

LATERALIZED HAPPINESS

KINEMATICS OF LEFT AND RIGHT FACE

Elisa Straulino¹, Beatriz Chozas Barrientos¹, Sonia Betti², Cristina Scarpazza^{1,3}, Luisa Sartori^{1,3}

¹Department of General Psychology - University of Padua - Padua, Italy

²Department of Psychology - University of Bologna - Cesena

³Padova Neuroscience Center, University of Padua, Padua, Italy

INTRODUCTION

Classic literature on emotional displays has several drawbacks. Previous investigations mainly focused on static and inauthentic images posed by actors, with facial movements manually analysed by individual FACS coders. The true move towards an objective analysis of emotional function is the digital 3-D tracking of dynamic and spontaneous facial expressions. Temporal, spatial, and speed parameters of happiness expressions have been investigated to reveal the inner syntax of emotional language. I extracted five simple and relevant anatomical landmarks to define a replicable and universal **Clepsydra Model** with the purpose of analyzing separately the upper and lower face and comparing the left and right sides of the face.

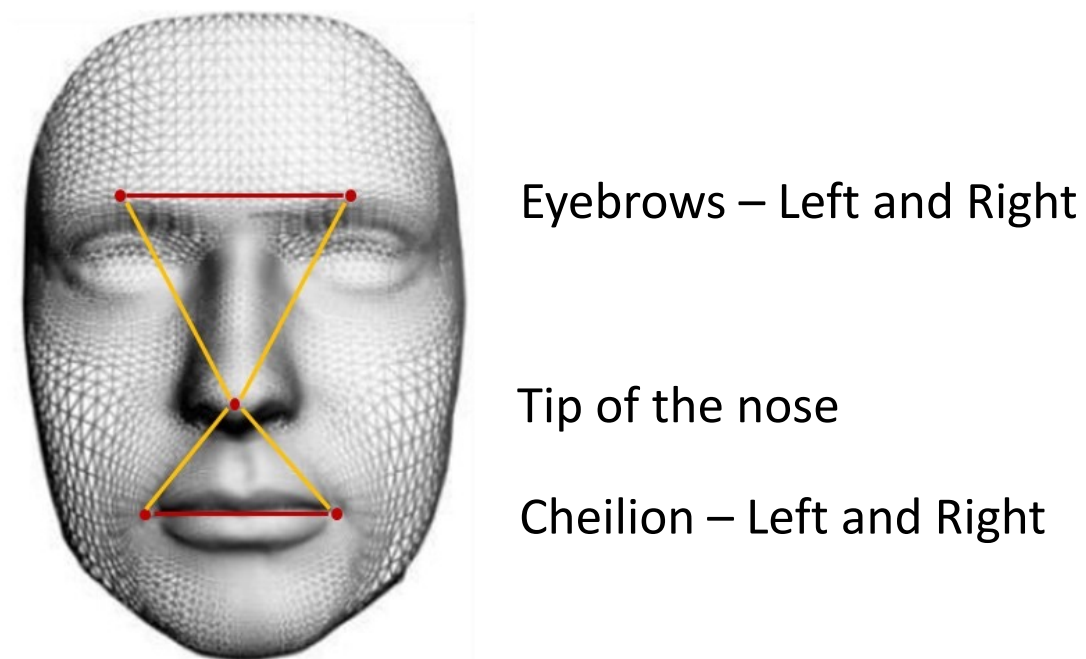


Figure 1. The Clepsydra Model. Schematic representation of the position of the infrared reflective markers (red dots). The lower and upper parts of the face were studied by considering the red line segments, while the left and right sides of the face were analysed by the four yellow lines. The calculation of space, time and velocity between two points instead of on individual points makes it possible to neutralise possible head movements.

METHODS

Study 1. Naïve Participants (N=20) watched video clips of comedians that elicited genuine expressions of happiness (**Spontaneous** condition)

Study 2. Naïve participants (N=20) watched video clips of ordinary people eliciting genuine expressions of happiness (**Spontaneous** condition)

In the **Posed** condition, participants from both the Experiments were asked to deliberately reproduce the same expression, but without video support

Five reflective hemispherical markers (3 mm in diameter) were used to acquire motion data (Figure 1). Kinematic profiles of facial movements were recorded by means of six infra red cameras using a 3 D motion analysis system. A repeated-measures ANOVA with Condition (Posed and Spontaneous) and Side of the face (Left and Right) as within subject variables was performed.

Dependent Measures related to the **Cheilion**:



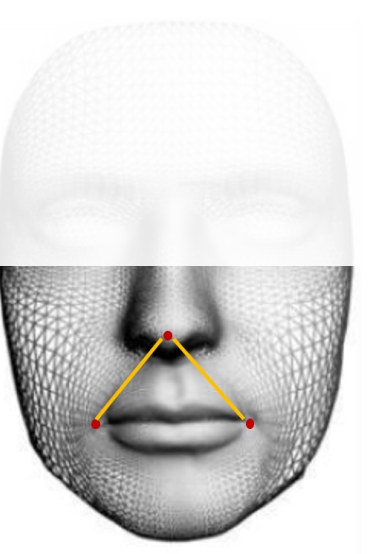
Left-MDCH and **right-MDCH**: the distance of Cheilion markers with the tip of the nose



Left-MVCH and **Right-MVCH**: the maximum velocity calculated on the displacement of the tip of the and left and right Cheilion markers

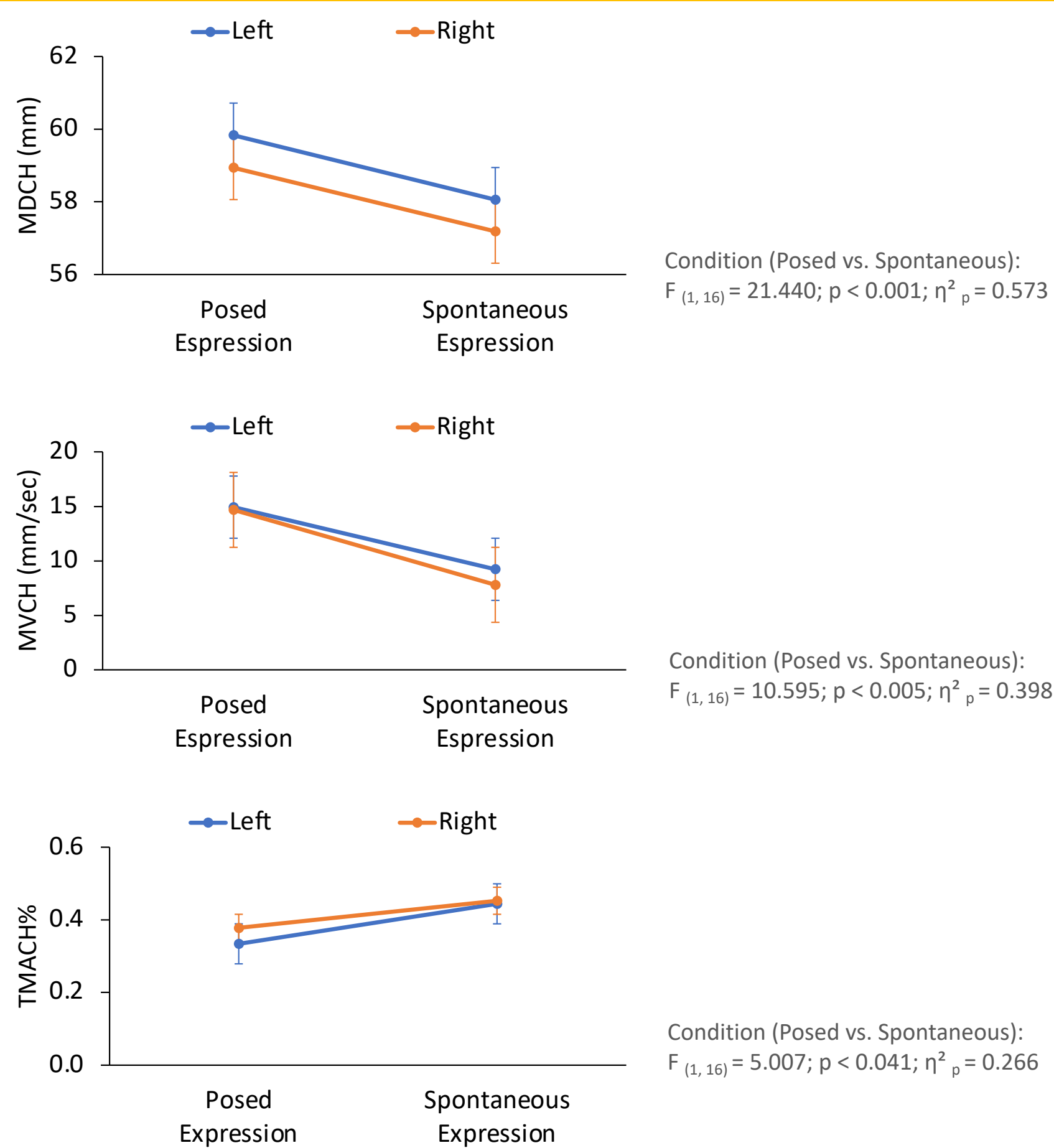


Left-TMACH% and **Right-TMACH%**: The percentage of time at which the peak of acceleration occurs with respect to movement time

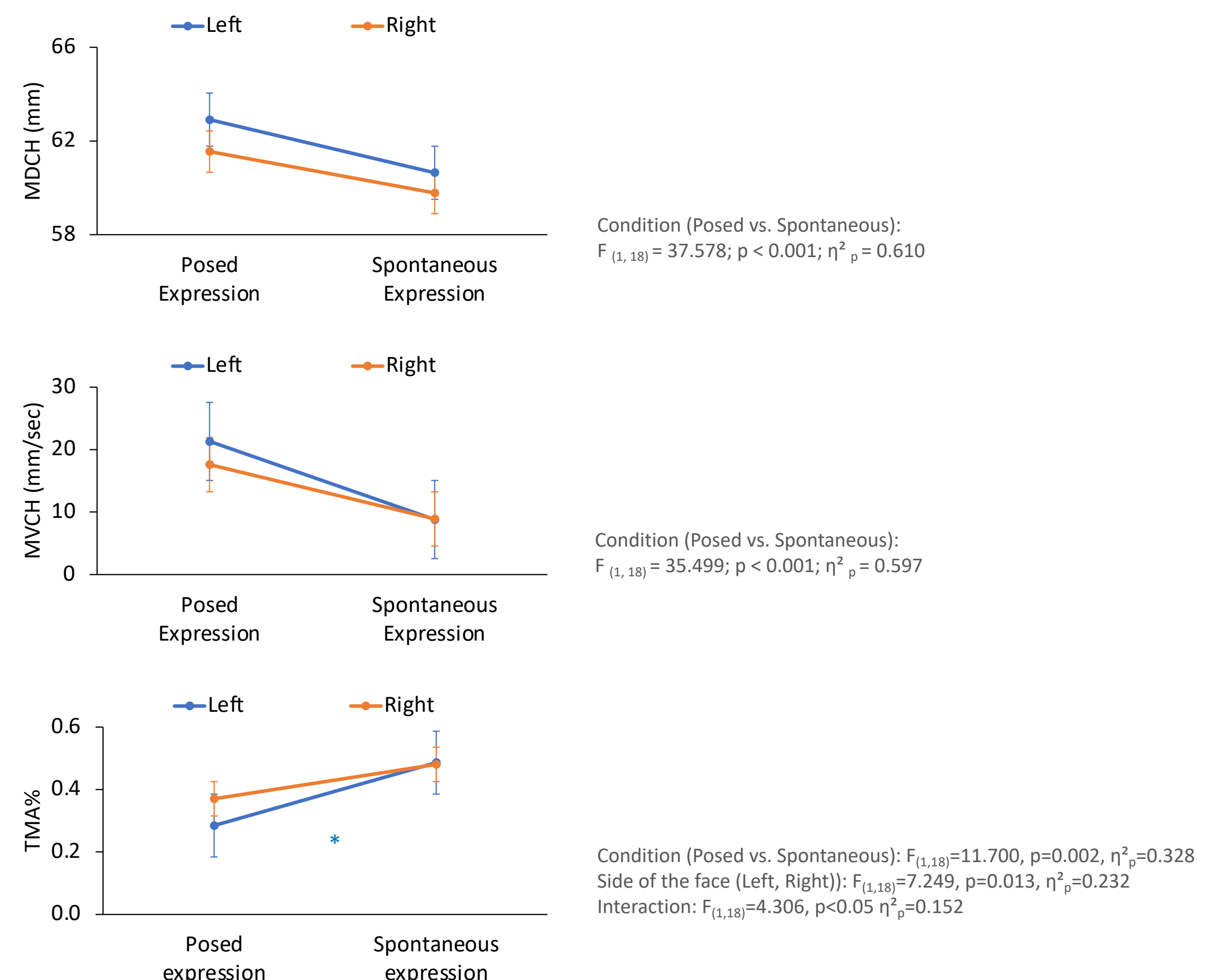


RESULTS

STUDY 1



STUDY 2



CONCLUSIONS

The expression of spontaneous and posed emotions is subserved by two functionally and anatomically different systems in the brain. In fact, spontaneous emotions are usually less intense, more subtle, and much more difficult to detect than those used in laboratory (Tcherkassof et al., 2013)

In Study 1 and Study 2, the results show that spontaneous expressions of Happiness:

- Decrease mouth widening and peak velocity, irrespective of the induction method

In Study 2, during posed expressions, the acceleration peak of the left corner of the mouth was reached earlier in time with respect to the right corner



These results will be a step forward for the identification of clues of facial deception and the creation of a database of spontaneous expressions for future multidisciplinary studies



The development of a gold standard three-dimensional model will also allow investigations to be carried out throughout the life span, from childhood to old age, as well as in the clinical population

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