# EXP 4174C: Sensory Processes Laboratory

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Class Hours: Tues 9:35-11:30 & Thur 9:35-11:30 or 11:45-1:40
Class Room: 2102 McCarthy C & 191 Psych Bldg

## Course Description

This semester students will gain hands-on experience in the techniques and procedures of perceptual psychophysics and psychology research. Activities in the lab will challenge students to think carefully and critically about every aspect of the research process in order to understand benefits and limitations of the scientific method in psychological research. After completing a progression of small assignments involving data manipulation, students conduct instructor-supervised group projects to replicate a previously published sensory processes experiment. Designing and conducting their replication experiment, students will collect behavioral data, and grapple with producing tables, visualizations, and inferential statistics in order to compare data with experimental results from the original research. In the end, students will judge similarities and differences between the methods and results of their own replication experiment in comparison to the published experiment. In order to apply methods of scientific communication, students will summarize results and experiences, do lab write-ups, present data talks, and write a final paper. Students will also learn how to report research in line with requirements of the Publication Manual of the American Psychological Association.

## Course Objectives

- Understand sensory & cognitive processes using behavioral & neuroscience approaches
- Learn concepts in sensory & cognitive neuroscience and how they relate to research paradigms
- Learn how to openly and reproducibly use experimental data in order to summarize research
- Understand how experiments work and how to communicate research methods & findings

## Recommended Readings

Peirce, Jonathan and Michael MacAskill (2018). *Building Experiments in PsychoPy*. SAGE.

# Class Schedule

Students must read, complete, or turn in the following before Tuesday & Thursdays's lab. Important: class readings and assignment date are subject to change, contingent on mitigating circumstances and the progress we make as a class. Students are encouraged check Canvas for updates.

Table 1: Schedule of lab topics and assignments

| Week | Dates | Lab Reports | DataCamp | Assignments |
|---|---|---|---|---|
| 1 | 01/07 - 01/11 | | | |
| 2 | 01/14 - 01/18 | Blindspot–14 | | |
| 3 | 01/21 - 01/25 | Metacontrast Masking–16 | Introduction to Tidyverse (Jan-22) | |
| 4 | 01/28 - 02/01 | Signal Detection–1 | Data Visualization with GGplot2 – pt.1 (Jan-29) | |
| 5 | 02/04 - 02/08 | Visual Search–7 | Data Vis. with GGplot2 – pt.2 and Reports with Rmarkdown (Feb-5) | |
| 6 | 02/11 - 02/15 | Attentional Blink–10 | Data Manipulation with Dplyr (Feb-12) | CogLab Data Presentation (Feb 14) |
| 7 | 02/18 - 02/22 | | | |
| 8 | 02/25 - 03/01 | | | |
| 9 | 03/04 - 03/08 | *– No Lab –* | *SPRING* | *BREAK* |
| 10 | 03/11 - 03/15 | | | |
| 11 | 03/18 - 03/22 | **Replication Proposal (Mar 22)** | | Replication Experiments (Month of March) |
| 12 | 03/25 - 03/29 | | | Open Science Reviews (Mar 26-28) |
| 13 | 04/01 - 04/05 | | | |
| 14 | 04/08 - 04/12 | **Draft Report (Apr 12)** | | Replication Data Presentation (Apr 8–23) |
| 15 | 04/15 - 04/19 | | | |
| 16 | 04/22 - 04/26 | **Final Report (Apr 24)** | | |

## Grading

- **30%** of your grade will be determined by lab assignments.

- **30%** of your grade will be determined by your presentation and leading of class discussions.

- **30%** of your grade will be determined by the replication research project and report.

- **10%** of your grade will be determined by your attendance and participation in class. Classroom participation is evaluated from informal class assignments and questionnaires. Generally, ask questions and answer them.

# Course Policies

**LABORATORY ASSIGNMENTS**: Assignments will comprise 30% of the course grade. If you are absent during a laboratory session, please contact me AS SOON AS POSSIBLE. Late assignments will be given a lower grade.

**TECHNICAL & SCIENTIFIC COMMUNICATION ASSIGNMENTS**: Presentations or descriptions of research will comprise 30% of course grade. A selection of potential papers for class discussion are listed on the following page (p.4) of the syllabus. A sign-up sheet will be available from the start of the course. Class discussions need to be spaced evenly throughout the semester. So, if you don't make any selections, you might be "volunteered" for a date.

**REPLICATION RESEARCH PROJECT**: The replication report will comprise 30% of the course grade. The Replication Project will take up about half of the time for the course, and all assignments and lab activities will build toward this final project and report.

**PARTICIPATION**: Discussion and lab participation will account for 10% of the final grade. Attendance will be tracked but not graded. Classroom participation is evaluated from informal class assignments and questionnaires.

**CLASS ATTENDANCE POLICY**: Class attendance is expected. Excused absences are consistent with university policies in the undergraduate catalog (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx) and require appropriate documentation.

**UF HONESTY POLICY**: UF students are bound by The Honor Pledge, which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (https://www.dso.ufl.edu/sccr/process/student-conduct- honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TA in this class.

**CLASS EVALUATIONS**: Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.

**STUDENTS REQUIRING ACCOMMODATIONS**: Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter, which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

**COUNSELING AND WELLNESS CENTER**: Contact information for the Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc/Default.aspx, 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

## Selections for Paper Presentation

Brandt, M. J., IJzerman, H., Dijksterhuis, A., Farach, F. J., Geller, J., Giner-Sorolla, R., . . . Van't Veer, A. (2014). The replication recipe: What makes for a convincing replication? *Journal of Experimental Social Psychology*, *50*, 217–224.

Button, K. S., Ioannidis, J. P., Mokrysz, C., Nosek, B. A., Flint, J., Robinson, E. S., & Munafò, M. R. (2013). Power failure: Why small sample size undermines the reliability of neuroscience. *Nature Reviews Neuroscience*, *14*, 365.

Frank, M. C., & Saxe, R. (2012). Teaching replication. *Perspectives on Psychological Science*, *7*, 600–604.

Gelman, A., & Loken, E. (2014). Ethics and statistics: The AAA tranche of subprime science. *Chance*, *27*, 51–56.

Gilbert, D. T., King, G., Pettigrew, S., & Wilson, T. D. (2016). Comment on "Estimating the reproducibility of psychological science". *Science*, *351*, 1037–1037.

Gilmore, R. O., Diaz, M. T., Wyble, B. A., & Yarkoni, T. (2017). Progress toward openness, transparency, and reproducibility in cognitive neuroscience. *Annals of the New York Academy of Sciences*.

Grolemund, G., & Wickham, H. (2014). A cognitive interpretation of data analysis. *International Statistical Review*, *82*, 184–204.

Ioannidis, J. P. (2005). Why most published research findings are false. *PLoS Medicine*, *2*, e124.

Loken, E., & Gelman, A. (2017). Measurement error and the replication crisis. *Science*, *355*, 584–585.

Munafò, M. R., Nosek, B. A., Bishop, D. V., Button, K. S., Chambers, C. D., Sert, N. P. du, . . . Ioannidis, J. P. (2017). A manifesto for reproducible science. *Nature Human Behaviour*, *1*, 0021.

Nosek, B. A., & others. (2015). Estimating the reproducibility of psychological science. *Science*, *349*, aac4716.

Poldrack, R. A., Baker, C. I., Durnez, J., Gorgolewski, K. J., Matthews, P. M., Munafò, M. R., . . . Yarkoni, T. (2017). Scanning the horizon: Towards transparent and reproducible neuroimaging research. *Nature Reviews Neuroscience*, *18*, 115.