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Fast but inefficient processing: neural signature of anxiety in adults who stutter

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Introduction

Adults who stutter (AWS) often exhibit altered cognitive control and emotional processing. Although behavioral indices such as reaction times and accuracy have been extensively studied, the influence of anxiety traits on neural dynamics during cognitive tasks remains understudied.

This study investigates the relationship between trait anxiety, measured via the Beck Anxiety Inventory (BAI), and neural markers (event-related potentials N2 and P3) during a visual stop-signal task in AWS compared to fluent controls.

Methods

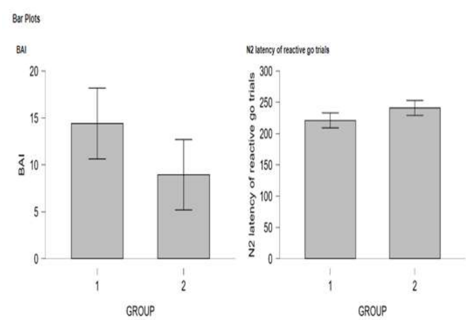
Forty-two adults (22 AWS, 20 controls) completed a visual stop-signal task with continuous EEG recording. ERP components N2 and P3 were extracted from proactive and reactive "go" trials. BAI scores were collected to assess anxiety. Independent Samples T-Test and Partial Correlation analyses were conducted to examine differences between groups and relationships between anxiety scores and ERP measures.

Results

AWS displayed significantly shorter N2 latencies during reactive go trials compared to controls, suggesting quicker neural conflict detection.

AWS also showed higher BAI scores, reflecting elevated anxiety. After controlling for age and group, a trend-level negative correlation was observed between BAI scores and N2 latency during go trials (Spearman correlation: -0.319, p = 0.058), indicating a possible link between higher anxiety and faster neural processing.

Figure 1. Descriptive plots comparing Beck Anxiety Inventory (BAI) scores and N2 latency during reactive go trials between adults who stutter (Group 1) and control participants (Group 2)



Conclusion

These results confirm higher anxiety levels in AWS and suggest anxiety may modulate neural timing in cognitive control tasks.

Shorter N2 latency points to accelerated but potentially inefficient conflict monitoring, highlighting possible hyperactivity in the anterior cingulate cortex associated with anxiety in AWS.

Keywords

Adults Who Stutter, Anxiety, N2 latency, EEG, Anterior Cingulate Cortex

Figure 2. Spearman' s partial correlation of Beck Anxiety Inventory (BAI) scores and N2 latency of go trials, conditioned on variables: age and groups.

Correlation ▼

Spearman's Partial Correlations ▼

Variable		BAI	N2 latency of go trials
1. BAI	Spearman's rho	—	
	p-value	—	
2. N2 latency of go trials	Spearman's rho	-0.319	—
	p-value	0.058	—

Note. Conditioned on variables: Age, GROUP.
Note. Standard error of effect size (Fisher's z) is currently unavailable for non-parametric partial correlations.

Photo credit: Don Erhardt

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Acknowledgement

Special thanks to Dr. Shahrzad Mazhari and Dr. Ali Purrahimi for their invaluable supervision during the PhD research from which these data were derived.