Emotions unfold over time. Consequently, a full understanding of emotion characteristics can only be reached when their dynamic nature is taken into account. A particularly salient dynamic characteristic of emotions is their intensity. During an emotional episode, intensity varies over time, resulting in an emotion intensity profile. It has been shown that intensity profiles can take many different shapes differing mainly in explosiveness (i.e., whether the profile has a steep vs. a gentle start) and accumulation (i.e., whether intensity increases over time vs. goes back to baseline). However, the psychological and neural mechanisms underlying variability in these dynamic features remain largely unknown. We conducted two fMRI studies to fill this gap. Participants received negative social feedback and were asked to think about it, either without any further specification (Study 1), or from an immersed vs. a distanced perspective (Study 2). In both studies, participants were further asked to draw emotion intensity profiles reflecting changes in their emotional experience over time. In Study 1, emotion explosiveness and accumulation were found to have a different neural signature with explosiveness being related to cortical midline regions involved in self-referential processing, and accumulation to regions belonging to the salience and social pain networks (e.g., Insula). In Study 2, taking a distanced perspective was found to decrease both emotion explosiveness and accumulation. The neural mechanisms mediating the effect of self-distancing will be discussed.

D - 32

STABILITY AND RELIABILITY OF A PHYSIOLOGICAL MEASURE OF NEGATIVE AFFECT

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Historically, electromyographic activity over the corrugator supercilii (cEMG) has been used as measure of negative emotion and of exerted effort. Recently, researchers have found evidence for early increased cEMG during errors in cognitive control tasks, and that these increases are correlated with behavioral and neurophysiological measures of error monitoring. Given the potential for cEMG to be a more objective, continuous, and unobtrusive measure of negative emotion than self-report, we sought to assess its stability and reliability during errors of commission. In the present study, we reanalyzed error-related cEMG data from two studies—one using an inhibitory control task (n = 54) and the other using a classic Eriksen flanker task (n = 51)—and compared them to established measures of neural monitoring, the ERN and Pe. Calculations of Cronbach's alpha, signal-to-noise ratios, and correlations with grand average signal revealed that error-related cEMG was sufficiently stable and reliable in as few as 6 trials, and acquired excellent stability and reliability in as few as 14. Surprisingly, these results are highly comparable to both the ERN and Pe, despite the greater overall inter- and intra-variability of facial EMG compared to EEG. These findings suggest that cEMG is a stable and reliable measure when event-locked to errors, and may prove useful to researchers seeking an objective and fast measure of negative emotions during response tasks.

D - 33

SPATIOTEMPORAL CHARACTERISTICS OF SOCIAL AND NON-SOCIAL DECISION MAKING.

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Social decision-making is the most complex cognitive function performed by the human brain (Seo & Lee, 2012). Traditionally it was thought that social and non-social decision making rely on distinct neural representation, however, recent studies have identified a unified mechanism for motivational control of behaviour that may incorporate both social and non-social factors (Ruff & Fehr, 2014).

The present study developed a novel high-density EEG fronto-central circuitry to investigate the neural networks of social and non-social decision-making by recording neural activity in real time as participants complete tasks. This is the first EEG/ERP study to examine fronto-central circuitry comparing responses to social and non-social stimuli concurrently in a task that encodes preference choice without reward signal analysis.

Participants (n=25, 84% females) completed two preference choice tasks, which varied in the sociality dimension (social versus non-social) and in the valence dimension (positive versus negative). On each trial, participants were instructed to make preference choices between pair of pictures (either faces or landscapes) to compare temporal characteristics and regional coding between social and non-social choices.

Behavioural results revealed slower reaction time for social decisions compared to non-social ones. Preliminary electrophysiological analysis identified major discriminating components including the face-selective N170 and a significant late positive component for the social stimuli in comparison to the non-social stimuli.

These findings provide behavioural, neuroimaging and electrophysiological evidence about the longstanding question of the relationship between social and non-social decision-making and represent an important step toward a neural explanation for complex human social behaviours.