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Your emotion moves into my motor system

Borgomaneri, S.

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Curriculum Vitae et studiorum

Sara Borgomaneri

- Date of birth: 12/08/1985
- Nationality: Italian

Contact details:

- **address:** A.da Giussano, 27/c 21013 Gallarate (VA)
- **e-mail:** sara.borgomaneri2@unibo.it
- **mobile:** +39-3490674660
- **voice:** +39-0331780268

Current Positions:

- Since 2011, PhD Student University of Groningen (The Netherland).
- 2011-2015, Fellowship (Assegno di ricerca) at Centro studi e ricerche in Neuroscienze Cognitive, University of Bologna.

Education

- 2004, Diploma Liceo Classico “E. Cairoli” (VA), score: 80/100
- 2007, Bachelor’s Degree in Psychological Sciences and Techniques, University of Milan “Vita-Salute S. Raffaele”, score: magna cum laude.
Title of the thesis: “*DEEPASHRAM (INDIA): COGNITIVE STIMULATION IN CHILDREN WITH PHYSICAL AND MENTAL DISORDERS*”.
- 2009, Master Degree in Neuropsychology , University of Bologna, score: magna cum laude.
Title of the thesis: “*ROLE OF SENSORIMOTOR CORTICES IN MAPPING OTHERS’ PAIN*”.

Courses and workshops

- 2010, Advanced technical course on tDCS, Fatebenefratelli, Brescia, Italy (11-12 November).
- 2011, Congress of Functional Neuroradiology, San Raffaele Hospital, Milano.
- 2012, Brain dissection Summer School, Bangor; UK.
- 2013, 5th International conference of non invasive brain stimulation, Leipzig, Germany.

Scientific experiences

- 2007 November - 2008 February, Neuropsychological testing in “Ville Turro”, Neuropsychiatric clinic, San Raffaele Hospital in Milan, Italy.
- 2007 March-April, Neuropsychological testing, Indian Spinal Injury Hospital, New Delhi, India.
- Since 2008, Research assistant at Non invasive Brain Stimulation lab at Centro studi e ricerche in Neuroscienze Cognitive, Cesena – University of Bologna under the supervision of Prof. Alessio Avenanti.

- 2010 April-June, Research assistant at Neuroimaging Center, University Medical Center of Groningen, The Netherlands, under supervision of Prof. Valeria Gazzola and Christian Keysers. TMS and fMRI experiments investigating the neural correlates of action observation and weight judgments (in progress).

Visiting

- 2013 June-July Combined TMS and fMRI experiment on action observation at University of Maastricht under the supervision of Prof Alexander Sack.

Publications

- **Borgomaneri S.**, Gazzola V., Avenanti A. (2012). Motor mapping of implied actions during perception of emotional body language. *Brain Stimulation*. 5:70-6. (**IF: 4.538**)
- Tidoni E., **Borgomaneri S.**, di Pellegrino G., Avenanti, A. (2013). Action Simulation Plays a Critical Role in Deceptive Action Recognition. *Journal of Neuroscience*. 33:611-23. (**IF: 6.91**)
- **Borgomaneri S.**, Gazzola V., Avenanti A. (2013). Temporal dynamics of motor cortex excitability during perception of natural emotional scenes. *Social Cognitive and Affective Neuroscience*. 9:1451-7. (**IF= 5.042**)
- Avenanti A., Vicario C.M., **Borgomaneri S.** (2014). Social dimensions of pain: Comment on "Facing the experience of pain: A neuropsychological perspective" by Fabbro and Crescentini. *Physics of Life Reviews*. 11: 558-61. (**IF= 6.583**)
- **Borgomaneri S.**, Gazzola V., Avenanti A. (2014). Transcranial magnetic stimulation reveals two functionally distinct stages of motor cortex involvement during perception of emotional body language. *Brain Structure & Function*. (**IF= 7.837**)
- **Borgomaneri S.**, Gazzola V., Avenanti A. (2014). Seeing fearful body language rapidly freezes the observer's motor cortex. *Cortex*. (**IF= 6.042**)

Posters

- **Borgomaneri S.**, Aglioti S., Avenanti A. Perturbing and measuring neural activity in the pain resonance network: TMS studies. CAOS, Concepts, Actions and Objects. Functional and Neural Perspectives. Rovereto, 19-22.05.2011.
- Avenanti A., Tidoni E., **Borgomaneri S.**, di Pellegrino G. The inferior frontal gyrus is critical for recognition of deceptive intentions. IBRO. International Brain Research Organization. Firenze, 14-18.07.2011.
- **Borgomaneri S.**, Aglioti S., Avenanti, A. Perturbing and measuring neural activity in the pain resonance network: TMS studies. IBRO. International Brain Research Organization. Firenze, 14-18.06.2011.
- **Borgomaneri S.**, Avenanti, A. Causative connectivity of sensorimotor regions during embodied empathy for pain as revealed by perturb-and-measure TMS. 2011 TMS Summer School_Oxford.

- **Borgomaneri S.**, Gazzola V., Avenanti A. Motor mapping of implied actions during perception of emotional body language. CAOs, Concepts, Actions and Objects: Functional and Neural Perspectives. Rovereto, 24-27.05.2012.
- **Borgomaneri S.**, Avenanti A. Temporal dynamics of motor cortex excitability during perception of emotional IAPS stimuli. 2012 Magstim Neuroscience Conference & Workshop 2012. Oxford, UK. 12-13.05.2012.
- **Borgomaneri S.**, Avenanti A. Motor resonance and motor reactions during emotional body perception. 2013 Magstim Neuroscience Conference & Workshop 2013. Oxford, UK. 04-05.05.2013.
- Makris S., Mele S., **Borgomaneri S.**, Avenanti A., Urgesi, C. "I know you are going to grasp a cactus". 2013 Magstim Neuroscience Conference & Workshop 2013. Oxford, UK. 04-05.05.2013.
- Mele S., Makris S., **Borgomaneri S.**, Avenanti A., Urgesi, C. Per favore, non farlo! Simulazione di azioni disgustose e dolorose nel sistema motorio. AIP - SEZIONE PSICOLOGIA SPERIMENTALE, Roma, Italy.
- **Borgomaneri S.**, Avenanti A. Emotional bodies triggers fast motor reactions and motor resonance: single and paired-pulse TMS studies. XXVI Congresso SIFP 2013. Lecce, Italy.
- Vicario C.M, Rafal R.D, Marinovic W., **Borgomaneri S.**, Kritikos A., Riek S. and Avenanti A. Perceiving disgust affects cortico-bulbar excitability. A TMS study. ACNS-2013 Australasian Cognitive Neuroscience Society Conference. Clayton, Melbourne, Australia, 28 Nov - 1 Dec, 2013.

Talk

- **Borgomaneri S.**, Anelli F., Aglioti S., Avenanti, A. (2011). Causal connectivity in the cortical network underlying embodied empathy for pain: a perturb-and-measure TMS study. Riunione Autunnale della Società Italiana di Neuropsicologia (SINP 2011), Bologna, 18-19.11.2011.
- **Borgomaneri S.**, Avenanti A. (2012). Perception of emotional bodies triggers fast motor reactions and motor resonance in the human corticospinal system. Congresso Annuale SINP 2012. Roma, 9-10.11.2012.
- **Borgomaneri S.**, Avenanti A. (2013). Che emozione è? Chiedi al Solco Temporale Superiore: uno studio di TMS-priming. AIP - SEZIONE PSICOLOGIA SPERIMENTALE, Roma, Italy.
- **Borgomaneri S.**, Avenanti A. (2014). Comprendere e reagire al linguaggio emotivo del corpo, prima della simulazione motoria. AIP - SEZIONE PSICOLOGIA SPERIMENTALE, Pavia, Italy.

Award

- Premio casa editrice Pearson, best scientific oral presentation, AIP - SEZIONE PSICOLOGIA SPERIMENTALE, Roma, Italy.

Research Grant/Fellowship

- 2011-2014, Grant Fellowship (Assegno di ricerca, ~20k € per year) at Centro studi e ricerche in Neuroscienze Cognitive, University of Bologna, Italy.
- October 2010, Research grant for a Phd position University of Rome, La Sapienza, Italy (~12k € per year, renounced).
- April 2010, Small grant fellowship, University Medical Center of Groningen, The Netherland (~2k €).
- March 2010, Travel Grant for students working on Masters thesis, University of Bologna, Italy (~1k €).
- 2011-2012, Assegno di Ricerca, Polo scientifico didattico di Cesena, Università di Bologna.
- 2012-2013, Assegno di Ricerca, Polo scientifico didattico di Cesena, Università di Bologna.
- 2013-2014, Borsa di studio, IRCCS Fondazione Santa Lucia, Roma.

Scientific and technical skills

- Transcranial Magnetic Stimulation: single pulse, paired-pulse, dual coil and repetitive TMS protocols. Cortico-cortical paired associative stimulation paradigm.
- Offline and Online Transcranial Magnetic Stimulation and Electroencephalography study, Online combined TMS and fMRI.
- Analysis of physiological signals (electromyography, motor-evoked potentials): Biopac MP 35/36, 150.
- Neuronavigation systems: Polaris Vicra and SofTactic Neuronavigation.
- Programming behavioural and neurophysiological experiments using Matlab.

Computer skills

- Operating Systems: Windows
- Programming Languages: MATLAB
- Research software applications: MATLAB Psychtoolbox, Statistica, SPSS.
- Packages: Office, Photoshop, Premiere.

Other language: English

- Writing: good
- Speaking: good
- Comprehension: good

References

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- Adolphs R, Damasio H, Tranel D, Damasio AR (1996) Cortical systems for the recognition of emotion in facial expressions. *J Neurosci* 16:7678–7687.
- Adolphs R, Spezio M (2006) Role of the amygdala in processing visual social stimuli. *Prog Brain Res* 156:363–378.
- Adolphs R, Tranel D (2003) Amygdala damage impairs emotion recognition from scenes only when they contain facial expressions. *Neuropsychologia* 41:1281–1289.
- Adolphs R, Tranel D, Damasio H, Damasio AR (1995) Fear and the human amygdala. *J Neurosci* 15:5879–5891.
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- Alves NT, Aznar-Casanova JA, Fukusima SS (2009) Patterns of brain asymmetry in the perception of positive and negative facial expressions. *Laterality* 14:256–272.
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- Aron AR, Robbins TW, Poldrack RA (2014) Inhibition and the right inferior frontal cortex: one decade on. *Trends Cogn Sci*:1–9.
- Atkinson AP, Adolphs R (2011) The neuropsychology of face perception: beyond simple dissociations and functional selectivity. *Philos Trans R Soc Lond B Biol Sci* 366:1726–1738.
- Avenanti A, Aglioti S (2006) The sensorimotor side of empathy for pain. In: *Psychoanalysis and neuroscience* (Mancia M, ed), pp 235–256. Milan: Springer-Verlag Italia.
- Avenanti A, Annala L, Serino A (2012a) Suppression of premotor cortex disrupts motor coding of peripersonal space. *Neuroimage* 63:281–288.
- Avenanti A, Annella L, Candidi M, Urgesi C, Aglioti SM (2013a) Compensatory plasticity in the action observation network : virtual lesions of STS enhance anticipatory simulation of seen actions. *Cereb cortex* 23:570–580.
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- Avenanti A, Coccia M, Ladavas E, Provinciali L, Ceravolo MG (2012b) Low-frequency rTMS promotes use-dependent motor plasticity in chronic stroke: a randomized trial. *Neurology* 78:256–264.
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- Avenanti A, Minio-Paluello I, Bufalari I, Aglioti SM (2009a) The pain of a model in the personality of an onlooker: influence of state-reactivity and personality traits on embodied empathy for pain. *Neuroimage* 44:275–283.
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- Avenanti A, Sirigu A, Aglioti SM (2010) Racial bias reduces empathic sensorimotor resonance with other-race pain. *Curr Biol* 20:1018–1022.
- Avenanti A, Urgesi C (2011) Understanding “what” others do: mirror mechanisms play a crucial role in action perception. *Soc Cogn Affect Neurosci* 6:257–259.
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