



**Basic Neuroscience  
for Organisational Research and Economics  
Module II**

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*Postgraduate Seminar  
TUM Graduate School of Management  
Winter term 2018/2019*

## **I. Seminar Description**

This seminar aims at teaching the basics of cognitive neuroscience and how it is applied more or less meaningfully in management & organisational research, and economics. We will extend the knowledge students acquired in the first module of this course and focus on inventing and writing concrete research proposals applying neuroscientific methodology to our respective fields of research. Graduate students will be enabled to understand neuroscientific methods in depth, to widen their horizon regarding neuroscientific applications in organisational research, and to transfer their knowledge to their own research. This course can also be attended by graduate students who did not attend Module I.

## **II. Seminar Objectives**

At the end of the seminar graduate students will be able:

1. ...to evaluate if, when, and how it is meaningful to include neuroscientific methods into the methodology of organisational research.
2. ... to debate the pros and cons of neuroscience in behavioural science.
3. ... to reflect on a variety of neuroscientific applications in management & organisational research, and economics.
4. ... to directly transfer their newly acquired skills to their own field of research.
5. ... to write a good research proposal (a skill that will transfer to grant writing).

The seminar objectives will be achieved by: attending and participating actively in class; reading and discussing the assigned materials; and drafting and presenting a research proposal.

## **III. Sessions and didactic elements**

The seminar will include four sessions (first session a 4.5 hours, three further sessions a 6 hours).

### Session I: *The why and when in social neuroscience*

During this session, we will discuss when and why it can be useful to apply neuroscientific methodology to behavioural science. We will unravel the empirical potential of neuroscientific methodologies, while not neglecting their limitations. The instructor will present an overview over various neuroscientific methodologies. We will discuss some basic advice on how to come up with a poignant research proposal.

During our first session, we will, furthermore, clarify some organisational aspects of the course.

## Session II

Session will be used to introduce the concept of peer-review. We will focus on how to complete helpful, effective and ethical reviews of a colleague's work. In the afternoon, graduate students will review their peers research proposals.

## Session III to IV

In session III and IV, we will interactively discuss the research proposals brought forward by the graduate students.

## **IV. Evaluation of Learning**

The main delivery is the submission of a written research proposal, which applies the usage of neuroscientific methodologies to the respective field of research of the graduate student. Each graduate student will come up with their own proposal and students will give each other peer-feedback, before presenting the proposals to the group.

## **V. Grading Policy**

Assuming that the postgraduate students participate regularly and actively in class and prepare their proposals, they will receive a letter of participation, passing the seminar.

## **VI. Seminar Schedule**

Session I: 03.12.2018, 9:30-12:00 & 13:00-15:00, Location (t.b.d.)

Session II: 12.12.2018, 9:00-12:00 & 13:00-16:00, Location (t.b.d.)

Session III: 17.01.2019, 9:00-12:00 & 13:00-16:00, Location (t.b.d.)

Session IV: 18.01.2019, 9:00-12:00 & 13:00-16:00, Location (t.b.d.)

## **VII. Readings**

Readings and further materials will be announced during the 1<sup>st</sup> session.

## Readings that can be used as inspiration for the research proposals:

Cacioppo, J. T., Berntson, G. G., Sheridan, J. F., & McClintock, M. K. (2000). Multilevel integrative analyses of human behavior: social neuroscience and the complementing nature of social and biological approaches. *Psychological bulletin*, 126(6), 829.

### Non-invasive brain stimulation

#### *Methodological papers*

Nitsche, M. A., Cohen, L. G., Wassermann, E. M., Priori, A., Lang, N., Antal, A., ... & Pascual-Leone, A. (2008). Transcranial direct current stimulation: state of the art 2008. *Brain Stimulation: Basic, Translational, and Clinical Research in Neuromodulation*, 1(3), 206-223.

Hallett, M. (2007). Transcranial magnetic stimulation: a primer. *Neuron*, 55(2), 187-199.

Robertson, E. M., Theoret, H., & Pascual-Leone, A. (2003). Studies in cognition: the problems solved and created by transcranial magnetic stimulation. *Journal of Cognitive Neuroscience*, 15(7), 948-960.

#### *Empirical papers*

Knoch, D., Pascual-Leone, A., Meyer, K., Treyer, V., & Fehr, E. (2006). Diminishing reciprocal fairness by disrupting the right prefrontal cortex. *Science*, 312, 829-832.

Strang, S., Gross, J., Schuhmann, T., Riedl, A., Weber, B., & Sack, A. (2014). Be nice if you have to-The neurobiological roots of strategic fairness. *Social cognitive and affective neuroscience*, nsu114.

Gross, J., Emmerling, F., Vostroknutov, A., Sack, A. T. (in press). Manipulation of Pro-Sociality and Rule-Following with Non-invasive Brain Stimulation. *Nature Scientific Reports*.

### Electroencephalogram

#### *Methodological papers*

Teplan, M. (2002). Fundamentals of EEG measurement. *Measurement science review*, 2(2), 1-11.

Chapter 2 (all other Chapters are also very worth reading) of Dickter, C. L., & Kieffaber, P. D. (2013). *EEG methods for the psychological sciences*. Sage.

The complete Pocket Guide to EEG. iMotion. (Disclaimer: This is a document created by a commercial company and, thus, highly branded; nevertheless it is helpful to gain a first understanding of EEG)

#### *Empirical papers*

Balthazard, P. A., Waldman, D. A., Thatcher, R. W., & Hannah, S. T. (2012). Differentiating transformational and non-transformational leaders on the basis of neurological imaging. *The Leadership Quarterly*, 23(2), 244-258.

Waldman, D. A., Balthazard, P. A., & Peterson, S. J. (2011). Leadership and neuroscience: Can we revolutionize the way that inspirational leaders are identified and developed? *The Academy of Management Perspectives*, 25(1), 60-74.

Hannah, S. T., Balthazard, P. A., Waldman, D. A., Jennings, P. L., & Thatcher, R. W. (2013). The psychological and neurological bases of leader self-complexity and effects on adaptive decision-making. *Journal of Applied Psychology*, 98(3), 393.

### Functional Magnetic Resonance Imaging

#### *Methodological papers*

Schild, H. (1994). MRI made easy (... well almost). *Nationales Druckhaus Berlin*, Germany.

Amaro Jr, E., & Barker, G. J. (2006). Study design in fMRI: basic principles. *Brain and cognition*, 60(3), 220-232.

#### *Empirical papers*

Caspers, S., Heim, S., Lucas, M. G., Stephan, E., Fischer, L., Amunts, K., & Zilles, K. (2012). Dissociated neural processing for decisions in managers and non-managers. *Plos one*, 7(8), e43537.

Hollmann, M., Rieger, J. W., Baecke, S., Lützkendorf, R., Müller, C., Adolf, D., & Bernarding, J. (2011). Predicting decisions in human social interactions using real-time fMRI and pattern classification. *PLoS One*, 6(10), e25304.

Laureiro-Martinez, D., Brusoni, S., Canessa, N., & Zollo, M. (2015). Understanding the exploration-exploitation dilemma: An fMRI study of attention control and decision-making performance. *Strategic Management Journal*, 36(3), 319-338.