

Hot Under the Collar: Mapping Thermal Feedback to Dimensional Models of Emotion

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ABSTRACT

There are inherent associations between temperature and emotion in language, cognition and subjective experience [22,42]. However, there exists no systematic mapping of thermal feedback to models of emotion that could be used by designers and users to convey a range of emotions in HCI. A common way of classifying emotions and quantifying emotional experience is through ratings along valence and arousal dimensions, originating from Russell's circumplex model [32]. Therefore, the research in this paper mapped subjective ratings of a range of thermal stimuli to the circumplex model to understand the range of emotions that might be conveyed through thermal feedback. However, as the suitability of the model varies depending on the type of emotional stimuli [31], we also compared the goodness of fit of ratings between the circumplex and vector [8,31] models of emotion. The results showed that thermal feedback was interpreted as representing a limited range of emotions concentrated in just two quadrants or categories of the circumplex: high valence, low arousal and low valence, high arousal. Warm stimuli were perceived as more pleasant/positive than cool stimuli and altering either the rate or extent of temperature change affected both valence and arousal axes simultaneously. The results showed a significantly better fit to a vector model than to the circumplex.