

Matthew Apps, PhD.

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My research examines the neurobiological mechanisms underlying motivation and reward processing. How does our brain decide what is worth doing and how do we understand similar decisions made by other people? I use combination of techniques including fMRI, diffusion-weighted imaging, computational modelling, pharmacology and brain stimulation to examine how the brain evaluates the costs and benefits of behaviours, and how similar evaluations of other people are processed during social interactions. I use these approaches to understand variability in motivation and social abilities in healthy individuals as well as in neurological (e.g. Parkinson's disease) and psychiatric conditions (e.g. Autism Spectrum Disorders).

Education and Employment History

- 2015-2018:** **BBSRC Anniversary Future Leader Fellow (Principal Investigator)**
Topic: *A Biological Framework for Understanding and Modulating Apathy in Healthy People*
Institution: Experimental Psychology, Uni. of Oxford.
- 2014-2016:** **Somerville College Fulford Junior Research Fellow**
- 2013-2015:** **Postdoctoral Research Associate**
Topic: *Apathy, motivation and effort-based decision-making*
Supervisor: Prof. Masud Husain
Institution: Nuffield Department of Clinical Neuroscience, Uni. of Oxford.
- 2011-2013:** **Postdoctoral Research Fellow**
Topic: *Computational modelling of self-other distinction*
Supervisor: Prof. Manos Tsakiris
Institution: Royal Holloway, University of London.
- 2008-2011:** **PhD. Student (ESRC scholarship)**
Thesis: *Anterior cingulate cortex: contributions to social cognition*
Supervisor: Prof. Narender Ramnani
Examiners: Dr. Mark Walton (University of Oxford), Dr. James Kilner (UCL) and Prof. Johannes Zanker (Royal Holloway)
Institution: Royal Holloway, University of London.
- 2007-2008:** **MSc. Research Methods in Psychology (ESRC scholarship)**
Grade: Distinction (1st in cohort)
Institution: University of Reading.
- 2004-2007:** **BSc. Psychology**
Grade: First Class Honours
Institution: Royal Holloway, University of London.

Grants

Research Grants

- BBSRC AFL Fellowship (Principal Investigator) ~£295,000
- ESRC 1+3 open competition MSc. and PhD Studentship (2007-2011) ~£70,000

Travel Grants

- ESCAN Young scientist award (2016) - €1500
- Organization for Human Brain Mapping trainee award (2009, 2015) - \$2700
- Guarantors of Brain travel grant (2009, 2011, 2013) - £2400
- BPS postdoctoral travel award (2014) - £350
- EPS Grindlay grant (2013) - £500
- Oxford University Autumn School in Cognitive Neuroscience bursary (2008) - £250

Awards

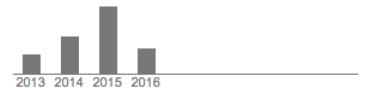
- European Society for Cognitive and Affective Neuroscience Young Scientist Award (2016)
- OHBM trainee award (2009, 2015)
- Guardian Research of the Week (2015): <http://www.theguardian.com/teacher-network/2015/feb/20/scientists-teachers-brains-work-weekly-news-review>
- Awarded competitive Fulford Junior Research Fellowship at Somerville College, Oxford (2014-2016)
- Elected postgraduate representative (2009-2010)
- Jack Westaway prize for best undergraduate project (2007)

Active Collaborations

- | | |
|---------------------------------------|---|
| • Prof. Masud Husain (Oxford) | • Prof. Narender Ramnani (RHUL) |
| • Prof. Matthew Rushworth (Oxford) | • Prof. Manos Tsakiris (Royal Holloway) |
| • Prof. Essi Viding (UCL) | • Dr. Patricia Lockwood (Oxford) |
| • Prof. Jon Roiser (UCL) | • Dr Trevor Chong (Macquarie) |
| • Dr. Steve Chang (Yale) | • Dr. Nils Kolling (Oxford) |
| • Prof. Nicole Wenderoth (ETH Zurich) | • Dr. Sanjay Manohar (Oxford) |
| • Dr. Joshua Balsters (ETH Zurich) | • Dr. Eliana Vassena (Gent/Donders) |

Publications

Citation indices	All	Since 2011
Citations	195	192
h-index	8	8
i10-index	7	7



2016

Apps, M.A.J., Rushworth, M.F.S., Chang, S.W.C. (in press). The anterior cingulate gyrus and social cognition: tracking the motivation of others. *Neuron*. **IF = 15.77**

Balsters, J.H., Mantini, D., **Apps, M.A.**, Eickhoff, S., Wenderoth, N. (2016). Connectivity-based parcellation increases network detection sensitivity in resting state fMRI: An investigation into the cingulate cortex in autism. *Neuroimage: Clinical*. **IF = 2.5**; *Altmetric*: 16 – top 10% of all papers.

2015

Apps, M.A.J., Lesage, E., & Ramnani, N. (2015) Vicarious Reinforcement Learning Signals When Instructing Others. *Journal of Neuroscience*. **IF = 6.3**; *cited*: 5. *Altmetric*: 58 – top 2% of all papers.

Apps, M.A.J., Grima, L., Manohar, S., & Husain, M. (2015). The role of cognitive effort in subjective reward devaluation and risky decision-making. *Scientific Reports*. **IF = 5.6**. *Altmetric*: 30 – top 3% of all papers.

Manohar, S., Chong, T., **Apps M.A.J.**, Batla A., Stamelou M., Jarman PR., Bhatia KP., & Husain, M. (2015). Reward Pays the Cost of Noise Reduction in Motor and Cognitive Control. *Current Biology*. **IF = 9.6**; *cited*: 8. *Altmetric*: 35 – top 3% of all papers.

Lockwood, P.L., **Apps M.A.J.**, Roiser, J., & Viding, E. (2015) Encoding of vicarious reward prediction in anterior cingulate cortex and relationship with trait empathy. *Journal of Neuroscience*. **IF = 6.3**. *cited*: 3. *Altmetric*: 141 – top 1% of all papers.

Ang, Y-S., Manohar, S. & **Apps, M.A.J.** (2015). Commentary: Noradrenaline and Dopamine Neurons in the Reward/Effort Trade-off: A Direct Electrophysiological Comparison in Behaving Monkeys. *Frontiers in Behavioural Neuroscience*. **IF = 3.3**. *Altmetric*: 13 – top 8% of all papers.

2014

Apps M.A.J., & Ramnani, N. (2014). The anterior cingulate gyrus signals the net-value of others' rewards. *Journal of Neuroscience*. **IF = 6.3**; *cited*: 14. *Altmetric*: 29 – top 4% of all papers.

Apps, M.A.J. & Tsakiris, M (2014). The free-energy self: A predictive coding account of self-recognition. *Neuroscience and Biobehavioural Reviews*. **IF = 9.4**; *cited*: 62. *Altmetric*: 6 – top 16%.

2013

Apps, M.A.J. & Tsakiris, M. (2013). Predictive codes of familiarity and context during the perceptual learning of facial identities. *Nature Communications*, 4. **IF = 11.5**; *cited*: 8. *Altmetric*: 51 – top 2%.

Apps, M. A. J., Tajadura-Jiménez, A., Sereno, M., Blanke, O., & Tsakiris, M. (2013). Plasticity in unimodal and multimodal brain areas reflects multisensory changes in self-face identification. *Cerebral Cortex* **IF = 8.7**; *cited*: 20. *Altmetric*: 11 – top 8% of all papers.

Apps M.A.J., Lockwood, P.L. & Balsters, J.H. (2013). The role of the midcingulate cortex in monitoring others' decisions. *Frontiers in Neuroscience*. **IF = 3.7**; *cited*: 12. *Altmetric*: 40 – top 3% of all papers.

Apps, M.A.J., Green, R., & Ramnani, N. (2013). Reinforcement learning signals in the anterior cingulate cortex code for others' false beliefs. *Neuroimage*. **IF = 6.3**; cited: 12. *Altmetric*: 6 – top 15%

2012

Apps, M.A.J., Tajadura-Jimenez, A., Turley, G., & Tsakiris, M. (2012). The different faces of one's self: an fMRI study into the recognition of current and past self-facial appearances. *Neuroimage*. **IF = 6.3**; cited: 19. *Altmetric*: 2 – top 50% of all papers.

Apps, M.A.J., Balsters, J. H., & Ramnani, N. (2012). The Anterior Cingulate Cortex: Monitoring the outcomes of others' decisions. *Social Neuroscience*. **IF = 2.7**; cited: 20. *Altmetric*: 7 – top 15

2010

Lesage E., **Apps, M. A. J.**, Hayter, A. L., Beckmann, C. F., Barnes, D., Langdon, D. W., & Ramnani, N. (2010). Cerebellar Information Processing In Relapsing-Remitting Multiple Sclerosis (RRMS). *Behavioural Neurology*. **IF = 1.5**; cited: 8.

Under Review

Apps, M.A.J., & Ramnani, N. (under review PNAS). Medial prefrontal contributions to subjective and normative economic decision-making.

Chong, T-J. T. **, **Apps, M.A.J.** **, Blake, A., Giehl, K., Grima, L., & Husain, M. (under review PLOS Biology). The neural basis of subjective reward devaluation by cognitive and physical effort. * **equal contributors**

Lockwood, P.L., **Apps M.A.J.**, Valton, V., Roiser, J., & Viding, E. (under revision PNAS). Neurocomputational mechanisms of prosocial learning.

Farmer, H., **Apps, M.A.J.**, & Tsakiris, M. (under revision *European Journal of Neuroscience*). Reputation in an Economic Game Modulates Premotor Cortex Activity during Action Observation.

Ainley, V., **Apps, M.A.J.**, Fotopolou, A., & Tsakiris, M. (under review *Philosophical Transactions of the Royal Society Biological Sciences B*). 'Bodily Precision': A Predictive Coding Account of Individual Differences in the Interoceptive Accuracy.

Balsters, J.H., **Apps, M.A.J.**, Bolis, D., Lehner, R., Gallagher, I., & Wenderoth, N. (Submitted to *Nature Neuroscience*). Social prediction error deficits in the autism spectrum.

In preparation

Apps, M.A.J., * McKay, R., * Azvedo, R., Tsakiris, M., * & Whitehouse, H., * (in prep for PNAS). Medial prefrontal cortex contributions ingroup unfairness. * **equal contributors**

Lockwood, P.L., Hamonet, M., Ratnavel, A., Salmony, F., Husain, M., **Apps, M.A.J** (in prep for *Current Biology*). Prosocial Motivation: Hypo-altruism for exerting effort.

Apps, M.A.J., Chong, T., Husain, M. (in prep). The connectional basis of subjective motivation.

Invited Oral Presentations

- Oxford autumn school in cognitive neuroscience seminar (forthcoming)
- London Judgement and Decision-Making seminar series (forthcoming)
- ESCAN 2016 meeting, Porto, Young Scientist Award Lecture (forthcoming)
- Control Processes Conference, San Diego (forthcoming)
- Social and Affective Neuroscience Society symposium talk (2016)
- Neuroscience department, ETH Zurich (2015)
- Neuroimaging group, IOPPN, King's College London (2015)
- Decision-Making and Motivation Workshop, University of Oxford (2015)
- Experimental Psychology department seminar, Ghent University (2015)
- Developmental Risk and Resilience Unit, UCL (2015)
- Psychology Departmental seminar, Roehampton University (2014)
- Department of Physiology, Development and Neuroscience, University of Cambridge (2013)
- Decision-making and action seminar series, Department of Experimental Psychology, University of Oxford (2013)
- Experimental Psychology Society meeting, London (2013)
- Institute of Neuroscience seminar, Trinity College, Dublin (2012)
- Symposia talk, Annual meeting of the Organization for Human Brain Mapping (2009)

Media/Public engagement

- Professional twitter account (>1500 followers incl. scientists and general public)
- Invited blog on the conversation website: <https://theconversation.com/what-goes-on-in-teachers-brains-as-they-help-students-to-learn-37672>
- Guardian Research of the Week: <http://www.theguardian.com/teacher-network/2015/feb/20/scientists-teachers-brains-work-weekly-news-review>
- Study reported on BBC news: <http://www.bbc.co.uk/news/education-31503265>
- Study reported in the Times newspaper and the Times online: <http://www.thetimes.co.uk/tto/science/article3921675.ece>
- Report in Men's Health US: <http://www.menshealth.com/best-life/remember-faces>
- Comment in Nature news section: doi:10.1038/nature.2012.1211
- Studies also reported in: La Scienza, O Globo, Le Figaro, Psypost, ScienceDaily, HealthCanal
- Demonstrator at British Neuroscience Society Festival of Neuroscience
- Royal Holloway open day demonstrator
- Royal Holloway UCAS day presenter

Responsibilities

- Organiser of Neuroscience Seminar Series (2015-)
- Organiser of Department of Experimental Psychology 1-day workshop of Motivation and Decision-Making (2015)
- Grant reviewing: *BBSRC, National Science Foundation US*
- Journal reviewing: *Current Biology, Journal of Neuroscience, Cerebral Cortex, Neuroscience and Biobehavioural Reviews, Neuroimage, Neuroimage: Clinical, Cortex, Frontiers in Psychology, Frontiers in Neuroscience, Frontiers in Neurology, PLoS One, Social Cognition and Affective Neuroscience, Scientific Reports, Psychiatry Research: neuroimaging, Brain Research*

Teaching

Supervision:

- Psychology, Biomedical sciences and Medical student projects (>10)
- MSc student solo and co-supervision:
 - Robin Green (Now a University of Birmingham PhD student)
 - Dr. Vivien Ainley (PhD awarded from Royal Holloway)
 - Dr. Erman Misirlisoy, (PhD awarded from UCL)
 - Laura Grima (Now a DPhil student at University of Oxford)
 - Dariusz Pilucik (Current MSc student at University of Oxford)

Postgraduate:

- 'The Primate Brain: Structural Anatomy', Lecture, Human Neuroscience MSc. (2010)
- 'The Social Brain', Lecture, Human Neuroscience MSc. (2010)
- 'Social Neuroscience Techniques', Lecture, Applied Social Psychology MSc. (2010)
- MSc./BSc. Neuroanatomy practical (post-mortem tissue demonstration; 2009-2012)

Undergraduate:

- 'Learning in the Brain: Dopamine, Reward and Reinforcement', 2nd year Brain and Behaviour Lecture, Psychology BSc. (2011-2014)
- 'How to use Linux and MATLAB' tutorial (2010)
- 'Preprocessing and General Linear Model Analysis in SPM' tutorial (2010)
- 'Dynamic Causal Modelling for fMRI: Theory and Practice' tutorial (2010)
- Statistics Tuition, 2nd Year Undergraduate statistical theory and SPSS training (2007-2008)

