

NENS Training Stay Stipend – Final Report

Giuseppina Porciello

Home: Social and Cognitive Neuroscience Laboratory, “Sapienza”, University, Rome, Italy.
Supervisor: Prof. Salvatore Maria Aglioti;

Host: Neurological Clinic, University Hospital Zurich, Zurich, Switzerland.
Supervisor: Prof. Peter Brugger; Dr. Bigna Lenggenhager.

How the body shapes human conscious experience is an old and controversial debate. Yet, compelling evidence and recent theoretical models underlie the importance, already in newborns (e.g. Filippetti, et al., 2013, 2014; Zmyj, et al., 2011), as well as in non-human primates (e.g. Chang et al., 2015), of the integration of multisensory body-related signals coming from the external environment and importantly, for the goal of the present project, from the internal body to build, maintain and update different aspects of the bodily self (see Faivre et al., for a review) and surprisingly also one of the most distinctive key feature of the self identity: the discrimination of one’s own face (Sforza et al., 2010; Tsakiris, 2008).

The aim of my stay at the Neurological Clinic of the UHZ, was to further explore the role of the multisensory integration underlying self-perception and self-other distinction by including underinvestigated senses, but extremely important for self-processing, such as interoception and smell.

Capitalizing on my previous experience at the Social and Cognitive Neuroscience Laboratory directed by Prof. Salvatore M. Aglioti, where I focused my attention on the effects mediated by a shared visuo-tactile stimulation on self-other face discrimination ability and making use of the extensive experience of the host laboratory (see Lenggenhager et al., 2007, 2014; Brugger et al. 2013; Macaуда et al., 2014), in the first part of my visit we built a novel and highly implicit interpersonal multisensory stimulation (IMS) paradigm. Thus, we related (or not) the visual presentation of morphed stimuli to the online recorded participants’ heartbeat.

Indeed, while it has been already demonstrated that conflictual visuo-cardio signals can influence crucial aspects of bodily self consciousness like: i) ownership and ii) self location (see Aspell et al., 2013; Suzuki et al., 2013), we still don’t know whether this extends also to the ability of discriminate one’s own face from others’ face.

To test this hypothesis we carried out two similar experiments (in which we manipulated the difference in the amount of asynchronicity (high or low) used in the control condition) where we presented ambiguous faces (obtained by morphing at different percentages participants’ face (and in a control task a same gender friend’ s face) with a model face), synchronized or not with online participants’ heartbeat (Fig.1).

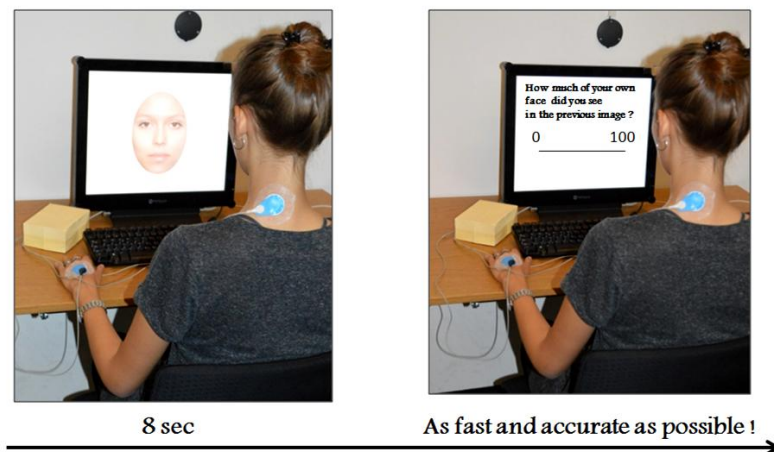


Fig. 1 shows one of our participants performing the self/friend discrimination task. Morphed images flashed on the monitor for 8 s, then a 0-100 VAS scale was presented. Participants have to reply as fast and accurate as possible by rating “How much of their own/friend face was present in each stimuli”. Morphed stimuli could flash synchronously or not with the participant’s online heartbeat.

We also collected self-report measures of interoceptive awareness (i.e. the Multidimensional Assessment of Interoceptive Awareness (MAIA) and the Body Consciousness Questionnaire (BCQ)) and two more objective measures of interoceptive awareness (i.e. the Heartbeat Counting Task and an adapted version of the Heartbeat Detection Task) to try to investigate the possible correlation between the implicit hypothesized effect driven from the a/synchronous visuo-cardio presentation on the self-face discrimination ability and some more explicit measures of interoceptive awareness.

Preliminary results from the two studies suggest that only in presence of an high level of asynchronicity in the visuo-cardio presentation of one’s own morphed faces it is possible to influence the self-other discrimination ability and that this happens in some difficult intervals of the morphing task. More sophisticated analysis and probably an higher number of participants are needed to confirm and better explore this preliminary effect.

In the last month of my visit we worked on the second goal of the project, we constructed a series of new experimental paradigms to investigate the role of the body odors in self-other discrimination ability and we also submit a research grant to collect fundings for that.

Importantly, if the behavioural experiments performed in Zurich will prove to be successful, we will plan follow-up studies in my home institution laboratory to further explore the underlying behavioral and neural mechanisms and in the host institution as well where it would be interesting to test how and when during development, from childhood to adulthood, the multisensory integration processes contribute to bodily self representation.

All in all, I think that this new and interdisciplinary context added to the research experience of the host institution have been for me extremely helpful for improve my research knowledge and career. It allowed me to enlarge international collaborations, it has been highly inspiring for planning future research projects and it also contributed to my personal enrichment.

Finally, thanks to this training stay, I will be able to transfer the methodology I have acquired to my home institution laboratory and to share the knowledge I have gained with my colleagues.

I would like to thank NENS Exchange program that crucially contributed to my visit at the Neurological Clinic of the University Hospital Zurich (UHZ) by giving me the Stipend for the Training Stay provided by the Federation of European Neuroscience Society (FENS). Fig.2 shows my last day at the host institution, the persons that supervised me during these months, i.e. Dr. Bigna Lenggenhager and Prof. Peter Brugger and all the members of the group.



Fig. 2 Me at the Neurological Clinic of the University Hospital Zurich (UHZ) the last day of my visiting stay with my daily supervisors: Dr. Bigna Lenggenhager on my right and Prof. Peter Brugger on my left and all the other members of the group.