

Measuring Happiness and Wellbeing in Elderly People

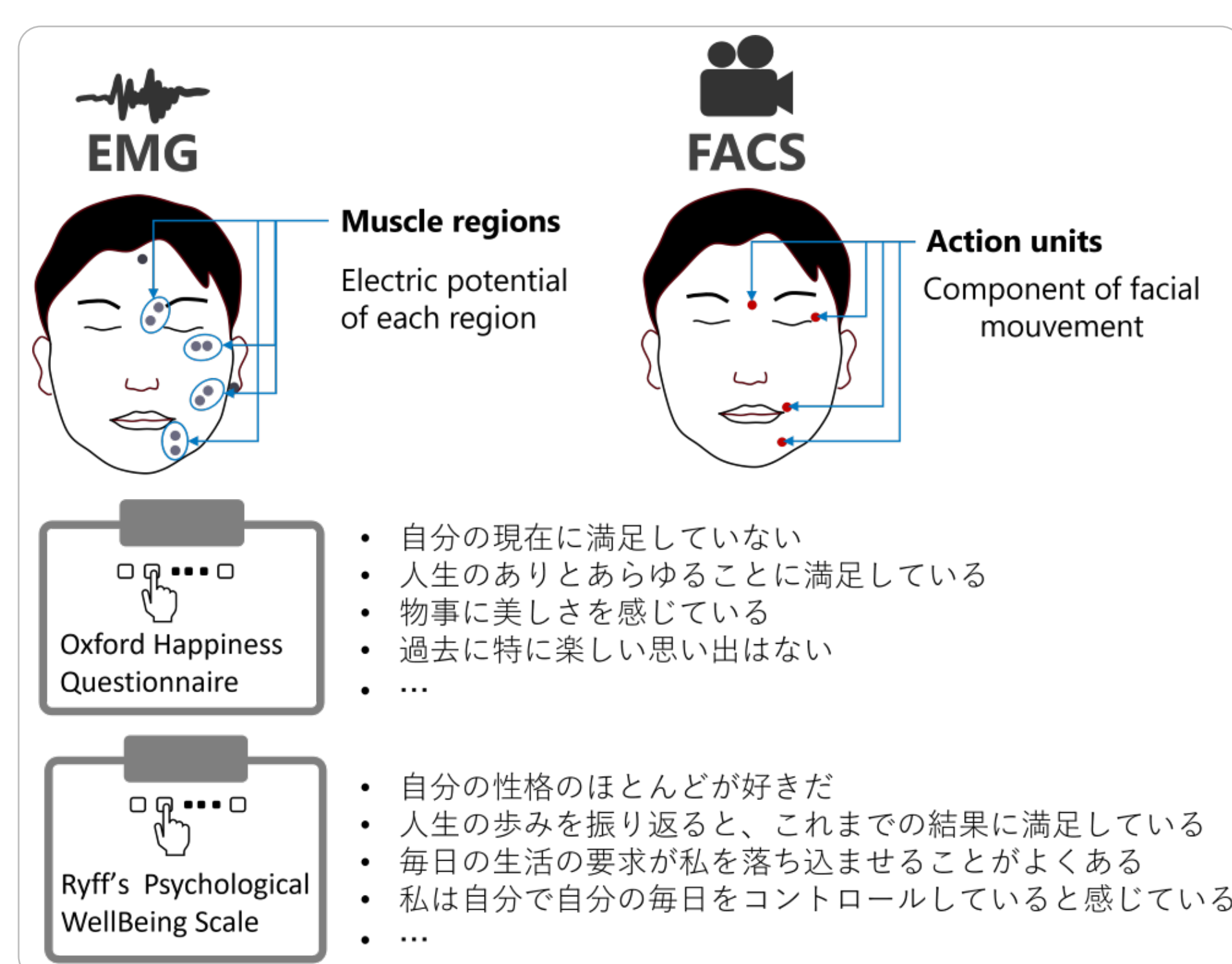
- ▶ Happiness and wellbeing in elderly people are objectively reflected in facial EMG activity
- ▶ Happiness and wellbeing in elderly people may be objectively measured using FACS and FaceReader

Facial EMG, FACS, Happiness and Wellbeing

Facial expressions can be measured using:

- Electromyography technique (EMG): measures the electric potential of facial muscle regions.
- Video analysis based on the facial action coding system (FACS): measures the variation of the components of facial movement (variation of the action units).

As facial expressions are correlated with psychological states, could happiness and wellbeing be measured using these objective techniques?

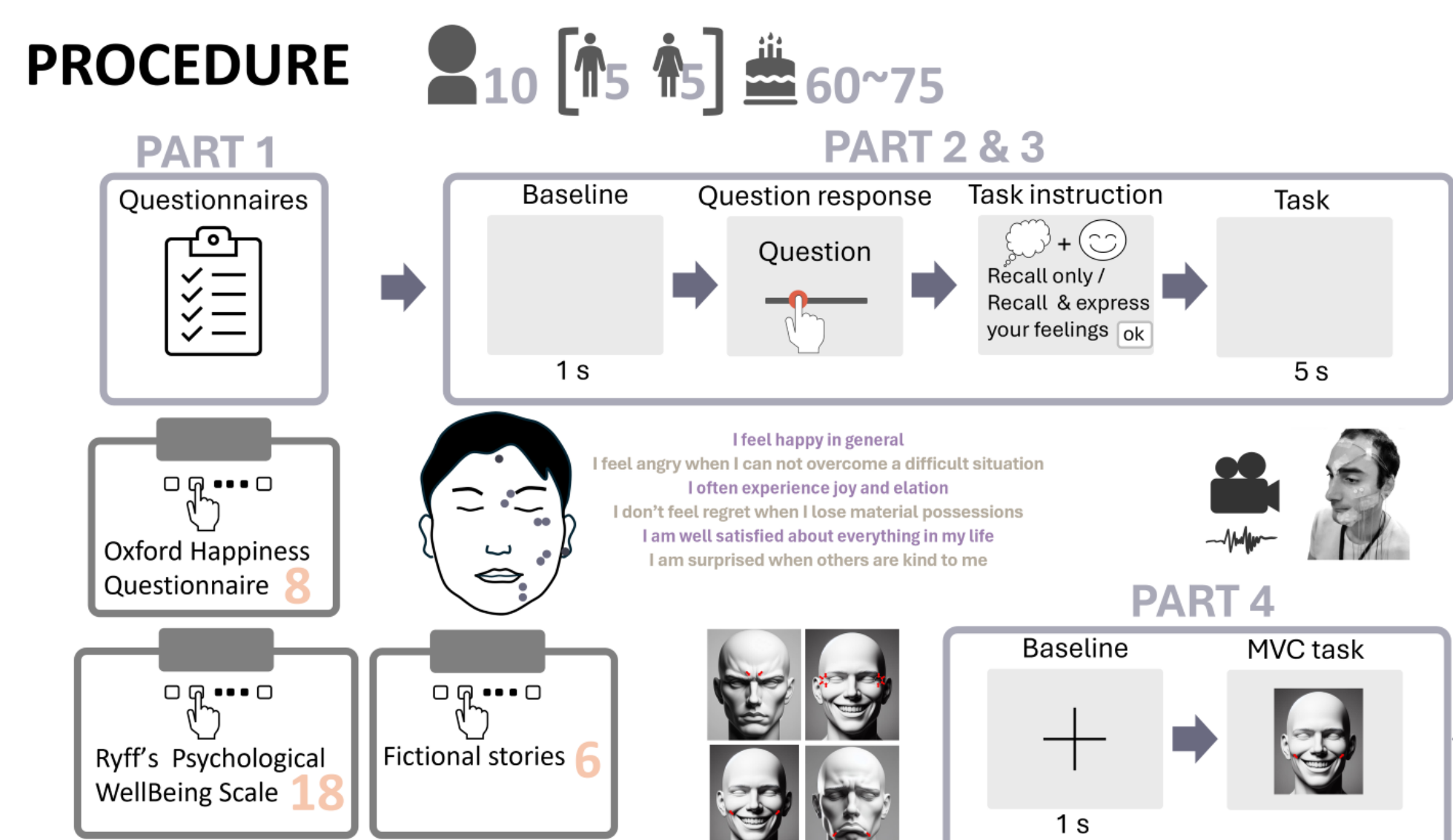


Happiness and wellbeing are complex emotional traits that reflect long-term emotional states.

- They are assessed through subjective self-reports using instruments such as the Oxford Happiness Questionnaire and Ryff's Psychological Well-Being Scale.

Illustration of EMG and FACS measurements and examples of happiness and wellbeing questionnaires

Material & Method



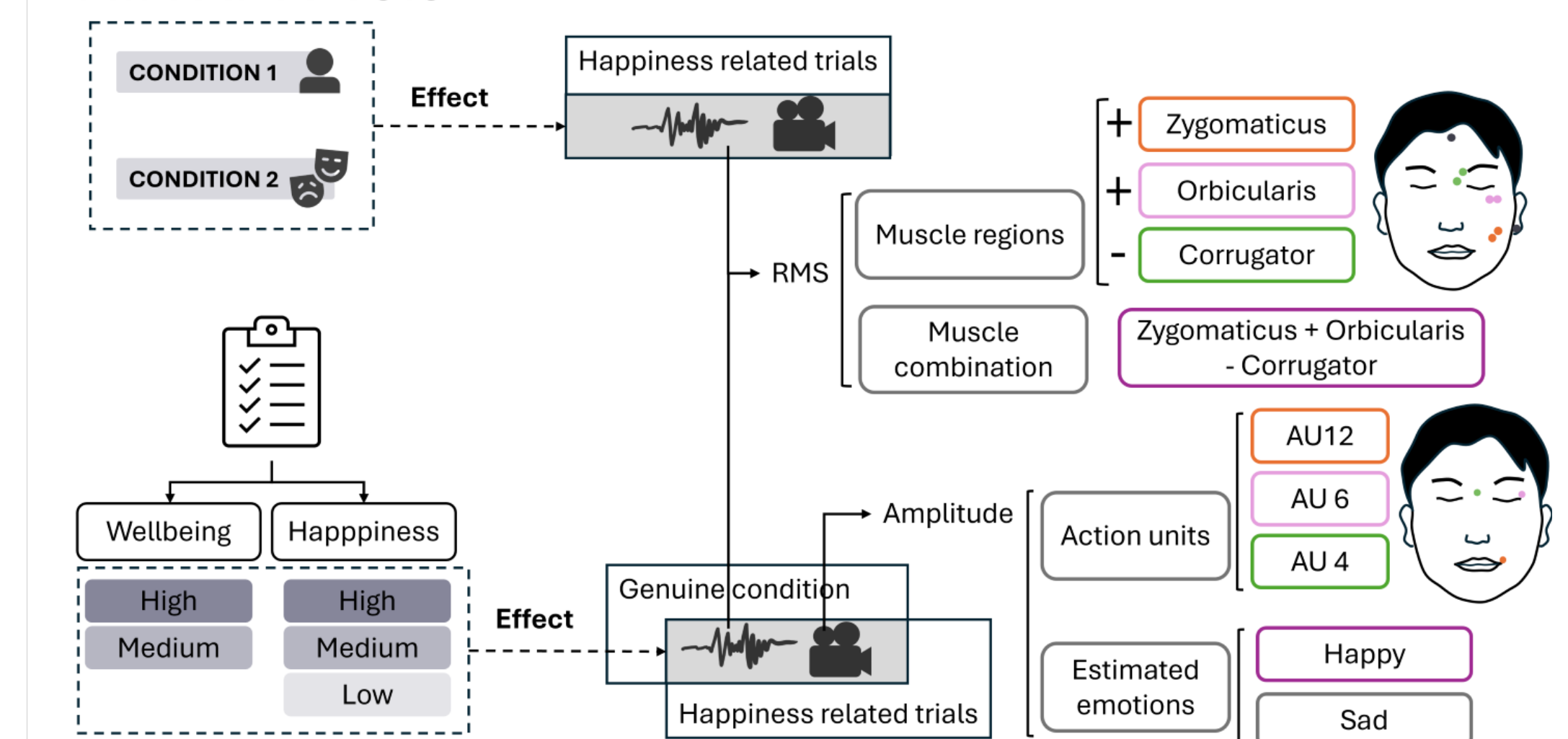
Experiment procedure

The conducted experiment with 10 elderly individuals includes two steps:

- **Self-report** questionnaires
- While **EMG activity** is measured and the **face video** recoded, participants answered dummy and happiness-related questions, and they recalled or recalled and expressed their felt emotion.

The questions and task addressed: a) participants **genuine** emotions, b) **fictional** character's emotions (participants played the role of the character)

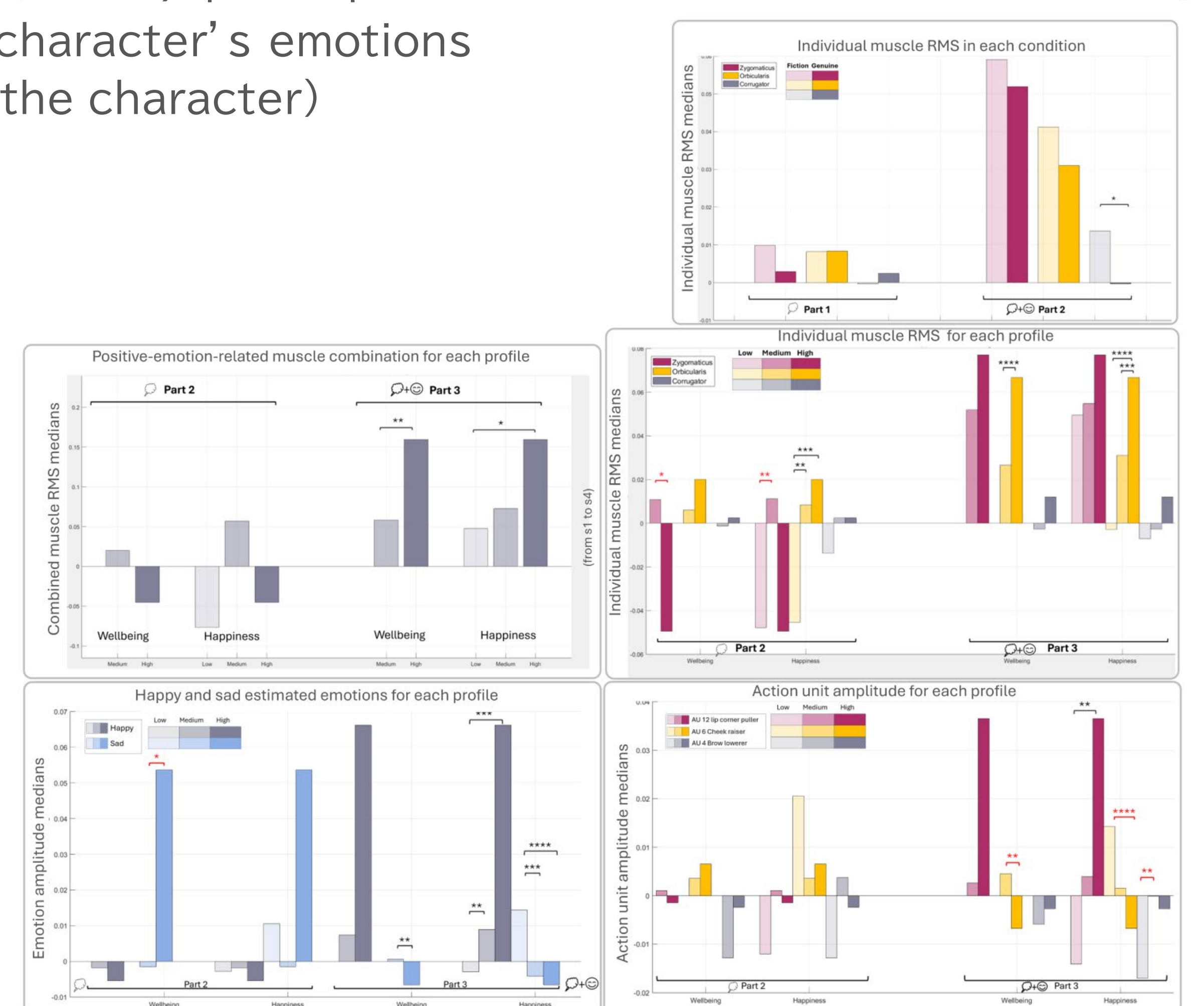
DATA ANALYSIS



Data analysis chart

Results

- **Combined EMG measures** are effective indicators for assessing happiness and wellbeing in elderly individuals (stronger positive emotion-related EMG activation in participants with high happiness and wellbeing levels compared to those with low levels).
- The **orbicularis muscle** provides a robust and reliable measure for assessing happiness and wellbeing in elderly individuals.
- The activation of the **lip corner puller (AU12)** but not the cheek raiser (AU6) that are associated with smiling, may serve as a reliable predictor of happiness in elderly individuals.
- **Estimated happy and sad emotions** may serve as a reliable predictor of happiness and wellbeing (stronger happy amplitude for high-happiness-level participants compared to those with low level; weaker sad amplitude for high-happiness and wellbeing levels participants compared to those with lower levels).



Bar graphs of EMG activity and action-unit amplitudes for 3 categories of participants' happiness and wellbeing profiles using non-parametric ANOVAs