Facial emotion modulates the neural mechanisms responsible for short interval time perception

Jason Tipples\textsuperscript{1,*}, Victoria Brattan\textsuperscript{2}, Pat Johnston\textsuperscript{2}

\textsuperscript{1}Department of Psychology, University of Hull, Hull, HU6 7RX, England
\textsuperscript{2}Department of Psychology, University of York, York, YO10 5DD, England

Abstract

Emotionally arousing events can distort our sense of time. We used mixed block/event-related fMRI design to establish the neural basis for this effect. Nineteen participants were asked to judge whether angry, happy, and neutral facial expressions that varied in duration (from 400 to 1600 ms) were closer in duration to either a short or long duration they learnt previously. Time was overestimated for both angry and happy expressions compared to neutral expressions. For faces presented for 700 ms, facial emotion modulated activity in regions of the timing network (Wiener, Turkeltaub, & Coslett, 2010) namely the right supplementary motor area (SMA) and the junction of the right inferior frontal gyrus and anterior insula (IFG/AI). Reaction times were slowest when faces were displayed for 700 ms indicating increased decision making difficulty. Taken together with existing electrophysiological evidence (Ng, Tobin, & Penney, 2011), the effects are consistent with the idea that facial emotion moderates temporal decision making and that the right SMA and right IFG/AI are key neural structures responsible for this effect.

Keywords: Emotion; Neural timing; Temporal bisection