**Experimental Psychology: Human Behavior**

**W1420 – Spring 2023**

**Instructor Information:**

Patricia Lindemann

Office hours: Virtual on Wednesdays 11-12, or by appointment

After class: Most weeks I’ll be available after class to address questions

E-mail: PGL2@columbia.edu

Lecture: Mon: 4:10-6:00, virtual or 614 Schermerhorn

**Teaching Assistants**

Eivinas Butkus - eb3407@columbia.edu

Arlene Lormestoire - al4201@columbia.edu
Chris Medina-Kirchner – cmk2206@columbia.edu

Victoria Schelkun - vrs2122@columbia.edu

**Lab Time Lab Instructor**

Lab Sec 1: Mon 7:10-9:00 Eivinas Butkus

Lab Sec 2: Tues 10:10-noon Arlene Lornestoire

Lab Sec 3: Tues 12:10-2:00 Victoria Schelkun

Lab Sec 4: Tues 2:10-4:00 Chris Medina-Kirchner

See Courseworks for Psyc 1421 for lab-related information specific to your own section.

**Brief Course Description**

An introduction to research methods employed in the study of human behavior in psychology with a focus on studies in the areas of cognition and perception. Students will gain experience in the design and conduct of research, including ethical issues, observation and measurement techniques, interpretation of data, and preparation of written and oral reports.

Prerequisites: Both an introductory psychology course and statistics course are **required**. Students are expected to be familiar with descriptive statistics, t-tests, correlation, regression and ANOVA. Without some background in statistics, it would be very difficult to get the most out of this course. The basic statistical methods necessary to understand/conduct the data analysis will be reviewed.

We will introduce and use R as a tool for statistical analysis. You are not expected to have any prior knowledge of R or any other statistical programming language. R is useful because it is widely used and freely available. It is only a tool, not a goal in itself. Note, this is not a full course in R, but rather a general/gentle introduction. You will not become an R programmer by taking this course.

You will get a great deal of practice writing lab reports to describe research projects in accordance with the publication manual of the American Psychological Association. You will also get practice with oral presentation of research.

**Learning Objectives:**

Research is a process and in this course you will learn about that process in a variety of ways. The foundational skills that you will develop in this course will be useful to you whether you are a beginning researcher yourself or are assessing the research of others. The goals of the course align with the [psychology department’s program goals](https://psychology.columbia.edu/content/psychology-program-goals) for our students which are available on the psychology department web site.

By actively engaging in this course, you will be able to:

* understand and apply basic research methods and experimental design principles
* **identify interesting research questions based on empirical literature and observations**
* **design a research study motivated by theory**
* **plan, conduct and interpret appropriate statistical tests using R**
* **thoughtfully interpret basic visual representations of data**
* **report research in both oral and written form**
* **critically evaluate research conducted by others**

**Course Structure**

This course has a lecture component and a lab component. Both are required. Generally speaking, the lecture and lab components will be related so that the concepts introduced in lecture will be important for lab and reinforced by the lab experience.

**Readings**

Passer, M.W., (any recent edition). *Research Methods: Concepts and Connection*. New York: Worth.

Readings are listed by chapter heading rather than page number. Hopefully these are the same for all editions. Recently the book has been available as a textbook rental, as a looseleaf edition or as an e-book.

Note: Additional readings will be listed (and posted) on the Courseworks class website.

Notes on the reading/video segments:

* Readings are to be read prior to day where they are listed
* Book chapter readings are intended to provide familiarity with the concepts we will be using in class. Know the vocabulary.
* Videos are primarily intended to review statistical concepts that you will (hopefully) be familiar from intro to statistics

**Course Outline, Readings, and Assignments**

**Course Requirements**

Each week, you will attend a two-hour lecture on Monday afternoon and a two-hour lab section.

Lecture

In the lecture component of the course we will introduce and discuss the theory and practice of conducting empirical research. We will also review related statistical concepts and their application. We will engage in many in class activities to facilitate your learning. Please do the reading before class. Class attendance and participation will be recorded beginning in the second lecture. You are allowed one unexcused absence.

In-class quizzes - Each class will begin with an ungraded quiz covering topics from the last class and/or the assigned reading. The quizzes are there to help you assess your own learning and to encourage you to keep up with the reading. Sometimes there will be a second quiz in the middle of the class covering different topics. Again, these are ungraded and intended to encourage you to keep current with the material and to help you think about it more deeply. We will use canvas quizzing for the quizzes. If you do not have a device that can access the quizzes in class, you can work with someone who does.

Illness Policy – If you are ill, do not come to class. There will be a zoom option. The class is meant to be live. The TAs will monitor the zoom option. If you need to use the zoom option more than once, you need to check in with your TA and Prof. Lindemann to explain the circumstances.

Labs

Labs are your time to get hands on experience developing research ideas and conducting studies. You must be present and able to actively participate. Unexcused absences will impact your grade. Missing lab will only be excused in cases of serious medical or personal emergency.

There are four lab projects, each with its own set of learning goals. They are detailed below.

**Project 1 – Understanding the Basics** – Weeks 1- 3

This project introduces you to the process of developing a study based on previous research. Our study is based on work by Iyengar et al. (2006), Schwartz et al. (2002) and Diab et al. (2008). Goals:

* Develop hypotheses based on previous research findings
* Operationalize psychological constructs
* Understand statistical concepts – correlation, regression, mediator variables, median split, t-test
* Conduct (and interpret) very basic statistical analyses using R
* Present findings in APA format (most elements)

**Project 2 – Nuts and Bolts of Project Development** – Week 4 - 6

For this project, you will expand on the skills you developed for project 1. Your lab will create your own version of an experiment based on an existing paradigm. Goals:

* Consider aspects of experimental design (Selecting conditions, between vs. within, order effects, etc)
* Representing results graphically
* Understand statistical concepts – factorial designs, main effects, interactions
* Conduct (and interpret) ANOVA using R
* Present findings in APA format (all elements)

**Project 3 – Research Proposal** – Week 7 - 9

For this project, you will develop your own independent research proposal. Goals:

* Literature review
* Develop your own hypothesis and methodology related to existing research
* Plan appropriate statistical tests
* Present oral proposal
* Present written proposal in APA format

**Project 4 – Group Project** – Weeks 10 - 14

We will select several of your proposals to develop into full projects. Goals:

* Develop methodology
* Pilot testing (giving, receiving and incorporating feedback)
* Planning appropriate statistical tests
* Analyzing data
* Interpret findings
* Present findings in oral presentation
* Present findings in written report in APA format

**The reading list and weekly syllabus (subject to revision)**

**Part 1 – BASIC FOUNDATIONS**

**\*\*\*Lab Project 1: Decision Making Styles: Maximizers and Satisficers (Weeks 1-3)**

Week 1 (Week of January 23) – Introductions

Class Topics:

* Review of scientific method
* How to read a scientific paper
* Brief Introduction to Decision Making Styles Project – What is Maximizing?

Lab Plan:

* + - * Icebreaker exercise
	+ R assignment 1
	+ Introduction to R using data from Class Survey 1

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| **Required Reading** | **Recommended Video** | **Assignment** |
| Chapter 1: Science and Psychology (can be done after the lecture) |  | **Before Class on Monday, January 23 – Complete Lab Survey 1** |

Week 2 (Week of January 30) – **Research basics: hypothesis, procedure, results**

Class Topics:

* Developing a good question/finding a gap in the literature
	+ - What were the questions in Iyengar et al (2006)?
		- How did they evaluate them?
	+ Our study – extending Iyengar, et al. (2006)
		- Identifying our research question
		- Testing boundary conditions
* Stats review: Variable types (discrete, continuous, nominal, ordinal, ratio, interval)

Lab Plan:

* Making predictions and developing hypotheses
* R assignment 2 using data from Class Surveys 1 and 2
	+ Descriptive statistics in R
	+ Testing correlational hypotheses in R

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| **Required Reading** | **Recommended Video** | **Assignment** |
| * Iyengar, et al. (2006) + related worksheet
* Chapter 2: Conducting Psychological Research (Generating Research Ideas, Gathering Background Information, Forming a Hypothesis)
* Chapter 4: Defining and Measuring Variables (Types of Variables, Defining Variables, Scales of Measurement)
* Chapter 5: Correlation and Correlational Research - (Basic Concepts, Correlation and Prediction)
* Statistics Modules 1-5 (these are at the back of the textbook)
 | -[Measures of Central Tendency and Spread](https://www.khanacademy.org/math/statistics-probability/summarizing-quantitative-data)-[Correlation and Regression introduction](https://www.khanacademy.org/math/statistics-probability/describing-relationships-quantitative-data) | **Before Class:****Class Survey 2****Iyengar Worksheet** |

Week 3 (Week of February 6) – Operationalizing

Class Topics:

* Lecture: Finish discussion of Iyengar, et al (2006)
* Operationalizing – Schwartz et al., (2002) vs. Diab et al. (2008) – 2 views on maximizing
* Guidelines for writing lab 1
* Experiments vs correlational design Part 1

Lab Plan:

* Developing more hypotheses
* R assignment 3
* Correlations vs. t-tests
* How to write up your lab report

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| **Required Reading** | **Recommended Video** | **Assignment** |
| * Schwartz et al., 2002 (limited sections indicated on worksheet)
* Diab et al., 2008 (limited sections indicated on worksheet)
* Chapter 5: Correlation and Correlational Research - (Correlation does not establish Causation, Benefits of Correlation Research, Special Issues)
* Statistics Module 12
 | - [Significance tests](https://www.khanacademy.org/math/statistics-probability/significance-tests-one-sample)-[Comparing Two Sample Means](https://www.khanacademy.org/math/statistics-probability/significance-tests-confidence-intervals-two-samples) | **Before Class:** * **Class Survey 3**
* **Schwartz/Diab worksheet**
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**\*\*\*Lab Project 2: Dual-Task Paradigm: The problem of multitasking (Weeks 4-6)**

Week 4 (Week of Feb 13) Basic Experimental Design

Class Topics:

* Measurement Accuracy, Reliability and Validity
* Between vs. Within Subjects Designs
* Type 1 and Type 2 Errors
* Introduction to Project 2 - multitasking

Lab Plan:

* Draft review/questions about papers
* Developing our study

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| **Required Reading** | **Recommended Video** | **Assignment** |
| * Chapter 4: Defining and Measuring Variables (Measurement Accuracy, Reliability and Validity)
* Chapter 8: Single Factor Experimental Designs
* Chapter 10: Experimentation and Validity (Critical Thinking, Inforence and Validity; Types of Validity; Basic Threats)
* Appendix A: Communicating Research Results, pp. A1 - A14 (For writing your paper)
 | - [Comparing Two Sample Means](https://www.khanacademy.org/math/statistics-probability/significance-tests-confidence-intervals-two-samples)- [z scores](https://www.khanacademy.org/math/statistics-probability/modeling-distributions-of-data)-[Purdue OWL](https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/general_format.html) (useful reference website for writing your paper) | * **Try out the dual task experiment paradigm (complete worksheet)**
* **Lab Project 1 – draft, checklist and questions.**
* **Written report due this week. Exact date depends on lab section.**
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Week 5 (Week of Feb 20) – Factorial Designs and our study

Class Topic:

* Factorial design 1
* Studies with two IVs (focus on the 2X2 design)

Lab Plan:

* Predicting Main Effects and Interactions
* Analyze and interpret data

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| **Required Reading** | **Recommended Video** | **Assignment** |
| * Chapter 9: Factorial Designs
* Statistical Module 16
* Vergauwe, et al. (2010)
 |  | **Run the study using parameters from your group by Friday, Feb 12 and submit results** |

Week 6 (Week of Feb 27) – Factorial Designs and our study (Part 2)

 Class Topics

* Factorial design 2
* Review for midterm

Lab Plan:

* Finalizing Predictions
* Data Representation in R

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| **Required Reading** | **Recommended Video** | **Assignment** |
| * Review/catch up
 |  | **Questions for review?****Complete R assignment** |

**Part 2 – DEVELOPING ORIGINAL RESEARCH**

**\*\*\*Lab Project 3: Individual Project Proposal (Weeks 7 - 9)**

Week 7 (Week of Mar 6) Midterm

 Class Topic:

 MIDTERM (up to, but not including factorial designs)

Lab Plan:

* Questions about papers?
* Brainstorming Proposal Ideas
* Literature Search

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| **Required Reading** | **Recommended Video** | **Assignment** |
| * Identify one article related to your proposal idea
 |  | * **Come to lab with a germ of a proposal idea (at least a topic and variables of interest)**
* **Lab Project 2 written report due this week. Exact date TBD**
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**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Week of March 13 - SPRING BREAK\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

Week 8 (Week of March 20): Developing Research Ideas

Class Topics:

* Developing Research Ideas
* Data Visualization

Lab Plan:

* 1 minute practice talks (no preparation required)
* Time to work on your proposal and presentation

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| **Required Reading** | **Recommended Video** | **Assignment** |
| * Chapter 2: Conducting Psychological Research (review and finish the chapter)
* Read two articles related to your proposal idea
 |  | * **Preliminary Proposal due. Hypthesis + 2 related articles**
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Week 9 (Week of March 27) Developing your survey

Class Topics:

* Writing a good survey
* Correlation and Causality
* Effect Size and Power

Lab Plan:

* **Oral Presentations**

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| **Required Reading** | **Recommended Video** | **Assignment** |
| * Chapter 7: Survey Research
* Statistics Modules 13-15
 | [Error Probabilities and Power](https://www.khanacademy.org/math/statistics-probability/significance-tests-one-sample) | * **Prepare your oral presentation**
* **Lab Project 3 – Written Proposal due this week. Exact date TBD**
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**\*\*\*Lab Project 4: Group Project (Weeks 10-14)**

Week 10 (Week of April 3) – Case Studies and Obser4vational Research

Class Topics:

* Case Studies and Observational Research

Lab Plan:

* Begin Group work

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| **Required Reading** | **Recommended Video** | **Assignment** |
| * Chapter 6: Case-Studies and Observational Research
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Week 11 (Week of April 11) – Additional Experimental Approaches

 Class Topics:

* Quasi Experimental Design
* Single-Case Experimental Design

Lab Plan:

* Pilot Testing 1

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| **Required Reading** | **Recommended Video** | **Assignment** |
| * Chapter 11: Quasi Experimental Design
* Chapter 12: Single-Case Experimental Design
 |  | * **Have materials to pilot ready for lab**
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**Part 3 – HOW ARE WE DOING AS RESEARCH PSYCHOLOGISTS?**

Week 12 (Week of April 17) – Ethics

Class Topics:

* Ethics
* Evaluating research

Lab Plan:

* Additional Pilot Testing
* Finalize Materials
* Plan Analyses

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| **Required Reading** | **Recommended Video** | **Assignment** |
| * Chapter 3: Conducting Ethical Research
* Appendix B: APA Ethical Principles
 |  | * **SUBMIT FINAL MATERIALS TO YOUR TA BY THURS. April 21**
 |

Week 13 (Week of April 24) – The Replication Crisis and Open Science

 Required Reading:

 Class Topics:

* Replicability
* Systematic Biases
* Open Science

Lab Plan:

* Data Analysis
* Presentation Planning

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| **Required Reading** | **Recommended Video** | **Assignment** |
| * Open Source Collaboration (2015) <https://science.sciencemag.org/content/349/6251/aac4716>
* Faneli (2018) <https://www.pnas.org/content/115/11/2628>
 |  | * **WORK ON DATA ANALYSIS**
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Week 14

Monday, May 1

PSYC 1420 Research Symposium

Share your findings with your peers

\*Final Written Report due Friday, May 5

Monday, May 8, 4:10-7:00pm – Projected **Final Exam** (cumulative) – date to be confirmed by the registrar

**Grades**

Grading is determined as follows:

 Exams (35% of final grade)

 Midterm 1 15%

 Final (cumulative) 20%

Lab Participation (10% of final grade) 10%

 Attendance + Active participation + Completing assignments on time

Lab Projects (55% of final grade)

 Project 1 - Mini-lab 10%

 Project 2 – Full-lab 10%

 Project 3 – Your proposal (oral) 5%

Project 3 – Your proposal (written) 10%

Project 4 – Group project (oral) 5%

Project 4 – Group project (written) 15%

Exams – Exams will have short written responses (typically no more than a sentence). They will test your ability to apply concepts that we have discussed in class and in lab. More details will be discussed in class.

Lab Participation – You are expected to attend all lab sessions. This is essential for the learning experience. That said, we do not want you to attend if you are ill. Please contact your lab TA and Prof. Lindemann if you are sick and cannot attend lab. Students who attend all lab sessions, complete all assignments on time and sometimes contribute to class discussion will earn an A (95 points) for class participation. To earn a grade above 95, you should participate regularly, demonstrate that you are well-prepared for class, and make a strong positive contribution by building on what your classmates contribute.

Lab Projects – Each of the lab projects will be described in greater detail. For the first two there will be in-depth rubrics. If you start early and follow the guidelines, you will be able to write strong papers and give strong oral presentations.

**Academic Integrity**

"The intellectual venture in which we are all engaged requires of faculty and students alike the highest level of personal and academic integrity. As members of an academic community, each one of us bears the responsibility to participate in scholarly discourse and research in a manner characterized by intellectual honesty and scholarly integrity. . . . In practical terms, this means that, as students, you must be responsible for the full citations of others’ ideas in all of your research papers and projects; you must be scrupulously honest when taking your examinations; you must always submit your own work and not that of another student, scholar, or internet agent."

From the Faculty Statement on Academic Integrity -

https://www.college.columbia.edu/academics/integrity-statement

Cheating on assignments or exams and plagiarism are very serious violations within the academic community. You are expected to do your own work on all tests and assignments for this class. Neglecting to cite sources in a paper is considered plagiarism. Copying text from another student is considered plagiarism. So is writing a paper together, even if each of you put it in your own words. This can be confusing when it comes to labs you work on with a partner or group projects, so please check with me or your TA if you have any questions about what is or is not OK. Here are some basics:

OK:

* You can discuss ideas with others (your lab partner, your TA, your mom).
* You can work on statistical analyses with others especially your lab partner.
* You SHOULD please use the templates we give you for presenting statistical analyses. You CAN copy this language exactly without citations.
* Feel free to double check formatting rules with others. Remember the Purdue OWL website for APA formatting is the final word on formatting for this class.
* You can have a friend proofread or go to the writing center.

Remember - IF YOUR PAPER IS VERY SIMILAR TO YOUR LAB PARTNER’S, IT LOOKS LIKE PLAGIARISM. THE BEST WAY TO AVOID THIS IS TO AVOID PLANNING/WORKING ON YOUR PAPERS TOGETHER. If you don't plan the papers together, you won't use the same arguments, structure, or format, even if you are using the same data.

Some things that are NOT OK:

* Don't work together when you write your paper. Your arguments may end up so similar that it will constitute plagiarism.
* If you are working with a partner on a project, do not share an outline. There are many ways to present the same basic story. We expect yours to be your own.
* Don't copy figures or tables from someone else. Make your own.
* For group projects - Don't copy from the slides used for group presentations.
* For group projects - Don't copy text or specific arguments from the project proposal.
* And don't forget proper citations! ALWAYS cite other people's work (or even your own if it was previously submitted!). If in doubt, cite.

If you have any question about whether or not something is acceptable in your written work, please ask. As noted above, these rules can sometimes be confusing, especially when you are working with one or more partners in the lab section.

And finally, as part of this academic community you are expected to always act in accordance with the Columbia honor code. Any student found cheating or plagiarizing in this class will be reported to Columbia's Office of Judicial Affairs and Community Standards for evaluation and academic discipline. If you have questions about any aspect of academic integrity at Columbia, please refer to the following link: https://www.college.columbia.edu/academics/integrity and if you have specific questions about sanctions or the judicial process: see https://www.college.columbia.edu/academics/disciplinaryprocess

**Students with Disabilities:**

From the office of Disability Services:

In order to receive disability-related academic accommodations for this course, students must first be registered with their school Disability Services (DS) office. Detailed information is available online for both the[***Columbia***](https://health.columbia.edu/content/disability-services)and[***Barnard***](https://barnard.edu/disabilityservices/students/register)registration processes.

Refer to the appropriate website for information regarding deadlines, disability documentation requirements, and [***drop-in hours***](http://health.columbia.edu/getting-care/drop-offices/disability-services-drop-hours)(Columbia)/[***intake session***](https://barnard.edu/disabilityservices/students/register)(Barnard).

***In order to receive disability-related academic accommodations for this course, students must first be registered with their school Disability Services (DS) office. Detailed information is available online for both the*** [***Columbia***](https://health.columbia.edu/content/disability-services) ***and*** [***Barnard***](https://barnard.edu/disabilityservices) ***registration processes.***

***Refer to the appropriate website for information regarding deadlines, disability documentation requirements, and*** [***drop-in hours***](http://health.columbia.edu/getting-care/drop-offices/disability-services-drop-hours)***(Columbia)/***[***intake session***](https://barnard.edu/disabilityservices) ***(Barnard).***

***For this course, students are not required to have testing forms or accommodation letters signed by faculty. However, students must do the following:***

* ***The Instructor section of the form has already been completed and does not need to be signed by the professor.***
* ***The student must complete the Student section of the form and submit the form to Disability Services.***
* ***Master forms are available in the Disability Services office or online:*** [***https://health.columbia.edu/services/testing-accommodations***](https://health.columbia.edu/services/testing-accommodations)

**Additional Resources for Students:**

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| Columbia University Writing Center  | <https://www.college.columbia.edu/core/uwp/writing-center> |
| Tutoring Service  | <https://www.cc-seas.columbia.edu/csa/tutoring> |
| Health Services  | <https://health.columbia.edu/> |
| Go Ask Alice! (answers to health questions)  | <https://goaskalice.columbia.edu/> |
| Counseling and Psychological Services (CPS)  | <https://health.columbia.edu/content/counseling-and-psychological-services>For appointments, call 212-854-2878. For after-hours assistance, call 212-854-9797 or contact Public Safety at 212-854- 5555.  |
| Office of Disability Services  | Columbia - <https://health.columbia.edu/content/disability-services>Barnard - <https://barnard.edu/disabilityservices> |
| Office of University Chaplain | <http://ouc.columbia.edu/> |