Measuring the Self: 
Behavioural and neural correlates of bodily awareness

ABSTRACT:

Aim of the study
The project aimed to investigate the contribution of brain visuo-motor areas and sensorimotor plasticity following the manipulation of subjective experience of body ownership by means of visual manipulation of body continuity.

Method
We collected subjective and physiological (skin conductance responses, motor evoked potentials) answers in healthy participants immersed in a virtual reality environment and explored whether visual discontinuity between the hand and limb of an avatar could reduce a person’s sense of ownership of the virtual body.

Results
We observed that placing different amounts of visual discontinuity between a virtual hand and limb differently modulate the perceived sense of ownership and control over observed virtual bodies and actions. Crucially autonomic reactivity but not motor evoked potentials were modulated by the felt ownership over the virtual body. Indeed only high amplitudes of SCRs were found during the observation of both a normal hand-limb connection and a non-natural connection by means of a rigid wire. On the other hand, the analysis of subjective ratings revealed that only the observation of natural full connected virtual limb elicited high levels of ownership in all studies.

Discussion
Our data show that mere observation of limb discontinuity can change a person’s ownership and agency over a virtual body observed from a first-person perspective, even in the absence of any multisensory stimulation of the real body. Importantly different measures of physiological activity were differently modulated by subjective body ownership sensations suggesting that different methods to elicit body ownership illusions may differently affect indirect indexes of body representation.

Keywords
Body ownership, TMS, Virtual reality, Skin conductance, Motor evoked potentials
Published Work:


Researcher’s Contacts:

Emmanuele Tidoni  
Email: etidoni@gmail.com

Department of Psychology, "Sapienza" University of Rome  
Via dei Marsi 78, 00185 Rome, Italy

IRCCS Fondazione S. Lucia  
Via Ardeatina, 306; Rome 00142

Centro di Studi e Ricerche in Neuroscienze Cognitive,  
Viale Europa 980, 47521 Cesena, Italy