

Combined Effects of Optimism Level and Caffeine Intake on QEEG Alpha Wave Power: A Pilot Study

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Introduction

- ☐ Caffeine has a general effect on alpha brain waves (Diukova, 2010).
- ☐ Heavy caffeine users experienced increased neural activity compared to vasoconstriction (Gilbert et al., 2000)
- ☐ Purpose of the pilot study is to assess the effects of caffeine intake and optimism levels on alpha wave activity in heavy caffeine users.

Method

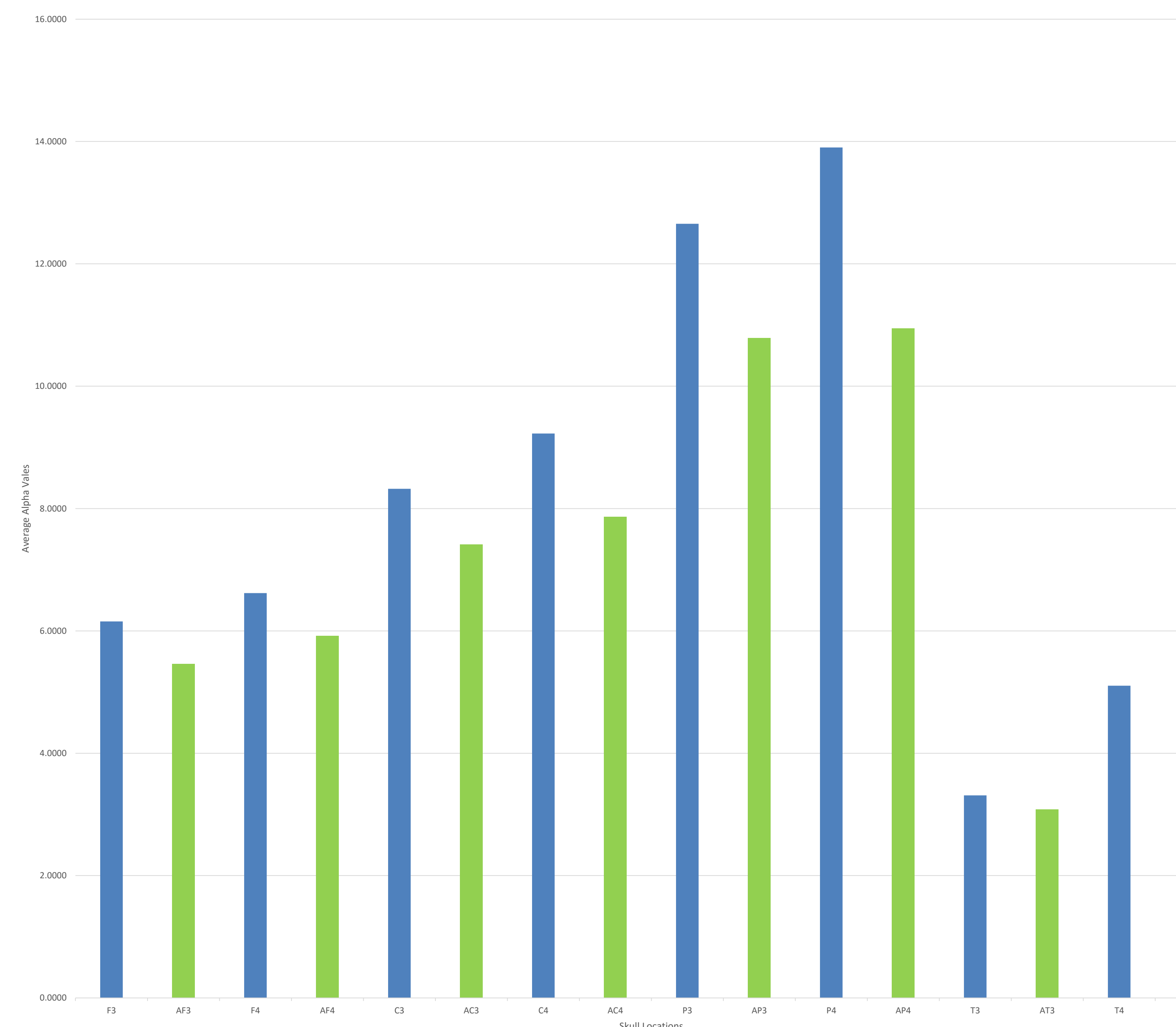
Participants

- ☐ Six participants: three males and three females
- ☐ All participants are heavy caffeine users – defined as daily consumption of more than one cup of coffee

Materials and Methods

- ☐ Participants abstained from caffeine for 12 hours prior to assessment
- ☐ Assessments occurred between 8am and 11am
- ☐ Standard QEEG assessments using the 10-20 system
 - ☐ First assessment prior to coffee
 - ☐ Participants drank one cup of black coffee
 - ☐ Second assessment 20 minutes after coffee

Mean Alpha Activity vs Location



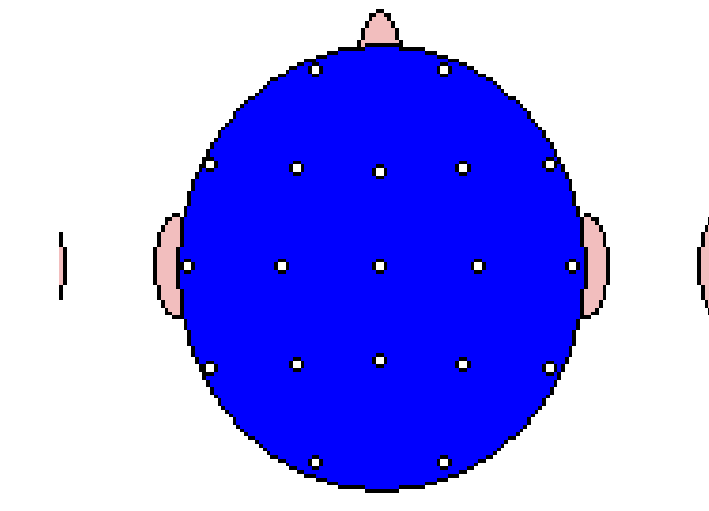
Results

- ☐ Strong correlations between absolute power and optimism in frontal (before $R=-0.345$; after $R=-0.447$)
- ☐ Greater caffeine activity correlated with optimism in frontal ($R=0.413$) and central ($R=0.359$) locations
- ☐ Interhemispheric differences in temporal areas (Mean before=1.54; Mean after=1.46)

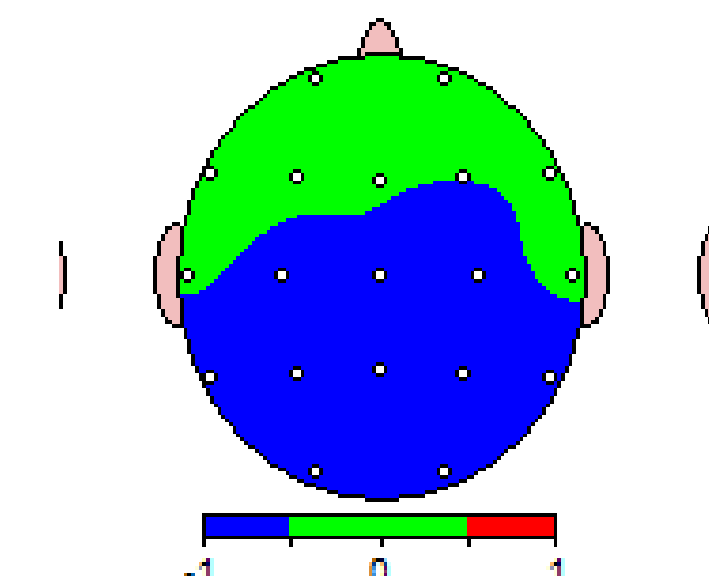
Z-Scored Alpha Activity Example

Before

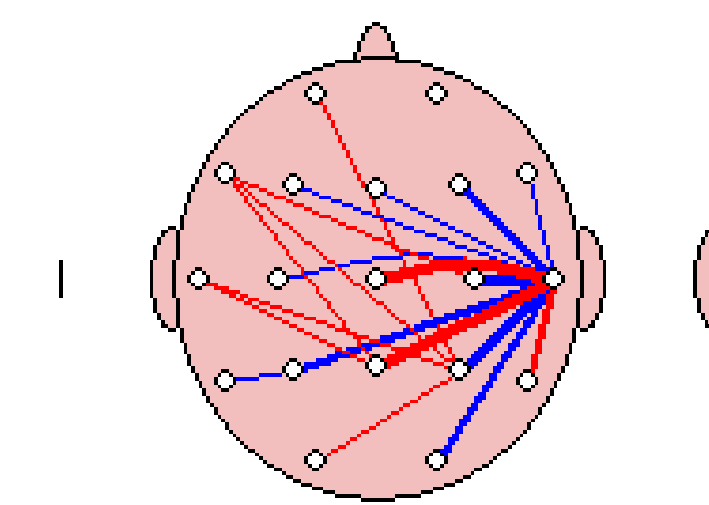
e^{Alpha}



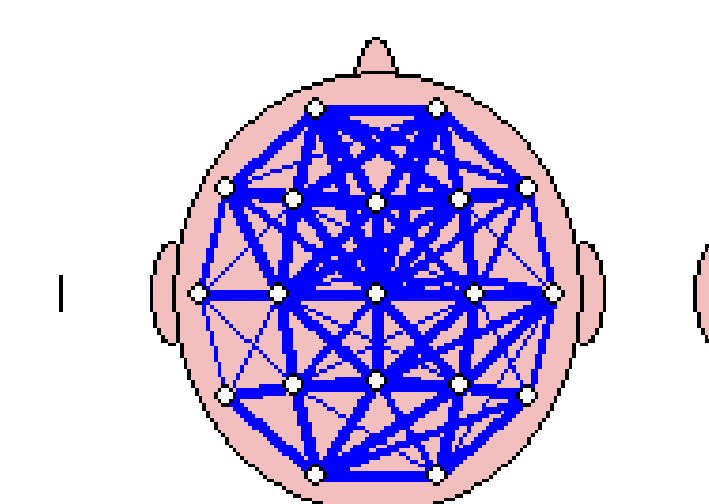
Absolute Power



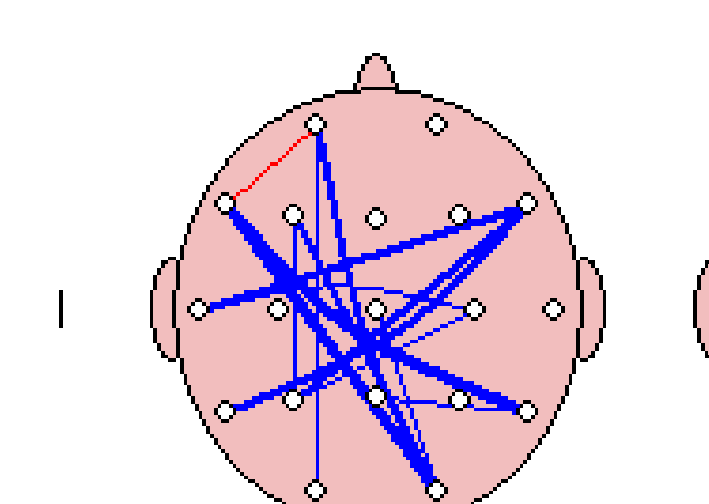
Relative Power



Amplitude Asymmetry



Coherence

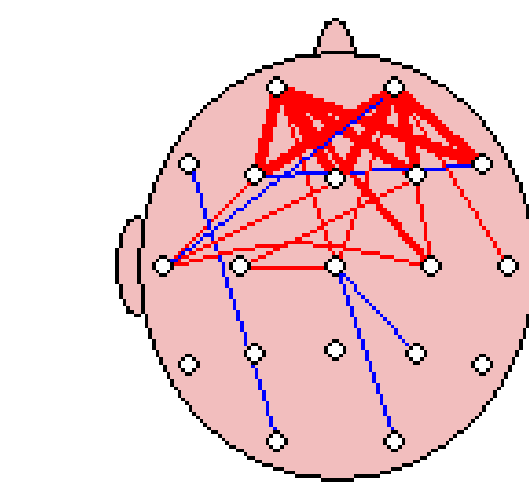
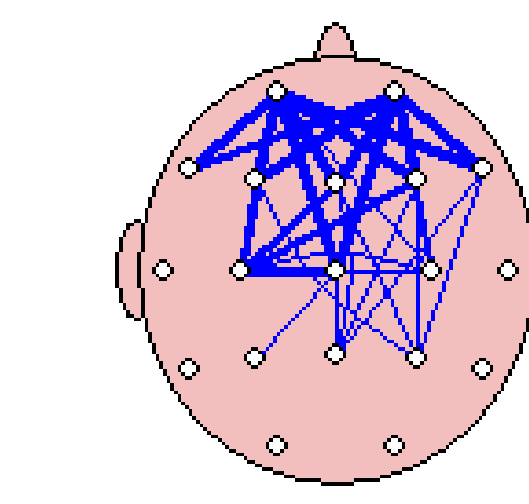
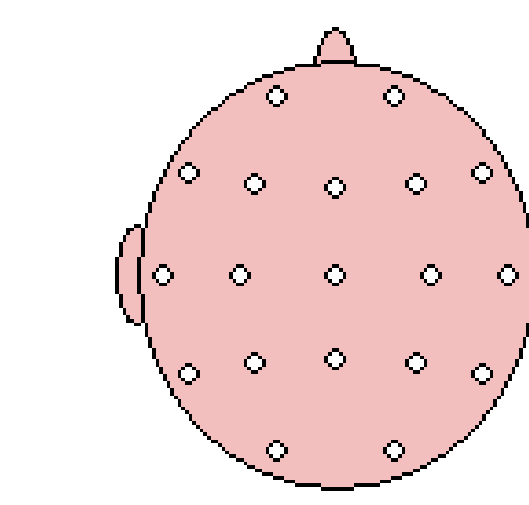
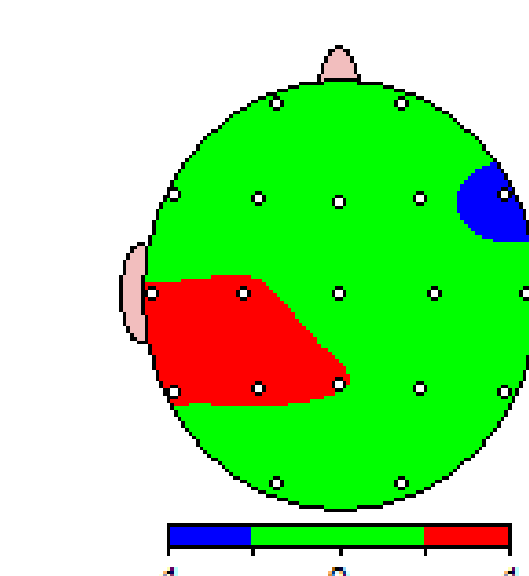
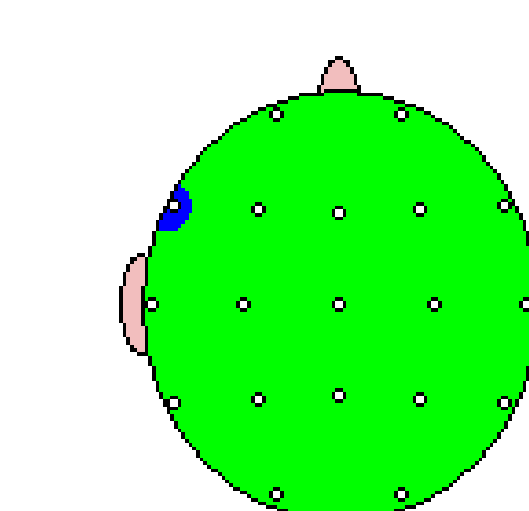


Phase Lag

Z-Score ≥ 2.58

After

Alpha



Z-Score ≥ 2.58

Conclusion

Caffeine has a general effect on alpha wave activity and optimism scores in heavy users. Although the sample size is small, the trend is significant enough to warrant further study.

