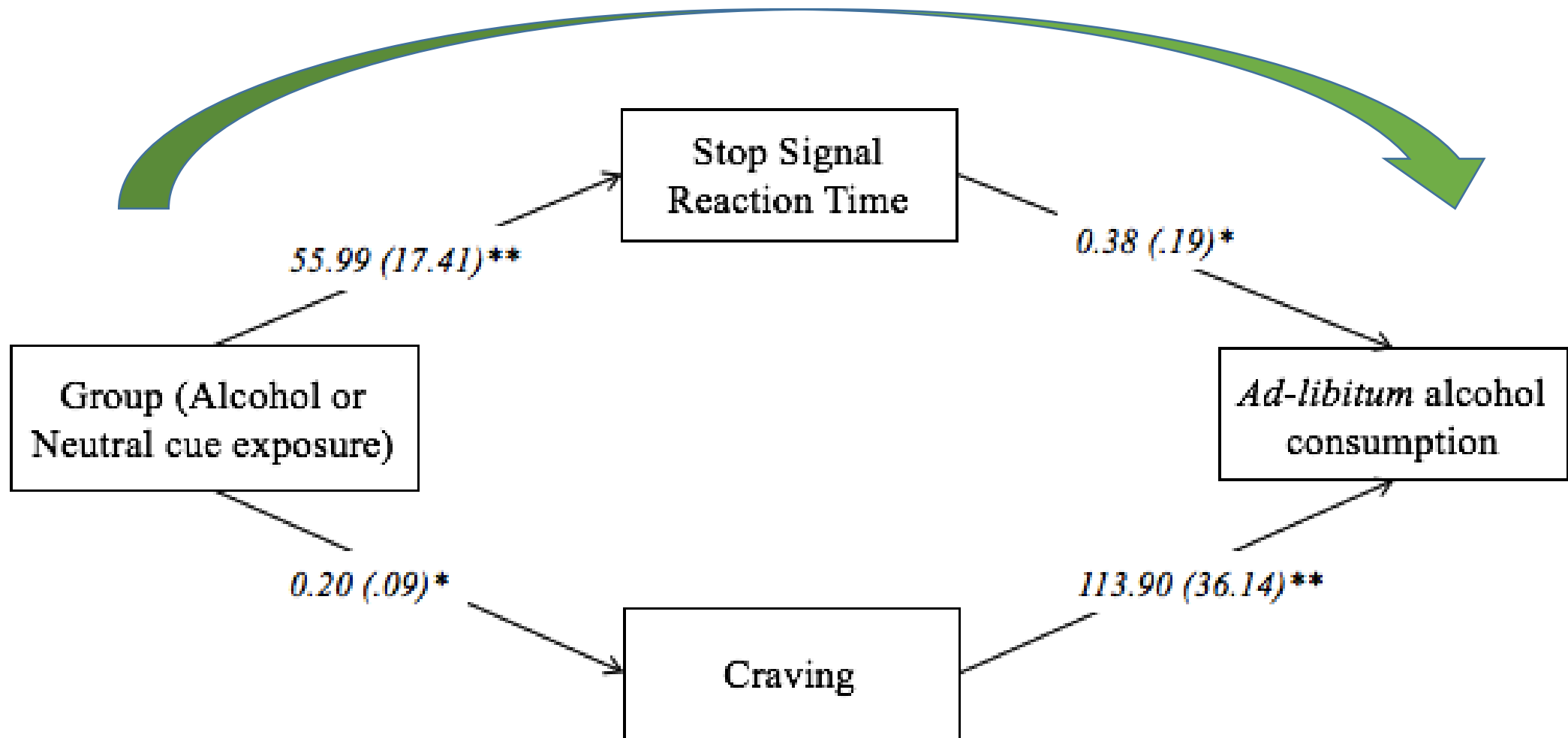
Figure 2. Mean Stop Signal Reaction Time (SSRT) scores (and standard errors) for each picture set during the stop-signal task.

**Jones and Field (2015)**

**Meta-analysis suggests a robust effect of alcohol-related cues on inhibitory control (Jones et al, in prep)**

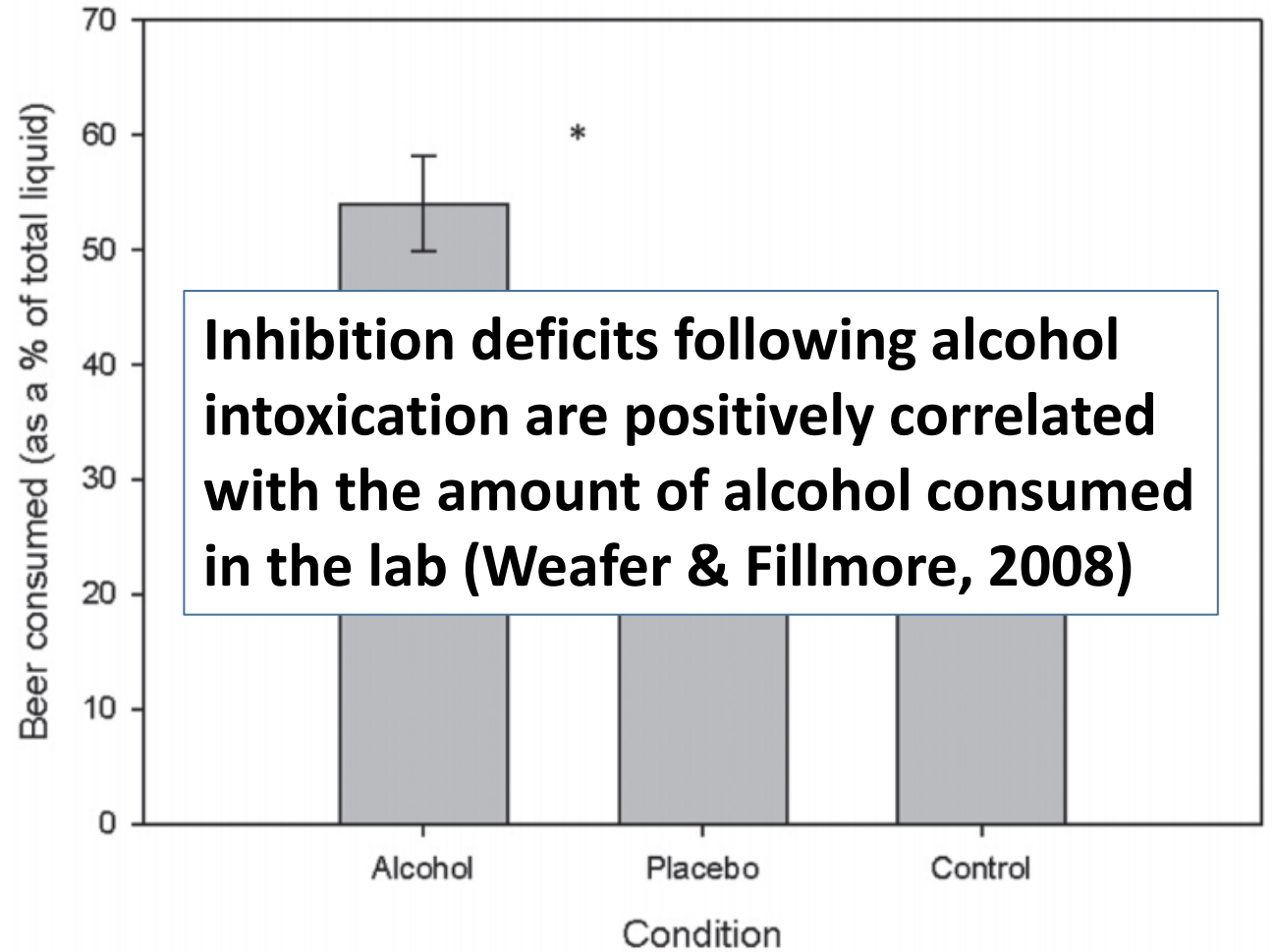
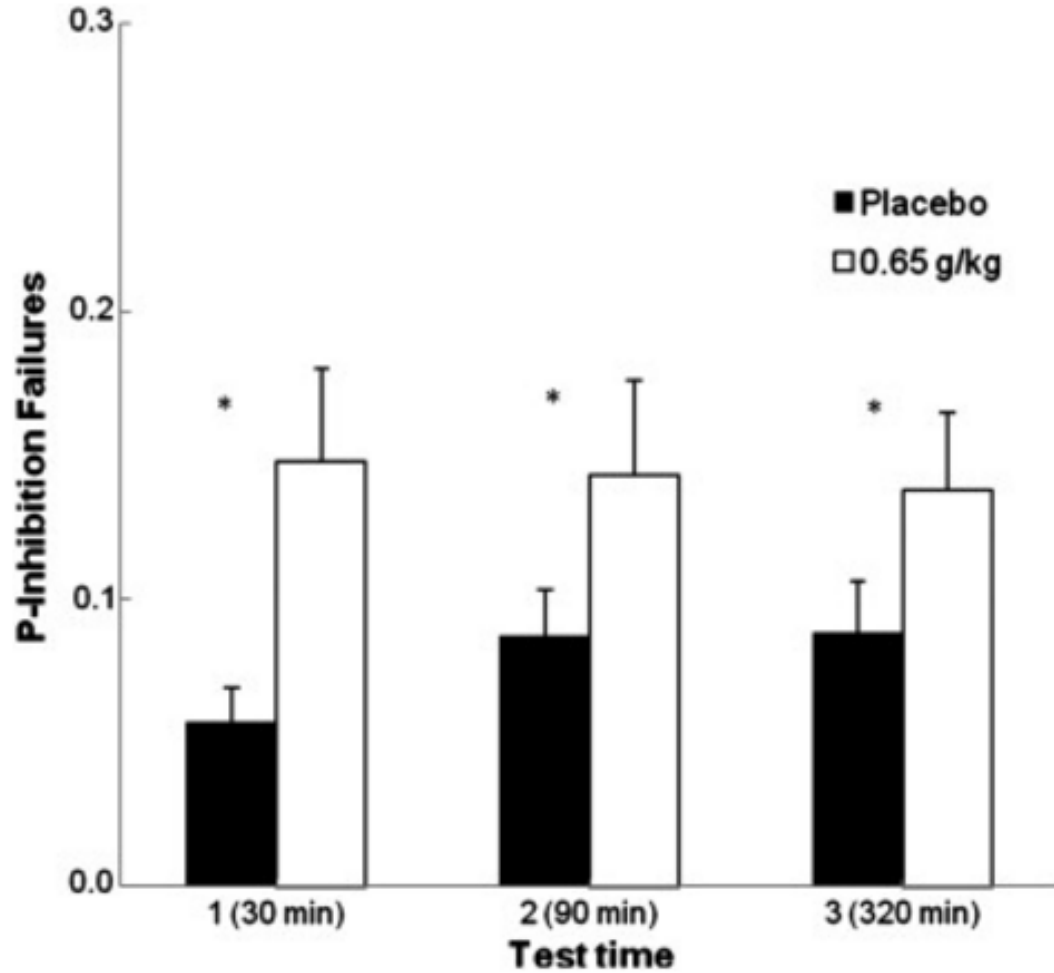


# Exposure to alcohol-related cues (2)



Field and Jones (2017)

# Acute alcohol effects



**Inhibition deficits following alcohol intoxication are positively correlated with the amount of alcohol consumed in the lab (Weafer & Fillmore, 2008)**

*Christiansen et al (2013)*

# Stress / Arousal

Attentional bias, inhibitory control and acute stress in current and former opiate addicts

*Constantinou et al (2010)*

Acute stress impairs inhibitory control based on individual differences in parasympathetic nervous system activity

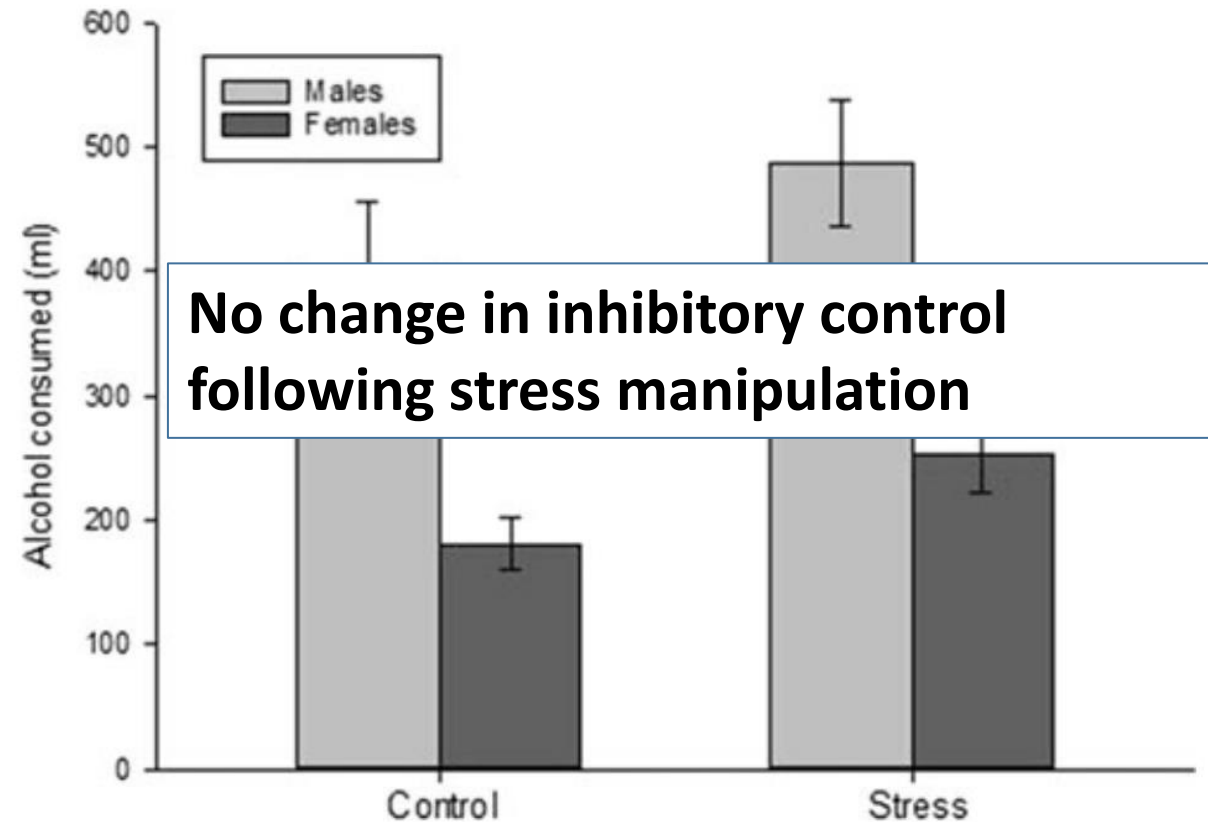
*Roos et al (2017)*

Stress-Level Cortisol Treatment Impairs Inhibitory Control of Behavior in Monkeys

*Lyons et al (2010)*

Go no-go performance under psychosocial stress: Beneficial effects of implementation intentions

*Scholz et al (2009)*



*McGrath, Jones and Field (2016)*

# *Back to the model?*

- Drug-related cues ✓
- Acute alcohol effects ✓
- Ego-depletion ✗
- High and Low Arousal/Stress ✗
- Motivational Biases ✓
- Overconfidence in self-control ✗



# *What are the implications?*

Experimental and Clinical Psychopharmacology  
2013, Vol. 21, No. 1, 8–16

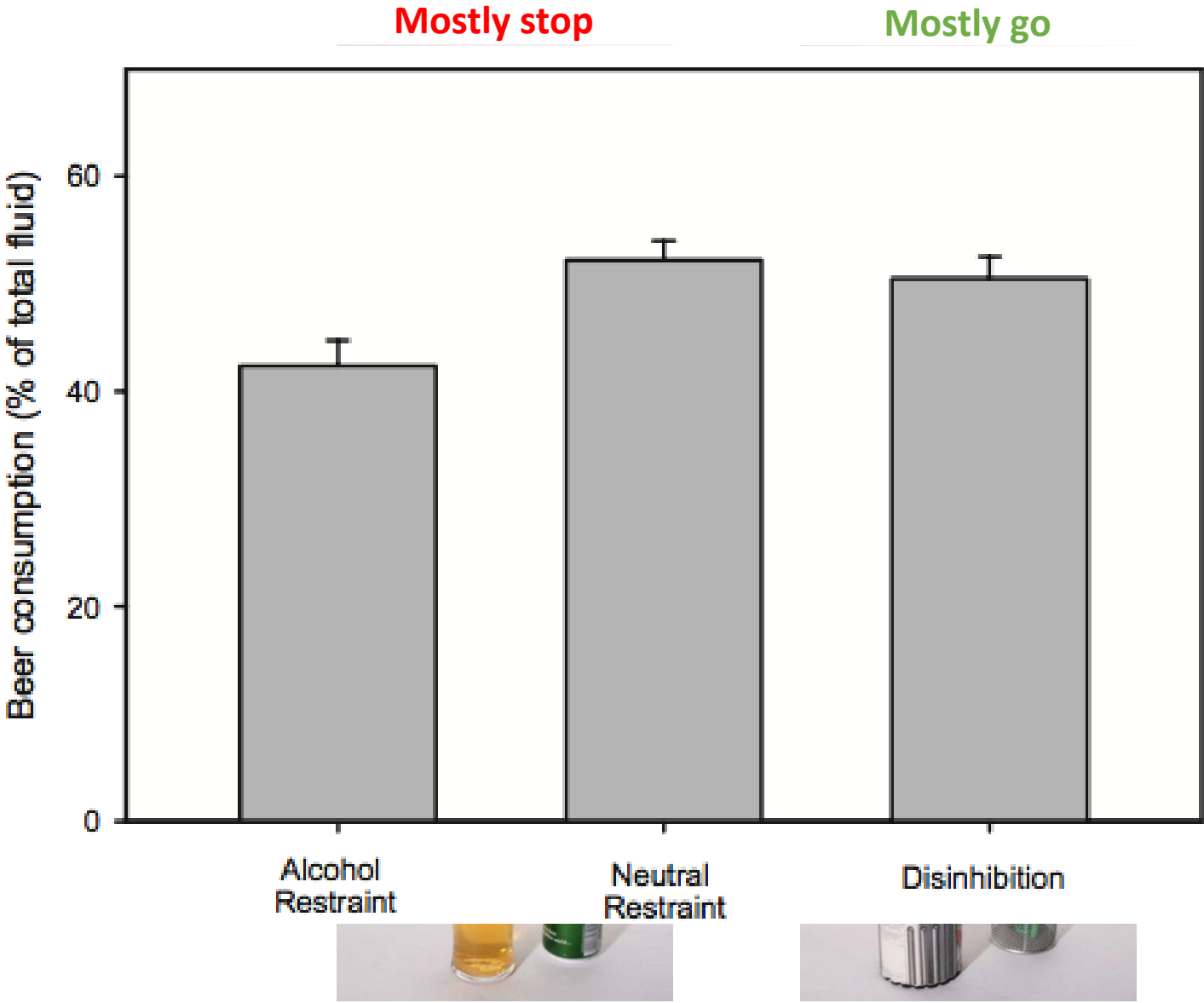
© 2012 American Psychological Association  
1064-1297/13/\$12.00 DOI: 10.1037/a0030683

## The Effects of Cue-Specific Inhibition Training on Alcohol Consumption in Heavy Social Drinkers

Andrew Jones and Matt Field  
University of Liverpool, Liverpool, United Kingdom



# Continued









# Robust effects

Research review

## Inhibitory control training for appetitive behaviour change: A meta-analytic investigation of mechanisms of action and moderators of effectiveness

Andrew Jones <sup>a, b</sup>  , Lisa C.G. Di Lemma <sup>a, b</sup>, Eric Robinson <sup>a, b</sup>, Paul Christiansen <sup>a, b</sup>, Sarah Nolan <sup>c</sup>, Catrin Tudur-Smith <sup>c</sup>, Matt Field <sup>a, b</sup>

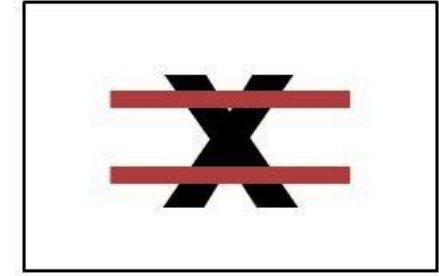
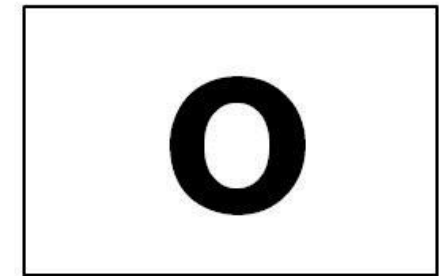
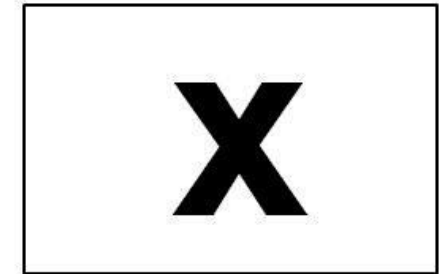
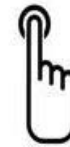
*A. Jones et al. / Appetite 97 (2016) 16–28*

Study or Subgroup	Std. Mean Difference		Experimental Control		Weight	Std. Mean Difference IV, Random, 95% CI	Std. Mean Difference IV, Random, 95% CI
	SE	Total	Total	Total			
<b>Alcohol</b>							
Bowley et al (2013)	0.441	0.16	19	20	4.9%	0.44 [0.13, 0.75]	
Di Lemma et al (unpublished)	0.614	0.129	30	30	5.7%	0.61 [0.36, 0.87]	
Houben et al (2011)	0.34	0.161	25	27	4.9%	0.34 [0.02, 0.66]	
Jones & Field (2013) Study 1	0.476	0.129	30	30	5.7%	0.48 [0.22, 0.73]	
Jones & Field (2013) Study 2	0.246	0.129	30	30	5.7%	0.25 [-0.01, 0.50]	
<b>Subtotal (95% CI)</b>			<b>134</b>	<b>137</b>	<b>26.9%</b>	<b>0.43 [0.30, 0.56]</b>	
Heterogeneity: Tau <sup>2</sup> = 0.00; Chi <sup>2</sup> = 4.51, df = 4 (P = 0.34); I <sup>2</sup> = 11 %							
Test for overall effect: Z = 6.46 (P < 0.00001)							

# A comparison of three types of web-based inhibition training for the reduction of alcohol consumption in problem drinkers: study protocol

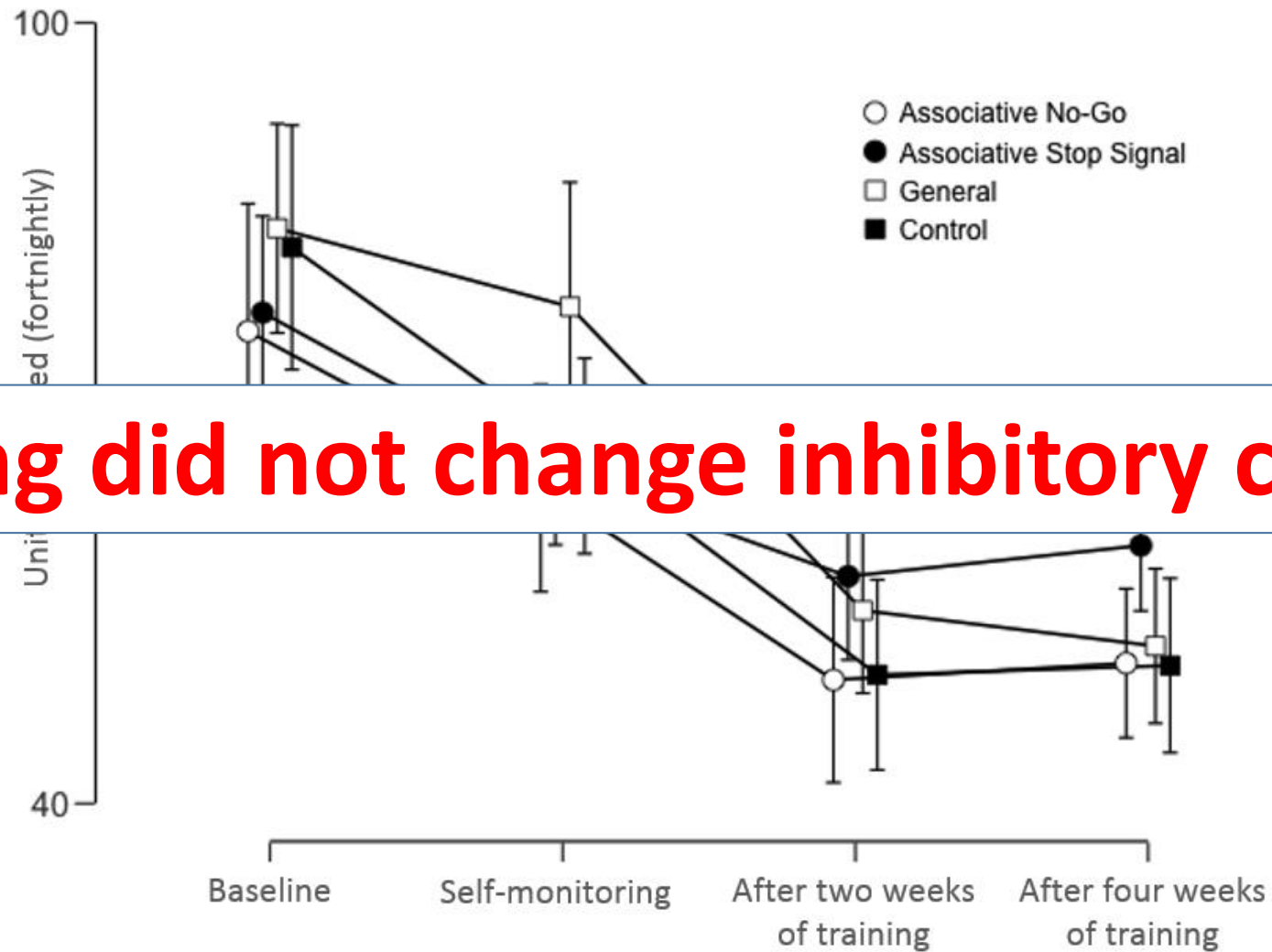
Andrew Jones<sup>1</sup>, Elly McGrath<sup>1</sup>, Katrijn Houben<sup>2</sup>, Chantal Nederkoorn<sup>2</sup>, Eric Robinson<sup>1</sup> and Matt Field<sup>1\*</sup>

Included:  
Online intervention  
Four weeks of Inhibitory control training / control  
Daily alcohol diary





# *No evidence of translation?*




**Training did not change inhibitory control.**

# *Part of a wider debate...*

 OPEN ACCESS  PEER-REVIEWED

RESEARCH ARTICLE

## The Effectiveness of Cognitive Bias Modification Interventions for Substance Addictions: A Meta-Analysis

Ioana A. Cristea , Robin N. Kok, Pim Cuijpers

Confusing procedures with process  
when appraising the impact of cognitive  
bias modification on emotional vulnerability†

Ben Grafton, Colin MacLeod, Daniel Rudaizky, Emily A. Holmes, Elske Salemink,  
Elaine Fox and Lies Notebaert



UNIVERSITY OF  
LIVERPOOL

# *Conclusions*

Evidence suggests a link between 'loss of control' and drinking status.

Models are over-simplistic...don't take into account transient nature of control

Certain 'events' can decrease behavioural control, and as a result increase the risk of (re) lapse / consumption.

ICT demonstrates promise in the lab, but (as of yet) has not translated to the real world.

# Future research

- Building a richer model of inhibitory control in alcohol use

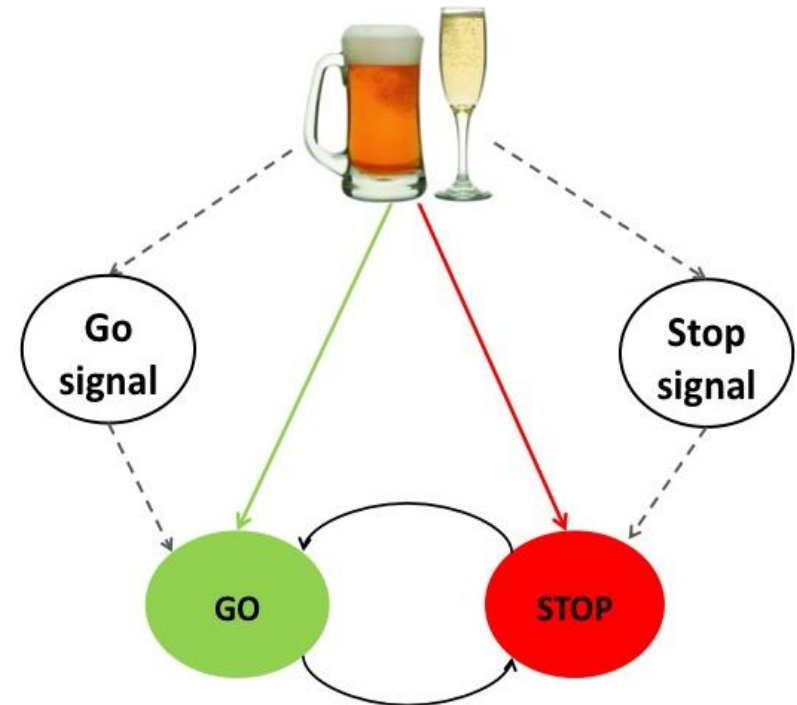
 [An ecological momentary assessment of proactive control and alcohol use](#) | Registered: 2017-05-12

21:34 UTC

Jones, Field, Verbruggen & 1 more

10 contributions

- ICT – back to the drawing board?



Thanks...

Matt Field

Paul Christiansen

Eric Robinson

Katrijn Houben

Chantal Nederkoorn

Brian Tiplady



Email [ajj@liv.ac.uk](mailto:ajj@liv.ac.uk)

Twitter @ajj\_1988

