Effects of intranasal oxytocin on interoception, in social drinkers

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Interoception

General sensitivity to bodily sensations
  *e.g. heart beat, visceral pain, thirst*

Crucial facet of emotional regulation

Insula, the “interoceptive hub”

Interoceptive Accuracy = objective measure

Craig, 2002 Nature Reviews Neuroscience; Gray & Critchley, 2007 Neuron; Critchley et al., 2004 Nature Neuroscience; Garfinkel et al., 2014 Biological Psychiatry
Interoception & Alcohol Use Disorder (AUD)

Relevance of interoception in addiction

Decreased interoceptive accuracy

Deficit was positively correlated with AUD severity

Navqi et al., 2007 Science; Sönmez et al., 2016, Journal of Substance Use; Betka et al., Submitted
Oxytocin: Interoception & alcohol

Neuropeptide hormone

Essential role in emotional regulation

Reduced self-administration of ethanol in rats and alcohol withdrawal in human subjects

Enhanced visceral afferent transmission

King et al. 2017 Alcohol Clin Exp Res.; MacFayden et al., 2016 Pharmacol Biochem Behav; Pedersen et al., 2013 Alcohol Clin Exp Res; Wang et al., 2009 Brain Res; Peters et al., 2008 J. Neuroscience
Aim and hypotheses

Exploring the impact of intranasal oxytocin on interoceptive accuracy, in social drinkers

Oxytocin will increase interoceptive accuracy compared to placebo.

This increase will be more likely to occur in heavy drinkers.
Methods

Participants
31 healthy male social drinkers (>0 Unit of alcohol/week)
Based on Alcohol Use Questionnaire (Mean =25.37; SD=4.68)
Age (Mean=25.31; SD=3.32)

Design
Within-subjects Design
Drug {Oxytocin and Placebo}
40IU of nasal spray

Mehrabian et al., 1978
Methods

Procedure
Heart beat detection task
Sequence of 10 auditory tones

Judgment
In Sync
OR
Out of Sync?

INTEROCEPTIVE ACCURACY (%)
Methods

Equipment
Pulse oximetry was recorded during the task (triggering stimulations)

Data Analysis
ANCOVA
*Categorical predictor variable*: Drug
*Continuous predictor variable*: Weekly units of alcohol (Units)
*Control Variable*: Session sequence, anxiety, depression, alexithymia, impulsivity, craving, basal plasmatic oxytocin level and resting heart rate

Additional analysis
Split on Units
Low-to-Moderate Drinkers (<= 21 units) vs Heavy Drinkers ( >21 units)
Results

No main effect of Drug $(F_{(1,28)} = 0.341, p=0.566)$

Drug*Unit Interaction
$F_{(1,28)} = 5.37, p=0.032 ; R^2=0.22$

The more people drink, the more oxytocin increases interoceptive accuracy compared to placebo.
Results

Drug*Group Interaction
\[ F_{2,28} = 0.341, \ p=0.073 \]

Oxytocin increases interoceptive accuracy compared to placebo, in the heavy drinkers group but not in the low-to-moderate drinkers group.

* \( p < 0.01 \)
Conclusion

• No clear interoceptive accuracy impairment observed in social drinking.

• **Oxytocin increases interoceptive accuracy** compared to placebo, in the heavy drinkers group but not in the low-to-moderate drinkers one.

• This effect is still present when controlling for subjective mood ratings (e.g. depression, anxiety etc.).

• This phenomenon could be one of the **mechanisms by which peripheral oxytocin modulates** alcohol or drug intake.
Next direction

Which mode of action?
Exploring **Heart Rate Variability**
Modelling fixed and random effects

Linking electrophysiological and behavioural observations with **neuroimaging data**.

*Talk Friday morning # SSA FUNDED RESEARCHERS SESSION: Bodily sensation processing in social drinking: a combined fMRI, VBM & MRS study*
My main PhD challenges

- To apprehend a new culture and a new language
  Not always easy but it is a great adventure! Go out of your comfort zone! 😊

- When I felt I was overwhelmed with work
  Break down your crazy amount of work into small, clear and realistic missions.

- When I was stuck and “no one” was able to help
  Ask, ask and ask again! Do not be scared to “annoy” your colleagues! You have nothing to loose! Use your network! Use Internet, go on specific forums or support list! Go to trainings! Ask, ask and ask again!

AND DON’T FORGET YOU ARE NOT ALONE AND YOU CAN LEARN! :D
My main PhD challenges

- When I realise, in year 3, that I am able to criticise all the choices I made at the beginning of my PhD

Well, actually that is pretty cool. It means that I learnt which is the whole point of a PhD right? ;)

- What if a better decision exists than the one I WILL take (i.e. postdoc)?

There is NO BETTER DECISION that the one I will take; but it is always good to provoke opportunity! Ask advice, make things happen!!

- When I realized that Supervisors’ decisions are not always in my interest

Sometimes, you will have to make decision by yourself. You will have to think about yourself. To have mentor(s) can be very helpful.

If you have any question, email me at s.betka@bsms.ac.uk
Thank you for your attention!

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