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Comparing Thermographic, EEG, and Subjective Measures of Affective Experience During Simulated Product Interactions

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Abstract

The affective experience of a stimulus has traditionally been studied by statistically correlating the Electroencephalogram (EEG) and Affective Self Report (ASR). Here, this method is extended into a three-way correlation by including measurement of changes in forehead temperature on the right and left sides using Infrared Thermography (IRT). Sixteen male undergraduate designers were given a cognitive task whilst simultaneous IRT and EEG measurements were conducted. Measures of Arousal and Valence were recorded along with an additional post-test measure of Task Engagement. Using a Pearson product-moment correlation coefficient, the initial results exhibited inconclusive evidence of triangulation between the three methods, although a strong positive association was established between changes in forehead temperature and changes in total EEG activity. Further analysis revealed that the sample group was complex: half displayed higher temperatures on the right side and half displayed higher temperatures on the left side throughout the test. Analysis of these smaller groups revealed significant correlations between IRT, EEG, and ASR. The results support the view that IRT has potential use in the measurement of cognitive work and affective state changes during user-product interactions and suggest that further work is required to establish a more definitive relationship between forehead temperature dynamics and affect.

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