

The Hebrew University of Jerusalem

Syllabus

Neuropsych. of the frontal lobes: functions and disfunctions - 51708

Last update 12-02-2017

HU Credits: 2

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: psychology

Academic year: 0

Semester: 2nd Semester

Teaching Languages: Hebrew

Campus: Mt. Scopus

Course/Module Coordinator: Prof. Dan Hoofien

Coordinator Email: dan.hoofien@mail.huji.ac.il

Coordinator Office Hours: Upon appointment

Teaching Staff:

Prof Dan Hoofien

Course/Module description:

The human frontal lobes (FL) are a central and important subject of research in current neurosciences. Their importance stems from their supervisory and controlling role of complex human behaviors, like executive functions, emotional regulation and reward seeking. In many respects the F.L. are the source of the huge differences between humans and other wild-life civilizations. The course will aim at learning the structural and functional aspects of the FL and the known interactions between them.

Course/Module aims:

To learn and comprehend, theoretically and clinically, the main sub-structures of the F.L. in general and the pre-frontal lobes in particular; their open and closed connections with other CNS structures; the cognitive and mental functions that are mediated by these components and the interactions between them, 'in sickness and in health'.

Learning outcomes - On successful completion of this module, students should be able to:

- Will be able to define the structural and functional components of the F.L. according to updated theories and studies that investigate them.
- Will be able to differentiate, evaluate and compare, structurally and functionally, between three pre-frontal structures and their functions: The dorsolateral (executive functions), the orbitofrontal (impulse control) and the medial (initiation).
- Will be able to explain the F.L. functions in both healthy and disease states.

Attendance requirements(%):

100

Teaching arrangement and method of instruction: The course will include frontal lectures accompanied by PPP, case presentations and discussions based on pre-read articles and book-chapters.

Course/Module Content:

- The F.L. in the context of the CNS and human existence.

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- The history of the F.L. – early theories and interpretations.
 - The structure of the F.L.
 - Open connections and closed circles
 - The Dorso-lateral area and attention, memory and executive functions
 - The Orbito-frontal area and impulse control
 - The medial area and initiation
 - The polar area (10) and meta-cognition
 - Development of the F.L. from birth to aging.

Required Reading:

Text books:

- Stuss, D.T. & Knight, R.T (2002, Eds.) *Principles of Frontal Lobe Function*, New York, Oxford University Press.
- Stuss, D.T. & Knight, R.T (Second edition, 2013, Eds.) *Principles of Frontal Lobe Function*, New York, Oxford University Press.
- Miller, B.L. & Cummings, J.L. (1999) *The human frontal lobes: Functions and disorders*. The Guilford Press, New-York.

Introduction: From Phineas Gage to Tim Shallice

1. M.M. Mesulam (2002) *The human frontal lobes: Transcending the default mode through contingent encoding*. In D.T. Stuss & R.T. Knight (Eds.) *Principles of Frontal Lobe Function*, New York, Oxford University Press. Chap. 2
2. Fuster, J.M. (2013) *Cognitive functions of the prefrontal cortex*. In D.T. Stuss, D.T. & R.T. Knight, R.T (Second edition, Eds.) *Principles of Frontal Lobe Function*, New York, Oxford University Press. Chap 2

Neuroanatomy

3. Petrides, M; & Payanda, D. N. (2002) *Association pathways of the prefrontal cortex and functional observations*. In D.T. Stuss & R.T. Knight (Eds.) *Principles of Frontal Lobe Function*, New York, Oxford University Press. Chap. 3.

4. Chow, T.W & Cummings, J.L. (1999) *Frontal subcortical circuits*. In Miller, B.L. & Cummings, J.L. *The human frontal lobes: Functions and disorders*. The Guilford Press, New-York. Chap. 1

Dorso Lateral Pre-Frontal

Attention:

5. Baddeley A. (2002) *Fractionating the central executive*. In D.T. Stuss & R.T. Knight (Eds.) *Principles of Frontal Lobe Function*, New York, Oxford University Press. Chap. 16.

6. Petrides, M. (2013) *The mid-dorsolateral prefronto-parietal network and eopptic process*. In D.T. Stuss, D.T. & R.T. Knight, R.T (Second edition, Eds.) *Principles of Frontal Lobe Function*, New York, Oxford University Press. Chap 7.

Memory:

7. Moscovitch, M; & Winocur, G. (2002) *The frontal cortex and working with memory*. In D.T. Stuss & R.T. Knight (Eds.) *Principles of Frontal Lobe Function*, New York, Oxford University Press. Chap. 12

Executive functioning:

8. NIH-EXAMINER Manual:

<http://memory.ucsf.edu/sites/all/files/download/EXAMINER%20User%20Manual.pdf>

Orbital-Frontal (ventro-medial) Pre Frontal

9. Rolls, E.T. (2002) *The functions of the orbito-frontal cortex*. In D.T. Stuss & R.T. Knight (Eds.) *Principles of Frontal Lobe Function*, New York, Oxford University Press. Chap. 23.

10. O'doherty J.P. (2013). *Functional contributions of the ventromedial prefrontal cortex in value-based decision making*. In D.T. Stuss, D.T. & R.T. Knight, R.T (Second edition, Eds.) *Principles of Frontal Lobe Function*, New York, Oxford University Press. Chap 20.

Area 10

11. Burgess, P.W. & Hsuan-Chen, W. (2013) *Rostral prefrontal cortex (Brodmann Area 10): Metacognition in the brain*. In D.T. Stuss, D.T. & R.T. Knight, R.T (Second edition, Eds.) *Principles of Frontal Lobe Function*, New York, Oxford University Press. Chap. 31.

Development of the frontal lobes:

12. Anderson, V; & Spencer-Smith, M; (2013) *Childrens frontal lobes: No longer*

silent. In D.T. Stuss, D.T. & R.T. Knight, R.T (Second edition, Eds.) *Principles of Frontal Lobe Function*, New York, Oxford University Press. Chap. 9.

13. Gazzaley, A. (2013) *Top-down modulation (TDM) in the aging brain: An emerging theory of cognitive aging*. In D.T. Stuss, D.T. & R.T. Knight, R.T (Second edition, Eds.) *Principles of Frontal Lobe Function*, New York, Oxford University Press. Chap. 35.

14. Miller, B. (2014) *The clinical Syndrome of bvFTD*. In B. Miller. *Frontotemporal Dementia* (Chap. 2). Oxford University Press.

Additional Reading Material:

Course/Module evaluation:

End of year written/oral examination 100 %

Presentation 0 %

Participation in Tutorials 0 %

Project work 0 %

Assignments 0 %

Reports 0 %

Research project 0 %

Quizzes 0 %

Other 0 %

Additional information:

Prior knowledge of the structure of the CNS is needed. Therefore a prerequisite for this course is a course in physiological psychology or biology of behavior. The course is aimed for 2nd and 3rd year undergraduate and graduate students.