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

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)

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.

Z-Scored Alpha Activity Example

- Before
  - Absolute Power
  - Relative Power
  - Amplitude Asymmetry
  - Coherence
  - Phase Lag

- After
  - Absolute Power
  - Relative Power
  - Amplitude Asymmetry
  - Coherence
  - Phase Lag

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