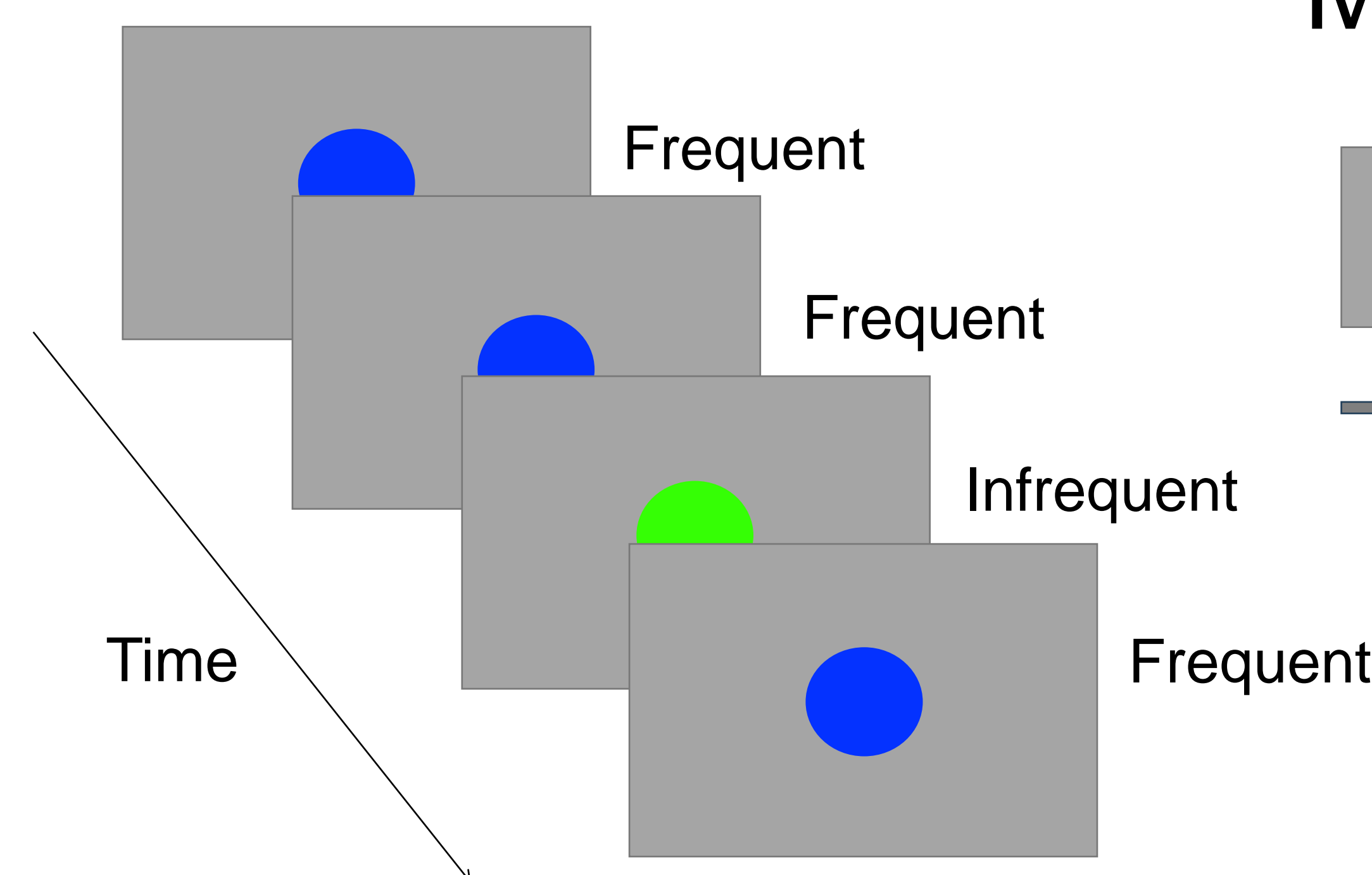


INTRODUCTION

- Acute exercise improves long and short-term brain functioning.
- Conflicting results indicate that endurance exercise may temporarily impair cognitive function.
- Impaired cognition from prolonged activity could have implications for professions which require long hours without rest.
- Electroencephalography (EEG) is a noninvasive way to measure brain activity.
- N200, a specific Event Related Potential (ERP) component is seen in EEG data when an infrequent stimulus is presented, reflecting attention and inhibition. It is similar to what you might experience when seeing a stop light.

Research Question: Will a two-hour submaximal run reduce the cognitive processes of attention and inhibition?

Oddball Paradigm



METHODS



EEG data was collected from participants before and after a two-hour run using an oddball paradigm on a digital tablet to elicit the ERP component N200. Participants were instructed to tap the screen when the green circle was shown.

RESULTS

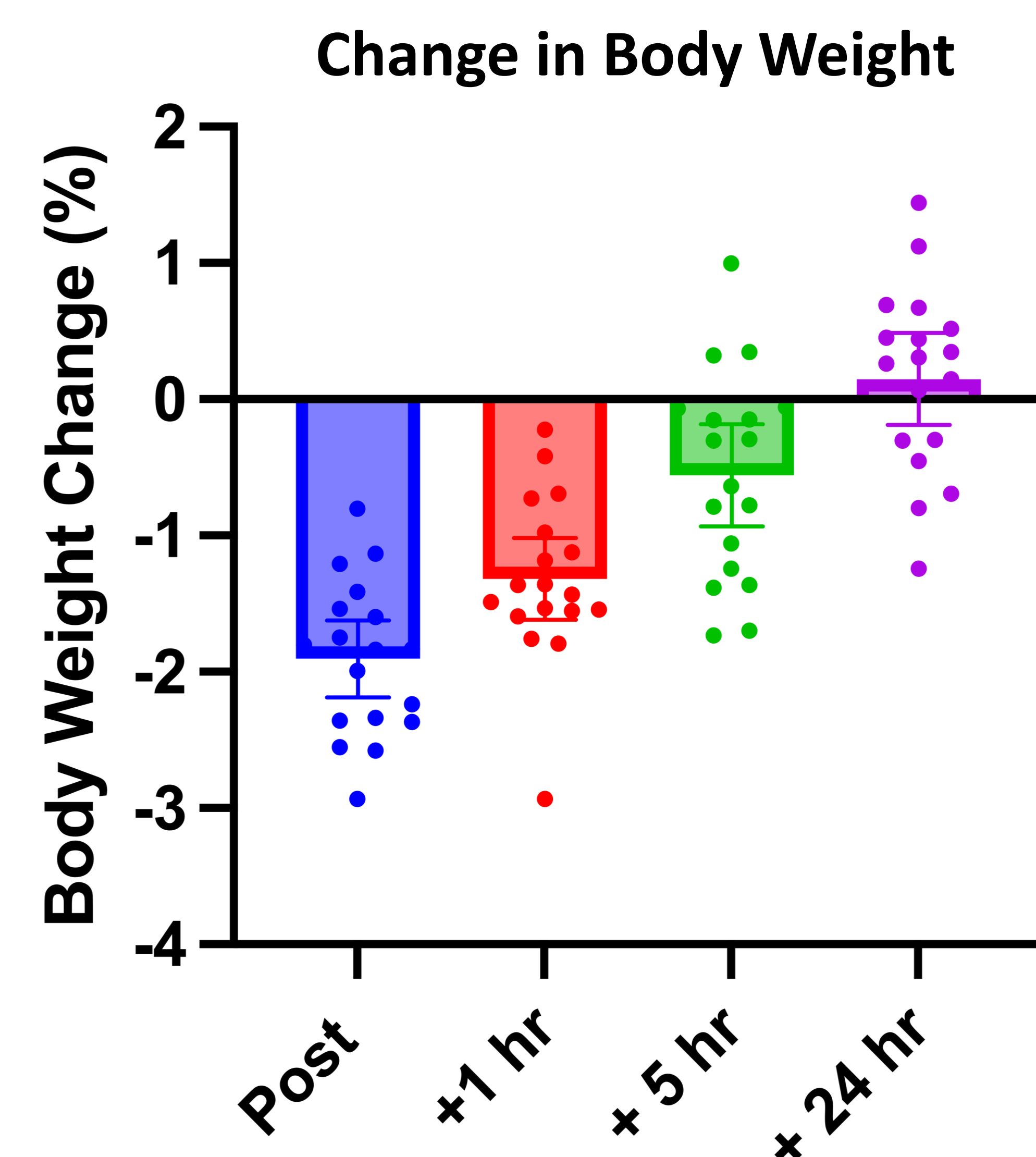


Figure 1. Changes in body weight relative to starting weight expressed as a percentage

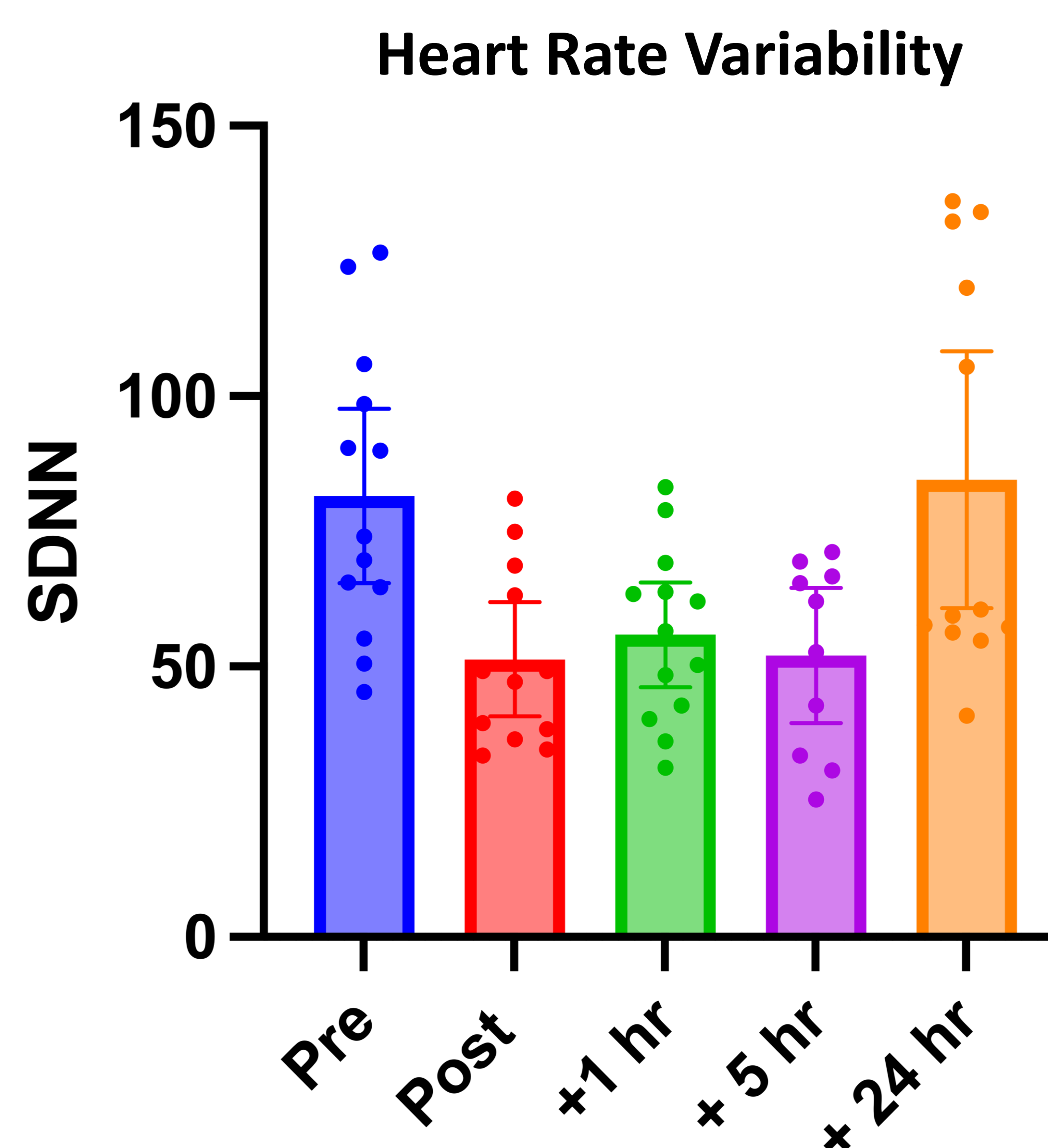


Figure 2. Standard deviation of the interbeat interval of normal sinus beats (SDNN)

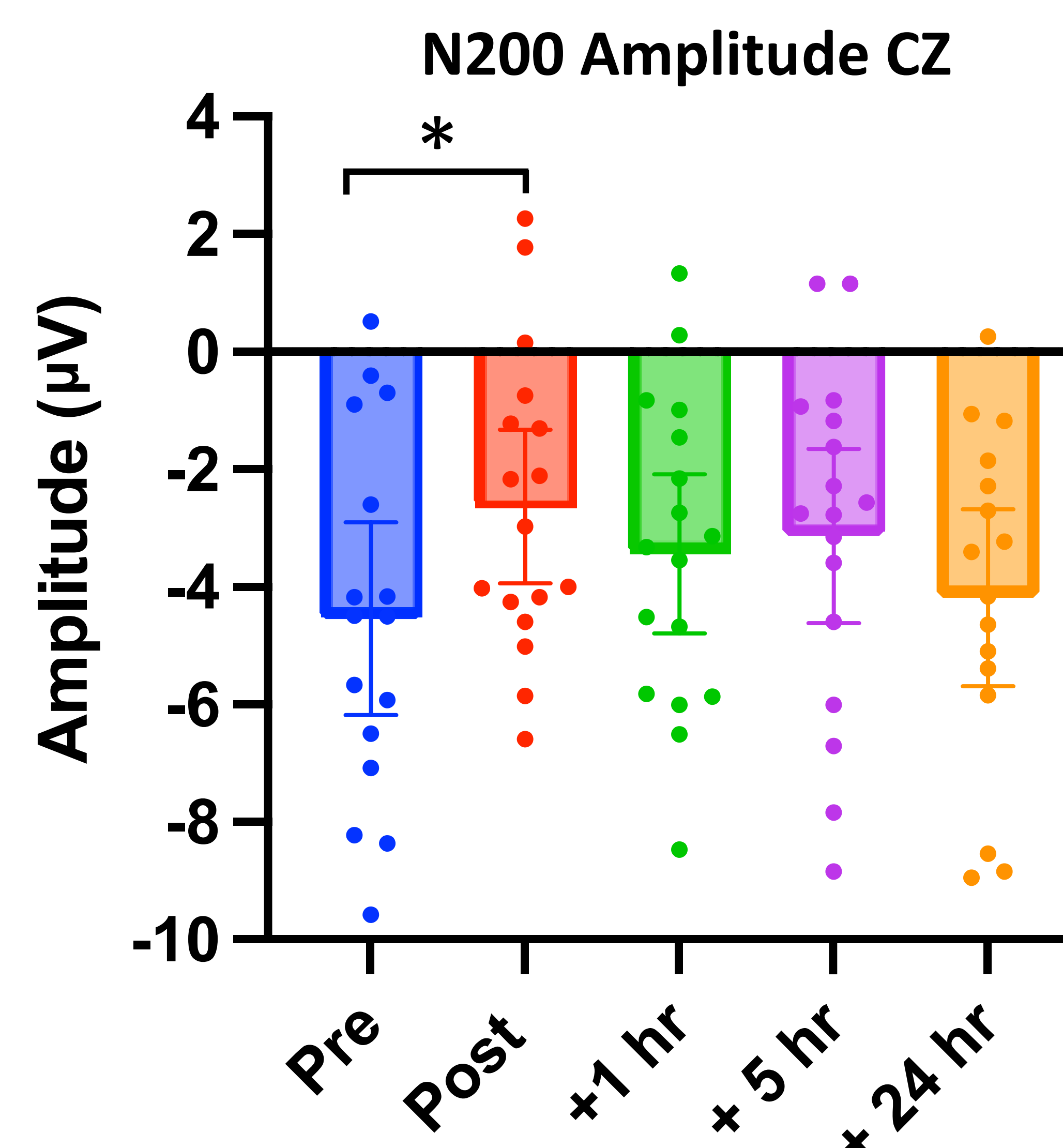


Figure 3. Changes in mean Cz amplitude (μV). Post-hoc paired T-test, Pre to Post ($t(15)=2.162, p=0.0472$. Mean Difference= 1.826 , $SD=3.378$)

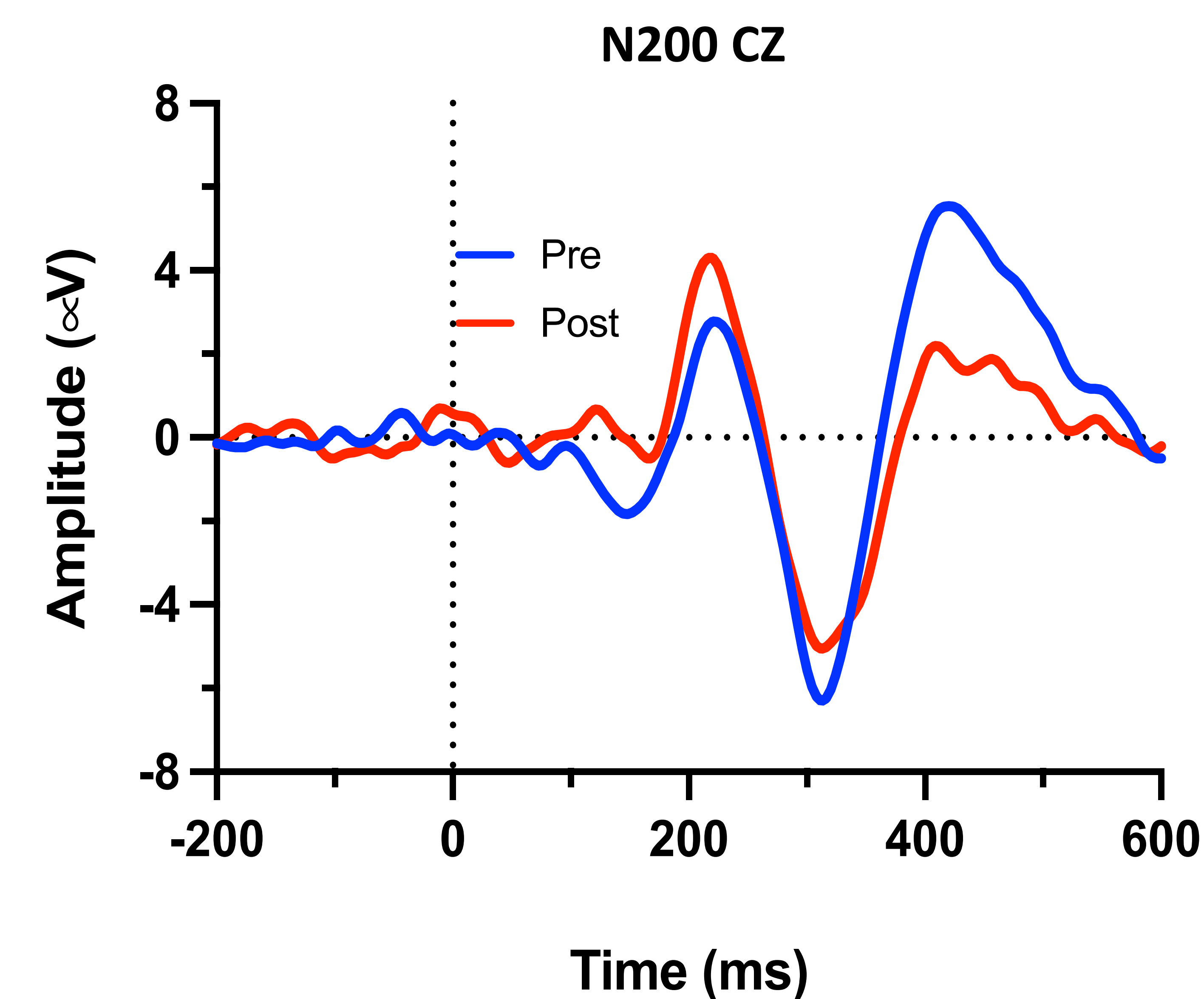


Figure 4. Grand average waves pre and post 2 hour run at Cz. N200 observable at 300ms

CONCLUSIONS

- After two hours of running amplitude of the N200 decreased immediately post test and had recovered within one hour post exercise, there was also a notable difference in the amplitude of P300. Results of this study indicated that endurance related fatigue may be enough to suppress the normal positive cognitive benefits associated with acute exercise.
- Recommendations for future studies is the inclusion of physiological biomarkers of fatigue and stress in conjunction with EEG data during and following endurance exercise.