Modeling the meaning of emotion words using multimodal features of real-world contexts

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The experience of emotion is high-dimensional. Emotions involve bodily sensations, mental contents, and associated behaviors, and unfold in the context of personal motivations, social relationships, and physical surroundings (Barrett et al. 2007). Because of this, modeling the meaning of emotion words is a theoretically relevant task (Kousta et al. 2011): how are these rich, embodied concepts represented in the mind and instantiated in language? Modeling emotion word meaning is also practically relevant, as it can provide insight into individual and cultural differences in how people experience themselves in relation to the world (Lindquist 2017). The meaning of emotion words is commonly quantified in terms of valence (pleasantness) and arousal (activation), as well as abstractness and imageability, by asking survey participants to provide explicit ratings (Altarriba, Bauer & Benvenuto 1999; Warriner, Kuperman & Brysbaert 2013). Researchers have also used corpus-based methods to construct and compare profiles of emotion words in natural language (Krawczak 2014). These approaches reveal important insights into emotion words, but overlook the personal, social, and physical contexts in which they are used, and which also contribute to their meaning.

I address this gap by applying corpus-linguistic methods to a unique database of emotion words used in real-world experiences. As part of a larger study of emotion in daily life, US English-speaking participants (N = 50) received 6-10 smartphone prompts per day for 14 days, at each prompt providing a label for their current feeling, indicating if they were currently with anyone else, and describing what they were currently doing. Participants' cardiovascular signals and gross bodily movement were also continuously recorded using a system of sensors. Using these data, I conducted a multiple correspondence analysis (Glynn 2014) to characterize the meaning of six emotion words that were frequently used by participants ("amused", "bored", "excited", "focused", "relaxed", "stressed"). I modeled these words relative to four contextual features: social situation (alone, with others); activity (work, leisure, non-work task, computer, eating); posture (sitting, standing, reclining); and physiological arousal (represented by recent increase, decrease, or no change in sympathetic nervous system activity).

A plot of the first two dimensions identified by the analysis revealed interesting relationships between the emotion words and their context of use. The first dimension roughly distinguished work from non-work activities, with "focused", "bored", and "stressed" on one side, and "amused", "excited", and "relaxed" on the other. The second dimension captured physical aspects like energy and posture: "relaxed" was associated with reclining, whereas "excited" was closer to standing. A 'stress' cluster also emerged, wherein "stressed" was associated with sitting, the presence of social others, increases in physiological arousal, and (to a lesser extent) work. These findings extend previous corpus linguistic work by demonstrating how emotion word meaning can be modeled using context features measured in the world rather than inferred from surrounding language. They also extend prior psycholinguistic work by illustrating how contextualized emotion word meanings can be derived from different modalities, beyond self-report. As such, this approach has the potential to bring new perspectives to embodiment and embeddedness in the language for emotion.

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