

Blake Johnson  
Professor  
School of Psychological Sciences  
Hearing CRC  
**Email:** blake.johnson@mq.edu.au  
**Phone:** 0298506879



## Biography

A 2 minute talk explaining our research on speech production in the developing brain

## Biography

My research programs investigate the brain mechanisms that support perception, cognition, motor control and mental imagery. I use a variety of research tools with emphasis on electrophysiological measures of brain function including magnetoencephalography (MEG) and electroencephalography (EEG).

## Employment

### Honorary Professor

Professor  
School of Psychological Sciences  
Macquarie University  
1 Jan 2022 → present

### Hearing CRC

Macquarie University  
9 Jul 2007 → present

## Research output

### Electroencephalogram signal clustering with convex cooperative games

Dai, C., Wu, J., Pi, D., Cui, L., Johnson, B. & Becker, S. I., Dec 2022, In: IEEE Transactions on Knowledge and Data Engineering. 34, 12, p. 5755-5769 15 p.

### Speech kinematics and coordination measured with an MEG-compatible speech tracking system

Anastasopoulou, I., van Lieshout, P., Cheyne, D. O. & Johnson, B. W., 28 Jun 2022, In: Frontiers in Neurology. 13, p. 1-14 14 p., 828237.

### Brain EEG time-series clustering using maximum-weight clique

Dai, C., Wu, J., Pi, D., Becker, S. I., Cui, L., Zhang, Q. & Johnson, B., Jan 2022, In: IEEE Transactions on Cybernetics. 52, 1, p. 357-371 15 p.

### An efficient and adaptive test of auditory mental imagery

Gelding, R. W., Harrison, P. M. C., Silas, S., Johnson, B. W., Thompson, W. F. & Müllensiefen, D., Apr 2021, In: Psychological Research. 85, 3, p. 1201–1220 20 p.

### Lateralized cerebral processing of abstract linguistic structure in clear and degraded speech

Meng, Q., Li Hegner, Y., Giblin, I., McMahon, C. & Johnson, B. W., Jan 2021, In: Cerebral Cortex. 31, 1, p. 591-602 12 p.

### Individual differences in motor development during early childhood: an MEG study

Johnson, B., Jobst, C., Al-Loos, R., He, W. & Cheyne, D., Sept 2020, In: Developmental Science. 23, 5, 15 p., e12935.

### Gender differences in navigation performance are associated with differential theta and high-gamma activities in the hippocampus and parahippocampus

Pu, Y., Cornwell, B. R., Cheyne, D. & Johnson, B. W., 5 Aug 2020, In: Behavioural Brain Research. 391, p. 1-11 11 p., 112664.

**Theta oscillations support the interface between language and memory**

Pu, Y., Cheyne, D., Sun, Y. & Johnson, B. W., 15 Jul 2020, In: *NeuroImage*. 215, p. 1-12 12 p., 116782.

**CenEEGs: valid EEG selection for classification**

Dai, C., Pi, D., Becker, S. I., Wu, J., Cui, L. & Johnson, B., Mar 2020, In: *ACM Transactions on Knowledge Discovery from Data*. 14, 2, p. 1-25 25 p., 18.

**Musical imagery depends upon coordination of auditory and sensorimotor brain activity**

Gelding, R. W., Thompson, W. F. & Johnson, B. W., 14 Nov 2019, In: *Scientific Reports*. 9, p. 1-13 13 p., 16823.

**Poorer speech reception threshold in noise is associated with lower brain volume in auditory and cognitive processing regions**

Rudner, M., Seeto, M., Keidser, G., Johnson, B. & Rönnberg, J., 26 Apr 2019, In: *Journal of Speech, Language, and Hearing Research*. 62, 4S, p. 1117-1130 14 p.

**Studying brain function in children using magnetoencephalography**

Rapaport, H., Seymour, R. A., Sowman, P. F., Benikos, N., Stylianou, E., Johnson, B. W., Crain, S. & He, W., 1 Apr 2019, In: *Journal of visualized experiments : JoVE*. 146, p. 1-7 7 p., e58909.

**Improved coupled tensor factorization with its applications in health data analysis**

Wu, Q., Wang, J., Fan, J., Xu, G., Wu, J., Johnson, B., Li, X., Do, Q. & Ge, R., 2019, In: *Complexity*. 2019, p. 1-16 16 p., 1574240.

**High-gamma activity in the human hippocampus and parahippocampus during inter-trial rest periods of a virtual navigation task**

Pu, Y., Cornwell, B. R., Cheyne, D. & Johnson, B. W., Sept 2018, In: *NeuroImage*. 178, p. 92-103 12 p.

**Development of face recognition: Dynamic causal modelling of MEG data**

He, W. & Johnson, B. W., 1 Apr 2018, In: *Developmental Cognitive Neuroscience*. 30, p. 13-22 10 p.

**Atypical brain responses to auditory spatial cues in adults with autism spectrum disorder**

Lodhia, V., Hautus, M. J., Johnson, B. W. & Brock, J., Mar 2018, In: *European Journal of Neuroscience*. 47, 6, p. 682-689 8 p.

**Syntactic processing in music and language: parallel abnormalities observed in congenital amusia**

Sun, Y., Lu, X., Ho, H. T., Johnson, B. W., Sammler, D. & Thompson, W. F., 2018, In: *NeuroImage: Clinical*. 19, p. 640-651 12 p.

**The functional role of human right hippocampal/parahippocampal theta rhythm in environmental encoding during virtual spatial navigation**

Pu, Y., Cornwell, B. R., Cheyne, D. & Johnson, B. W., 1 Mar 2017, In: *Human Brain Mapping*. 38, 3, p. 1347-1361 15 p.

**Grey matter volume differences in the left caudate nucleus of people who stutter**

Sowman, P. F., Ryan, M., Johnson, B. W., Savage, G., Crain, S., Harrison, E., Martin, E. & Burianová, H., 1 Jan 2017, In: *Brain and Language*. 164, p. 9-15 7 p.

**The influence of visual information on auditory processing in individuals with congenital amusia: An ERP study**

Lu, X., Ho, H. T., Sun, Y., Johnson, B. W. & Thompson, W. F., 15 Jul 2016, In: *NeuroImage*. 135, p. 142-151 10 p.

**Event-related fields evoked by vocal response inhibition: a comparison of younger and older adults**

Castro-Meneses, L. J., Johnson, B. W. & Sowman, P. F., 1 Jun 2016, In: *Experimental Brain Research*. 234, 6, p. 1525-1535 11 p.

**Adaptive Motor Imagery: A Multimodal Study of Immobilization-Induced Brain Plasticity**

Burianova, H., Sowman, P. F., Marsteller, L., Rich, A. N., Williams, M. A., Savage, G., Al-Janabi, S., De Lissa, P. & Johnson, B. W., 1 Mar 2016, In: *Cerebral Cortex*. 26, 3, p. 1072-1080 9 p.

**Dual temporal encoding mechanisms in human auditory cortex: evidence from MEG and EEG**

Tang, H., Crain, S. & Johnson, B. W., 1 Mar 2016, In: *NeuroImage*. 128, p. 32-43 12 p.

**Sound envelope processing in the developing human brain: a MEG study**

Tang, H., Brock, J. & Johnson, B. W., 1 Feb 2016, In: *Clinical Neurophysiology*. 127, 2, p. 1206-1215 10 p.

**Abnormal time course of low beta modulation in non-fluent preschool children: a magnetoencephalographic study of rhythm tracking**

Etchell, A. C., Ryan, M., Martin, E., Johnson, B. W. & Sowman, P. F., 15 Jan 2016, In: *NeuroImage*. 125, p. 953-963 11 p.

**Vocal response inhibition is enhanced by anodal tDCS over the right prefrontal cortex**

Castro-Meneses, L. J., Johnson, B. W. & Sowman, P. F., 1 Jan 2016, In: *Experimental Brain Research*. 234, 1, p. 185-195 11 p.

**Cortical beta oscillations and motor thresholds differ across the spectrum of post-stroke motor impairment, a preliminary MEG and TMS study**

Shiner, C. T., Tang, H., Johnson, B. W. & McNulty, P. A., 10 Dec 2015, In: *Brain Research*. 1629, p. 26-37 12 p.

**The effects of impulsivity and proactive inhibition on reactive inhibition and the go process: Insights from vocal and manual stop signal tasks**

Castro-Meneses, L. J., Johnson, B. W. & Sowman, P. F., 6 Oct 2015, In: *Frontiers in Human Neuroscience*. 9, p. 1-12 12 p., 529.

**Development of effective connectivity in the core network for face perception**

He, W., Garrido, M. I., Sowman, P. F., Brock, J. & Johnson, B. W., 1 Jun 2015, In: *Human Brain Mapping*. 36, 6, p. 2161-2173 13 p.

**The Pitch Imagery Arrow Task: effects of musical training, vividness, and mental control**

Gelding, R. W., Thompson, W. F. & Johnson, B. W., 25 Mar 2015, In: *PLoS ONE*. 10, 3, p. 1-20 20 p., e0121809.

**Face processing in the brains of pre-school aged children measured with MEG**

He, W., Brock, J. & Johnson, B. W., 1 Feb 2015, In: *NeuroImage*. 106, p. 317-327 11 p.

**Beta oscillations, timing, and stuttering**

Etchell, A. C., Johnson, B. W. & Sowman, P. F., 6 Jan 2015, In: *Frontiers in Human Neuroscience*. 8, p. 1-4 4 p., 1036.

**Deconvolution of magnetic acoustic change complex (mACC)**

Bardy, F., McMahon, C. M., Yau, S. H. & Johnson, B. W., Nov 2014, In: *Clinical Neurophysiology*. 125, 11, p. 2220-2231 12 p.

**Movement-related neuromagnetic fields in preschool age children**

Cheyne, D., Jobst, C., Tesan, G., Crain, S. & Johnson, B., Sept 2014, In: *Human Brain Mapping*. 35, 9, p. 4858-4875 18 p.

**Behavioral and multimodal neuroimaging evidence for a deficit in brain timing networks in stuttering: a hypothesis and theory**

Etchell, A. C., Johnson, B. W. & Sowman, P. F., 25 Jun 2014, In: *Frontiers in Human Neuroscience*. 8, p. 1-10 10 p., 467.

**Lateralization of brain activation in fluent and non-fluent preschool children: a magnetoencephalographic study of picture-naming**

Sowman, P. F., Crain, S., Harrison, E. & Johnson, B. W., 28 May 2014, In: *Frontiers in Human Neuroscience*. 8, p. 1-9 9 p., 354.

**Face-sensitive brain responses measured from a four-year-old child with a custom-sized child MEG system**

He, W., Brock, J. & Johnson, B. W., 30 Jan 2014, In: *Journal of Neuroscience Methods*. 222, p. 213-217 5 p.

**Reduced object related negativity response indicates impaired auditory scene analysis in adults with autistic spectrum disorder**

Lodhia, V., Brock, J., Johnson, B. W. & Hautus, M. J., 2014, In: *PeerJ*. 2, p. 1-15 15 p., e261.

**Brief report: atypical neuromagnetic responses to illusory auditory pitch in children with autism spectrum disorders**

Brock, J., Bzishvili, S., Reid, M., Hautus, M. & Johnson, B. W., Nov 2013, In: *Journal of Autism and Developmental Disorders*. 43, 11, p. 2726-2731 6 p.

**Neuromagnetic imaging reveals timing of volitional and anticipatory motor control in bimanual load lifting**

Ng, T. H. B., Sowman, P. F., Brock, J. & Johnson, B. W., 15 Jun 2013, In: *Behavioural Brain Research*. 247, p. 182-192 11 p.

**Multimodal functional imaging of motor imagery using a novel paradigm**

Burianová, H., Marsteller, L., Sowman, P., Tesan, G., Rich, A. N., Williams, M., Savage, G. & Johnson, B. W., 1 May 2013 , In: *NeuroImage*. 71, p. 50-58 9 p.

**Lateralized auditory brain function in children with normal reading ability and in children with dyslexia**

Johnson, B. W., McArthur, G., Hautus, M., Reid, M., Brock, J., Castles, A. & Crain, S., Mar 2013, In: *Neuropsychologia*. 51 , 4, p. 633-641 9 p.

**Neuromagnetic brain activity associated with anticipatory postural adjustments for bimanual load lifting**

Ng, T. H. B., Sowman, P. F., Brock, J. & Johnson, B. W., 1 Feb 2013, In: *NeuroImage*. 66, p. 343-352 10 p.

**Two routes to expertise in mental rotation**

Provost, A., Johnson, B., Karayanidis, F., Brown, S. D. & Heathcote, A., 2013, In: *Cognitive Science*. 37, 7, p. 1321-1342 22 p.

**Reduced activation of left orbitofrontal cortex precedes blocked vocalization: A magnetoencephalographic study**

Sowman, P. F., Crain, S., Harrison, E. & Johnson, B. W., Dec 2012, In: *Journal of Fluency Disorders*. 37, 4, p. 359-365 7 p.

**Self-initiation and temporal cueing of monaural tones reduce the auditory N1 and P2**

Sowman, P. F., Kuusik, A. & Johnson, B. W., Oct 2012, In: *Experimental Brain Research*. 222, 1-2, p. 149-157 9 p.

**How the brain responds to any: An MEG study**

Tesan, G., Johnson, B. W. & Crain, S., Jan 2012, In: *Brain and Language*. 120, 1, p. 66-72 7 p.

**"Shut up!" An electrophysiological study investigating the neural correlates of vocal inhibition**

Etchell, A. C., Sowman, P. F. & Johnson, B. W., Jan 2012, In: *Neuropsychologia*. 50, 1, p. 129-138 10 p.

**Premovement brain activity in a bimanual load-lifting task**

Ng, T. H. B., Sowman, P. F., Brock, J. & Johnson, B. W., Jan 2011, In: *Experimental Brain Research*. 208, 2, p. 189-201 13 p.

**Processing of binaural spatial information in human auditory cortex: Neuromagnetic responses to interaural timing and level differences**

Johnson, B. W. & Hautus, M. J., Jul 2010, In: *Neuropsychologia*. 48, 9, p. 2610-2619 10 p.

**Measurement of brain function in pre-school children using a custom sized whole-head MEG sensor array**

Johnson, B. W., Crain, S., Thornton, R., Tesan, G. & Reid, M., Mar 2010, In: *Clinical Neurophysiology*. 121, 3, p. 340-349 10 p.

**Measurement of neuromagnetic brain function in pre-school children with custom sized MEG**

Tesan, G., Johnson, B. W., Reid, M., Thornton, R. & Crain, S., Feb 2010, In: *Journal of visualized experiments : JoVE*. 36 , p. 1-4 4 p., e1693.

**Event-related potentials for interaural time differences and spectral cues**

Hautus, M. J., Johnson, B. W. & Colling, L. J., 1 Jul 2009, In: *NeuroReport*. 20, 10, p. 951-956 6 p.

**Identifying treatment effects in multi-channel measurements in electroencephalographic studies: Multivariate permutation tests and multiple comparisons**

Wheldon, M. C., Anderson, M. J. & Johnson, B. W., Dec 2007, In: *Australian and New Zealand Journal of Statistics*. 49, 4, p. 397-413 17 p.

Sequential processing of interaural timing differences for sound source segregation and spatial localization: Evidence from event-related cortical potentials

Johnson, B. W., Hautus, M. J., Duff, D. J. & Clapp, W. C., Jul 2007, In: *Psychophysiology*. 44, 4, p. 541-551 11 p.

Neuromagnetic and neuroelectric oscillatory responses to acoustic stimulation with broadband noise

Johnson, B. W., Muthukumaraswamy, S. D., Gaetz, W. C. & Cheyne, D. O., Jun 2007, In: *International Congress Series*. 1300, p. 41-44 4 p.

Graded cue information in dichotic pitch: Effects on event-related potentials

Clapp, W. C., Johnson, B. W. & Hautus, M. J., Mar 2007, In: *NeuroReport*. 18, 4, p. 365-368 4 p.

Cerebral processes during visuo-motor imagery of hands

Thayer, Z. C. & Johnson, B. W., Jul 2006, In: *Psychophysiology*. 43, 4, p. 401-412 12 p.

Neural processing of observed oro-facial movements reflects multiple action encoding strategies in the human brain

Muthukumaraswamy, S. D., Johnson, B. W., Gaetz, W. C. & Cheyne, D. O., 3 Feb 2006, In: *Brain Research*. 1071, 1, p. 105-112 8 p.

Differential cortical processing of location and pitch changes in dichotic pitch

Johnson, B. W., Hautus, M. J., Hayns, A. L. & Fitzgibbon, B. M., 2006, In: *NeuroReport*. 17, 4, p. 389-393 5 p.

Long-term potentiation of human visual evoked responses

Teyler, T. J., Hamm, J. P., Clapp, W. C., Johnson, B. W., Corballis, M. C. & Kirk, I. J., Apr 2005, In: *European Journal of Neuroscience*. 21, 7, p. 2045-2050 6 p.

Object-related brain potentials associated with the perceptual segregation of a dichotically embedded pitch

Hautus, M. J. & Johnson, B. W., Jan 2005, In: *Journal of the Acoustical Society of America*. 117, 1, p. 275-280 6 p.

Primary motor cortex activation during action observation revealed by wavelet analysis of the EEG

Muthukumaraswamy, S. D. & Johnson, B. W., Aug 2004, In: *Clinical Neurophysiology*. 115, 8, p. 1760-1766 7 p.

Mu rhythm modulation during observation of an object-directed grasp

Muthukumaraswamy, S. D., Johnson, B. W. & McNair, N. A., Apr 2004, In: *Cognitive Brain Research*. 19, 2, p. 195-201 7 p.

Changes in rolandic mu rhythm during observation of a precision grip  
Muthukumaraswamy, S. D. & Johnson, B. W., Jan 2004, In: *Psychophysiology*. 41, 1, p. 152-156 5 p.

**Modulation of neuromagnetic oscillatory activity during the observation of oro-facial movements**  
Muthukumaraswamy, S. D., Johnson, B. W., Gaetz, W. C. & Cheyne, D. O., 2004, In: *Neurology & clinical neurophysiology : NCN*. 2004, p. 21 p.

One good turn deserves another: An event-related brain potential study of rotated mirror-normal letter discriminations  
Hamm, J. P., Johnson, B. W. & Corballis, M. C., 2004, In: *Neuropsychologia*. 42, 6, p. 810-820 11 p.

Neural activity associated with binaural processes for the perceptual segregation of pitch  
Johnson, B. W., Hautus, M. & Clapp, W. C., Dec 2003, In: *Clinical Neurophysiology*. 114, 12, p. 2245-2250 6 p.

Turn that frown upside down: ERP effects of Thatcherization of misorientated faces  
Milivojevic, B., Clapp, W. C., Johnson, B. W. & Corballis, M. C., Nov 2003, In: *Psychophysiology*. 40, 6, p. 967-978 12 p.

A high density ERP comparison of mental rotation and mental size transformation  
Muthukumaraswamy, S. D., Johnson, B. W. & Hamm, J. P., Jul 2003, In: *Brain and Cognition*. 52, 2, p. 271-280 10 p.

High-density EEG mapping during general anaesthesia with Xenon and propofol: A pilot study  
Johnson, B. W., Sleigh, J. W., Kirk, I. J. & Williams, M. L., Apr 2003, In: *Anaesthesia and Intensive Care*. 31, 2, p. 155-163 9 p.

Non-identical neural mechanisms for two types of mental transformation: Event-related potentials during mental rotation and mental paper folding  
Milivojevic, B., Johnson, B. W., Hamm, J. P. & Corballis, M. C., 2003, In: *Neuropsychologia*. 41, 10, p. 1345-1356 12 p.

Cerebral asymmetry for mental rotation: Effects of response hand, handedness and gender  
Johnson, B. W., McKenzie, K. J. & Hamm, J. P., 28 Oct 2002, In: *NeuroReport*. 13, 15, p. 1929-1932 4 p.

Comparison of the N300 and N400 ERPs to picture stimuli in congruent and incongruent contexts  
Hamm, J. P., Johnson, B. W. & Kirk, I. J., 2002, In: *Clinical Neurophysiology*. 113, 8, p. 1339-1350 12 p.

Perceptual and motor mechanisms for mental rotation of human hands  
Thayer, Z. C., Johnson, B. W., Corballis, M. C. & Hamm, J. P., 16 Nov 2001, In: *NeuroReport*. 12, 16, p. 3433-3437 5 p.

High-density mapping in an N400 paradigm: Evidence for bilateral temporal lobe generators  
Johnson, B. W. & Hamm, J. P., 1 Mar 2000, In: *Clinical Neurophysiology*. 111, 3, p. 532-545 14 p.

Use of multiple dipole analysis for the classification of benign rolandic epilepsy  
Weinberg, H., Wong, P. K. H., Crisp, D., Johnson, B. & Cheyne, D., Sept 1990, In: *Brain Topography*. 3, 1, p. 183-190 8 p.

Functional imaging of Brain responses to repetitive sensory stimulation: Sources estimated from EEG and SPECT  
Weinberg, H., Johnson, B., Cohen, P., Crisp, D. & Robertson, A., Sept 1989, In: *Brain Topography*. 2, 1-2, p. 171-180 10 p.

Topographic distribution of the 40 Hz auditory evoked-related potential in normal and aged subjects  
Johnson, B. W., Weinberg, H., Ribary, U., Cheyne, D. O. & Ancill, R., Dec 1988, In: *Brain Topography*. 1, 2, p. 117-121 5 p.