THE ROLE OF STRESS-REACTIVITY, STRESS-RECOVERY AND RISKY DESCISION-MAKING IN PSYCHOSOCIAL STRESS-INDUCED ALCOHOL CONSUMPTION IN SOCIAL DRINKERS

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BACKGROUND

Alcohol Use Disorder (AUD)

In some individuals, chronic alcohol misuse can escalate into alcohol use disorder (AUD) - characterised by physical dependence (withdrawal symptoms in the absence to alcohol) and psychological addiction (compulsive alcohol seeking, anhedonia, social/familial problems[1]) .

Psychological Stress

One established risk factor for AUD relapse is psychological stress. Chronic alcohol use causes neuroadaptations in stress and reward pathways, for example, within the hypothalamic pituitary adrenocortical axis (HPA) and sympathetic adrenomedullary axis (SAM)[2] – identified by (for example) cortisol response dysregulation[3] and/or deficits in emotional regulation[4]. Consequently, due to these neuroadaptations, AUD patients commonly present with an increased stress-induced craving for alcohol.

Neurocognitive Endophenotypes

Impulsivity i.e. the propensity to proceed without forethought and reflection, despite adverse consequences[5] is believed to be a risk factor for predicting the development of compulsive (addicted) states and for predicting relapse post treatment[6,7].

Our Previous research suggests that risk-taking (a trait closely related to impulsivity) mediates stress-induced craving i.e. people with greater risk-taking tended to have a larger craving for alcohol post-stress [8] .

OBJECTIVES

One:

To test the hypothesis that an acute psychosocial stressor i.e. the Trier Social Stress Test[9] would cause an increase in alcohol craving in a sample of healthy (non-alcoholic) drinkers.

Two:

To test the hypothesis that impulsivity and related traits (risk-taking, sensation seeking and decision making) would mediate the increased craving.

Three:

To test the hypothesis that a greater craving would cause alcohol consumption (quantified as number of drinks consumed) to increase and that this effect would be mediated by impulsivity.

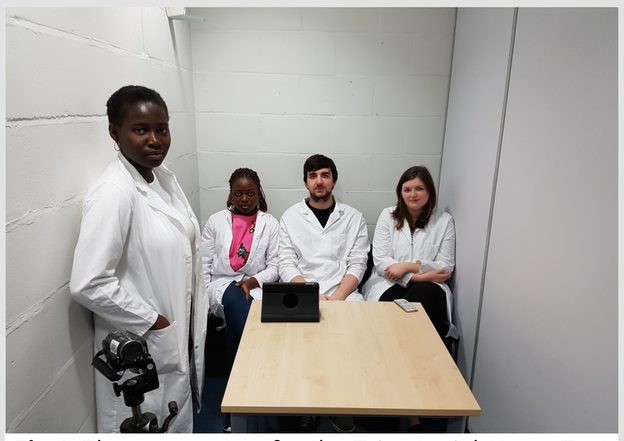

Fig 1. The room setup for the Trier Social Stress Test

METHODS

39 participants (22 male and 17 female; mean age = 23.92 years [SD = 4.90] were recruited from the University of Portsmouth and surrounding community.

Participants were randomly placed in "stress" (experimental [N = 23]) or "no-stress" (control [N = 16]) groups.

Alcohol Use and Drinking Behaviour

Prior alcohol use was measured using a 12-item version of the Alcohol Dependence Questionnaire[1]; the Alcohol Use Disorders Identification Test[10]; and the Binge Drinking Scale[11].

Neurocognitive Endophenotypes

Impulsivity: Barratt Impulsiveness Scale[12] and the Stop-Signal Task (SST)[13].

Risk-taking: The Balloon Analogue Risk Task (BART)[14].

Sensation Seeking: The Arnett Inventory of Sensation Seeking[15].

Decision Making: The Iowa Gambling Task (IGT)[16].

Craving

Both implicit (via computer task) and explicit (via questionnaire) was assessed using the Approach Avoidance Task (AAT)[17] and the Desires for Alcohol Questionnaire (DAQ) respectively[18].

Alcohol Consumption

Alcohol consumption was assessed through a Progressive Ratio Schedule[19] and "drink enjoyment" rated on a 15-point Likert scale.

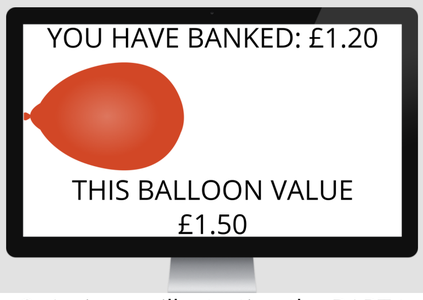

Fig 2. An image illustrating the BART task.

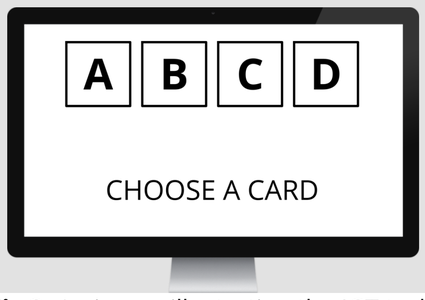

Fig 3. An image illustrating the IGT task.

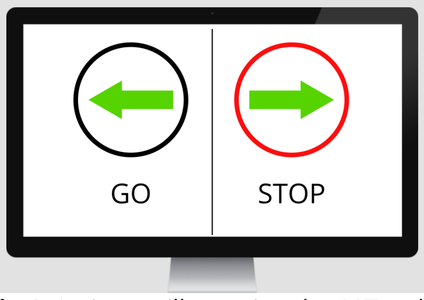

Fig 4. An image illustrating the SST task.

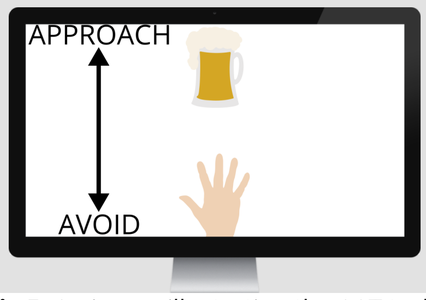

Fig 5. An image illustrating the AAT task.

RESULTS

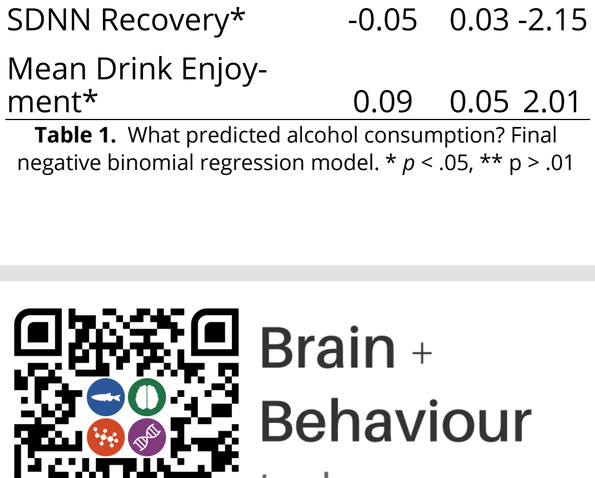

Fig 6. Mean ± SEM DAQ (craving) change. p = .03, t (23.32)

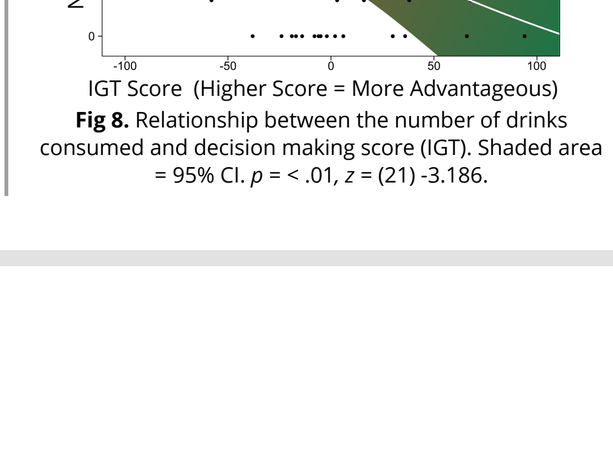

Fig 7. Mean ± SEM HR change. p = <.001, F (1.96, 62.78) = 25.03

Variable	β	S.E. β	z
Constant	1.29	0.54	2.41
Group (Control)**	-0.80	0.27	-2.93
IGT Score (a-tendency - b tendency)**	-0.01	0.003	-3.08
HR Recovery**	-0.04	0.01	-3.26
SDNN Reactivity**	0.04	0.02	2.75
SDNN Recovery*	-0.05	0.03	-2.15
Mean Drink Enjoyment*	0.09	0.05	2.01

Table 1. What predicted alcohol consumption? Final negative binomial regression model. * p < .05, ** p > .01

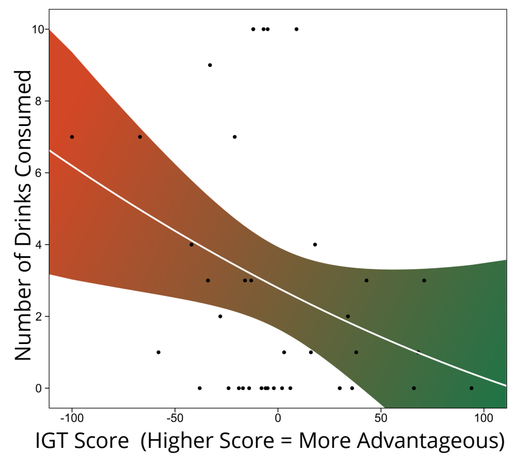

Fig 8. Relationship between the number of drinks consumed and decision making score (IGT). Shaded area = 95% CI. p = < .01, z = (21) -3.186.

CONCLUSIONS AND IMPLICATIONS

Conclusions

1. The Trier Social Stress Test evoked psychosocial stress in a sample of healthy (non -alcoholic) social drinkers which in turn increased explicit craving for alcohol.
2. Surprisingly, alcohol craving intensity did not predict drinking. The most important predictors were risky decision making, slow HR recovery, poor reactivity and greater recovery vagal tone.

Implications

1. Craving for alcohol may not be the most important factor for predicting the onset of alcohol consumption.
2. Future research should endeavour to explore these findings further, possibly using a longitudinal method of study. One option would be to use wearable technology to "track" participant's stress, craving and drinking as this would allow for continual round-the-clock data collection.
3. Other research should focus on applying these findings in a clinal setting to investigate whether the results of this study are replicable in alcoholic patients.

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