PARIETAL EEG ALPHA SYMMETRY AND OBSESSIVE-COMPULSIVE SYMPTOMATOLOGY

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Introduction

- Although the clinical presentation of various anxiety disorders differ from each other, symptom overlap across disorders can be substantial
- Anxious apprehension and anxious arousal appear in several anxiety disorders, and may have differential lateralization of neural activity
  - Anxious apprehension is linked to greater relative left hemisphere brain activity[1]
  - Anxious arousal is linked to greater relative right hemisphere brain activity[1,2]
- To date, research has not investigated if anxious apprehension, and a similar phenomenon—obsessions—elicit similar neural activity

Method

Participants

- Data from 97 participants (66 females) were included in the analysis.
- Participants were recruited by way of their responses to surveys administered to introductory psychology courses (Table 1)

Procedure

- Resting EEG was recorded from 64-channels during one-minute segments with eyes open or closed.
- Artifacts were identified visually, and also using a semi-automated ICA-based procedure (ADJUST[3])
- Data transformed to Current-Source Density (CSD[4]) montage
- FFT computed for overlapping 2.048-second epochs, and resultant spectra were averaged across epochs
- EEG alpha-band power (8-13Hz) extracted, and natural-log transformed
- Asymmetry computed by ln(Right)-ln(Left) alpha power at homologous electrodes (e.g. F8-F7).

Analyses

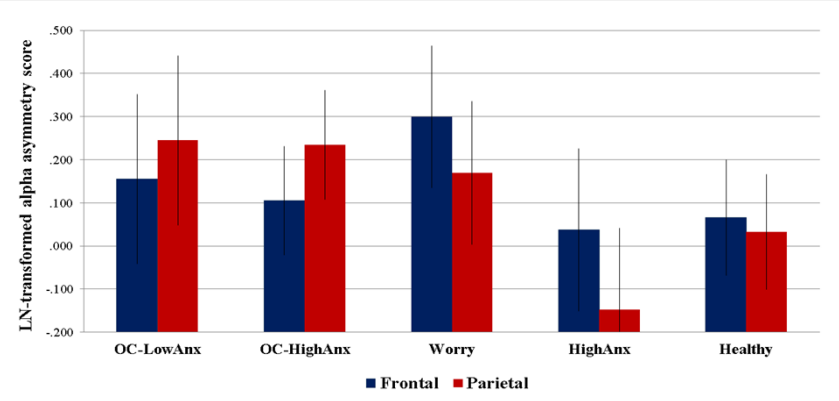
- Frontal region: Asymmetry scores at F8/7, F6/5, F4/3, and F2/1
- Parietal region: Asymmetry scores at P8/7, P6/5, P4/3, and P2/1
- For both regions, a Group (5) X Electrode (4) Mixed-Linear Model (MLM) tested whether asymmetry scores differed across Group and Electrode. Post-hoc comparisons evaluated differences pair-wise between groups.

Results

Table 1. Self-report criteria for group selection

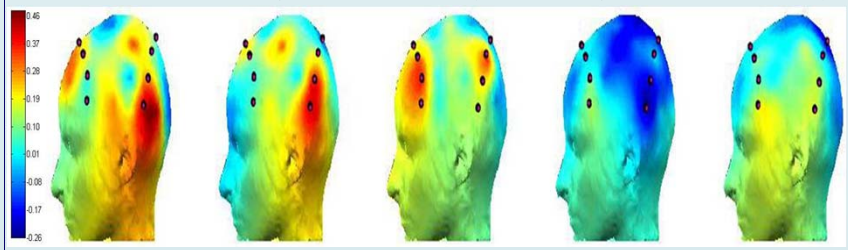
	OC-LowAnx (N=12)	OC-HighAnx (N=29)	Worry (N=17)	HighAnx (N=13)	Healthy (N=26)
OCI-R (clinical cutoff = 20)	↑ clinical cutoff	↑ clinical cutoff	↓ clinical cutoff	↓ clinical cutoff	↓ median
STAI-T	↓ median	↑ median	↓ median	↑ median	↓ median
PSWQ (clinical cutoff = 60)	↓ median	↑ median	↑ clinical cutoff	↓ cutoff	↓ median

Figure 1. Alpha asymmetry scores for frontal and parietal regions and for each group



Note: Higher scores indicate greater left-than-right activity. Bars indicate 95% confidence intervals.

Figure 2. Scalp maps of CSD-transformed alpha asymmetry scores (R-L in ln(μV²/cm²))



Note: Red (blue) indicates greater (less) left-than-right activity. Dots indicate approximate location of sites included in analyses.

Results (Cont'd)

Frontal Asymmetry:

- There was no main effect of Group nor Group X Electrode interaction (*p*s>.15) for frontal alpha asymmetry.

Parietal Asymmetry:

- Parietal alpha asymmetry varied with Group ($F(4, 360)=3.37$, $p=.01$); the Group X Electrode interaction was not significant ($F<1$)
  - OC-LowAnx had more relative left activity than HighAnx and HC (*p*s<.04)
  - OC-HighAnx had more relative left activity than HighAnx and HC (*p*s<.04)
  - Worry had more relative left activity than HighAnx at trend-level ($p=.08$)
  - HighAnx did not significantly differ from Healthy ($p=.17$)

Discussion

- OC and Worry groups had more relative left parietal activity
  - Relative left parietal activity may index increased anxious apprehension in these participants
  - Present results suggest regional specificity in terms of laterality and anxious apprehension[1]
- Limitations / Future directions
  - Resting state data may not be the strongest test of our hypotheses[2,5] and a future report might induce anxious apprehension in participants (i.e., a capability model[5])
  - Better measures of anxious arousal besides the STAI-T could be used in follow-up studies
  - Other EEG bands might be examined, (i.e., midfrontal theta) and have been linked to OCD[6] and worry symptoms[7]

References

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