EEG ACTIVATION IN MONOZYGOTIC AND DIZYGOTIC TWINS TO ASSESS HERITABILITY OF PRE- AND POST-STIMULUS RESPONSE TO VISUAL AND PHOTIC STIMULI

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Background: Brain electrical activity is influenced by heredity as reflected in electroencephalography (EEG). A key strategy to explore heritability of EEG parameters is through the study of twins by comparing monozygotic (MZ) and same sex dizygotic (DZ) twins. Previous research is suggestive of correlated EEG signals in isolated individuals. The role of genetic factors for anticipatory processing in contributing to the pre- and post-stimulus activation have not been adequately studied. We propose to study twins to address (1) EEG parameters of anticipation of and response to emotional stimuli and (2) frontal alpha asymmetry in explaining these responses to address underexplored areas of heritability of processing of emotions and the explanatory power of the frontal asymmetry index in this context in twins.

Aims: (1) Determine real-time concordance of EEG in separated twin pairs where one twin is exposed to visual stimuli (pleasant, unpleasant and emotionally neutral pictures) and the co-twin is spatially isolated in a separate room in an 'at rest' condition. (2) Determine concordance of EEG in separated twin pairs, using a paradigm like Aim 1, but substituting (a) photic stimuli (12Hz) and (b) alpha blocking through alternating eyes open and closed in one twin.

Method: In this investigation we plan to assess the concordance in EEG reactivity in isolated MZ and DZ twin pairs in response to photic stimuli and pictures standardized in terms of emotional valence. Twelve pairs each of MZ and same-sex DZ twins will be tested for real time concordance in EEG parameters using robust statistical methods and checks to ensure no order or time-on-task effects that might reflect competing causes for any concordance effects.

Preliminary results: Extensive work was undertaken to ensure that both EEG measurement systems produce identical standardized data so that any significant findings of correlated EEG signals in isolated twins could not be attributed to errors in hardware. Response to recruitment efforts of same sex twins has been successful. Data collection is in progress. There are currently no results to report.

Keywords: Anticipation, Pre-stimulus, Electroencephalography, EEG, Emotion

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