When the executive gets drunk: Effects of alcohol intoxication on cognitive neurodynamics

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Spatio-Temporal Brain Imaging Lab

Multimodal imaging
“where” and “when” of cognitive functions
- Cognitive control
- Language
- Face perception

Autism spectrum disorder

Alcohol-induced impairments
- genetic markers
- family history
EXECUTIVE CONTROL

- plan, make decisions
- suppress automatic responses
- Use anatomically-constrained MEG
- Neural basis of cognitive control
- Acute intoxication
- Healthy social drinkers

Stroop task
Congruent GREEN
Incongruent BLUE
Anatomically-constrained MEG combines distributed source modeling with structural MRI

Dale et al., 2000; Marinkovic, 2004
Group average: Theta during Stroop

- Anterior cingulate cortex subserves executive control
- Alcohol reduces conflict-related theta in ACC
Phase-Locking (Co-oscillations):

- Explore effects at the level of an interactive functional system

- Theta synchrony increased to conflict under placebo
- Alcohol disrupts co-oscillations
Alcohol-induced impairment of executive control:

- inappropriate decisions in conflict situations, social interactions, traffic

- may contribute to continued drinking

- Binge drinking
- dopamine genetic markers
- dispositional variables (impulsivity)
- family history
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