Valence and arousal lengthen time for subsequent neutral events

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Emotional stimuli are typically overestimated compared to neutral stimuli of equal duration. Recent evidence suggests that the emotional states induced by emotional stimuli could also influence the timing of simultaneous neutral events. Since emotional states can outlast their sources and linger, they could also influence the timing of subsequent events. Here, we tested if and how different levels of valence and arousal modulate the timing of subsequent neutral events. To this end, participants performed a temporal bisection task where they learned a short (400 ms) and a long (700 ms) tone duration. Then, they sorted a range of durations by being more similar to the learned short or long duration. Using our custom vibration patterns, we induced different levels of valence and arousal in a task-irrelevant manner just before the onset of tones in the temporal bisection task. We fitted individual psychometric functions to estimate the bisection points (i.e. equal probability of responding short or long) and Weber fractions. We found that the duration of neutral tones was overestimated when they followed a Low Arousal-Pleasant, High Arousal-Pleasant, or High Arousal-Unpleasant vibration compared to a neutral vibration. Moreover, comparing emotional vibrations revealed an interaction between arousal and valence for subsequent timing. Specifically, we found that for low arousal, pleasant vibrations expanded timing more than unpleasant vibrations. However, independent from valence, high arousal vibrations expanded subsequent timing comparably. We observed comparable Weber fractions in emotional and neutral conditions, suggesting that participants maintain an overestimation bias when judging future events. In conclusion, our results draw a nuanced picture of how emotional states can influence the sub-second timing of future independent neutral events.

Keywords: Time perception, Arousal, Valence, Tactile, Auditory