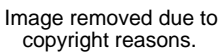


9.63 Laboratory in Cognitive Science

Fall 2005
 Course 1- Introduction 

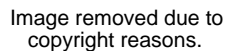
Aude Oliva

9.63 At a Glance

Day	Day	Date	Lecture Topics	Written assignments due date
wed	wed	7.Sep	Introduction	
mon	mon	12.Sep	Variables and Controls - Signal Detection Theory	Coglab 1: Signal detection (summary)
wed	wed	14.Sep	Single Factor design + statistic (t-test)	
mon	mon	19.Sep	holidays	
wed	wed	21.Sep	Factorial Design + External Validity	Coglab 2: Spatial Cuing (summary)
mon	mon	26.Sep	How to write a research paper / How to give a talk	
wed	wed	28.Sep	Factorial Design + statistical analysis (ANOVA)	Coglab 3: Visual Search (summary)
Mon	Mon	3.Oct	Project 1 presentation: single factor design	Project 1 short paper (1000 words)
wed	wed	9.Oct	Matlab tutorial - Description of Project 2	
mon	mon	10.Oct	holidays	
wed	wed	12.Oct	Greatest Experiments in Cognitive Science	Coglab 4: Typical Reasoning (summary)
mon	mon	17.Oct	Experimental Paradigms in Cognitive Science	
wed	wed	19.Oct	Cognitive neuroscience methods	Coglab 5: Mental Rotation (summary)
mon	mon	24.Oct	Single participant experiments - Quasi-Experiments	Coglab 6: Receptive Fields (summary)
wed	wed	26.Oct	Correlational studies and non experimental research	
mon	mon	31.Oct	Project 2 presentation: factorial design	Project 2 short paper (1000 words)
wed	wed	7.Nov	Description of Project 3	
mon	mon	7.Nov	Experiments in other sciences	
wed	wed	9.Nov	Special Topic: Understanding the visual world	Coglab 7: False Memory (summary)
mon	mon	14.Nov	Ethics in Research	
wed	wed	16.Nov	General Review	Coglab 8: Lexical decision (summary)
mon	mon	21.Nov	Exam in class	
wed	wed	23.Nov	Project 3 Discussion	
mon	mon	28.Nov	Final based studies	
wed	wed	30.Nov	TBA (catching up)	
mon	mon	5.Dec	Project 3 presentation	
wed	wed	7.Dec	Project 3 presentation	Project 3 long paper (12-15 pp)
mon	mon	12.Dec	Discussion of articles responses	
wed	wed	14.Dec	Last class: Final	Final Project 3 paper

3 Projects, 3 Experiments

- **Project 1:** One experiment, single-factor design (1 factor, 2 conditions + controls, t-test)
- **Project 2:** One experiment, factorial design (2 factors, ANOVA)
- **Project 3:** A research question, with 1 or 2 experiments.
- All research projects done in group (2 to 5 students)



Written Assignments

- 5 CogLab Summaries (1 page each)
- Two small papers (~ 1000 words each, for Project 1 and Project 2) **
- One long paper (final paper, 12-15 pp) **

** Option to rewrite/correct your paper

CogLab Summary

- A 1 to 2 pages word document including:
- A graph of your results (when possible)
- A summary in 7 sections (200-300 words)

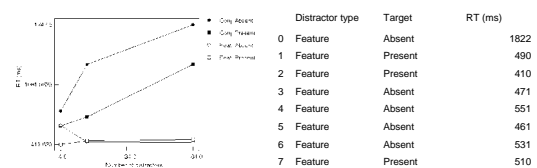
- 1- A title
- 2- Introduction (1-2 sentences)
- 3- Hypothesis (1-3 sentences)
- 4- Experimental method (2-4 sentences)
- 5- Result: A description of "your" result (2-4 sentences)
- 6- Interpretation (2-4 sentences)
- 7- Conclusion (2 sentences)

- Answers to 1-2 questions

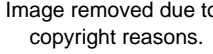
"Email" CogLab Assignments

- A total of 5 html/excel files with your data from 5 coglab experiments
- Due Friday midnight (written summary due the next Wednesday)

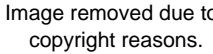
Example (CogLab: Visual Search)



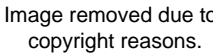
Talk “assignments”

- Participation in class 
- Present 1 coglab experiment
- Present 3 talks (one for each project)

CogLab Talk

- Present 1 coglab experiment: 
- We send you the excel file with the data from all the participants
- You run a statistic (using excel or matlab)
- You plot the group graph
- You think a little about the results
- You talk in class about the group results (5 min, draw on the board or prepare slides)
- We all discuss the results and the interpretation

Mid-Term Exam

- 15 % of the total grade 
- Based on the slides and the coglab
- Do not worry

Grading Scale

- Experiment 1 (single factor): **15 %** (10 % for the small paper, 5% talk presentation in group)
- Experiment 2 (factorial design): **15 %** (10 % for the small paper, 5% talk presentation - 10 min - in group)
- Experiment 3 (a more elaborated experiment): **30 %** (10 % for the talk, 20% for the 12-15 pp paper)
- Assignments (coglab experiments: 5/7): **15 %** (5 summaries of coglab experiments)
- Mid-Term Exam (in class): **15%**
- CogLab presentation in class: **5 %**
- Participation in class: **5%**

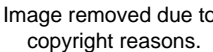
More meetings with us

- Contact directly the instructor by email

Subject line: 9.63 – *keywords, topic*
9.63 – *can we meet?*
9.63 – *references help*
9.63 – *course 3: question*
9.63 – *got a great idea!!*

- Once we are in the new BCS building, there will be additional lab hours and access to computers

Sept 12: Getting started: Variables, Controls and Signal Detection Theory

- And lots of details to get started.. 

Sept, 14: Single factor design and statistical analysis (t-test)

- A single factor design will be used in Project 1 (for oct. 3)
- T-test analysis presented by Ruth Rosenholtz

Image removed due to copyright reasons.

Sept. 21 & 26 Factorial Design, External Validity & ANOVA

- A factorial design will be used in Project 2 (for oct.31)

Image removed due to copyright reasons.

Sept. 28: How to write a paper? How to give a talk?

- And how to react to the questions, the critics

Image removed due to copyright reasons.

Oct 3: Project 1 presentation

- Talk given by each group (10-15 min + 5 min questions) describing all the phases of the project
- You are speaking to us, so relax.

Image removed due to copyright reasons.

Oct 5: Matlab Tutorial (with computers)

- We should be in the new BCS building ☺
- We should have 5 new dell computers
- Matlab tutorials and exercises in:
 - - statistics
 - - experimental design

Image removed due to copyright reasons.

Oct. 12: Greatest Experiments in Cognitive Science

- Vision
- Memory
- Learning
- Problem solving
- Development
- Neuroscience
- Cool methods

Image removed due to copyright reasons.

Oct. 17: Experimental paradigms in Cognitive Science

- Description and demos of a variety of paradigms
- Use of CogLab and Matlab

Image removed due to copyright reasons.

Oct. 19: Cognitive Neuroscience Methods

- Lecture by Ben
- fMRI
- ERPs
- TMS
- Single cell recording

Image removed due to copyright reasons.

Oct.24: Single Participant Study and Quasi-Experiments

- Also research methods in neuropsychology (with patients)

Image removed due to copyright reasons.

Oct. 26: Correlational studies and Non experimental research

- Lecture by Charles

Image removed due to copyright reasons.

Oct. 31: Project 2 Presentation

- You will have to talk again (and we will all listen)

Image removed due to copyright reasons.

Nov. 2: Description of Project 3

- Discussion in class of projects 3 as well as the different stages of each research topic (literature review, theoretical question, experimental hypothesis, prediction, methods, statistical analysis, results, interpretation, conclusion)

Image removed due to copyright reasons.

Nov. 7: Experiments in Other Sciences

- How to compare human results to computational modeling?
- Developmental research

Image removed due to copyright reasons.

Nov 9: Special Topic: Understanding the Visual World

- Talk and Brain storming: How does the brain recognize objects and complex scenes?

Image removed due to copyright reasons.

Nov 14: Research Ethics

Image removed due to copyright reasons.

Nov.16: General Review

- Reviews of all classes and CogLab experiments

Image removed due to copyright reasons.

Nov 21: Mid-Term Exam

- Based on the slides and the coglab
- Do not worry

Image removed due to copyright reasons.

Nov 23 (day off 😊)

- You do not have to come to class (leave for Thanksgiving)
- For those of you here, we will speak about your project 3 and results.

Image removed due to copyright reasons.

Nov. 28: Flawed studies

- What's wrong?

Image removed due to copyright reasons.

Experimental facts

- "You can observe a lot by just watching" Berra
- "Perfection is the greatest enemy of a good beginning"
- "The greatest the island of knowledge, the longer the shoreline of the unknown".
- "I have no data yet. It is a capital mistake the theorize before one has data. Insensibly one begins to twist facts to suit theories, instead of theories to suit facts."
- "When you rush, you make mistakes"

Image removed due to copyright reasons.

Eye-Witness Testimony sequential or simultaneously presentation?

Image removed due to copyright reasons.

False Memory (Loftus)

- Subjects shown video (slides) of an accident between two cars
- Some subjects asked: How fast were the cars going when they smashed into each other?
- Others asked: How fast were the cars going when they hit each other?

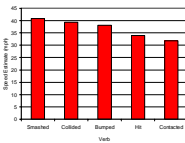
Image removed due to copyright reasons.

False Memory (Loftus)

Word Used in Question

Average Speed Estimate

<u>smashed</u>	41 m.p.h.
collided	39 m.p.h.
bumped	38 m.p.h.
hit	34 m.p.h.
contacted	32 m.p.h.



Mr. Angry and Dr. Smile (Schyns-Oliva)

Image removed due to copyright reasons.

Visual Memory

- Looking at movie trailers: what did you really see?
- What do you remember?
- Mary Potter RSVP Experiments

Image removed due to copyright reasons.

Visual Search & Attention

Image removed due to copyright reasons.

Effect of context on face/emotion recognition

Image removed due to copyright reasons.

Short-term memory

Image removed due to copyright reasons.

The truth about Research

“ As he was testing hypothesis number one by experimental method a flood of other hypotheses would come to mind, and as he was testing these, some more came to mind, and as he was testing these, still more came to mind until it became painfully evident that as he continued testing hypotheses and eliminating them or confirming them their number did not decrease. It actually increased as he went along”. R.M. Pirsig (1975)

CogLab: Signal Detection Data by Friday, Sept, 9, night? ☺

A research domain where SDT has been successfully applied is in the study of memory. Typically in memory experiments, participants are shown a list of words (image, sequence, etc) and later asked to make a "yes" or "no" statement as to whether they remember seeing an item before. Alternatively, participants make "old" or "new" responses. The results of the experiment can be portrayed in what is called a **decision matrix**.

	Old	New
Say "Old"	Hit	False Alarm
Say "New"	Miss	Correct Rejection