



Interactions Between Anxiety and Alcohol Sensitivity: Alterations in Brain Response to Monetary Loss



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Introduction

- Greater likelihood of harmful drinking among those with low versus high alcohol sensitivity (AS)¹
- Those with low AS show reduced stress following heavy drinking, possibly due to diminished concern for consequences²
- Processes underlying low AS-related risk for concerning alcohol use have been informed by event-related potential (ERP) research³
- One ERP of specific relevance to AS and harmful drinking is the P3 brain response elicited by salient task stimuli
- Heightened P3 responses to alcohol cues, and blunted P3 to natural reward cues predicts greater severity of alcohol use⁴
- Reduced P3 to monetary gain/loss feedback relates to genetic predisposition to harmful alcohol use,⁵ while increased P3 to negative stimuli associates with anxiety⁶
- Heightened P3 among anxious individuals suggests hypervigilance and greater attentional allocation

Study Aims and Hypotheses

- Examine P3 amplitude to loss feedback in high and low AS drinkers
 - H1: *Smaller loss P3 in the low versus high AS group*
- Test whether anxiety levels change AS group differences in loss P3
 - H2: *Similar loss P3 across AS groups when anxiety is high*

Methods

- 56 undergraduate students (36 female) aged 18-28; broken into two groups pertaining to AS:
 - Low AS ($N = 26$; 15 female), High AS ($N = 30$, 21 female)
 - Alcohol Sensitivity Questionnaire ⁷
 - "Do you ever experience a hangover after drinking alcohol"
- Self-reported anxiety (7 items; sum score)
- Depression Anxiety Stress Scale (DASS-21) ⁸
 - "I was worried about situations in which I might panic and make a fool of myself"
- Monetary gain/loss task, participants select one of two doors
- EEG data collection
 - 32 electrode cap
 - Facial sensors for detecting blinks; mastoid reference
 - P3 to loss feedback:
 - Average amplitude from 300 to 500 ms post-feedback at Pz

Results

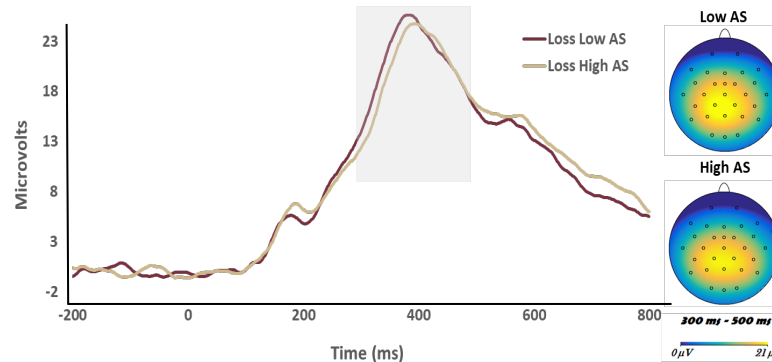
Descriptives Statistics for Participants with High and Low AS

	Mean		Median		SD	
	High	Low	High	Low	High	Low
Age	19.10	19.31	2.83	2.89	1.19	2.13
Anxiety Sum	3.43	2.55	3.00	2.00	3.13	2.52
Average Loss (Pz)	20.36	21.13	19.95	19.60	5.39	6.48

Predicting Loss P3 Amplitude with the Anxiety by Alcohol Sensitivity Group Interaction

	R^2		F		p	
Overall Model	.04		.66		.578	
Predictor	b	SE	Lower	Upper	t	p
Intercept	20.56	.81	18.96	22.20	25.55	<.001
Group (High AS - Low AS)	-.57	1.61	-3.80	2.66	-.35	.725
Anxiety	-.62	.84	-2.31	1.08	-.73	.467
Group X Anxiety	2.14	1.69	-1.25	5.52	1.27	.212

Loss Feedback ERP at Site Pz



Discussion

- Loss P3 amplitude was similar across high and low AS groups
- Anxiety did not relate to loss P3
- Lack of group differences in loss P3 magnitude did not vary by anxiety level
- Low sensitivity to alcohol may be unrelated to monetary loss salience
- Further, anxiety might not alter attention toward negative feedback
- Limitations**
 - Small sample size reducing likelihood of significant relationships
 - Anxiety levels were generally low
 - Had smaller number of male participants
- Future directions**
 - Investigate role of self-reported reward sensitivity in loss P3
 - Examine P3 to different negative outcomes such as loud noises

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