

Cognitive and Neural Markers of Executive Control and Vigilance in OSA-Symptomatic Young Adults

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Background

- Obstructive Sleep Apnea (OSA) is a sleep disorder characterized by repeated breathing interruptions during sleep (Azagra-Calero et. al., 2012; Xie et. al., 2016)
- OSA is estimated to affect 1 billion individuals worldwide (Iannella et. al., 2025; Jehan et. al., 2017)
- OSA has been linked to cognitive impairments in attention and executive functioning (Deering et. al., 2017; Yilmaz et. al., 2016)
- Most research focuses on moderate-severe OSA commonly found in older populations

Participants

- Participants were grouped into either the OSA-Symptomatic or Non-Symptomatic group based on self-reported symptoms through modified scoring of the Berlin Sleep Questionnaire (BSQ)
- 33 18-22 year old College of Wooster Students

	OSA-Symptomatic	Non-Symptomatic
Male	3	2
Female	10	18

- The BSQ is an 11 question survey to identify those high at risk for OSA
- Focusing on three symptom categories: snoring intensity/frequency, daytime sleepiness, and history of hypertension and obesity

Methods

Stroop Task:

- Measures executive functioning through inhibitory control and conflict monitoring
- Participants were presented with a congruent and incongruent condition
- An Electroencephalogram (EEG) was used to measure neural activity during the Stroop Task
- Focused on the N450 ERP Component (Conflict Monitoring) for frontal electrodes

Congruent
RED
BLUE
GREEN

Incongruent
RED
BLUE
GREEN

Psychomotor Vigilance Task (PVT):

- Measures sustained attention
- Participants were presented with a stimulus at random intervals (2-10 seconds) and were instructed to respond as quickly as possible

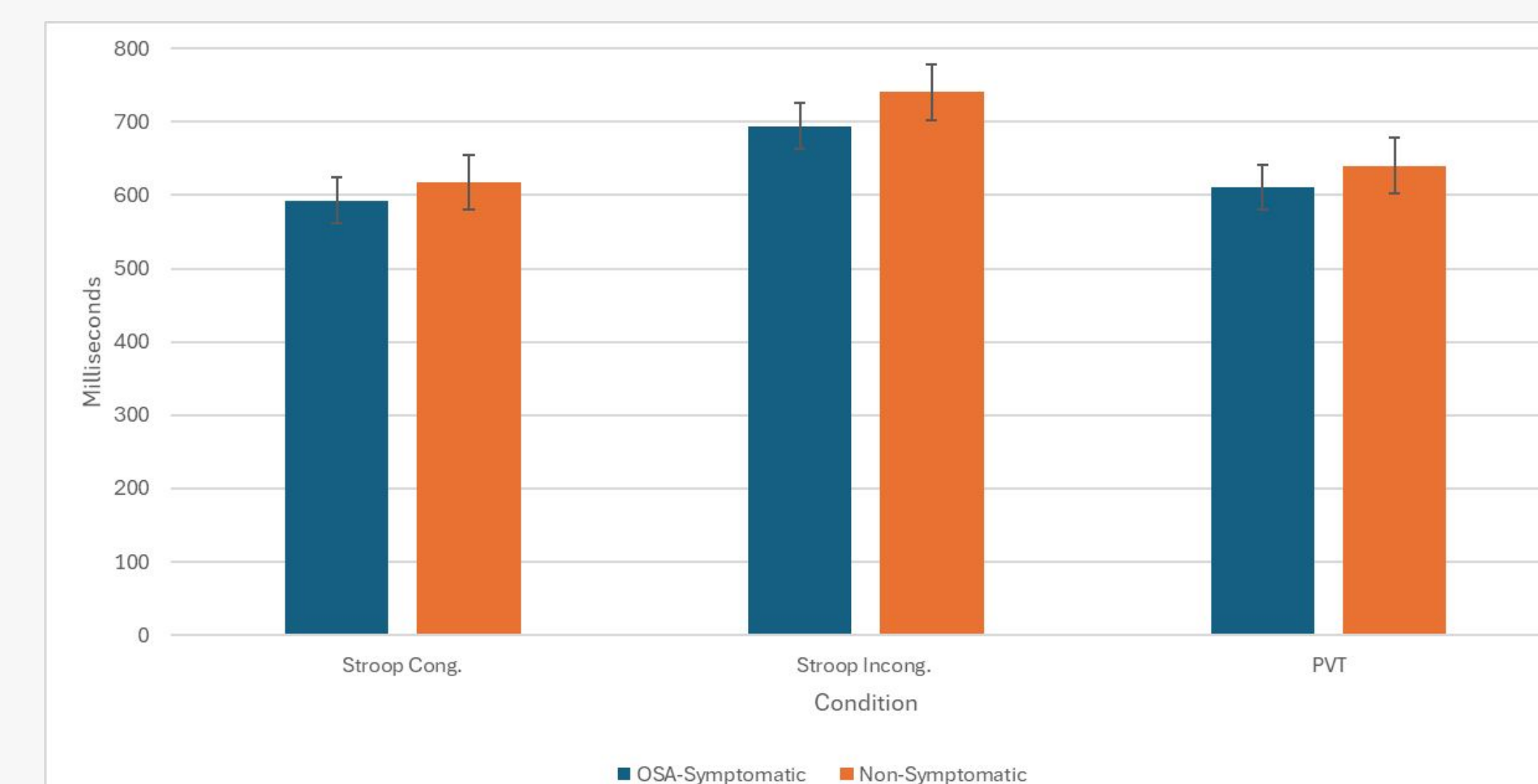
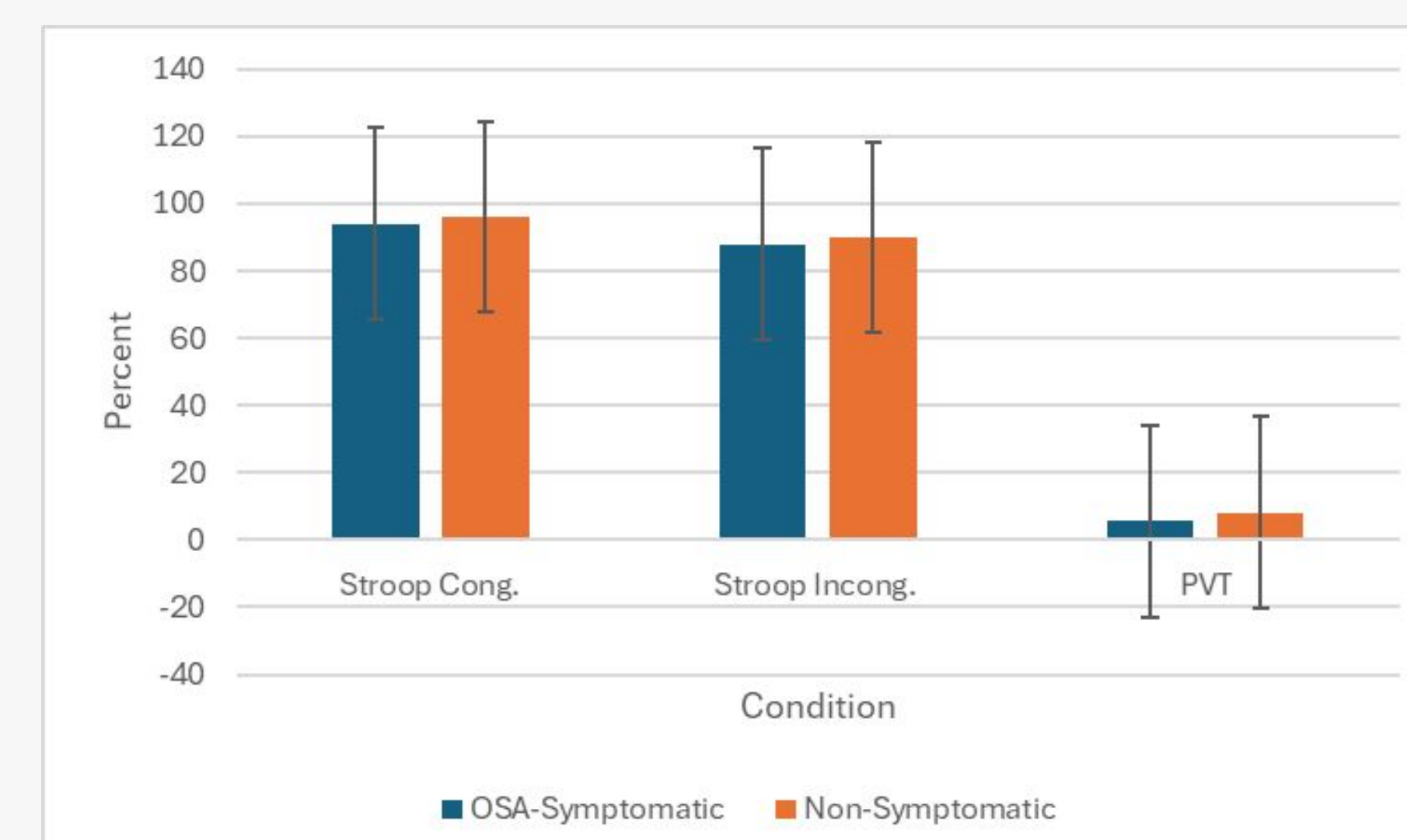
Hypotheses

OSA Symptomatic Individuals would show:

- Slower reaction times and reduced accuracy on both the Stroop and PVT
- Reduced (less negative) N450 Amplitudes for the Stroop Task

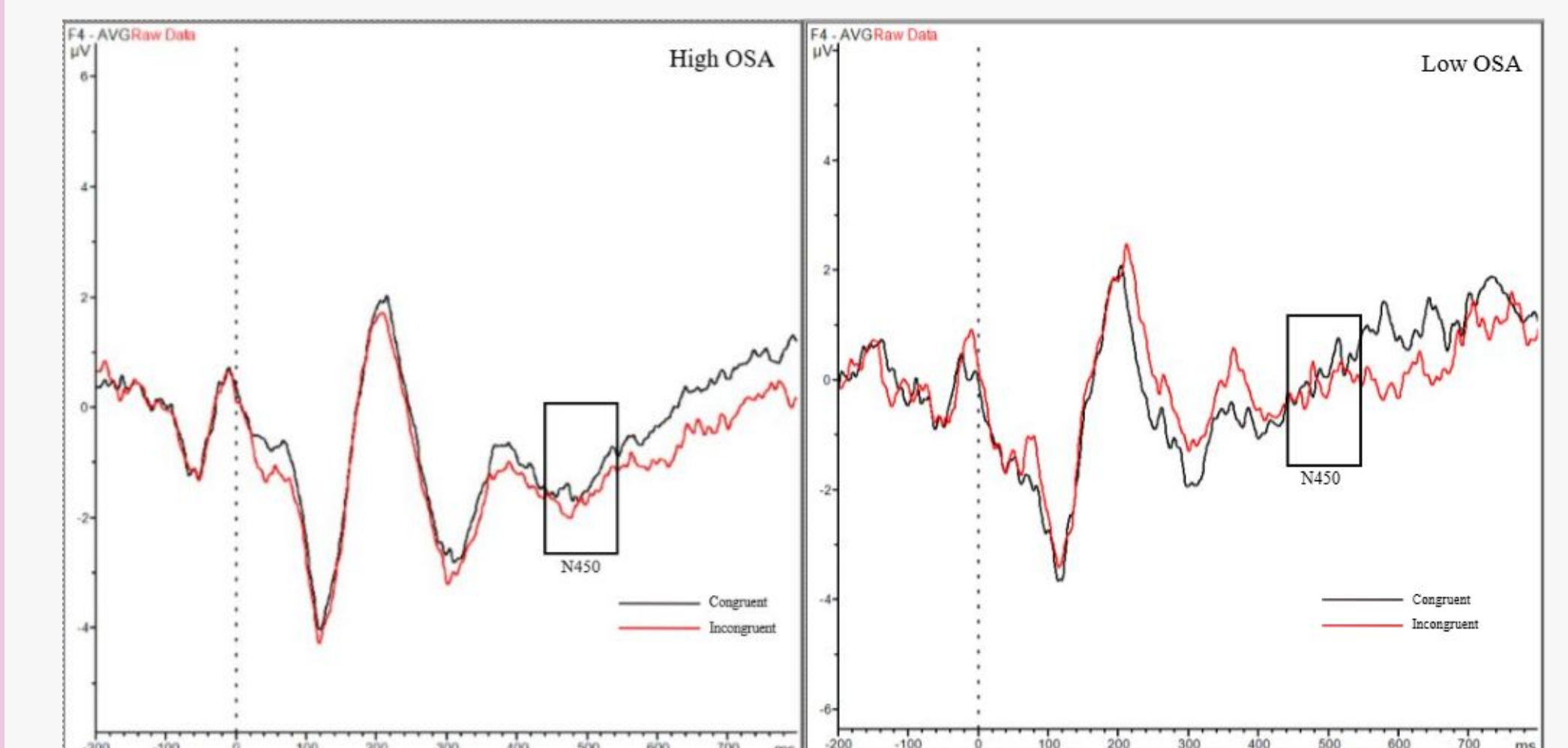
Behavioral Results

- No significant group differences in reaction time or accuracy between OSA-Symptomatic and Non-Symptomatic groups for the Stroop and PVT were observed
- A stroop effect was observed for both groups as participants had slower reaction times and accuracy percentages for the incongruent condition



EEG Results

- OSA-Symptomatic participants showed more negative N450 Amplitudes compared to the Non-Symptomatic Group across conditions
- Altered neural processing despite similar behavioral results between groups



Conclusions

- OSA-Symptoms were associated with differences in brain activity, even without behavioral impairments
- More Negative N450 amplitudes suggest an increased engagement of conflict monitoring networks (Coderre et. al., 2011)
- Supports the idea that greater neural recruitment helps maintain performance compared to individuals with no symptoms

Future Directions

- The use of college students with clinically diagnosed OSA
- Including participants that have moderate to severe symptoms
- Examine additional ERP components

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