Analysis of Aperiodic EEG Components Across Task and Population Conditions

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Electroencephalography (EEG) measures ongoing brain activity, the amalgam of underlying electrical activity in groups of neurons. This ongoing activity is modified by tasks, disease, and development. EEG activity is quantified by these oscillatory periodic components, but also contain aperiodic components. Previous work has focused on the periodic components. Recent work suggests that the aperiodic components may have more significance than previously thought. This project explores potential differences in periodic and aperiodic components of EEG data in two studies. The first study, eXe, consists of healthy adults in eyes open and closed conditions. The second study, PNE, are two groups of infants, one exposed to nicotine prenatally and one control. We analyzed wavelet decomposed periodic activity and spectral parameterization for aperiodic activity. Aperiodic components were not statistically different for the PNE infants, but were across the eyes closed and open conditions for eXe. Results highlight the importance of aperiodic components. Future work could use a larger sample size and explore the relationship between aperiodic and periodic components.