

---

# Understanding individual face perception by means of steady-state visual evoked potentials

Bruno Rossion\*<sup>†1</sup>, Adriano Boremanse<sup>1</sup>, Dana Kuefner<sup>1</sup>, and Esther Alonso Prieto<sup>1</sup>

<sup>1</sup>University of Louvain – Belgium

## Abstract

A novel approach to understand face perception in the human brain by means of steady-state visual-evoked potentials (SSVEPs, Regan, 1966) is introduced (Rossion & Boremanse, 2011). In such experiments, participants are presented with pictures of faces appearing at a constant rate (e.g., 4Hz, or 4 faces/second) for a 90s duration while high-density EEG is recorded (128 channels). Time-frequency analysis shows large responses at the fundamental frequency (4 Hz) and harmonics (8 Hz, ...) over posterior electrode sites. The first and second harmonic responses are much larger at right occipito-temporal channels when different faces are presented than when the same face is repeated. This reduction of signal in the identical face condition is much smaller for inverted or contrast-reversed faces, two manipulations that are known to greatly affect facial identity perception. The SSVEP response at the specific frequency rate increases until about 10 seconds and then decreases when the same face is repeated. The sudden introduction of different face stimuli leads to an immediate increase of signal, indicating a fast, large and stimulation frequency-specific release to face identity adaptation. Overall, this sensitivity of the SSVEP to face identity in the human brain provides further evidence for face individualization in the right occipito-temporal cortex by means of a much simpler, faster and higher signal-to-noise approach than previously used. It offers a promising tool to study the sensitivity to visual features of individual faces in various populations presenting a lower sensitivity of their electrical brain responses (e.g., infants and children, clinical populations).

---

\*Speaker

†Corresponding author: