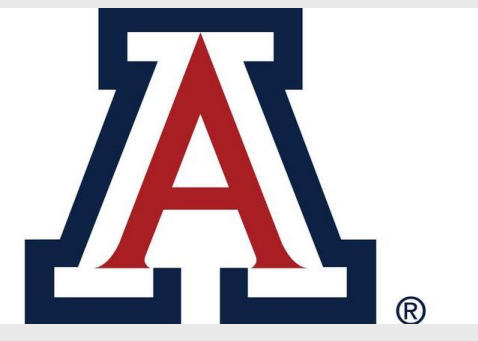


Stability of Frontal EEG Alpha Asymmetry in a Hostile MRI Environment

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Summary

EEG alpha asymmetry has shown stability over multiple recording sessions with about 60% of the variance being stable trait variance.

Would EEG alpha asymmetry recorded in the MRI scanner show similar stability?

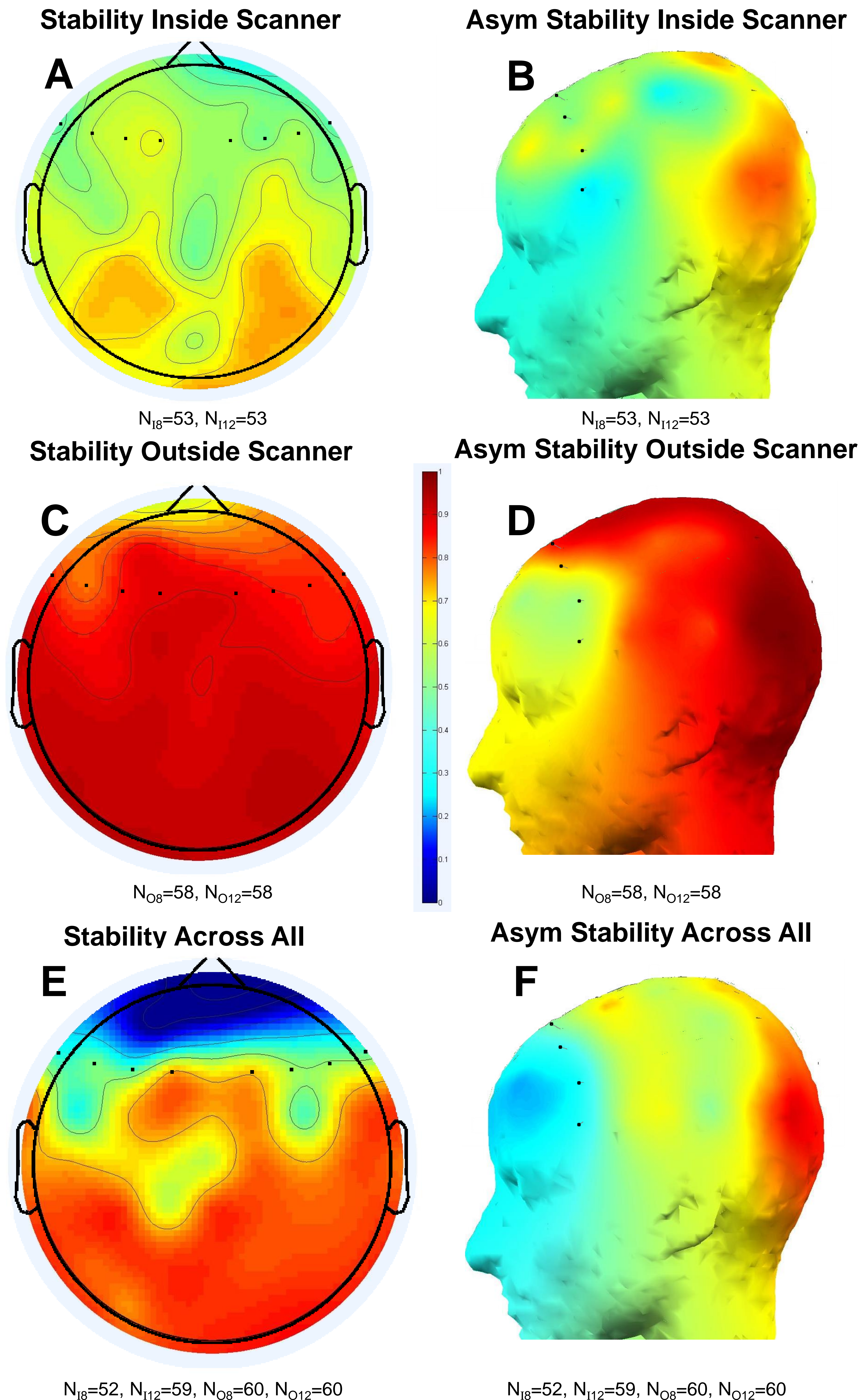
EEG data (N=60) obtained in the scanner was cleaned using BrainVision's MR Correction and CB Correction successively, then performing manual rejection and ICA removal.

After applying the current-source density transform, alpha power was extracted via FFT and asymmetry scores were calculated: $\ln(\text{right}) - \ln(\text{left})$.

Intraclass correlations of stability across a 30 minute interval were fair to excellent for data collected within a setting (either inside scanner or outside scanner).

Stability across recording settings was lower, especially for frontal regions.

Intraclass correlations of stability



In figure subtitles: 'I' refers to recordings taken inside the scanner, while 'O' refers to those taken outside. In each condition an 8 and 12 minute recording were taken, referenced by the numbering in subtitles. Dots represent the electrodes frequently used in the calculation of Frontal Alpha Asymmetry.

Conclusions

Stability inside the scanner is generally acceptable, but lower than stability outside the scanner.

Proposed causal factors:

- Lower signal-to-noise ratio inside the scanner may reduce stability of the true signal.
- Larger or more frequent changes in psychological state mediated by frontal systems may occur inside compared to outside the scanner.
- Effects of supine vs seated body posture on asymmetry have been observed, and may contribute to lower stability across contexts.
- Even small residual BCG artifacts may appear as an alpha frequency.

Because the largest instability is seen in frontal regions, this may cause concern for researchers interested in frontal EEG asymmetry.

Acknowledgments

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