

## **CURRICULUM VITAE**

**GIORGIO VALLORTIGARA, Ph.D.**  
**Full Professor of Neuroscience**  
**Centre for Mind/Brain Sciences**  
**University of Trento**

### **EDUCATION:**

Sussex University, 1991-1992 post-doc (Neuroscience)

University of Padua, Ph.D., 1990 (Joint with Sussex Univ., UK)  
Experimental Psychology  
(Neurobiology as a related area)

Doctor in Experimental Psychology (*Summa cum laude*)  
University of Padua, 1983

### **CAREER HISTORY:**

Vice-Rector for Research, University of Trento (2015 – present)

Director of the Centre for Mind/Brain Sciences  
University of Trento (2012 – 2015)

Associate Director of the Centre for Mind/Brain Sciences  
University of Trento  
(15 February 2008 – 2012)

Full Professor at University of Trento  
University of Trento  
(November 2007 – present)

Adjunct Professor  
School of Biological, Biomedical and Molecular Sciences  
University of New England, Australia  
(2007- 2011)

Dean of the Faculty of Psychology  
University of Trieste  
(November 2003 – 2006)

Head of the Department of Psychology  
University of Trieste

(April 2003 – November 2003)

Full Professor at University of Trieste (March 2000 - 2007)

Associate Professor (1999-2000)  
University of Trieste

Research Scientist (1991- 1999)  
University of Udine

Post-doc (1991)  
University of Sussex, U.K.

Graduate Fellow (1990)  
University of Sussex, U.K.

Graduate Fellow (1985-1990)  
University of Padua

Research Assistant (1983-1985)  
University of Padua

#### **EXPERIENCE:**

Visiting Research Worker (1988)  
Ethology and Neurophysiology Group,  
School of Biology, Sussex University, U.K.

Visiting Fellow (1991)  
Sussex Centre for Neuroscience, Sussex University, U.K.

Visiting Fellow (1992)  
Sussex Centre for Neuroscience, Sussex University, U.K.

Research Fellow (1994)  
Sussex Centre for Neuroscience, Sussex University, U.K.

#### **PROFESSIONAL ACTIVITIES:**

- Applied ethologist at MultiTecno S.p.A. (1984-85)
- Scientific consultant for the Italian C.O.N.I. (Italian National Olympic Committee) 1985
- Reviewer for:

*Nature*  
*Current Biology*  
*Brain and Behavioral Sciences*

*Cognition*  
*Journal of Neuroscience*  
*BMC Biology*  
*Cognitive Brain Research*  
*European Journal of Neuroscience*  
*Current Anthropology*  
*Behavioural Brain Research*  
*Laterality*  
*Brain Research*  
*Behavioural Processes*  
*Ethology*  
*Brain and Language*  
*Journal of Comparative Psychology*  
*Animal Behaviour*  
*Pharmacology Biochemistry and Behavior*  
*Physiology and Behavior*  
*Perception*  
*PLoS ONE*  
*Brain Research Bulletin*  
*Developmental Psychobiology*  
*Perception and Psychophysics*  
*International Journal of Comparative Psychology*  
*Bird Behavior*  
*Animal Cognition*  
*Journal of Comparative Psychology*  
*Psychological Review*  
*Journal of Experimental Psychology: General*  
*Journal of Experimental Psychology: Animal Behavior Processes*  
*Journal of Experimental Psychology: Learning, Memory and Cognition*  
*Neuropsychologia*  
*Psychological Science*  
*Behaviour*  
*Psychological Bulletin*  
*Neuroscience Letters*  
*Ibis*  
*Journal of Experimental Biology*  
*Cognition, Brain and Behavior*  
*Biology Letters*  
*Proceedings Royal Society of London B*  
*Journal of Cognitive Neuroscience*  
*Cell Biochemistry and Function*  
*Philosophical Transactions of the Royal Society of London*  
*Proceedings of the National Academy of Sciences USA*

- Scientific consultant for the *Rockefeller Foundation*, *National Science Foundation USA*, *British Biological and Biotechnology Research Council*, *Wellcome Trust*, *Leakey Foundation*, *Italian MIUR*, *European Research Council*.

- Member of the Editorial Board of "*Animal Cognition*", "*Journal of Comparative Psychology*", "*International Journal of Comparative Psychology*", "*Frontiers in Behavioural Neuroscience*", "*Frontiers in Emotion Science*", "*Frontiers in Comparative Psychology*", "*Italian Journal of Cognitive Sciences*", "*PeerJ*", "*PsyCh Journal*", and "*Giornale Italiano di Psicologia*". Associate of the journal "*Behavioral Brain Sciences*".
- Member of the Scientific Committee of the journal "*Le Scienze*" (italian edition of *Scientific American*).
- Member of the Scientific Committee of the journal "*Sistemi Intelligenti*".
- Member of the Directoral Committee of the journal "*Reti, Saperi e Linguaggi, Italian Journal of Cognitive Sciences*".
- Associate Editor of the journal "*Frontiers in Comparative Psychology*".
- Co-editor of the journal "*Laterality: Asymmetries of Body, Brain and Cognition*".

#### **RESEARCH INTERESTS:**

Lateralization in the vertebrate and invertebrate brain, evolution of brain lateralization, spatial cognition, number cognition, neurobiology of spatial memory, animal cognition, comparative visual perception

#### **TEACHING EXPERIENCE:**

Graduate seminars in neurobiology, neuropsychology, neuro-ethology and animal behaviour; undergraduate courses in psychobiology, neurobiology, human visual perception. He also taught at the Harvard Summer School (Mind, Brain and Behavior).

#### **SEMINARS AND CONFERENCES (selection – last two years):**

- Centre for Neuroscience, Sussex University;
- Brain Research Group, Open University, Milton Keynes;
- Centre for Developmental Biology, King College,
- London University
- Dept. Psychol., Université du Quebec, Montreal
- Dept. of Biology and Preclinical Medicine, Univ. St. Andrews, U.K.
- Konrad Lorenz Institute for Evolution and Cognition, Altenberg, Austria
- SISSA, Cognitive Neuroscience Sector, Trieste, Italy
- Dept. of Biology, Univ. of Groningen, The Netherlands
- Dept. Psychologie, Univ. de Paris V
- CNRS Neurosciences Fonctionnelles, Marseille, France

- Accademia dei Lincei, Roma
- School of Biological, Biomedical and Molecular Sciences, Univ. New England, Australia
- School of Biological Sciences, National Australian University
- Australian Academy of Sciences, Canberra, Australia
- BioZentrum, Vienna University, Austria
- Konrad Lorenz Institute of the Academy of Sciences, Wien
- Université Paris Descartes, Paris
- Collège de France, Paris
- Central European University, Budapest
- Ecole Polytechnic Federale de Lausanne, Human Brain Project

### **Organization of conferences and workshops:**

- 2005: Workshop on “Bridges linking behavior and cognition” (organizer: Matsushima, T., Vallortigara, G.), The 29th International Congress of Ethology (IEC2005), ELTE Convention Center, Budapest, Hungary, August 2005
- 2009 10-12 June, Organizer (with Elizabeth Spelke, Harvard University) of CogEvo – Workshop on Cognition and Evolution – First Edition
- 2010 17-19 June, (with Elizabeth Spelke, Harvard University) of CogEvo – Workshop on Cognition and Evolution – Second Edition
- 2012 28 June-1 July, (with Elizabeth Spelke, Harvard University) of CogEvo – Workshop on Cognition and Evolution – Third Edition
- The Brain and the Ideas. International Workshop on Innovative Ideas on the Functions of Brains. Dec. 4th 2014, Rovereto, Italy.
- 2014 7- 9 July, (with Elizabeth Spelke, Harvard University) of CogEvo – Workshop on Cognition and Evolution – Fourth Edition

### **AWARDS AND HONOURS:**

- 2000 Research Award of the Association for the Study of Animal Behaviour.
- 2001 Research Award of the Universities Federation for Animal Welfare.
- 2004 Research Grant Award of the Waltham Foundation (U.K.)
- 2005 Awarded the “*Giovanni Maria Pace*” for science writing.
- 2007 “*Conferenza Lincea Croce*”, Accademia Italiana dei Lincei.
- 2007 Awarded the “*Enrico Fermi “Città di Cecina*” for science popularization.
- Recipient of the “*Faculty of Science Distinguished Visitor Award 2007*”, University of New England, Australia.
- 2007 Appointed “*Adjunct Professor*”, School of Biomedical and Molecular Sciences, University of New England, Australia.

- 2010 - Research Grant Award Waltham Foundation
- 2011 - Elected Fellow of the Royal Society of Biology, FRSB
- 2011 - Elected Member of the Attention & Performance Advisory Council
- 2012 - Awarded an *ERC Advanced Research Grant*
- 2012 - Elected Member of the Accademia degli Agiati
- 2013 - Elected Socio ordinario of the “Società Museo Civico di Rovereto”
- 2013 – Selected by the Scientific Committee for the award “Galileo Award for Scientific Writing 2013” (“Premio letterario Galileo per la divulgazione scientifica” - anno 2013)
- 2013 – Awarded the Ferrari Soave Prize for Animal Biology of the Academy of Sciences of Turin
- 2016 – Member of the American Association for the Advancement of Science (AAAS)
- 2016 – Premio Geoffroy Saint Hilaire per l’Etologia, della Società Francese per l’Etologia e lo Studio del Comportamento Animale (SFECA).
- 2016 – *Doctor Rerum Naturalium Honoris Causa*, for outstanding achievements in the field of psychology, University of Bochum, Germany

#### **PROFESSIONAL SOCIETIES:**

- American Association for the Advancement of Science (AAAS)
- Association for the Study of Animal Behaviour (ASAB)
- Association for Psychological Science (APS)
- Psychonomic Society
- New York Academy of Sciences
- European Neuroscience Association
- European Brain and Behaviour Society
- International Society for Comparative Psychology
- International Brain Research Organization

#### **MOST SIGNIFICANT CONTRIBUTIONS IN RESEARCH**

Giorgio Vallortigara was the first scientist to report evidence for functional lateralization in higher cognitive processing (i.e., individual and social recognition) in the avian brain; moreover, he discovered the first evidence of brain lateralization in so-called lower vertebrate species (fish and amphibians); he published widely on this topic in, among others, *Nature*, *Current Biology*, *Neuropsychologia*, *Behavioral Neuroscience* and *Brain and Behavioural Sciences*. He developed a novel theory of the evolution of brain and behavioural asymmetries based on concepts of evolutionary biology and mathematical theory of games. He also has a reputation in animal cognition, associated with his findings on recognition of partly occluded objects, biological motion, and the encoding of numerical and geometric information in the animal brain (published, among others journals, in *Science* and *PNAS*). **He has published more than 250 refereed papers, with more than 12000 citations overall and an *h-index* of 54 in Scopus; on Google Scholar the *h-index* is 62**). His work has been rated several times in the *Faculty of 1000 Biology* and

widely described in general science books of animal behaviour, cognitive science and neuroscience (for instance in J. Vauclair (1996). *Animal Cognition*. Harvard: Harvard University Press; Pearce, J.M. (1997). *Animal Learning and Cognition*. Psychology Press, Hove, U.K.; S. Rose (1992). *The Making of Memory. From Molecules to Mind*, London: Bantam Press; L.J. Rogers (1997). *Minds of Their Own*, St. Leonards: Allen & Unwin; P.J. Kellman & M.E. Arterberry (1998). *The Cradle of Knowledge*, MIT Press; J. Hochberg (1998). *Perception and Cognition at Century's End*, Academic Press, San Diego; P. Bloom (2004). *Descartes' Baby: How the Science of Child Development Explains What Makes Us Human*. Basic Books, US.); G. Marcus (2004). *The Birth of the Mind*. Basic Books, New York. Shermer M. (2007). *The Mind of the Market. Compassionate Apes, Competitive Humans and Other Tales from Evolutionary Economics*. Times Books- Henry Holt and Co., N.Y.

## **SUPERVISION OF GRADUATE STUDENTS AND POSTDOCS**

Supervised several young scientists, who were doctoral students in his lab, and now recognized academics in Italy (Lucia Regolin, now associate professor at Padua Univ; Luca Tommasi, now full professor at Chieti University) and abroad (Claudio Cantalupo, now a research scientist at Yerkes Primates Center in Atlanta; Elisa Frasnelli now a research fellow at Exeter University, U.K.). He served also as external examiner of several Ph.D. thesis both in Italy and abroad (e.g., Sussex Univ., U.K., New Engl. Univ., Australia; Ruhr Univ., Germany; Rennes Univ., France).

## **GRANTS AND FUNDING SUPPORT (last 10 yrs)**

- European Commission, 6<sup>th</sup> Framework Program, "How does it means to be human" 2006-2009, overall 2.5 Meuro; 350 KEuro to G.V. lab
- Waltham Foundations, 2010-2012, 25000 US\$)
- ERC Advanced Grant, 2012-2017, 2.4 MEuro
- Caritro Foundation, 2017-2019, 330 Keuro.

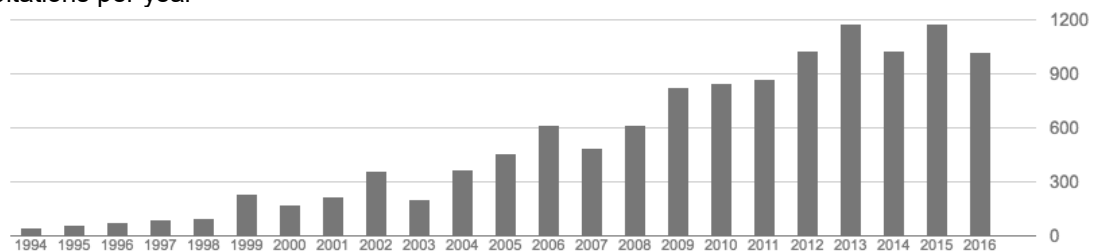
## **SCIENTIFIC DISSEMINATION**

He is regularly invited in public meetings associated with popular science events, radio and television shows, and writes for major Italian newspaper (Repubblica, Il Sole 24 Ore) and popular science magazines (e.g. *Scientific American*). He also published several popular science books. Newspapers articles that referred to his work were published in *New York Times*, *Daily Telegraph*, *Science Now*, *Nature News*, *Conocer Ciencia*, *Biology News*, *Scientific American*, *ABC News*, *The Economist*, *The Guardian*, *National Geographic*, *Washington Post*, *Times*, *BBC*, *Corriere della Sera*, *La Repubblica*, *La Stampa*, *Il Sole 24 Ore*, *Panorama*, *Le Scienze*, *L'Espresso*, *Mente & Cervello*.



Citazioni	12206	6294
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Citations per year



## IN THE MEDIA

Newspapers articles that referred to Giorgio Vallortigara work were published in, among others, *New York Times*, *Daily Telegraph*, *Science Now*, *Nature News*, *Conocer Ciencia*, *Biology News*, *Scientific American*, *ABC News*, *The Economist*, *The Guardian*, *National Geographic*, *Washington Post*, *Times*, *BBC Radio 4*, *Corriere della Sera*, *La Repubblica*, *La Stampa*, *Il Sole 24 Ore*, *Panorama*, *Le Scienze*, *L'Espresso*, *Mente & Cervello*.



## **GIORGIO VALLORTIGARA**

### **Books:**

Rogers, L.J., Vallortigara G., Andrew, R.J. (2013). *Divided Brains. The Biology and Behaviour of Brain Asymmetries*. Cambridge University Press, New York.

### **Edited Books:**

McManus, C. Nicholls, M., Vallortigara, G. (Editors) (2010). *The Right Hand and the Left Hand of History*. Taylor & Francis Ltd, Oxford, UK, ISBN 10: 1848727232 ISBN 13: 9781848727236

Rogers, L.J., Vallortigara, G. (Editors) (2017). *Lateralized Brain Functions: Methods in Human and Non-Human Species*. Springer Verlag, Berlin.

### **Peer-reviewed full-length papers**

#### **2016**

**(280)** Mayer, U., Rosa-Salva, O., Morbioli, F., Vallortigara, G. (2016). The motion of an alive conspecific activates septal and preoptic areas in naive domestic chicks (*Gallus gallus*). *European Journal of Neuroscience*, in press.

**(279)** Santolin, C., Rosa-Salva, O., Vallortigara, G., Regolin, L. (2016). Unsupervised statistical learning in newly-hatched chicks. *Current Biology*, in press

**(278)** Vallortigara, G., Versace, E. (2017). Laterality at the Neural, Cognitive, and Behavioral Levels. In "*APA Handbook of Comparative Psychology: Vol. 1. Basic Concepts, Methods, Neural Substrate, and Behavior*", J. Call (Editor-in-Chief), American Psychological Association, Washington DC.

**(277)** Rosa-Salva, O., Grassi, M., Lorenzi, E., Regolin, L. Vallortigara, G. (2016). Spontaneous preference for visual cues of animacy in naïve domestic chicks: the case of speed changes. *Cognition*, in press

**(276)** Di Giorgio, E., Loveland, J.L., Mayer, U., Rosa-Salva, O., Versace, E., Vallortigara, G. (2016). Filial responses as predisposed and learned

preferences: Early attachment in chicks and babies. *Behavioural Brain Research*, in press.

**(275)** Santolin, C., Rosa-Salva, O., Regolin, L., Vallortigara, G. (2016). Generalization of visual regularities in newly-hatched chicks (*Gallus gallus*). *Animal Cognition*, in press

**(274)** Rugani, R., McCrink, K., de Hevia, M-D., Vallortigara, G., Regolin, L. (2016). Ratio abstraction over discrete magnitudes by newly hatched domestic chicks (*Gallus gallus*). *Scientific Reports*, 6, 30114; doi: 10.1038/srep30114

**(273)** Mayer, U., Rosa-Salva, O., Lorenzi, E., Vallortigara, G. (2016). Social predisposition dependent neuronal activity in the intermediate medial mesopallium of domestic chicks (*Gallus gallus domesticus*). *Behavioural Brain Research*, 310: 93-102.

**(272)** Spiezio, C., Regaiolli, B., Vallortigara, G. (2016). Motor and postural asymmetries in marsupials: Forelimb preferences in the red-necked wallaby (*Macropus rufogriseus*). *Behavioural Processes*, 128: 119–125.

**(271)** Vallortigara G, Rosa Salva O (2016). Toolkits for cognition: From core-knowledge to genes. In Tucci, V. (Ed.) *Neurophenome: Cutting-edge Approaches and Technologies in Neurobehavioral Genetics*, Wiley-Blackwell. In press

**(270)** Di Giorgio, E., Frasnelli, E., Rosa Salva, O., Scattoni, M.L., Puopolo, M., Tosoni, D., Simion F., Vallortigara G. (2016). Difference in Visual Social Predispositions Between Newborns at Low- and High-risk for Autism. *Scientific Reports*, 6, 26395; doi: 10.1038/srep26395.

**(269)** Rugani, R., Vallortigara, G., Priftis, K., Regolin, L. (2016). Piece of Evidence. Commentary: Ancestral Mental Number Lines: What Is the Evidence? *Frontiers in Psychology*, 22 April 2016  
| <http://dx.doi.org/10.3389/fpsyg.2016.00553>

**(268)** Rugani, R., Vallortigara, G., Regolin, L. (2016). Mapping number to space in the two hemispheres of the avian brain. *Neurobiology of Learning and Memory*, 133: 13-18.

**(267)** Giroto, V., Fontanari, L. Gonzalez, M., Vallortigara, G., Blaye, A. (2016). Young children do not succeed in choice tasks that imply evaluating chances. *Cognition*, 152: 32-39.

**(266)** Paoli, M., Anesi, A., Antolini, R., Guella, G., Vallortigara, G., Haase, A. (2016). Differential odour coding of isotopomers in the honeybee brain. *Scientific Reports*, 21893; doi: 10.1038/srep21893.

**(265)** Di Giorgio, E., Lunghi, M., Simion, F., Vallortigara, G. (2016). Visual Cues of Motion that trigger Animacy Perception at Birth: The Case of Self-propulsion. *Developmental Science*, online: 21 Feb. 2016 | DOI: 10.1111/desc.12394

**(264)** Mayer, U., Pecchia, T., Bingman, V. Vallortigara, G. (2016). Hippocampus and Medial Striatum Dissociation during Goal Navigation by Geometry or Features in the Domestic Chick: An Immediate Early Gene Study. *Hippocampus*, 26: 27–40.

## **2015**

**(263)** Versace, E., Vallortigara, G. (2015). Origins of knowledge: Insights from precocial species. *Frontiers in Behavioral Neuroscience*, 9: 338. doi: 10.3389/fnbeh.2015.00338.

**(262)** Rogers, L.J.; Vallortigara, G. (2015). When and Why Did Brains Break Symmetry? *Symmetry*, 7: 2181-2194.

**(261)** Vallortigara, G. (2015). Handedness: What Kangaroos tell us about our lopsided brains. *Current Biology*, 25: R654–R676 (Dispatch).

**(260)** Lee, S.A., Ferrari, A., Vallortigara, G., Sovrano, V.A. (2015). Boundary primacy in spatial mapping: Evidence from zebrafish (*Danio rerio*). *Behavioural Processes*, 119: 116-122.

**(259)** Potrich, D., Sovrano, V.A., Stancher, G., Vallortigara, G. (2015). Quantity discrimination by zebrafish (*Danio rerio*). *Journal of Comparative Psychology*, 29: 388-393.

**(258)** Regaiolli, B., Spiezio, C., Vallortigara, G. (2015). Understanding primate lateralization: Handedness, target laterality and task complexity. *Laterality*, in press.

**(257)** Rugani, R., Rosa Salva, O., Regolin, L., Vallortigara, G. (2015). Brain asymmetry modulates perception of biological motion in newborn chicks (*Gallus gallus*). *Behavioural Brain Research*, in press.

**(256)** Versace, E., Vallortigara, G. (2015). Forelimb preferences in human beings and other species: multiple models for testing hypotheses on lateralization. *Frontiers in Psychology*, 6: 233. doi: 10.3389/fpsyg.2015.00233

**(255)** Lee, S.A., Tucci, V., Sovrano, V.A., Vallortigara, G. (2015). Working-memory vs. reference-memory tests of spatial navigation in mice (*Mus musculus*). *Journal of Comparative Psychology*, in press.

**(254)** Rigosi, E., Haase, A., Rath, L., Anfora, G., Vallortigara, G., Szyszka, P. (2015). Asymmetric neural coding revealed by *in vivo* calcium imaging in the honey bee brain. *Proceedings of the Royal Society of London B*, 282: 20142571. <http://dx.doi.org/10.1098/rspb.2014.2571>

**(253)** Rugani, R., Vallortigara, G., Priftis, K., Regolin, L. (2015). Number-space mapping in the newborn chick resembles humans' mental number line.

*Science*, 347: 534-536.

**(252)** Rosa Salva, O., Mayer, U., Vallortigara, G. (2015). Roots of a social brain: Developmental models of emerging animacy-detection mechanisms. *Neuroscience and Biobehavioral Reviews*, 50: 150–168.

## **2014**

**(251)** Vallortigara, G. (2014). Foundations of Number and Space Representations in Precocial Species. In “*Evolutionary Origins and Early Development of Number Processing*”, pp. 35-66 (Eds., D.C. Geary, D.B. Beach, K. Mann Koepke), Elsevier, New York.

**(250)** Rugani, R., Vallortigara, G., Regolin, L. (2014). The use of proportion by young domestic chicks (*Gallus gallus*). *Animal Cognition*, in press.

**(249)** Fontanari, L., Gonzalez, M., Vallortigara, G., Girotto, V. (2014). Probabilistic cognition in two Maya indigenous groups. *Proceedings of the National Academy of Sciences USA*, 111: 17075-17080.

**(248)** Lee, S.A., Vallortigara, G. (2014). Bumblebees spontaneously map location of conspecific using geometry and features. *Learning and Motivation*, in press

**(247)** Stancher G., Rugani R., Regolin L., Vallortigara G. (2015). Numerical discrimination by frogs (*Bombina orientalis*). *Animal Cognition*, 18: 219-229.

**(246)** Chiandetti, C., Spelke, E.S., Vallortigara, G. (2014). Inexperienced newborn chicks use geometry to spontaneously reorient to an artificial social partner. *Developmental Science*, DOI: 10.1111/desc.12277

**(245)** Rugani, R., Vallortigara, G., Regolin, L. (2014). At the root of the left–right asymmetries in spatial–numerical processing: From domestic chicks to human subjects. *Journal of Cognitive Psychology*, in press.

**(244)** Rosa Salva, O., Sovrano, V.A., Vallortigara, G. (2014). What can fish brains tell us about visual perception?. *Frontiers in Neural Circuits*, 8: 119. doi:10.3389/fncir.2014.00119

**(243)** Quaresmini, C., Forrester, G.S., Spiezio, C., Vallortigara, G. (2014). Social environment elicits lateralized behaviors in gorillas and chimpanzees. *Journal of Comparative Psychology*, 128: 276-284.

**(242)** Fontanari, L., Rugani, R., Regolin, L., Vallortigara, G. (2014). Use of kind information for object individuation in young domestic chicks. *Animal Cognition*, 17: 925-935.

**(241)** Girotto, V., Pievani, T., Vallortigara, G. (2014). Supernatural beliefs: Adaptations for social life or by-products of cognitive adaptations? *Behaviour*, 151: 385-402.

**(240)** Rugani, R., Vallortigara, G., Regolin, G. (2014). From small to large: numerical discrimination by young domestic chicks (*Gallus gallus*). *Journal of Comparative Psychology*, 128: 163-171.

**(239)** Frasnelli, E., Haase, A., Rigosi, E., Anfora, G., Rogers, L.J., Vallortigara, G. (2014). The bee as a model to investigate brain and behavioural asymmetries. *Insects*, 5, 120-138. doi:10.3390/insects5010120

## **2013**

**(238)** Lee, S.A., Vallortigara, G., Fiore, M., Sovrano, V.A. (2013). Navigation by environmental geometry: the use of zebrafish as a model. *Journal of Experimental Biology*, 216: 3693-3699.

**(237)** Rogers, L.J.; Rigosi, E.; Frasnelli, E.; Vallortigara, G. (2013). A right antenna for social behaviour in honeybees. *Scientific Reports*, 3, 2045.

**(236)** Siniscalchi, M., Lusito, R., Vallortigara, G., Quaranta, A. (2013). Seeing left- or right-asymmetric tail wagging produces different emotional responses in dogs. *Current Biology*, 23: 2279-2282.

**(235)** Rugani, R., Cavazzana, A., Vallortigara, G., Regolin, L. (2013). One, two, three, four, or is there something more? Numerical discrimination in day-old domestic chicks. *Animal Cognition*, 16: 557-564.

**(234)** Sovrano, V.A., Potrich, D., Vallortigara, G. (2013). Learning of geometry and features in bumblebees (*Bombus terrestris*). *Journal of Comparative Psychology*, 127: 312-318.

**(233)** Rugani, R., Vallortigara, G., Regolin, L. (2013). Numerical abstraction in young domestic chicks (*Gallus gallus*). *PLoS One*, 8(6): e65262. Doi: 10.1371/journal.pone.0065262

**(232)** Rosa Salva O., Rugani, R., Regolin, L., Vallortigara, G. (2013). Perception of the Ebbinghaus illusion in four-day-old domestic chicks (*Gallus gallus*). *Animal Cognition*, 16: 895-906.

**(231)** Stancher G, Sovrano V.A., Potrich, D., Vallortigara, G. (2013). Discrimination of small quantities by fish (redtail splitfin, *Xenotoca eiseni*). *Animal Cognition*, 16: 307 – 312.

**(230)** Chiandetti, C., Vallortigara, G. (2013). The origins of physics, number and space cognition: Insights from a chick's brain. *Human Evolution*, 28: 1-12.

**(229)** Mascalzoni, E., Regolin, L., Vallortigara, G., Simion, F. (2013). The cradle of causal reasoning: newborns' preference for physical causality. *Developmental Science*, 16: 327-335.

**(228)** Chiandetti, C., Galliussi, J., Andrew, R.J., Vallortigara, G. (2013). Early-light embryonic stimulation suggests a second route, via gene activation, to cerebral lateralization in vertebrates. *Scientific Reports*, 3, 2701; DOI:10.1038/srep02701.

## **2013**

**(237)** Lee, S.A., Vallortigara, G., Fiore, M., Sovrano, V.A. (2013). Navigation by environmental geometry: the use of zebrafish as a model. *Journal of Experimental Biology*, 216: 3693-3699.

**(236)** Rogers, L.J.; Rigosi, E.; Frasnelli, E.; Vallortigara, G. (2013). A right antenna for social behaviour in honeybees. *Scientific Reports*, 3, 2045.

**(235)** Siniscalchi, M., Lusito, R., Vallortigara, G., Quaranta, A. (2013). Seeing left- or right-asymmetric tail wagging produces different emotional responses in dogs. *Current Biology*, 23: 2279-2282.

**(234)** Rugani, R., Cavazzana, A., Vallortigara, G., Regolin, L. (2013). One, two, three, four, or is there something more? Numerical discrimination in day-old domestic chicks. *Animal Cognition*, 16: 557-564.

**(233)** Sovrano, V.A., Potrich, D., Vallortigara, G. (2013). Learning of Geometry and Features in Bumblebees (*Bombus terrestris*). *Journal of Comparative Psychology*, 127: 312-318.

**(232)** Rugani, R., Vallortigara, G., Regolin, L. (2013). Numerical abstraction in young domestic chicks (*Gallus gallus*). Discrimination of large numbers. *PLoS One*, in press.

**(231)** Rosa Salva O., Rugani, R., Regolin, L., Vallortigara, G. (2013). Perception of the Ebbinghaus illusion in four-day-old domestic chicks (*Gallus gallus*). *Animal Cognition*, in press

**(230)** Stancher G, Sovrano V.A., Potrich, D., Vallortigara, G. (2013). Discrimination of small quantities by fish (redtail splitfin, *Xenotoca eiseni*). *Animal Cognition*, 16: 307 – 312.

**(229)** Chiandetti, C., Vallortigara, G. (2013). The origins of physics, number and space cognition: Insights from a chick's brain. *Human Evolution*, 28: 1-12.

**(228)** Mascialzoni, E., Regolin, L., Vallortigara, G., Simion, F. (2013). The cradle of causal reasoning: newborns' preference for physical causality. *Developmental Science*, 16: 327-335.

## **2012**

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