

## The Debate of Core Affect Structure: Moving Beyond the Limitations of Self-Report

**Competing Theoretical Models of Core Affect:** Dimensional theories of emotion suggest that discrete emotions, such as “excitement”, can be reduced to simpler, more primitive psychological elements: collectively referred to as *core affect*. This construct is considered to be the simplest consciously accessible experience of emotion<sup>1</sup>; making it fundamentally important to psychological research on emotion. However, disagreements over the structure of core affect persist, with theoretical models making competing, but testable, predictions.

Most theories of core affect agree that one of the underlying elements of emotion experience is *valence*: how positive or negative one feels. However, theories diverge over whether positive and negative feelings are separable entities. The leading model, the Circumplex Model of Affect<sup>1</sup>, argues that valence is a single, non-separable psychological construct. In other words, this model maintains that it is impossible to simultaneously experience the negative feeling associated with sadness, and the positive feeling associated with happiness. One, therefore, cannot experience a *mixed affective state*, such as the bittersweet feelings reported during college graduations, college student move-out days, and nostalgic reminiscing. On the other hand, a competing model, the Evaluative Space Model<sup>2</sup>, contends that positive and negative affect are separable in experience, allowing for the existence of mixed affective states. This is concisely referred to as the “great bipolarity debate”, and it is considered to be one of the top 13 long-standing unanswered debates in social/cognitive psychology.<sup>3</sup> Herein, I will elucidate the limitations with the current state of this debate, and explain my plan to move beyond these limitations in my graduate career.

**Current State of Affairs:** As predicted by the Evaluative Space Model, a recent review highlights accumulating evidence that people can experience mixed feelings.<sup>4</sup> However, this research has relied solely on self-reports, which is considered one of the major holes in mixed emotion research.<sup>4</sup> These reports are limited because they disrupt the core affective experience and are susceptible to distortion from demand characteristics. Proponents of the Circumplex Model of Affect argue that the evidence for mixed affective states is a result of these limitations, indicating a need to move beyond self-reports in this theoretical debate. In my graduate career, I will contribute to this debate by using indirect measures of core affect and analyses of facial responses to mixed-affect eliciting stimuli. These methodologies will test the two models’ competing predictions, producing unique insight into the contested structure of core affect.

**Methodological Plan:** To move beyond self-reports, I will use indirect measures of core affect to investigate whether participants can experience mixed affective states. This will involve a series of studies comparing participants’ affective responses to neutral, positive, negative, and bittersweet (mixed) evoking film clips commonly utilized in the literature. To indirectly gauge participants’ core affective states after receiving these stimuli, the Implicit Positive and Negative Affect Test<sup>5</sup> and the Affect Misattribution Task<sup>6</sup> will be utilized. Both of these methodologies independently assess positive and negative affect in an indirect manner, moving beyond the limitations of self-reports with methods that are novel to this theoretical debate. The Evaluative Space Model predicts a co-activation of positive and negative affect after receiving bittersweet stimuli, whereas the Circumplex Model predicts a single-valence affective state.

I will also look at facial reactions to videos, focusing on smiling and frowning activity. Emotions often produce measurable changes in facial activity, and these patterns have been mostly consistent with the Circumplex Model of Affect. However, little work has examined facial reactions to mixed-affective stimuli, leaving the competing prediction of the Evaluative Space Model largely untested. I will investigate whether bittersweet, compared to positive, negative, and neutral, video stimuli elicit a “mixed-smile”, a reaction marked by simultaneous positive and negative facial responses (see image for illustrative pilot data). Reactions will be analyzed by three sources of judges: 1) naïve research assistants, 2) a Facial Affect Coding System-trained collaborator, and 3) two separate facial coding software. The Evaluative Space Model predicts a coactivation of positive and negative facial responses to bittersweet stimuli, whereas the Circumplex Model predicts a single valence facial response.



**Intellectual Merit:** By moving beyond the limitations of self-reports, indirect measures of core affect and analyses of facial reactions will address the major holes in mixed emotion research<sup>6</sup> and significantly advance the long-standing bivariate vs. bipolar debate.<sup>5</sup> Core affect is the underlying structure of many emotional entities, therefore, these insights will be fundamental to the field and of substantial theoretical and pragmatic importance.

**Broader Impacts:** This proposed line of research will also have a diverse undergraduate team, providing hands-on *STEM education* and increasing *scientific literacy*. Advancements in mixed-emotion research has the potential to advance societal well-being, as there is evidence that mixed feelings help with terminal illness and bereavement coping<sup>7</sup>. In addition, there is evidence that schizophrenia is associated with abnormally high rates of mixed emotion<sup>8</sup>. Results will be disseminated broadly, promoting progress in these related domains.

**Conclusion:** This research will be conducted by a highly qualified team. My mentor, Dr. Larsen, has spent his career studying mixed emotion, and my previous research and educational experiences give me confidence in my ability to perform this investigation. Last, our lab is especially equipped for this proposed activity; a) we have a sophisticated setup that allows us to collect videotaped facial expressions from up to 400 participants/year, b) we have a collaborator trained in the Facial Affect Coding System, and c) we possess several facial coding software. These studies will contribute to the prevailing debate over the structure of core affect, contributing to my broader career goal to investigate theoretical and applied aspects of emotion.

<sup>1</sup> Russell, J. A. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology*, 39(6), 1161; <sup>2</sup> Cacioppo, J. T., Gardner, W. L., & Berntson, G. G. (1999). The affect system has parallel and integrative processing components: Form follows function. *Journal of Personality and Social Psychology*, 76(5), 839; <sup>3</sup> Greenwald, A. G. (2012). There is nothing so theoretical as a good method. *Perspectives on Psychological Science*, 7(2), 99-108; <sup>4</sup> Larsen, J. T., & McGraw, A. P. (2014). The case for mixed emotions. *Social and Personality Psychology Compass*, 8(6), 263-274; <sup>5</sup> Quirin, M., Kazén, M., & Kuhl, J. (2009). When nonsense sounds happy or helpless: the implicit positive and negative affect test (IPANAT). *Journal of Personality and Social Psychology*, 97(3), 500. <sup>6</sup> Payne, B. K., Cheng, C. M., Govorun, O., & Stewart, B. D. (2005). An inkblot for attitudes: affect misattribution as implicit measurement. *Journal of Personality and Social Psychology*, 89(3), 277. <sup>7</sup> Coifman, K. G., Bonanno, G. A., & Rafaeli, E. (2007). Affect dynamics, bereavement and resilience to loss. *Journal of Happiness Studies*, 8(3), 371-392. <sup>8</sup> Cohen, A. S., St-Hilaire, A., Aakre, J. M., & Docherty, N. M. (2009). Understanding anhedonia in schizophrenia through lexical analysis of natural speech. *Cognition and Emotion*, 23(3), 569-586.