Gender Effects in Implicit Associations Towards Alcohol in Patients with Alcohol Use Disorder - Preliminary Results

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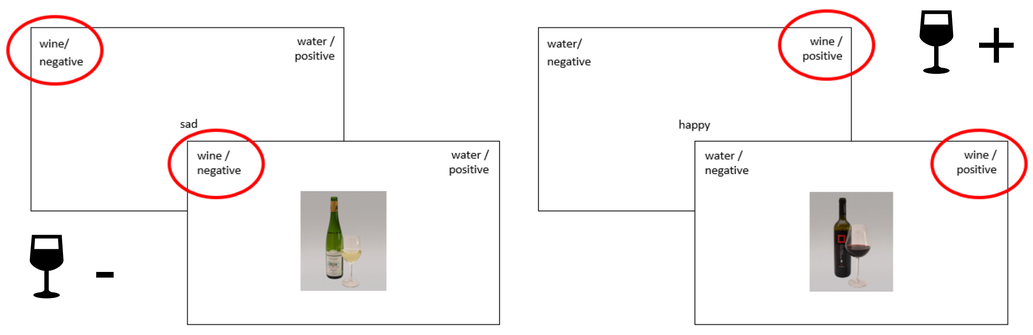
Background

- Current neuroscientific theories postulate an imbalance between enhanced automatic reaction towards alcohol and impaired inhibitory control as a significant factor in the development and maintenance of an alcohol use disorder (AUD) [e.g. 1].
- Implicit associations, as measured with the Implicit Association Test (IAT), could indicate the strength of such automatic reactions.
- Preclinical behavioral studies reveal that women and men differ in their implicit associations and that these associations predict the success of inhibition trainings [e.g. 2, 3].
- Neurophysiological findings in other research areas show ERP changes regarding implicit associations [e.g. 4, 5].
- Studies investigating the neurophysiological correlates of implicit alcohol associations and gender effects in patients with AUD are missing.

Implicit Association Test (IAT)



Implicit Association Task (IAT): During alcohol-positive blocks, the assignment of alcohol cues is consistently paired with positive words. In alcohol-negative blocks, alcohol cues and negative words share the same allocation.

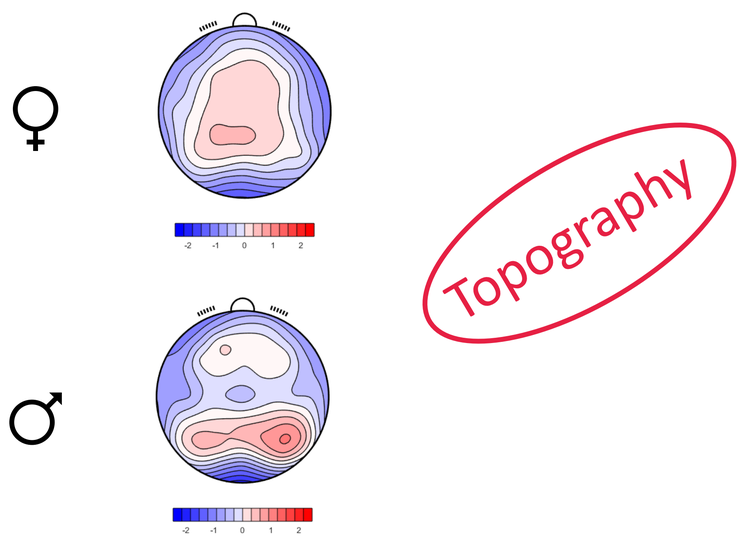
Methods

- 66 abstinent inpatients with AUD attending a specialized treatment program were measured with a 64-channel EEG.
- All performed an IAT to assess positive and negative implicit associations towards alcohol.
- After preprocessing, two ERPs were obtained for each subject over all correct trials: alcohol-positive and alcohol-negative.
- First, a 2x2 TANOVA with the between-factor **gender** (male, female) and the within-factor **valence** (alcohol-positive, alcohol-negative) was conducted to test for interactions. Second, GFP analyses were calculated for the same interactions.

Results

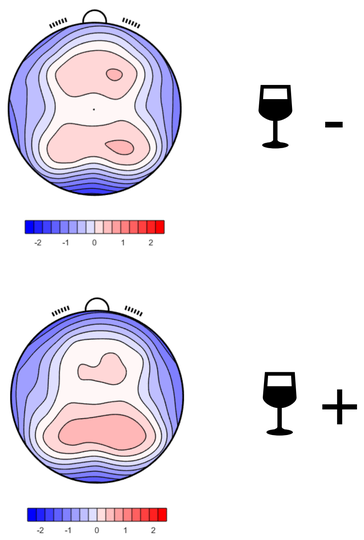
➢ Main effect Gender (426 – 544ms)

Men and women differ significantly in their topography.



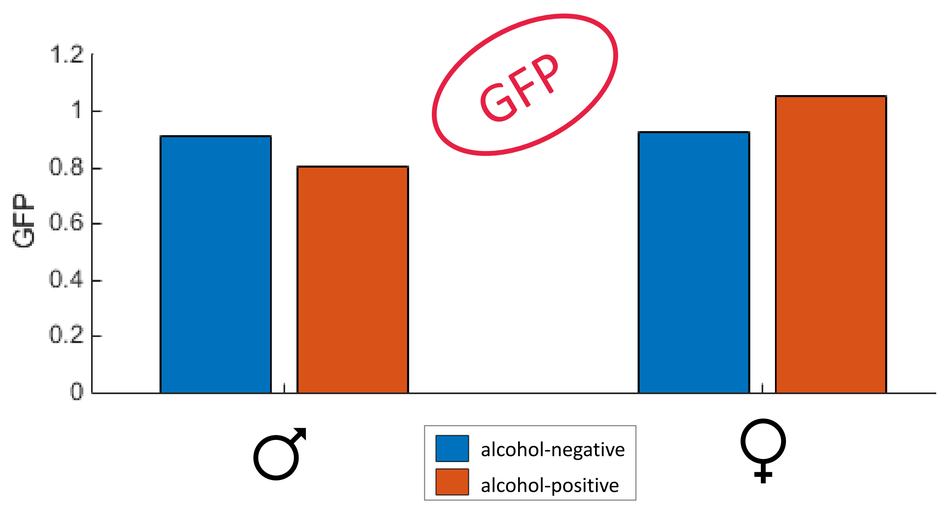
➢ Main effect Valence (350 – 562ms)

Topographies between alcohol-positive and alcohol-negative assignments vary significantly.



➢ Interaction Gender x Valence (656-712ms)

While men show higher GFP during the alcohol-negative assignments, women have higher GFP during alcohol-positive pairings.



Discussion

- Neurophysiological gender effects of an Alcohol-Valence-IAT in AUD are examined for the first time.
- During the late P3, women exhibit stronger frontal positivity, whereas men display a stronger lateralized posterior positivity. Further, alcohol-negative allocations show stronger frontal positivity than alcohol-positive assignments.

➢ Networks activated during the (late) P3 differ in terms of gender and valence.

- Men show higher GFP during the alcohol-negative while women have higher GFP during alcohol-positive allocations. This indicates that in women with AUD, more activation during the processing of positive associations is required, whereas the opposite pattern occurs in men.

➢ Women could have less positive associations towards alcohol than men, which is in line with previous research.

Outlook

➢ Comparison of patients and healthy controls
➢ Analyses of behavioral data
➢ Behavioral & neurophysiological change after an inhibition training

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Registration

ClinicalTrials.gov (NCT02968537)

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