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EEG Oscillatory Correlates Of Aesthetic Experience – A Review

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Introduction: With an aestheticization of life through technology, as well as with advances in neuroimaging and personalized marketing, the field of neuroaesthetics, i.e. the neuroscience of aesthetic experiences (AE), has received increased attention. An AE can be defined as “a perceptual experience that is evaluative, affectively absorbing and engages comprehension (meaning) processes” [1]. Previous neuroaesthetic reviews mostly focused on fMRI and ERPs and the neural dynamics of aesthetic preference remain unclear [1]. Therefore, we reviewed potential EEG oscillatory neuromarkers of AE from studies investigating brain oscillations of visual art preference. In order to avoid philosophical debate on the being of Art, we define ‘art’ pragmatically and consider as ‘art’, objects that are culturally accepted as ‘art’.

Material, Methods and Results: We conducted a literature review by scrounging publicly available databases, as well as the references and citations of neuroaesthetic literature. For search queries we used “+aesthetic|art|painting +EEG|brain|neur* +oscil*|wav*|frecuen*|rhythm*”. We used similar expressions in German, French and Spanish. We included EEG studies investigating oscillatory correlates of AE with static visual art stimuli (i.e. paintings and photographs) in ‘naturalistic’ viewing conditions (e.g. no Oddball paradigms), in order to reduce potential confounding factors. We rejected studies that did not collect aesthetic judgments from subjects. Our search yielded 6 articles fulfilling the criteria. 3 experiments (1 in the lab, 2 in the wild) reported frontal alpha asymmetry to be correlated with aesthetic beauty ratings [2, 3, 4]. [5] discovered evidence of occipital and parietal alpha suppression for preferred binarized Pollock paintings. Another mobile experiment found frontal beta suppression to be indicative of favorite paintings in a museum [6]. The last study described increased centroparietal high gamma for aesthetically moving visual art [7].

Discussion: The reviewed articles reported inconsistent modulations in alpha, beta and gamma frequency bands correlated to visual art preference. The inconsistencies might be explainable by the different types of aesthetic judgment or by muscle artifacts confounds. More reproducible naturalistic studies with good EEG preprocessing and artifact removal protocols are needed for deeper scientific understanding of AE.

Significance: This review summarizes EEG correlates of AE that could be used in passive BCI to improve user experience, e.g. by personalizing the aesthetics of digital environments.

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