

# Lab in Cognitive Science (CogLab)

PSYC 2740 | T TH 10.05-11.30 AM | DRUCK 24

# welcome!

**instructor:** Abhilasha Kumar

- she/her
- address me as:
  - Professor
  - Professor Kumar
  - Prof. Kumar
- office: Kanbar 217

**learning assistant:** Uma Mohamed

- she/her
- responsibilities
  - attendance
  - office hours
  - troubleshooting
- office: Kanbar 200

# agenda for today

- meet & greet
- course & canvas walkthrough
- open science intro

# introductions

- your name and pronouns
- your year & major
- where home is
- a **boring** fact about you



# where does the course live?

- course website:
  - <https://teaching-me.github.io/coglab/>
  - syllabus, readings, slides, schedule, and assignment details
  - will be updated regularly
- canvas
  - announcements
  - grades
  - Q&A

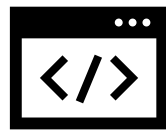
# what is this course about?

- introducing you to **modern techniques** of studying the **mind**
- empowering you with **transferable and highly valued skills**
- learning goals
  - **design** and conduct a web-based experiment
  - **analyze** real data
  - **communicate** scientific findings
  - [master best open science practices]

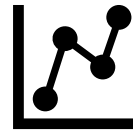


# course outline (big-picture)

- **replication** as a tool to understand the scientific process



design



analyze



communicate

# the nitty gritty

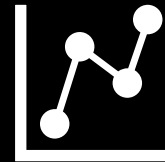
- literature review
- asking questions
- experiment creation  
[HTML/jsPsych]

design



- R & Rstudio
- describe data
- infer from data

analyze



- pre-registration
- poster
- short report

communicate





# some reflections

*I really liked that we learned programs such as R which can be helpful for grad school and further research in the field. The course was **focused on learning and applying things** rather than just memorization*

*A very well-organized course. The expectations were always clear. I have taken several non-coding courses that attempt to provide an intro to some sort of coding, and this is the first one I have taken where I felt like **I actually understood what was happening**. Very happy with what I learned in the course.*



*I learned **practical skills** and pushed myself through this course. Using R and VS code are things I would have otherwise not felt comfortable doing, and this class gave me the **space to grow in learning them without needing to master them completely**.*

*Good introduction to lab in psychology with a different approach based on replication of existing studies.*

*the assignments feel like they actually have **practical value***

*I learned **new skills pertaining to coding, data analysis, and experimental design**. I was not expecting there to be so much coding, and I'm not sure how much I'll use the skills again, but I definitely did learn a lot about writing code.*



course website walkthrough

# general class format

- you are expected to do some **reading/HW before class**
- **slides** will be uploaded right before class
  - hands-on format in most classes
  - minimize looking over in advance so you can be present!
- **class time** will be devoted to
  - learning by doing
  - discussions + question time
- **each week**, these things are due (prep-try-apply)
  - readings/surveys/tutorials (prep)
  - in-class work/coding/analyses (try)
  - project milestone (apply)



# how to get the most out of a group project

- **reflect** on your own strengths and weaknesses
- work on an **accountability contract**
- **meet in person** whenever possible (30 minutes - 1 hour)
  - have a shared google doc for meeting notes
  - have a meeting agenda and pre-assigned tasks
  - meet **1-2 weeks before milestone deadlines** to assign tasks/roles
  - meet on the **day of submission** for final touches
  - **collaborate & engage**; don't divide and conquer!
- **communicate** effectively and often, especially when things are not going well or you are struggling





questions?

# how to study for this class

- utilize **evidence-based effective** study strategies:
  - **retrieval practice**: quiz yourself, ask-a-friend, flash cards
  - **elaborative encoding**: ask “why” questions, use mental maps, paraphrase, try mini-exercises
  - **spaced practice**: space out your studying, do not cram!
- but...your **attitudes** toward effort also matter
  - a “growth mindset”
  - read the assigned material **before** class
  - come prepared to class for engagement
  - minimize distractions
  - plan early for assignments, assessments, and projects
  - **everyone can code!**

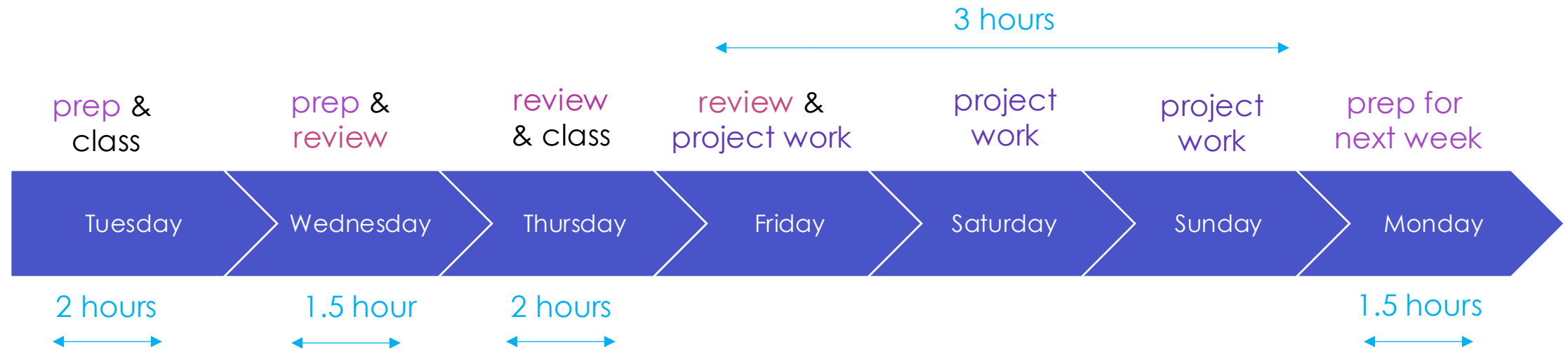


# the course is designed to support you

- **retrieval practice**
  - class participation via activities/reflections
  - incremental project milestones
- **elaborative encoding**
  - exercises that force you to go from knowing to actively learning
  - class project that helps you connect concepts learned in class via newer formats
- **spaced practice**
  - concepts from earlier classes form the basis of later classes
  - class project involves integrating old and new content

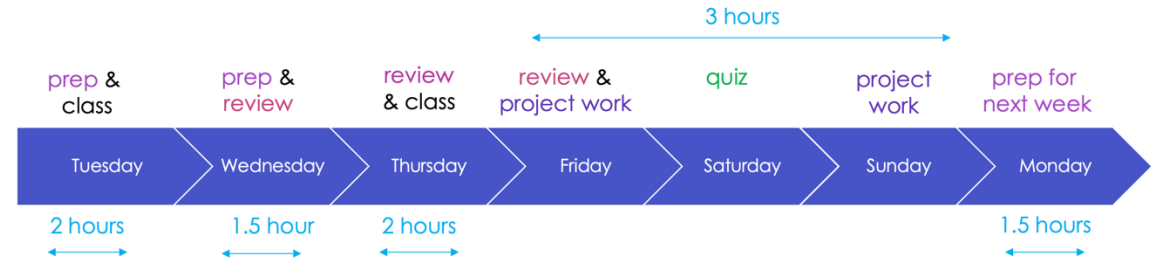


# a weekly breakdown





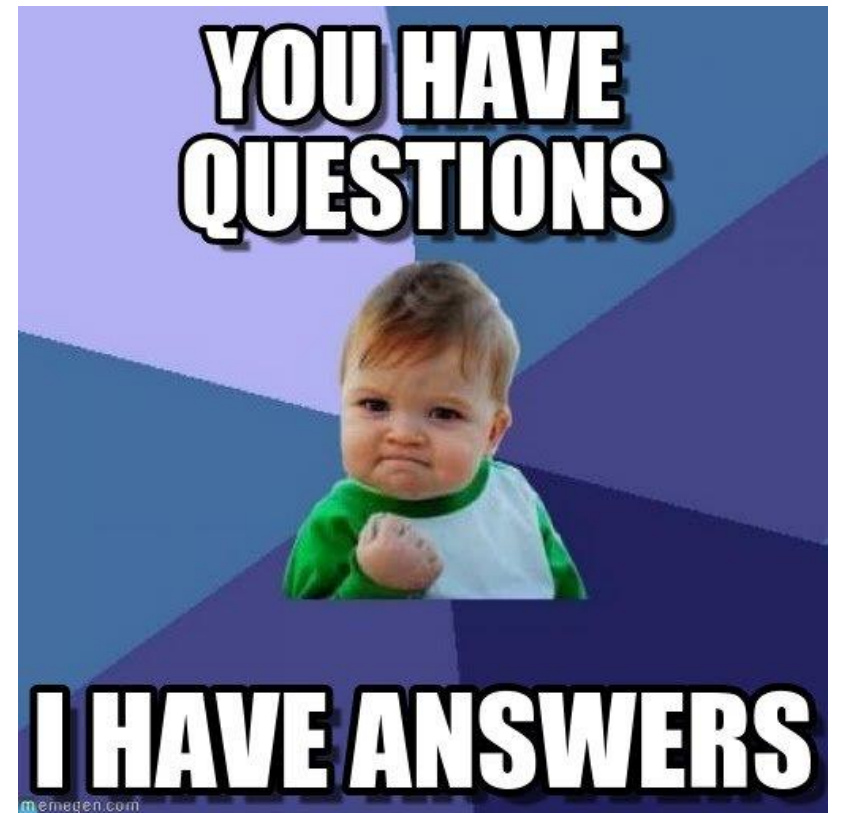
if I was a student, I would...



- USE A CALENDAR!!
- keep track of project milestones a week ahead of time
- schedule in-person/zoom time with group partner(s) to work on milestones
- use retrieval practice / elaborative encoding strategies
- make high-quality notes in class
- revisit notes and do some retrieval practice / reflection on Thursday/Friday
- allocate Saturday/Sunday to project work
- think about a possible meme on Saturday/Sunday

# when you have thoughts and questions

- **office hours**: these are YOUR hours!
  - will be finalized by next week
- meetings by **appointment**
- anonymous **feedback**
  - end of each month



# reasons to come to office hours (and whose)

- Prof. Kumar

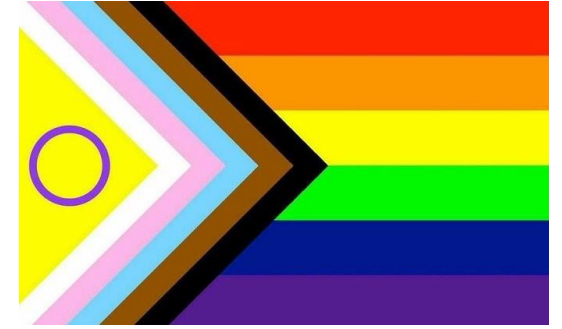
- Qs about material
- tech troubleshooting
- Qs about course policies/assessments/grades
- reflections on the classroom experience
- discussions about class project

- Uma

- informal feedback about course pace
- Qs about Canvas deadlines/due dates
- tech troubleshooting
- discussions about class project



# valuing our voices



- I will try my very best to create an **inclusive environment** for all of you
- we are all **different** and that is a **strength**
- we also exist **beyond the classroom!**



today's agenda

# agenda for today

- meet & greet
- course & canvas walkthrough
- open science intro



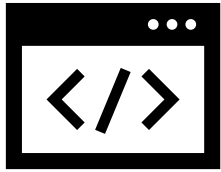
what is open science?

# open science and reproducibility

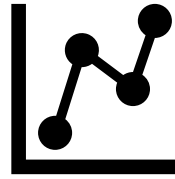




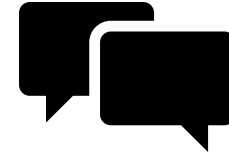
# ways to go wrong in doing science



design

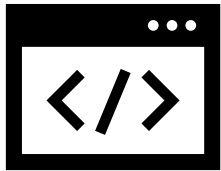


analyze



communicate

# ways to go wrong in doing science

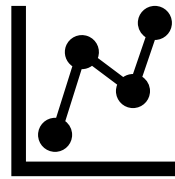


design

software errors

experimenter bias

low statistical power



analyze

coding errors

statistical errors

incomplete  
documentation

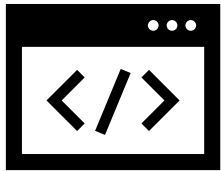


communicate

publication bias

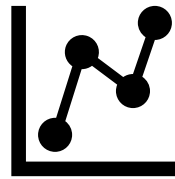
file drawer effect

# the solution: open science



design

pre-registration  
researcher blind  
paradigms  
power analysis



analyze

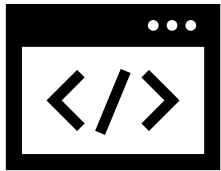
open-source  
software [R]  
open code and  
materials [github/jsPsych]



communicate

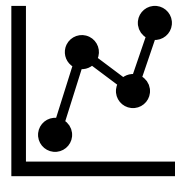
pre-prints  
open-access publishing

# the solution: teaching replication!



design

pre-registration  
researcher blind  
paradigms  
power analysis



analyze

open-source  
software [R]  
open code and  
materials [github/jsPsych]



communicate

pre-prints  
open-access publishing

# the story so far...



Eleven years of student replication projects provide evidence on the correlates of replicability in psychology

Veronica Boyce<sup>1,\*</sup>, Maya Mathur<sup>1</sup>, Michael C. Frank<sup>1</sup>

<sup>1</sup>Stanford University

## Abstract

Cumulative scientific progress requires empirical results that are robust enough to support theory construction and extension. Yet in psychology, some prominent findings have failed to replicate, and large-scale studies suggest replicability issues are widespread. The identification of predictors of replication success is limited by the difficulty of conducting large samples of independent replication experiments, however: most investigations re-analyse the same set of ~170 replications. We introduce a new dataset of 176 replications from students in a graduate-level methods course. Replication results were judged to be successful in 49% of replications; of the 136 where effect sizes could be numerically compared, 46% had point estimates within the prediction interval of the original outcome (versus the expected 95%). Larger original effect sizes and within-participants designs were especially related to replication success. Our results indicate that, consistent with prior reports, the robustness of the psychology literature is low enough to limit cumulative progress by student investigators.

Table 1: The unadjusted Pearson correlations between each individual predictor and the subjective replication score. See Methods for how these variables were coded.

r	p	Predictors
0.333	0.000	Within participants design (versus between participants)
0.182	0.015	Log number of trials
0.150	0.047	Open data
0.080	0.294	Non psychology (versus cognitive psych)
0.075	0.322	Other psychology (versus cognitive psych)
0.064	0.399	Publication year
0.002	0.979	Open materials
-0.027	0.725	Stanford affiliation of original authors at time of replication
-0.047	0.536	Log ratio between replication and original sample sizes
-0.108	0.155	Log original sample size
-0.158	0.037	Switch to online for replication (versus same modality for original and replication)
-0.246	0.001	Social psychology (versus cognitive psych)
-0.267	0.000	Single vignette (versus multiple items/inductions per condition)

# why should **you** care?

- as *practitioners* of science
  - broadening access to literature
  - improving quality of literature
  - mitigating stress, panic, and shame
- as *consumers* of science
  - critical and informed citizens
  - implementing evidence-based practices and policies

# [109] Data Falsificada (Part 1): "Clusterfake"

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Posted on June 17, 2023 by Uri, Joe, & Leif

This is the introduction to a four-part series of posts detailing evidence of fraud in four academic papers co-authored by Harvard Business School Professor Francesca Gino.

In 2021, we and a team of anonymous researchers examined a number of studies co-authored by Gino, because we had concerns that they contained fraudulent data. We discovered evidence of fraud in papers spanning over a decade, including papers published quite recently (in 2020).

## Support Data Colada's Legal Defense



 Simine Vazire is organising this fundraiser.

Created 1 day ago •  [Other](#)

**Data Colada Are Being Sued for Raising Scientific Concerns about Published Research: Support Their Legal Defense**

# to-do's

[web link](#)



## Before Tuesday

- Complete the [pre-class survey!](#)
- Read the [syllabus](#) for this course. If you have questions about the syllabus, then please ask them in class or in the survey.

## Before Thursday

- [Complete the language experiment](#)

## After Thursday

- Read the paper: [Canvas link](#)

Savic, O., Unger, L., & Sloutsky, V. M. (2022). Exposure to co-occurrence regularities in language drives semantic integration of new words. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 48(7), 1064.

- Read the [QALMRI + SPARK tutorial](#) on the course website
- Submit your Week 1 reflection and CITI certificate (due Sunday, see the [Apply](#) section)