ANTECIPATION OF PENDING PICTURES OF UNKNOWN EMOTIONAL VALENCE – A PRE-STIMULUS ELECTROENCEPHALOGRAPHY (EEG) STUDY

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Background: A growing body of research is focused on whether physiological measures can differentiate pending unpredictable stimuli based on stimulus characteristics unknown to participants and experimenters, theorized as “predictive anticipatory activity (PAA)”.

Aims: The focus of this research was to determine if the pre-stimulus electroencephalographic (EEG) activity could differentiate between randomly pending pleasant, unpleasant,and emotionally neutral visual stimuli in the absence of sensory cues. A first group of participants were recruited to test this hypothesis and a second group to replicate the findings. A third exploratory analysis tested the same hypothesis on the larger sample.

Method: Prior to the presentation of each visual stimulus, participants and experimenters were blind to the pending stimulus type that was selected truly randomly. 64-channel EEG data of the pre-stimulus period were analyzed with robust methods including robust corrections for multiple testing.

Results: A significant difference was observed between the pleasant and neutral conditions from 1072 and 1024 ms pre-stimulus over occipito-parietal electrodes (corrected for multiple comparisons). However this effect was not confirmed by the second group examined. A third exploratory analsysis on both groups combined showed a similar significant difference (same conditions and areas; corrected for multiple comparisons) but occurring between 148 and 112 ms before stimulus presentation.

Conclusions: Findings suggest an anomalous pre-stimulus effect but an outright replication was not found. While caution should be taken regarding the interpretation of these findings, the robust methods employed in this study suggest they merit replication and further study to be better understood.

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

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