

**Drs Stefan Bode & Carsten Murawski**

Decision Neuroscience  
Laboratory

**Melbourne School of  
Psychological Sciences**



## **Publications by current members of the Decision Neuroscience Lab**

### **2015**

- Bennett D, Murawski C, Bode S. Single-trial event-related potential correlates of belief updating. *eNeuro* 2015; in Press.
- Simmank J, Bode S, Murawski C, Horstmann A. Incidental rewarding cues influence economic decision-making in obesity. *Frontiers in Behavioral Neuroscience* 2015; **9**: 278.
- Bossaerts P, Murawski C. From behavioural economics to neuroeconomics to decision neuroscience: the ascent of biology in research on human decision making. *Current Opinion in Behavioral Sciences* 2015; **4**: 37-42.
- Morawetz C, Bode S, Baudewig J, Kirilina E, Heekeren HK. Changes in Effective Connectivity Between Dorsal and Ventral Prefrontal Regions Moderate Emotion Regulation. *Cerebral Cortex* 2015; in Press.

### **2014**

- Bode S, Murawski C, Soon CS, Bode P, Stahl J, Smith P. Demystifying "free will": The role of contextual information in explaining predictive brain activity for internal decisions. *Neuroscience & Biobehavioral Reviews* 2014; **47**: 636-645.
- Bode S, Bennett DB, Stahl J, Murawski, C. Distributed patterns of event-related potentials predict subsequent ratings of abstract stimulus attributes. *PLoS ONE* 2014; **9**(10): e109070.
- Corbett EA, Koerding KP, Perreault EJ. Dealing with target uncertainty in a reaching control interface. *PLoS ONE* 2014; **9**(1): e86811.

### **2013**

- Burnett J, Davis K, Murawski C, Wilkins R, Wilkinson N. Measuring retirement savings adequacy in Australia. *JASSA* 2013; **4**: 28-35.
- Corbett EA, Ethier C, Oby ER, Koerding KP, Perreault EJ, Miller LE. Advanced user interfaces for upper limb FES. In: Introduction to neural engineering for motor rehabilitation (Eds. Farina, Jensen and Akay). .2013; IEEE/Wiley Press, Vol. 40, p. 377-420.
- Corbett EA, Koerding KP, Perreault EJ. Real-time evaluation of a non-invasive neuroprosthetic interface for control of reach. *IEEE Transactions on Neural Systems and Rehabilitation Engineering* 2013; **21**(4): 674-683.
- Bode S, Bogler C, Haynes JD. Similar neural mechanisms for guesses and free decisions. *Neuroimage* 2013; **65**(2): 456-465.
- Bogler C, Bode S, Haynes JD. Orientation pop-out processing in human visual cortex. *Neuroimage* 2013; **81**: 73-80.
- Gibson R, Murawski C. Margining in derivatives markets and the stability of the banking sector. *Journal of Banking & Finance* 2013; **37**(4): 1119-1132.
- Soon, CS, He AH, Bode S, Haynes JD. Predicting free choices for abstract intentions. *Proceedings of the National Academy of Sciences of the USA* 2013; **110**: 6217-6222.
- Krüger D, Klapötke S, Bode S, Mattler U. Neural correlates of control operations in inverse priming with relevant and irrelevant masks. *Neuroimage* 2013; **64**(1): 197-208.



## 2012

- Armstrong J, Murawski C. Merchants of Light - Research for the Future. *Griffith Review* 2012; 36.
- Bode S, Bogler C, Soon CS, Haynes JD. The neural encoding of guesses in the human brain. *Neuroimage* 2012; **59**(2): 1924-1931.
- Bode S, Sewell D, Lilburn S, Forte J, Smith PL, Stahl J. Predicting perceptual decision biases from early brain activity. *The Journal of Neuroscience* 2012; **32**(36): 12488-12498.
- Corbett EA, Perreault EJ, Koerding KP. Decoding with Limited Neural Data: a Mixture of Time-warped Trajectory Models for Directional Reaches. *Journal of Neural Engineering* 2012; **9**(3): 036002.
- Murawski C, Harris PG, Bode S, Domínguez D. JF, Egan GF. Led into temptation? Rewarding brand logos bias the neural encoding of economic decisions. *PLoS ONE* 2012; **7**(3): e34155.
- Heinze J, Anders S, Bode S, Bogler C, Chen Y, Cichy RM, Hackmack K, Kahnt T, Kalberlah C, Reverberi C, Soon SC, Tusche A, Weygandt M, Haynes JD. Multivariate decoding of fMRI data – Towards a content-based cognitive neuroscience. *e-Neuroforum* 2012; **3**(1), 1-16.

## 2011

- Bogler C, Bode S, Haynes JD. Decoding successive computational stages of saliency processing. *Current Biology* 2011; **21**(19): 1667-1671.
- Bode S, He AH, Soon CS, Trampel R, Turner R, Haynes JD. Tracking the unconscious generation of free decisions using ultra-high field fMRI. *PLoS ONE* 2011; **6**(6): e21612. Corbett EA, Perreault EJ, Kuiken TA. A comparison of EMG and force as interfaces for prosthetic control. *Journal of Rehabilitation Research and Development* 2011; **48**(6): 629-642.
- Murawski, C. Neuroeconomics. Investigating the Neurobiology of Choice. *Australian Economic Review* 2011; **44**: 215-224.
- Müller AD, Bode S, Myer L, Stahl J, von Steinbüchel N. Predictors of adherence to antiretroviral treatment and therapeutic success among children in South Africa. *AIDS Care* 2011; **23**(2), 129-138.

## 2010

- Bode S. From stimuli to motor responses: Decoding rules and decision mechanisms in the human brain. Leipzig: Max Planck Institute for Human Cognitive and Brain Sciences 2010; 123 (MPI Series in Human Cognitive and Brain Sciences).
- Tusche A, Bode S, Haynes JD. Neural responses to unattended products predict later consumer choices. *The Journal of Neuroscience* 2010; **30**(23), 8024-8031.

## 2009

- Bode S, Haynes JD. Decoding sequential stages of task preparation in the human brain. *Neuroimage* 2009; **45**(2): 606-613.

## 2008

- Mueller AD, Bode S, Myer L, Roux P, von Steinbuechel N. Electronic measurement of adherence to paediatric antiretroviral therapy in South Africa. *The Paediatric Infectious Disease Journal* 2008; **27**(3): 257-262.

## **Presentations and posters by members of the Decision Neuroscience Lab**

### **2014**

- Murawski C. (2014). From Decision Neuroscience to Public Policy. Problem Gambling: An Inter-disciplinary Dialogue between Neuroscientists, Clinicians and Policy Makers. Melbourne, Australia.
- Morawetz C, Bode S, Baudewig J, Heekeren H (submitted). Neural representations of emotion regulation strategies: Prediction of successful reappraisal use. Organisation for Human Brain Mapping, Hamburg, Germany.
- Morawetz C, Bode S, Baudewig J, Kirilina E, Heekeren H (accepted). Neural representations of emotion regulation strategies. 11th Meeting of the Austrian Society for Psychology (GP), Vienna, Austria.
- Murawski C, Bode S (2014). Activation profiles in number processing brain regions predict discount rates in intertemporal choice. Society for Neuroeconomics annual meeting, Miami, United States.
- Bennett DB, Murawski C, Bode S (2014). Belief updating is indexed by single-trial P3 amplitude: a neurocognitive modelling approach to EEG. 12th International Cognitive Neuroscience Conference, Brisbane, Queensland, Australia.
- Bode S, Bennett DB, Stahl J, Murawski C (2014). Patterns of event-related potentials reflect fast unconscious semantic analyses of how images relate to subjective connotations of time. Association for the Scientific Studies of Consciousness, Brisbane, Queensland, Australia.
- Burnett J, Davis K, Murawski C, Wilkins R, Wilkinson N (2014). Measuring adequacy of retirement savings in Australia. 22nd Colloquium of Superannuation Researchers, University of New South Wales, Sydney, Australia.
- Murawski, C (2014). Financing our futures. 10th Economic and Social Outlook Conference, Melbourne, Australia.
- Bennett DB, Murawski C, Bode S (2014). Bayesian modeling of belief updating in reinforcement learning. Oral presentation. Australian Mathematical Psychology Conference, Canberra, ACT, Australia.

### **2013**

- Bennett D, Murawski C, Bode S (2013). Single-Trial P300 amplitudes index feedback information in reinforcement learning. Poster presentation. The 4th Australasian Cognitive Neuroscience Conference, Melbourne, VIC, Australia.
- Bennett D, Murawski C, Bode S (2013). Decoding distinct dimensions of feedback in reinforcement learning: an electroencephalography study. Poster presentation. Students of Brain Research Conference, Melbourne, VIC, Australia.
- Bennett D, Murawski C, Bode S (2013). Decoding feedback value and information from EEG signals. Poster presentation. Innovative Methods in Neuroimaging, Perception in Action Research Workshop. Macquarie University Sydney, VIC, Australia.
- Bode S, Stahl J (2013). Investigating error processing by decoding patterns of event-related potentials. Symposium presentation. The 4th Australasian Cognitive Neuroscience Conference, Melbourne, VIC, Australia.
- Bode S, Bennett D, Stahl J, Murawski C (2013). Predicting implicit abstract stimulus attributes from patterns of eventrelated potentials. Poster

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- presentation. The 4th Australasian Cognitive Neuroscience Conference, Melbourne, VIC, Australia.
- Bode S (2013). Informing decision-making models by decoding patterns of brain activity. Queensland Brain Institute Seminar, University of Queensland, Brisbane, Australia.
  - Bode S (2013). Predicting decisions and decision-errors from EEG and fMRI signals using multivariate pattern analysis. Seminar Program of the Department of Optometry and Vision Sciences, The University of Melbourne, Australia.
  - Bode S (2013). Informing models of human decision-making by decoding patterns of brain activity. Special Colloquium Melbourne School of Psychological Sciences, The University of Melbourne, Australia.
  - Bode S (2013). Extracting information from patterns of event-related potentials: Using MVPA for EEG data. Innovative Methods in Neuroimaging, Perception in Action Research Workshop. Macquarie University Sydney, Australia.
  - Bode S (2013). 'Mind reading' - A dialog between neuroscience and philosophy about the (im)possibility of one of the oldest dreams of mankind. Forum for Culture and Science, Hannover, Germany
  - Bode S (2013). Decoding decisions and post-decision errors from multivariate patterns of fMRI and EEG activity. Colloquium University of Newcastle, Australia.
  - Bode S (2013). Predicting decisions and post-decision errors from multivariate patterns of fMRI and EEG activity. Colloquium Macquarie University Sydney, Australia.
  - Bode S, Stahl J (2013). ERP-based multivariate pattern classification predicts errors before an overt response is executed. Poster presentation. Organisation for Human Brain Mapping, Seattle, WA, USA.
  - Brown S, Murawski C (2013). The riskiness of household portfolios over the life-cycle. Research Seminar, Department Publications | Decision Neuroscience Laboratory <http://dlab.unimelb.edu.au/publications> 3 of 6 4/12/2015 11:35 am
  - Burnett C, Davis K, Murawski C, Wilkins R, Wilkinson N (2013). Measuring retirement savings adequacy in Australia. Melbourne Money and Finance Conference, Brighton, VIC, Australia.
  - Corbett EA (2013). Development of a multi-source, body-signal decoder. Invited talk. Heeger Lab, Center for Neural Systems, New York University, New York NY.
  - Corbett EA, Sachs NA, Perreault EJ (2013). EMG control of robotic reaching by people with tetraplegia improved through proprioceptive and force feedback. Conference paper. 6th International IEEE/EMBS Conference on Neural Engineering, San Diego CA.
  - Corbett EA, Sachs NA, Perreault EJ (2013). The importance of congruent sensory feedback in EMG-controlled assisted reaching for people with tetraplegia. Poster presentation. 43rd Annual Meeting of the Society for Neuroscience, San Diego, CA.
  - Murawski C (2013). The economics of the long-term. Symposium 'Renaissance of the Humanities', Ormond College, The University of Melbourne, VIC, Australia.
  - Murawski C (2013). Measuring retirement savings adequacy. Research seminar, Department of Finance, The University of Melbourne, VIC, Australia.
  - Stahl J, Bierbrauer A, Gommann J, Lenk K, Bode S (2013). Error detection in a force-production task: Testing the force-unit monitoring model. Oral presentation. The 4th Australasian Cognitive Neuroscience Conference, Melbourne, VIC, Australia.

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- Stahl J, Bode S (2013). Perspectives on error processing. A methodological update. Symposium presentation. Symposium of the University of Cologne and the University of Aachen, Germany.
- Stahl J, Schmidt-Samoa C, Bode S, Dechent P, Barke A (2013). Neuronale Korrelate perfektionismusspezifischer Fehlerverarbeitung. Eine ereigniskorrelierte fMRT-Studie (Neural correlates of perfectionism-specific error processing. An event-related fMRI study). Poster presentation. Psychologie & Gehirn (W, rzburg, Germany).
- Thio J, Murawski C, Bode S (2013). The effects of context priming on intertemporal decision-making. Poster presentation. The 4th Australasian Cognitive Neuroscience Conference, Melbourne, VIC, Australia.
- Woolgar A, Bode S, Golland P (2013). Confounds in Multivoxel Pattern Analysis: what should we do about reaction time differences? Oral presentation. Innovative Methods in Neuroimaging, Perception in Action Research Workshop. Macquarie University Sydney, Australia.

## 2012

- Bode S, Sewell D, Lilburn S, Forte JD, Smith PL, Stahl J (2012). Early choice-predictive EEG signals reflect starting point bias in evidence accumulation. Oral presentation. XXIXI International Congress of Psychology (Cape Town, South Africa).
  - Bode S, Sewell D, Lilburn S, Forte JD, Stahl J, Smith PL (2012). Early choice-predictive EEG signals reflect starting point bias in evidence accumulation. Oral presentation. Australian Mathematical Psychology Conference (Adelaide, WA, Australia).
  - Bode S, Stahl J (2012). ERP-based multivariate pattern classification predicts errors before an overt response is executed. Oral presentation. The 3rd Australasian Cognitive Neuroscience Conference (Brisbane, QL, Australia).
  - Cichy RM, Bode S, Sterzer P, Haynes JD (2012). Object recognition under little and no visibility. Poster presentation. Vision Sciences Society (Naples, Italy).
  - Corbett EA (2012). Fusion of Gaze and EMG for a Reaching Neuroprosthesis. Invited talk. BME Research Day, Department of Biomedical Engineering, Northwestern University, Evanston IL.
  - Corbett EA, Koerding KP, Perreault EJ (2012). Real-time Fusion of Gaze and EMG for a Reaching Neuroprosthesis. Conference paper. 34th Annual International Conference of the IEEE Engineering in Medicine & Biology Society, San Diego CA.
  - Corbett EA, Koerding KP, Perreault EJ (2012). Real-time Fusion of Gaze and EMG for a Reaching Neuroprosthesis. Oral presentation. 34th Annual International Conference of the IEEE Engineering in Medicine & Biology Society, San Diego CA.
  - Corbett EA, Sachs NA, Koerding KP, Perreault EJ (2012). Combined Gaze and EMG Reaching Interface for People with Tetraplegia. IEEE EMB/CAS/SMC Workshop on Brain-Machine-Body-Interfaces, San Diego CA.
  - Corbett EA, Sachs NA, Koerding KP, Perreault EJ (2012). Combined Gaze and EMG Reaching Interface for People with Tetraplegia. Movement and Rehabilitation Sciences Training Day, Northwestern University, Chicago IL.
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- Morawetz C, Bode S, Baudewig J, Heekeren HR (2012). Skydivers and emotion regulation: training the amygdale. Poster presentation. Organisation for Human Brain Mapping (Beijing, China).

## **2011**

- Bode S. Predicting choices from brain activation. (2011). Symposium presentation. Australasian Cognitive Neurosciences Conference, 9th December 2011 (Sydney, NSW, Australia).
- Bode S, Murawski C, Harris PG, Dominguez D. JF, Egan GF (2011). Oral presentation. Led into temptation? Subliminally presented reward cues bias incidental economic decisions. Organisation for Human Brain Mapping (Quebec City, Canada).
- Bode S, Murawski C, Harris PG, Dominguez D. JF, Egan GF (2011). Oral presentation. Subliminally presented reward cues bias incidental economic decisions and the encoding of subjective values in the brain. Association for the Scientific Studies of Consciousness (Kyoto, Japan).
- Corbett EA, Koerding KP, Perreault EJ (2011). Reaching neuroprostheses: decoding with noisy gaze information and variable speeds. Movement and Rehabilitation Sciences Training Day, Northwestern University, Chicago IL.
- Corbett EA, Koerding KP, Perreault EJ (2011). Towards a closed-loop, multi-sensor decoder. Oral presentation. Chicago Functional Electrical Stimulation Meeting, Northwestern University, Chicago IL.
- Corbett EA, Perreault EJ, Koerding KP (2011). Time-warping and sensor fusion to improve reconstruction of reaching movements. Oral presentation. 2nd Annual Conference of the IFESS (UK and Ireland Chapter), Dublin, Ireland.
- Corbett EA, Sachs NA, Koerding KP, Perreault EJ (2011). Dealing with Noisy Gaze Information for a Target-dependant Neural Decoder. Oral presentation. 33rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society, Boston MA.
- Murawski C, Harris PG, Bode S, Dominguez D. JF, Egan GF (2011). Oral presentation. Subliminally presented reward cues bias the neural encoding of economic decisions. Cognitive Neuroscience Symposium, The University of Melbourne, Australia.
- Sachs NA, Corbett NA, Miller LE, Perreault EJ (2011). Continuous Movement Decoding Using a Target-dependent Model with EMG Inputs. Conference paper. 33rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society, Boston MA.

## **2010**

- Corbett EA, Perreault EJ, Koerding KP (2010). Mixture of time-warped trajectory models for movement decoding. Advances in Neural Information Processing Systems 23, Vancouver BC.
- Corbett EA, Perreault EJ, Koerding KP (2010). Improving movement trajectory models through time-warping and multisensor fusion. DARPA Neuro Engineering Science and Technology (NEST) Symposium, San Diego CA.

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- Corbett EA, Perreault EJ, Koerding KP (2010). Mixture of time-warped trajectory models for movement decoding. Oral presentation. Sensory Motor Performance Program Seminar Series, Rehabilitation Institute of Chicago, Chicago IL.
- Harris PG, Murawski C, Bode S, Dominguez D. JF, Egan GF (2010). Poster presentation. Brand reactions bias incidental decision-making. Neuroeconomics: Decision Making and the Brain ñ Society for Neuroeconomics (Evanston, IL, USA).
- Murawski C, Harris PG, Bode S, Dominguez D. JF, Egan GF (2010). Poster presentation. Brand reactions bias incidental decision-making. Computations, Decisions, and Movement (Schloss Raischholzhausen, Germany).

## **2009**

- Bode S, Bogler C, Haynes JD (2009). Two modes of perceptual decision making with and without awareness. Oral Presentation. Berlin Brain Days (Berlin, Germany).
- Bode S, Bogler C, Soon SC, Haynes JD (2009). Differential encoding of mechanisms for human decision making. Poster presentation. Association for the Scientific Studies of Consciousness (Berlin, Germany).
- Bode S, Bogler C, Walter S, Haynes JD (2009). Comparing mechanisms for decision making using multivariate decoding. Poster presentation. Organisation for Human Brain Mapping (San Francisco, CA, USA).
- Bogler C, Bode S, Haynes JD (2009). Multivariate decoding reveals successive computational stages of saliency processing. Poster presentation. Organisation for Human Brain Mapping (San Francisco, CA, USA).
- Schafmeister F, Bode S, Gibbons H, Kirchberg W, Menrad N, Blomeyer L, Hartmann M, von Steinbuechel N (2009). Development of a standardized stimulus-set for the investigation of semantic memory. Poster Presentation. Gehirn & Gesundheit, Deutsche Gesellschaft fuer Medizinische Psychologie (Goettingen, Germany).

## **2008**

- Bode S, Haynes JD (2008). Neural encoding of object categories with and without awareness: A challenge for signal detection models of human decision making.
- Mueller AD, Bode S, von Steinbuechel N, Myer L (2008). Predictors of antiretroviral treatment adherence and therapeutic success among children in Cape Town, South Africa. Poster presentation. XVII International AIDS Conference (Mexico City, Mexico).

## **2007**

- Bode S, Haynes JD (2007). Decoding task-sets from intraparietal sulcus and prefrontal cortex using multivariate pattern classification. Poster presentation. 3rd Bernstein Center for Computational Neuroscience Symposium (Göttingen, Germany).
- Bode S, Haynes JD (2007). Encoding of sensory stimuli and task sets in prefrontal cortex. Poster presentation. Organisation for Human Brain Mapping (Chicago, IL, USA).
- Mueller AD, Myer L, Jaspan HB, Bode S, Roux P, von Steinbuechel N (2007). Paediatric adherence in South Africa measured by Medication Event Monitoring

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System and its effect on treatment efficacy. Oral presentation. 2nd International Conference on HIV Treatment Adherence (New Jersey City, NY, USA).

## **2006**

- Bode S, Jaencke L (2006). Strategy-specific involvement of the primary motor cortex in mental rotation? A TMS-Study. Poster presentation. Psychologie & Gehirn (Dresden, Germany).
- Mueller AD, Bode S, Myer L, von Steinbuechel N (2006). Monitoring adherence to liquid antiretroviral medication in South African children - results and challenges. Oral presentation. 10th European Symposium on Patient Compliance and Persistence (Bonn, Germany).
- Mueller AD, Myer L, Jaspan HB, Bode S, Roux P, von Steinbuechel N (2006). Innovative use of electronic measurements for adherence to liquid antiretrovirals in an urban South African paediatric HIV clinic. Poster presentation. Priorities in AIDS Treatment and Care (Cape Town, South Africa).
- Tilch HL, Richter S, Bode S, Stiens G, von Steinbuechel N, Huether G (2006). Therapeutic effects of individual favorite music in elderly people. Poster presentation. 48. Tagung experimentell arbeitender Psychologen (Mainz, Germany).