Applied Cognitive Science - BSc Cognitive Science - F2022

Lecturer and contact
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Instructor: Sirid Wihlborg (SW)

Lecture room: 1451-219; **Class room:** 1485-240

Purpose of the course

The course has two main aims:

1) To follow up on and expand the knowledge base on Cognitive Science topics started in Introduction to Cognitive Science course
2) To explore how Cognitive Science topics are related to everyday life and the job-market. More details can be found in the course description in the study regulation (pasted below).

Structure of the course

The course is divided into a *lecture* part and a *class* part.

The lectures include

Lectures (60 min).
Study group presentations (30 min).
Guest talks by external people (45 min. + discussion, live or streamed)
Recorded video material.

The classes include

Study group assignments
Individual assignments.

Study group presentations

Each study group makes a 30 minutes presentation, taking the readings of the week as point of departure and coming up with a place/way in which this can be/is applied in the real world. Should include thoughts on what kinds of data this application could produce and what questions they could answer. The group uploads a brief abstract on the presentation to Brightspace at least two days before and uploads slides afterwards. The group makes Kahoot quiz with 4 questions from the presentations to boost fun, attention and learning (e.g. see Khanna 2015).

Examination

The primary exam form is a take home assignment. The assignment will require students to 1) identify a specific problem to which research on cognition could be applied; 2) contextualize this problem in terms of the relevant literature in cognitive science; 3) design a specific intervention, model, or experimental design which could contribute to solving this problem; 4) justify this contribution with relevant theoretical and experimental work from cognitive science; and 5) propose a course of action which could be used to implement the contribution. The assignment (early versions of it) are to be presented during the semester, and then written up as a 10-12 page paper, to be delivered at a date to be determined after the course.

Exam deadline: 2/6 (susceptible to change)

Semester plan

Overview with readings

1. Introduction (Groome & Eysenck, 2016, ch. 1; Knopik, et al., 2017, ch. 1)

Body over Mind: Physiology, Homeostasis & Motivation

2. A wake-up call: Biological cycles and cognition (Groome & Eysenck 2016, ch. 11, p. 253-286)

3. Food for thought: Homeostasis and motivation (Bear, et al., 2016, ch.16, p.551-578)

4. Drugs & learning (Groome & Eysenck 2016, ch. 10, p. 223-252)

Mind over body: Perception & Attention

5. Auditory perception and music (Groome & Eysenck 2016, ch. 4, p. 81-98)

6. Attention and the attention economy (Hendricks & Vestergaard, 2019, ch. 1, pp. 1-18) (Groome & Eysenck 2016, ch. 2, p. 9-38; Hari 2022)

7. Self-control: Language and self-talk (Nedergaard, et al., 2021; Wallentin & Nedergaard, in preparation)

Nature and nurture

8. Behavioral genetics (Knopik, et al., 2017, ch. 3-4)

9. General cognitive abilities (Knopik, et al., 2017, ch. 6, 7, 11)

10. Personality theory (Schultz & Schultz, 2016, chapters 7-8, pp. 191-244)

Business and pleasure

11. Decision making: Business intelligence (Sharda, et al., 2020, ch. 1)

12. Hooked: Reinforcement as business model (Schultz 2016, ch. 12)

13. Life hacks and happiness (Schultz 2016, ch.9,14)

Week 1

3/2 Lecture.

Introduction (Groome & Eysenck 2016, ch. 1, Knopik 2017, ch. 1)

4/2 Class

How to read literature in Applied. (SW)

Maximizing & Satisficing test (Making a correlation matrix) (MW – see video).

Body over Mind: Physiology, Homeostasis & Motivation

Week 2

10/2 Lecture.

A wake-up call: Biological cycles and cognition (Groome & Eysenck 2016, ch. 11, p. 253-286)

Additional literature: (Allan, et al., 2019; Danziger, et al., 2011; Linder, et al., 2014; Sievertsen, et al., 2016)

Student presentation: Study group 1

11/2 Class

Fasting/sleep deprivation experiment 1 (MW)

Week 3

17/2 Lecture.

Food for thought: Homeostasis and motivation (Bear et al. 2016, ch.16, p.551-578)

Student presentation: Study group 2

18/2 Class

Fasting/sleep deprivation experiment 2 (MW)

Week 4

24/2 Lecture.

Drugs & learning (Groome & Eysenck 2016, ch. 10, p. 223-252)

Student presentation: Study group 3

25/2 Class.

In this class, we are going to work with the reward system and how dopamine plays an essential role in *drive*, *wanting* and *focus* and hence ultimately *learning*. We are going to work with "hi-jacking" our dopamine release to (hopefully) increase cognitive performance and learning. The homework for the class is going to be an awesome article on the "wanting/liking" system, and then a voluntary (yet also awesome) participation in an experiment (elaboration on this as we get closer). *(SW)*

Mind over body: Perception & Attention

Week 5

3/3 Lecture.

Auditory perception and music (Groome & Eysenck 2016, ch. 4, p. 81-98)

Student presentation: Study group 4

4/3 Class

Project idea pitches. Recruitment: Musical ear test, working memory (MW)

Week 6

10/3 Lecture.

Attention and the attention economy (Groome & Eysenck 2016, ch. 2, p. 9-38; Hari 2022)(Hendricks & Vestergaard, 2019, ch. 1, pp. 1-18)

Student presentation: Study group 5

11/3 Class

TBA (SW)

Week 7

14/3 (NB. date change) Lecture

Guest lecturer: Johanne SK Nedergaard

Self-control: Language and self-talk (Wallentin & Nedergaard, in prep.; Nedergaard et al. 2021)

Student presentation: Study group 6

18/3 Class

Dual task interference and endurance/resistance (JSKN, MW)

Midterm evaluation

Nature and nurture

Week 8

24/3 Lecture.

Behavioral genetics (Knopik, et al., 2017, ch. 3-4)

Student presentation: Study group 7

25/3 Class

Introduction to factor analysis (SW)

Week 9

31/3 Lecture.

General cognitive abilities (Knopik, et al., 2017, ch. 6, 7, 11)

Student presentation: Study group 8

1/4 Class

Factor analysis 1. General cognitive abilities data (MW)

Week 10

7/4 Lecture.

Guest lecturer: Dennis Hvass (peopletestsystems.com)

Personality theory (Schultz, 2016, chapters 7-8, pp. 191-244)

8/4 Class

Factor analysis 2. Personality test data (SW)

EASTER BREAK

Business and pleasure

Week 11
19/4 (NB. date change) Lecture.
Guest lecturer: Joshua Skewes (Head of Department, Linguistics, Cognitive Science & Semiotics)
Guest lecturer: Josephine Hillebrand Hansen (Epinion.dk)
Decision making: Business intelligence (Sharda, et al., 2020, ch. 1)
19/4,22/4 Class
CogSci for business: The crowd-sourced Cognitive Science Textbook (JS, MW)

Week 12
28/4 Lecture.
Guest lecture: Maja From Andersen (fundayfactory.com)
Student presentation: Study group 9
Hooked: Reinforcement as business model (Schultz 2016, ch. 12)
29/4 Class
FunDay Factory Gaming data (SW)

Week 13
NB. No lecture or classes due to Match Point conference
2-4/5. Student Supervision Book time (1 x 15 min. slot per individual; 2 x 15 min.slots per group):
(Time booking to come)

Week 14
12/5 (NB. date and room change due to Match Point conference) Lecture.
Life hacks and happiness (Schultz 2016, ch.9,14)
Student presentation: Study group 10
12/5 (NB. date and room change due to Match Point conference) Class
Final project presentations. Evaluation (MW, SW)

2/6 Exam deadline

Literature

(https://www.dropbox.com/sh/fve3t2cjyblgqit/AAAvaORC97pN97TOzTAEjPO6a?dl=0)

Allan, J. L., Johnston, D. W., Powell, D. J. H., Farquharson, B., Jones, M. C., Leckie, G., & Johnston, M. (2019). Clinical decisions and time since rest break: An analysis of decision fatigue in nurses. *Health Psychology, 38*, 318-324, 10.1037/hea0000725,

Bear, M. F., Connors, B. W., & Paradiso, M. A. (2016). *Neuroscience - Exploring the brain* (4th edition ed.). Philidelphia: Wolters Kluwer,

Danziger, S., Levav, J., & Avnaim-Pesso, L. (2011). Extraneous factors in judicial decisions. *Proceedings of the National Academy of Sciences, 108*, 6889, 10.1073/pnas.1018033108, http://www.pnas.org/content/108/17/6889.abstract.

Groome, D., & Eysenck, M. W. (2016). *Applied Cognitive Psychology* (2nd edition ed.). New York: Psychology Press,

Hendricks, V. F., & Vestergaard, M. (2019). *Reality Lost - Markets of Attention, Misinformation and Manipulation*: Springer Open, https://doi.org/10.1007/978-3-030-00813-0,

Knopik, V. S., Neiderhiser, J. M., DeFries, J. C., & Plomin, R. (2017). *Behavioral Genetics* (7th edition ed.). New York: Worth Publishers,

Linder, J. A., Doctor, J. N., Friedberg, M. W., Reyes Nieva, H., Birks, C., Meeker, D., & Fox, C. R. (2014). Time of Day and the Decision to Prescribe Antibiotics. *JAMA Internal Medicine, 174*, 2029-2031, 10.1001/jamainternmed.2014.5225, https://doi.org/10.1001/jamainternmed.2014.5225.

Nedergaard, J., Christensen, M. S., & Wallentin, M. (2021). Valence, form, and content of self-talk predict sport type and level of performance. *Consciousness and Cognition, 89*, 103102, https://doi.org/10.1016/j.concog.2021.103102, https://www.sciencedirect.com/science/article/pii/S1053810021000283.

Schultz, D. P., & Schultz, S. E. (2016). *Theories of Personality*. Boston: Cengage Learning,

Sharda, R., Delen, D., & Turban, E. (2020). *Analytics, Data Science, & Artificial Intelligence - Systems for Decision Support* (11th edition ed.). Hoboken: Pearson,

Sievertsen, H. H., Gino, F., & Piovesan, M. (2016). Cognitive fatigue influences students' performance on standardized tests. *Proceedings of the National Academy of Sciences, 113*, 2621, 10.1073/pnas.1516947113, http://www.pnas.org/content/113/10/2621.abstract.

Wallentin, M., & Nedergaard, J. S. K. (in preparation). Language as an active inference tool for social control and self-control.

From study regulations

https://eddiprod.au.dk/EDDI/webservices/DokOrdningService.cfc?method=visGodkendtOrdning&dokOrdningId=16337&sprog=en

Purpose:

The purpose of the course is to provide the knowledge and skills needed to apply theory and methodology from cognitive science in extra-academic contexts. The course prepares students to use their knowledge of cognition and research design to analyse and/or solve real world social and organisational problems.

The course focuses on topics in cognitive science as they relate to applied, extra-academic contexts. Example topics include applications of attention and decision making research to consumer choice, applications of attention and perception research to design problems,

applications of learning and memory research to education, and applications of language and cognition research to communication.

This course builds on the Introduction to Cognitive Science and Methods 1 courses. It prepares students to include applied topics in their BSc thesis project, and prepares them for using their knowledge of and skills in cognitive science in non-university workplaces.

Academic objectives:
In the evaluation of the student's performance, emphasis is placed on the extent to which the student is able to:

Knowledge:
- explain how people think, act, and interact in real world contexts using theory from cognitive science.

Skills:
- evaluate applications of cognitive science to real world behavior
- apply theory from cognitive science to investigating or explaining real world behavior - explain to a lay audience how cognitive science can be applied in extra-academic contexts.

Competences:
- justify choice of theory when applying research from cognitive science in extra-academic contexts
- justify choice of methods when applying research from cognitive science in extra-academic contexts.

Forms of instruction:

- Lecture

- Classroom instruction

    Comments on form of instruction:

    Teaching involves a combination of lectures and classroom instructions. Classroom instruction may include some mix of discussion group exercises, writing exercises and feedback, or collective supervision of an applied project.

    Language of instruction:
    The rules governing language of exam and teaching are stated in section 2.1 of the academic regulations.

    Exam language:

- English

    Exam options:

    Take-home assignment on topic of student's choice

Form of co-examination: Internal co-examination

Assessment form: 7-point grading scale

Comments:
Ordinary examination and re-examination:
The exam is an take-home assignment on a topic of the student's choice. The topic and method used in the assignment must be relevant in relation to the content of the course and is subject to the approval of the teacher.

The assignment can be written individually or in groups of up to 3 students. Group assignments must be written in such a way that the contribution of each student, except for the abstract, thesis statement and conclusion, can form the basis of individual assessment. The assignment should clearly state which student is responsible for which section.

Length for one student: 10-12 standard pages
Length for two students: 17-22 standard pages
Length for three students: 24-32 standard pages

The take-home assignment must be handed in for assessment in the Digital Exam system by the date specified in the exam plan.