

MOLLY SIMMONITE, PhD

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ACADEMIC POSITIONS

2016 – present **Postdoctoral Research Fellow/Adjunct Lecturer**
Department of Psychology, University of Michigan
Advisor: Dr. Thad Polk

2013 – 2016 **Postdoctoral Research Fellow/Adjunct Research Scientist**
Rosalind Franklin University of Medicine and Science, North Chicago
The Mind Research Network, Albuquerque
Advisors: Dr. David Kosson & Dr. Kent Kiehl

EDUCATION

2009 – 2013 **PhD Psychiatry**, University of Nottingham, UK
Advisors: Professor Peter Liddle & Dr. S Bert G Park
Dissertation: Cerebral Connectivity in Psychosis

2008 – 2009 **MSc Cognitive Neuroscience and Neuroimaging**, University of Nottingham, UK
Thesis: Dissociation of updating and surprise in the Feedback Related Negativity

2004 – 2007 **BSc (Hons) Psychology**, University of Lincoln, UK

RESEARCH INTERESTS

Cognition • Cognitive Neuroscience • Neuroimaging • Magnetic Resonance Spectroscopy • Brain Networks
Functional Connectivity • Transcranial Magnetic Stimulation • Machine Learning • Brain Aging • Psychopathy
• Psychopathology • Psychotic Disorders • Executive Functioning

GRANT SUPPORT

Active

- University of Michigan Functional MRI Laboratory Pilot Grant (PI: **Simmonite**) 08/14/18-08/13/20
Mapping cognition using dense functional magnetic resonance imaging \$28,000

Pending

- NIH: R01 (PIs: Beltz & **Simmonite**, \$1,994,785 total) 04/01/20-03/31/25
Using dense, person-specific imaging to predict individual differences and Alzheimer's risk in older adults
- NSF (PI: **Simmonite**, \$598,286 total) 01/01/20-12/31/23
Using dense, person-specific neuroimaging to predict individual differences in cognition

PUBLICATIONS

- Khammash, D., **Simmonite, M.**, Polk, T. A., Taylor, S. F. & Meehan, S. K. (in press). Temporal dynamics of corticocortical inhibition in human visual cortex: A TMS study. *Neuroscience*. <https://doi.org/10.1016/j.neuroscience.2019.10.003>
- Lalwani, P., Gagnon, H., Cassady, K., **Simmonite, M.**, Peltier, S., Seidler, R. D., Taylor, S. F., Weissman, D. H., & Polk, T. A. (2019). Neural distinctiveness declines with age in auditory cortex and is associated with auditory GABA levels. *Neuroimage*, 201, 116033. <https://doi.org/10.1016/j.neuroimage.2019.116033>
- Cassady, K., Gagnon, H., Lalwani, P., **Simmonite, M.**, Foerster, B., Park, D., ... Polk, T.A. (2019). Sensorimotor network segregation declines with age and is linked to GABA and to sensorimotor performance. *Neuroimage*, 186, 234-244. <https://doi.org/10.1016/j.neuroimage.2018.11.008>
- Gagnon, H., **Simmonite, M.**, Cassady, K., Chamberlain, J., Freiburger, E., Lalwani, P., ... Polk, T. A. (2019). Michigan Neural Distinctiveness (MiND) study protocol: investigating the scope, causes, and consequences of age-related neural dedifferentiation. *BMC Neurology*, 19(1), 61. <https://doi.org/10.1186/s12883-019-1294-6>
- **Simmonite, M.**, & Polk, T. A. (2019). Independent components of neural activation associated with 100 days of cognitive training. *Journal of Cognitive Neuroscience*, 31(6), 808-820. https://doi.org/10.1162/jocn_a_01396
- Khammash, D., **Simmonite, M.**, Polk, T. A., Taylor, S. F. & Meehan, S. K. (2019). Probing short-interval cortical inhibition in the visual cortex with transcranial magnetic stimulation: a reliability study. *Brain Stimulation*, 12(3), 702-704. <https://doi.org/10.1016/j.acra.2018.07.024>
- **Simmonite, M.**, Carp, J., Foerster, B.R., Ossher, L., Petrou, M., Weissman, D.H. & Polk, T. A (2018). Age-related declines in occipital GABA are associated with reduced fluid processing ability. *Academic Radiology*, 26(8), 1053-1061. <https://doi.org/10.1016/j.acra.2018.07.024>
- **Simmonite, M.**, Harenski, C. L., Kiehl, K. A & Kosson, D. S., (2018) Testing the left hemisphere activation hypothesis in psychopathic offenders using the Stroop task. *Personality and Individual Differences*, 135, 182-187. <https://doi.org/10.1016/j.paid.2018.07.020>
- Kumar, J., Liddle, E. B., Fernandes, C., Palaniyappan, L., Hall, E. L., Robson, S. E., **Simmonite, M.**, ... & Liddle, P. F. (2018). Glutathione and Glutamate in Schizophrenia: A 7T MRS Study. *Molecular Psychiatry*, pp. 1-10. <https://doi.org/10.1038/s41380-018-0104-7>
- **Simmonite, M.**, Bates, A. B., Groom, M., Hollis, C., & Liddle, P. F., (2015). Reduced event-related low frequency EEG activity in patients with early onset schizophrenia and their unaffected siblings. *Psychiatry Research: Neuroimaging*, 232(1), 51-57. <https://doi.org/10.1016/j.pscychresns.2015.01.003>
- Palaniyappan, L., **Simmonite, M.**, White, T. P., Liddle, E. B., & Liddle, P. F., (2013). Neural primacy of the salience processing system in schizophrenia. *Neuron*, 79(4), 814-828. <https://doi.org/10.1016/j.neuron.2013.06.027>
- Tang, Y., Zhang, X., **Simmonite, M.**, Li, H., Guo, Q., Li, C., Fang, Y., Xu, Y. & Wang, J, (2013). Hyperactivity within an extensive cortical distribution associated with excessive sensitivity in error processing in unmedicated depression: a combined event-related potential and sLORETA study. *International Journal of Psychophysiology*, 90(2), 282-289. <https://doi.org/10.1016/j.ijpsycho.2013.09.001>
- **Simmonite, M.**, Bates, A.T., Groom, M.J., Jackson, G.M., Hollis, C., & Liddle, P.F., (2012). Error processing-associated event-related potentials in schizophrenia and unaffected siblings. *International Journal of Psychophysiology*, 84(1), 74-79. <https://doi.org/10.1016/j.ijpsycho.2012.01.012>

MANUSCRIPTS UNDER REVIEW (AVAILABLE ON REQUEST)

- **Simmonite, M.**, Doege, K. A., & Liddle, P. F. (under review). Abnormal cross-frequency coupling as a mechanism for disordered connectivity in schizophrenia.
- **Simmonite, M.**, Harenski, C. L., Calhoun, V. D., Kiehl, K. A. & Kosson, D. S., (under review). Aberrant network activity during an implicit moral processing task in criminal psychopathy: An independent components analysis.
- Montry, K., **Simmonite, M.**, Kiehl, K. A., and Kosson, D.S. (invited revision). Investigating the left hemisphere activation hypothesis: an electrophysiological study of the N320.
- Cassady, K., Gagnon, H., Freiburger, E., Lalwani, P., **Simmonite, M.**, Park, D. C., Peltier, S. J., Taylor, S. F., Weissman, D., Seidler, R. & Polk, T. A. (under review). Network segregation varies with neural distinctiveness in sensorimotor cortex and predicts sensorimotor performance.
- Chamberlain, J., Gagnon, H., Lalwani, P., Cassady, K., **Simmonite, M.**, Foerster, B., Petrou, M., Seidler, R., Taylor, S. F., Weissman, D. H., Park, D. & Polk, T. A. (under review). GABA levels in ventral visual cortex decline with age and are associated with neural distinctiveness.

PEER-REVIEWED CONFERENCE PROCEEDINGS

- **Simmonite, M.**, Beltz, A., & Polk, T. A. (2019). Reliable, person-specific functional architecture derived from Human Connectome Project task data. Platform presentation at Neuroscience 2019, the Society for Neuroscience's 49th annual meeting, Chicago, USA.
- Lalwani, P., Cassady, K., **Simmonite, M.**, Garrett, D., & Polk, T. A. (2019). The role of GABA in modulating brain signal variability. Poster presentation at the 26th annual meeting of the Cognitive Neuroscience Society, San Francisco, USA
- Lalwani, P., Cassady, K., **Simmonite, M.**, Garrett, D., & Polk, T. A (2019). Older adults who modulate BOLD-signal variability more, have higher GABA levels and better fluid processing abilities. Poster presentation at the 6th biennial Dallas Aging and Cognition Conference, Dallas, USA.
- Chamberlain, J. D., Gagnon, H., Lalwani, P., Cassady, K., **Simmonite, M.**, Foerster, B., Petrou, M., Seidler, R. D., Weissman, D. H., Park, D. C., & Polk, T. A. (2019). GABA levels in ventral visual cortex decline with age and predict neural distinctiveness. Poster presentation at the 6th biennial Dallas Aging and Cognition Conference, Dallas, USA.
- Cassady, K., Gagnon, H., Lalwani, P., **Simmonite, M.**, Foerster, B., Park, D. C., Peltier, S. J., Petrou, M., Taylor, S. F., Weissman, D. H., Seidler, R. D. & Polk, T. A. (2019). Sensorimotor network segregation declines with age, is linked to GABA and predicts sensorimotor performance. Poster presentation at the 6th biennial Dallas Aging and Cognition Conference, Dallas, USA.
- **Simmonite, M.**, Cassady, K., Gagnon, H.C., Lalwani, P., Taylor, S.F., Weissman, D.H., Seidler, R. D. & Polk, T. A. (2018). Age-related neural dedifferentiation extends beyond visual cortex and is driven by less reliable neural activation. Poster presentation at Neuroscience 2018, the Society for Neuroscience's 48th annual meeting, San Diego, USA
- Khammash, D., **Simmonite, M.**, Polk, T. A., Taylor, S. F. & Meehan, S. K. (2018). Assessing optimal transcranial magnetic stimulation parameters for probing inhibitory function in the visual cortex. Poster presented at Neuroscience 2018, the Society for Neuroscience's 48th annual meeting, San Diego, USA

- Cassady, K. E., Gagnon, H. C., Lalwani, P., **Simmonite, M.**, Foerster, B., Petrou, M., Taylor, S. F., Weissman, D. C., Seidler, R. D. & Polk, T. A. (2018). Sensorimotor network segregation declines with age, is linked to neural distinctiveness, and predicts sensorimotor performance. Platform presentation at Neuroscience 2018, the Society for Neuroscience's 48th annual meeting, San Diego, USA
- Lalwani, P, Gagnon, H., Cassady, K., **Simmonite, M.**, Petrou, M., Foerster, B., Seidler, R., Taylor, S., Weissman, D.H., & Polk, T.A. (2018). Age-related declines in GABA levels in the auditory cortex are associated with neural distinctiveness and auditory perception. Poster presentation at the 25th annual meeting of the Cognitive Neuroscience Society, Boston, Massachusetts
- Cassady, K., Gagnon, H., Lalwani, P., **Simmonite, M.**, Foerster, B., Park, D., Petrou, M., Seidler, R.D., Taylor, S., Weissman, D.H., & Polk, T.A. (2018). Aging in the sensorimotor system: Lower GABA levels are associated with decreased network segregation and impaired behavior. Poster presentation at the 25th annual meeting of the Cognitive Neuroscience Society, Boston, Massachusetts.
- **Simmonite, M.**, Lövdén, M., Lalwani, P., Chamberlain, J. & Polk, T.A. (2017). Independent components of neural activation before and after 100 days of cognitive training. Platform presentation at Neuroscience 2017, the Society for Neuroscience's 47th annual meeting, Washington D.C, USA.
- Lalwani, P.S., Gagnon, H.C., Cassady, K., Chamberlain, J., **Simmonite, M.**, Foerster, B., Petrou, M., Seidler, R., Taylor, S.F., Weissman, D., & Polk, T.A. (2017). Age-related declines in neural distinctiveness and GABA concentrations in auditory cortex. Platform presentation at Neuroscience 2017, the Society for Neuroscience's 47th annual meeting, Washington D.C, USA.
- Cassady, K.E., Gagnon, H., Chamberlain, J., Lalwani, P., **Simmonite, M.**, Foerster, B., Petrou, M., Seidler, R.D., Taylor, S.F., Weissman, D., & Polk, T.A. (2017) Aging in the somatosensory system: Neural distinctiveness, GABA concentration and tactile function. Platform presentation at Neuroscience 2017, the Society for Neuroscience's 47th annual meeting, Washington D.C, USA.
- Chamberlain, J.D., Gagnon, H., Lalwani, P., Cassady, K.E., **Simmonite, M.**, Foerster, B., Petrou, M., Seidler, R.D., Taylor, S.F., Weissman, D., & Polk, T.A. (2017). Neural distinctiveness and GABA concentrations in the aging ventral visual cortex. Poster presentation at Neuroscience 2017, the Society for Neuroscience's 47th annual meeting, Washington D.C, USA.
- **Simmonite, M.**, Gagnon, H., Carp, J., Cassady, K., Chamberlain, J., Lalwani, P., Ossher, L., Foerster, B., Park, D., Petrou, M., Seidler, R., Taylor, S.F., Weissman, D., & Polk, T.A (2017). Age-related reductions of neural distinctiveness and fluid processing ability are associated with lower GABA concentrations in visual, auditory and sensorimotor cortex. Platform talk presented at the 4th International Symposium of MRS of GABA meeting.
- **Simmonite, M.**, Lövdén, M., Lalwani, P., Chamberlain, J. & Polk, T.A. (2017). Independent components of neural activation before and after 100 days of cognitive training. Platform presentation at the 5th biennial Dallas Aging and Cognition Conference, Dallas, USA.
- **Simmonite, M.**, Weng, C & Polk, T. (2016). Independent components of neural activation during reading and their relationship to behavior. Poster presented at Neuroscience 2016, the Society for Neuroscience's 46th Annual meeting, San Diego, USA.
- Polk, T.A., Carp, J.M., Foerster, B.R., Ossher, L., Petrou, M., **Simmonite, M.**, & Weissman, D.H. (2016). GABA levels in occipital cortex decline with age and correlate with fluid processing ability. Poster presented at Neuroscience 2015, the Society for Neuroscience's 46th Annual meeting, San Diego, USA.

- **Simmonite, M.**, Kosson, D.S., Harenski, C.L., Calhoun, V.D., & Kiehl, K.A. (2015). Aberrant paralimbic network activity during the processing of moral violations in criminal psychopathy. Poster accepted for presentation at Neuroscience 2015, the Society for Neuroscience's 45th Annual meeting, Chicago, USA
- **Simmonite, M.**, Kosson, D.S., Kiehl, K.A. and Harenski, C.L., (2015). Hemispheric asymmetries in psychopathy during moral judgement. Oral presentation at the 6th biennial meeting of the Society for the Scientific Study of Psychopathy, Chicago, USA
- Kosson, D.S, **Simmonite, M.**, Harenski, C.L., & Kiehl., K.A., (2015). Brain imaging reveals dynamic cognitive dysfunction specific to left hemisphere activation conditions in psychopathy. Oral presentation at the 6th biennial meeting of the Society for the Scientific Study of Psychopathy, Chicago, USA
- **Simmonite, M.**, Harenski., C.L., Kiehl., K.A., & Kosson, D.S., (2015). Right hemispheric biases in psychopathy during a divided visual field task. Poster presented at the 6th biennial meeting of the Society for the Scientific Study of Psychopathy, Chicago, USA
- Montry, K., **Simmonite, M.**, Steele, V., Brook, M., Kiehl, K, A., & Kosson, D.S., (2015) Investigating the Left hemisphere Activation Hypothesis: An Electrophysiological Study of the N320. Poster presented at the 6th biennial meeting of the Society for the Scientific Study of Psychopathy, Chicago, USA
- Robson, S.E., Hall, E.L., Brookes, M.J., Palaniyappan, L., Liddle, P.F., Stephenson, M.C., **Simmonite, M.**, Liddle, E.B., Skelton, M., Christodoulou, N.G., Qureshi, A., Morris PG (2014) MRS in early stage psychosis: Dependence on tissue fraction correction. Poster presented at joint annual meeting of ISMRM-ESMRMB, Milan, Italy
- Fernandes, C.C., Hall, E.L, Robson, S.E., Kumar, J., Brookes, M.J., Palaniyappan, L., Liddle, P.F, Stephenson, M.C., **Simmonite, M.**, Liddle, E.B., Skelton, M., Christodoulou, N.G., Katshu, M, Oureshi, A., & Morris, P.G. (2014) Glutathione deficit as a pathological indicator in patients with psychosis. Poster presented at the 20th Annual Scientific Meeting of the British Chapter of the International Society for Magnetic Resonance in Medicine (ISMRM)
- Liao, D., Palaniyappan, L., Sreenivasan, K.R., Liddle, P.K., **Simmonite, M.**, Deshpande, G. (2013) Unconstrained Cross-Network Directional Interactions in Schizophrenia. Electronic poster presented at the 21st Annual meeting and Exhibition of the International Society for Magnetic Resonance in Medicine
- **Simmonite, M.**, Doege, K., Park, S.B.G., & Liddle, P.F (2012) Reduced cross-frequency modulation of EEG oscillations both within and between electrodes in schizophrenia. Oral presentation at Neuroscience 2012, the Society for Neuroscience's 42nd Annual meeting, New Orleans, USA.
- Palaniyappan, L., Balain, V., **Simmonite, M.**, Carrol, C., McGuffin, P., Aitchison, K., & Liddle, P.F, (2012) The influence of Disc1 ser704cys polymorphism on the cortical thickness of salience network (insula and anterior cingulate) in psychosis. Poster presented at the 3rd Biennial Schizophrenia International Research Conference, Florence, Italy.
- **Simmonite, M.**, Doege, K., White, T., & Liddle, P.F, (2011) Abnormal Phase-amplitude cross frequency coupling during information processing in schizophrenia. Poster presented at the 13th International Congress on Schizophrenia Research, Colorado Springs, USA.
- **Simmonite, M.**, Bates, A.T., Groom, M.J., Jackson, G, M, Hollis, C., & Liddle, P.F, (2010). Reduced event-related low frequency EEG activity in early onset schizophrenia patients and their unaffected siblings. Poster presented at the 2nd Biennial Schizophrenia International Research Conference, Florence, Italy.

TEACHING INTERESTS

Research Methods and Design • Statistics • Biological Psychology • Cognitive Neuroscience • Neuroscience of Mental Health • Human Neuroimaging Methods • Psychopathology • Computational Methods in Neuroscience

TEACHING EXPERIENCE

Lecturer, Department of Psychology, University of Michigan
Research Methods in Cognitive Neuroscience: Fall 2019

Research Mentor, Department of Psychology, Rosalind Franklin University of Medicine and Science
Responsible for 3 PhD students learning fMRI and EEG theory and analysis methods

Teaching Assistant, Department of Psychology, University of Nottingham
Computer Programming for Stimuli and Analysis (Masters module): Spring 2010
Practical Methods in Psychology: Fall 2009

AWARDS

MRC Early Career Award £18,153
Guarantors of Brain Travel Grant £460
Conference Travel Funding, University of Nottingham £600
Researcher Led Bid, Graduate School, University of Nottingham £1,465
Graduate School Travel Prize, University of Nottingham £300
Conference Travel Funding, University of Nottingham £300
Post Graduate Project Award, University of Nottingham £1500
Institute of Neuroscience, PhD Research Studentship
Universities Federation of Animal Welfare (UFAW) Vacation Scholarship £1,360

PROFESSIONAL ACTIVITIES

Ad-hoc Reviewer

- Neuroimage
- Human Brain Mapping
- International Journal of Psychophysiology
- Clinical EEG and Neuroscience

PROFESSIONAL SOCIETIES

- Society for Neuroscience
- Cognitive Neuroscience Society
- Society for Scientific Study of Psychopathy