

DRAFT

Module PS5235

Cognitive and Behavioural Neuroscience

2019/2020
Weeks 1 -5, Semester 1

Lecturer: Dr Ines Jentsch (email : ij7 ; room 2.04)

Timetable:

Date	Week	9-11am	1-2pm
Tuesdays		TBA	TBA
18/09/18	1	Lecture	Practical
25/09/18	2	Lecture	Practical
02/10/18	3	Lecture	Practical
09/10/18	4	Lecture	Practical
16/10/18	5	Lecture	Practical

In addition, a weekly 1-hour tutorial will complement the content lectures:

Fridays (weeks 1-5): 2:30-3:30pm, **Venue: TBA**

Aims and Objectives:

This module aims to provide an understanding of psychological knowledge in several inter-related domains concerned with the biological bases of behaviour. Emphasis will be laid on basic experimental science from analysis of synaptic events, brain lesion studies, brain activity scans, and clinical studies. The relationship between cognitive, emotional, behavioural, neurological and physiological processes will be examined and how these processes might differ between individuals focussing on State and Trait Anxiety, Externalizing vs Internalizing Personalities, and Aging.

Teaching will be based on morning lectures and afternoon seminars/practicals in which class members will be expected to play an active part (e.g., group presentations followed by class discussion), based on reading and critical evaluation of original material. Emphasis will be placed on the development of the skill of critical evaluation of alternative methods and models and levels of explanations of behaviour, with a particular focus on current debates and critiques of psychology. Students will learn to construct a coherent argument or debate by demonstrating logical processing of (complex) information and deductive reasoning and test hypotheses, theories, methods and evidence within their proper research contexts.

Intended Learning outcomes

A) Knowledge & Understanding / Intellectual Skills:

(1) to understand the basic research techniques in neuroscience sufficiently to allow comprehension and appraisal of original research papers; (2) to realise limits in methods and theory through critical evaluation; (3) to formulate new studies to advance the field; (4) to realise how brain processing underpins normal and pathological mental symptoms; (5) To understand how individuals can differ in basic behavioural and physiological processes.

B) Module Specific / Practical Skills; Transferable / Key Skills:

(1) Teamwork, (2) Effective communication via oral presentations (3) Practical skills of designing neuroscience experiments (4) Analysis of data arising from neuroscience experiments. (5) To think creatively and independently. (6) To handle complex bodies of information.

Assessment (*Continuous Assessment only*)

The completion of two pieces of continuous assessment is required:

1. Write a short essay on the topic *“Do we need neuroscience to attain a functional understanding of our behaviour? Demonstrate your points using an example.”*(1500 words*); deadline for submission: Monday the **7th of October 2019, 12noon**; 50% of final mark
2. Write a short essay on the topic *“How and/or why do we detect and respond to processing conflicts or errors”* (1500 words*); Submission deadline: Monday, the **28th October 2019, 12noon**; 50% of final mark.

Essay Formatting: The essays should be presented as follows: a title page stating the title of the work, student's matriculation number, the module number, and the date; – there must be at least a 1" margin all round (top, bottom, right and left); the text must be in Arial font at 12-point, 1.5 line spaced. The reference list does not count towards the word limit.

*word counts exclude references

Lecture 1. Methods in Cognitive Neuroscience I

Introduction; Lesion studies, TMS/tDCS, PET, fMRI

Reading (Lecture 1 and 2):

Gazzaniga, Ivry, & Mangun (2014). *Cognitive Neuroscience: The biology of the mind*. 4th Edition (Chapters 1, 3, 12 and 14). Northon and Company: New York.

Churchland & Sejnowski (1988). *Science*, 242,741-745.

Gratton et al. (2003). *Psychophysiology*, 40, 487-491.

Rorden & Karnath (2004). *Nature Reviews Neuroscience*, 5(10), 813-819.

Coles & Rugg (1995). www.cogsci.ucsd.edu/~coulson/cogs179/ColesRugg1995chpt1.pdf

Savoy (2001). *Acta Psychologica*, 107, 9-42.

Afternoon Practical: Cognition versus Neuroscience debate; Paper Discussion: Churchland & Sejnowski, 1988).

Additional reading for Conversion students:

Lisman (2015). The Challenge of Understanding the Brain: Where We Stand in 2015. *Neuron*, 86, 864-882.

Hochstein (2016). Giving up convergence and autonomy. *Studies in History and Philosophy of Science*, 56, 135-144.

Lecture 2. Methods in Cognitive Neuroscience II

EEG/ERP, MEG, Optical Imaging

Afternoon Practical: Paper Discussion: McCabe & Castel (2008) Seeing is believing. The effect of brain images on judgements of scientific reasoning. *Cognition*, 107, 343-352.

Additional reading for conversion students:

Weisberg (2008). *The Seductive Allure of Neuroscience Explanations*. *Journal of Cogn Neurosci*, 20(3), 470-477.

Lecture 3. Voluntary control over mental processes: Historical debates and experimental paradigms

Key Concepts (The control homunculus, modularity hypothesis); Conflict paradigms (S-R compatibility effect, Simon, Eriksen, and Stroop effect)

Reading:

Monsell (1996). Control of mental processes. In V. Bruce (Ed), (pp. 93-148). Psychology Press.

Botvinick et al. (2004). *TICS*, 8, 539-546.

Carter et al. (2007). *Cognitive, Affective, & Behavioural Neuroscience*, 7, 367-379.

Practical: Experimental Paradigms: Design and data collection

Additional reading for conversion students:

Block, N. (1995). "The Mind as the Software of the Brain" (An Invitation to Cognitive Science, edited by D. Osherson, L. Gleitman, S. Kosslyn, E. Smith and S. Sternberg, MIT Press, 1995) Chapter 11.1.5 only

Lecture 4. Voluntary control over mental processes: Neuroscience

Neuroanatomy of cognitive control; computational modelling

Reading:

Ullsperger et al. (2014). *Physiology Reviews*, 94, 35-79.

Botvinick (2007). *Cognitive, Affective, & Behavioral Neuroscience*, 7(4), 356-366.

Gehring et al. (1993). *Psychological Science*, 4(6), 385-390.

MacDonald et al. (2000). *Science*, 288, 1835-1838.

Taylor et al. (2007). *The Neuroscientist*, 13,160-172.

Williams et al. (2004). *Nature Neuroscience*, 7(12), 1370-1375.

Practical: Experimental Paradigms: Data Analysis, interpretation and critique

Lecture 5. Voluntary control over mental processes: Individual Differences

Individual variations affecting Cognitive Control: State and Trait Anxiety, Externalizing vs Internalizing Personalities, Aging, Depression

Reading:

Gehring, W.J., Himle, J., & Nisenson, L.G. (2000). *Psychological Science*, 11, 1-6.

Hajcak (2012). *Current Directions in Psychological Science*, 21(2), 101-106

Mathalon et al. (2003). *Neurobiology of Aging*, 24, 675-685.

Olvet & Hajcak (2008). *Clinical Psychology Review*, 28, 1343-1354

Pellegrino et al. (2007). *Journal of Cognitive Neuroscience*, 19(2), 275-286.

Ullsperger et al (2006). *International Journal of Psychophysiology*, 59, 59-69.

Weinberg et al. (2015). *International Journal of Psychophysiology*, 98, 276-299

Practical: Paper discussion, Critique: Erickson et al. (2004). *Human Brain Mapping*, 21, 98-107.

Additional task for conversion students: Prepare a one-page summary of the key findings including critique of the Erickson et al. (2004) paper before the practical session