Cognitive Psychology and its Applications

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Introduction

Much of modern society is made to fit human's brain and behavior. Sometimes this comes at our own expense: for example, supermarket layouts are designed in a way that maximizes our consumption and that optimally empties our wallets. More often, however, knowledge of brain and behavior is a good thing. It helps in building safer and more efficient environments. In the case of cognitive deficits or diseases, knowledge of the brain may help in designing tools that improve quality of life.

Then again, cognitive psychology is a relatively new field of science, and many of the neural mechanisms that drive human behavior are still somewhat mysterious. Thus, we cannot simply apply knowledge about the brain without continuing to learn a bit about the brain too.

This course is situated precisely at the border between theory and application. We will gain current knowledge about human's brain and behavior, and we will learn to *adopt the cognitive psychologist's mindset*. This means that we will design and conduct experiments ourselves in order to learn more about the brain. Most importantly, we will do this in societally relevant settings.

The course consists of three components: *lectures*, *workshops* and *research*. In the *lectures*, we will discuss various realms of cognition, such as perception, memory, attention, language and decision-making. In the *workshops* you will gain experience with various tricks that cognitive psychologists have up their sleeves: you will learn how to design and program experiments, analyze data, et cetera. All of this is applied in your own *research* project, wherein you conduct your own experiment, inspect results, and present conclusions to the group. All in all, this course should optimally prepare you for a career in cognitive science.

Course objectives

We have four key objectives. At the end of the course, you will be able to:

(i) Conceptualize cognition and the brain at an academic level;
(ii) Use various research methodologies, in terms of techniques (behavioral tasks, eye-tracking, pupillometry), experimental design (counterbalancing, Latin-square) and analysis (Linear Mixed Modelling);
(iii) Translate a research question into a valid experimental design;
(iv) Analyze and report data in the format of a scientific paper

Locations and times

Our meetings are in the main building, rooms **HG-10A00** (Mondays 11:00) and **HG-02A00** (Thursdays 15:30). For your research project, you can make use of testing cubicles in the *Brain and Behaviour Lab* in the MF-building (4th floor).

Examination

Written exam: 50% of final grade
Research project (report + presentation): 30% of final grade
Workshop assignments: 10% of final grade
Participation: 10% of final grade

You have to score a pass (i.e., grade > 5.4) on each of these components separately, in order to pass the course!

Program summary

Date & time	Lecture	Workshop	Research
04-09 at 11:00	Introduction		Form groups
07-09	***No meeting.***		Allocation projects to groups & Brainstorm
11-09 at 11:00	From theory to prediction to experiment	Cats, dogs, & capybara's: Building an experiment in OpenSesame	Work on experimental design
14-09 at 15:30	Perception & Attention (book ch. 3, 4)		Decide on the Methods and program the experiment
18-09 at 11:00	Response time, accuracy, signal detection theory		
21-09 at 15:30	Eye-tracking and pupillometry	Pupillometry in OpenSesame	Write Methods section and start data collection
25-09 at 11:00	Memory & Decision-making (book ch. 5, 6)		
28-09 at 15:30		Linear mixed-effect models in *R*	Continue data collection and prepare data analysis
02-10 at 11:00	Interfaces (book ch. 7, 14)		Data analysis & write Results section of report
05-10 at 15:30	Multi-dimensional cognition: Reading		Hand in Methods and Results for feedback, prepare presentations, write Intro and Discussion sections
Week of 09-10 to 15-10	***No meetings.***		
16-10 at 11:00	***Presentations***		
19-10 at 15:30	Recap lecture, exam preparation		
25-10 at 08:30	Exam		
29-10 at 23:59	Deadline report (group) and Abstract (individually)		