

# CogLab: Research Design

WEEK 1

# recap

- what we covered:
  - course overview
  - canvas
  - open science
- your to-dos were:
  - complete class survey
  - completing the language experiment



# today's agenda

- office hours
- language experiment discussion
- fall 2023 studies

# office hours / Kanbar 217 (Prof. Kumar)

- Tuesdays
  - 1-2 pm
  - 5-6 pm
- Thursdays
  - 9-10 am
  - 4.20-5.30 pm
- Uma's hours TBD

# project groups & milestone #1

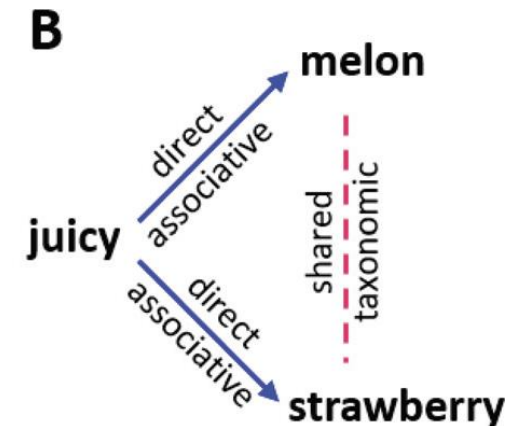
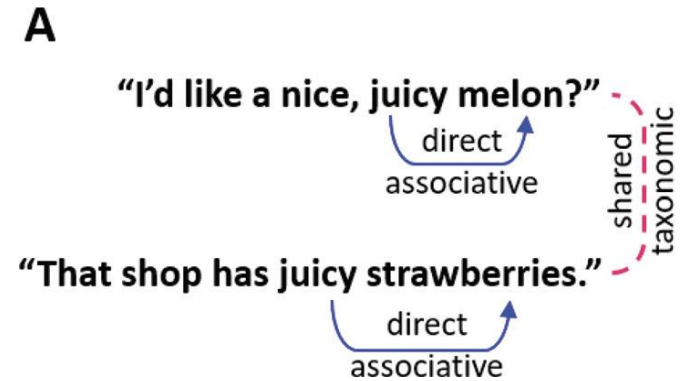
- groups:
  - Natalie & Lily [[group folder link](#)]
  - Mitri & Katie [[group folder link](#)]
- milestone #1: lit review (due Sep 15)
- locate and explore your group folder
- come up with a plan to meet for milestone #1
- ask any questions that are coming up

# experiment review

- think back to the language experiment you did
- what kinds of **tasks** did you perform?
- what do you think the experiment was about?

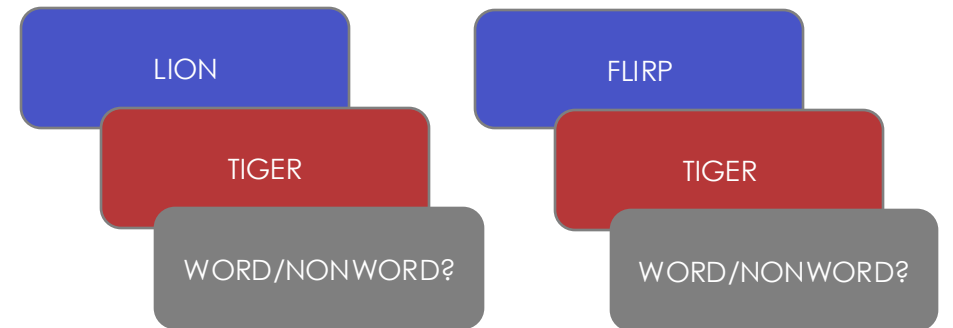
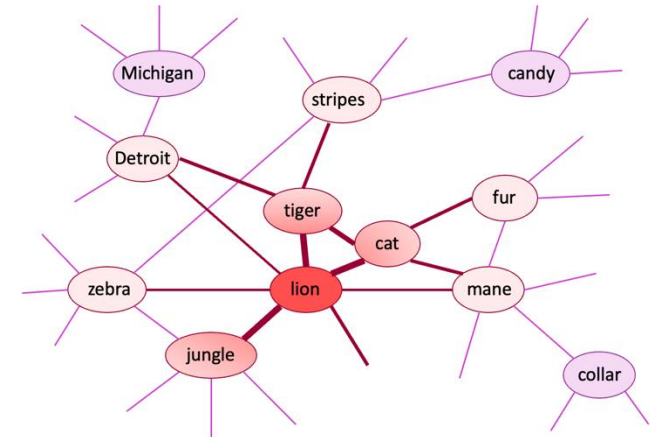
# learning from co-occurrence

- the meaning of words is learned based on **which words it co-occurs with** in natural language
  - “you shall know a word by the company it keeps” (Firth, 1957)
- co-occurrence can be defined in two ways:
  - **direct**: if words occur together in the **same** context (e.g., eat-food, sit-chair, etc.)
  - **indirect/shared**: if words occur in **similar** contexts (e.g., strawberries are red, apples are red)
- co-occurrences are statistical regularities and can extend to any type of input (tones, figures, words, etc.)



# semantic priming

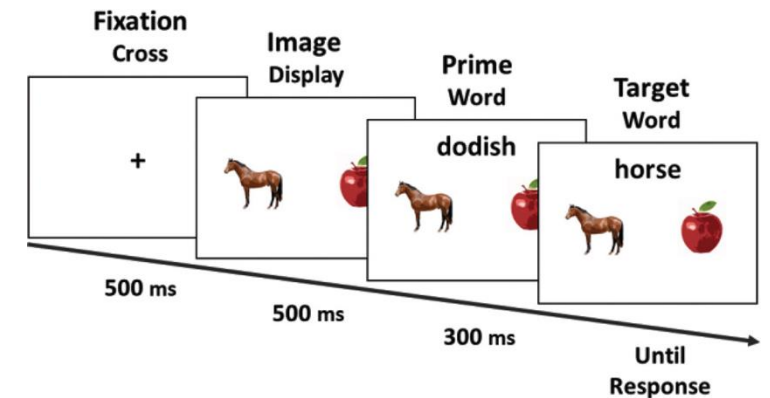
- **priming** refers to the phenomenon where presenting a stimulus influences processing of a subsequent stimulus
- semantic priming tasks are widely used to study how concepts influence the processing of other concepts (**spreading activation** theory) through meaningful relationships
- a key finding from **priming tasks** is that **related words are responded to faster than unrelated words**





# learning new words

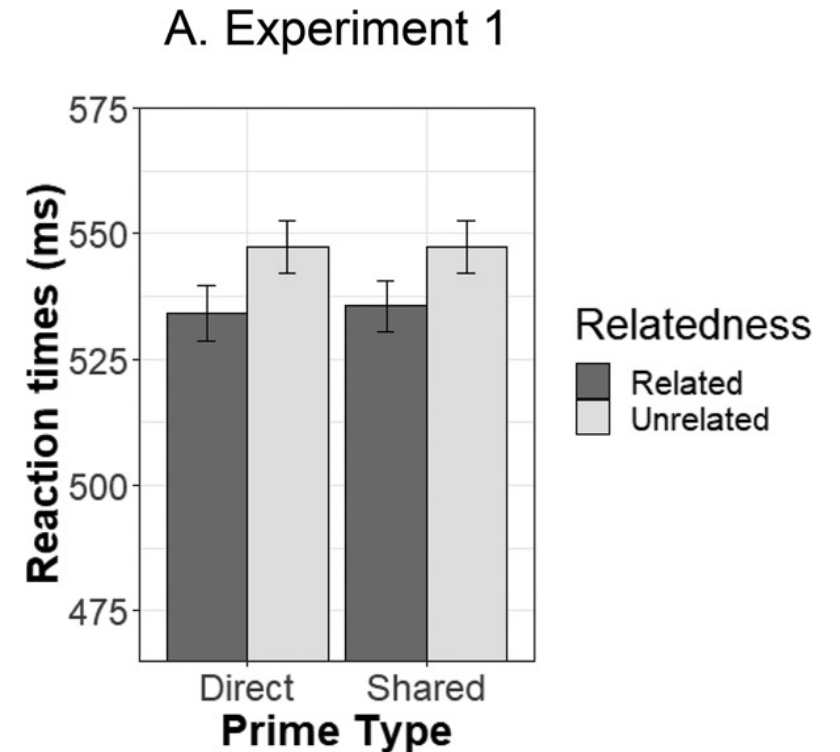
- Savic et al. (2022) had participants read sentences with novel (*dodish*) and familiar (*horse*) words
  - novel words co-occurred with familiar words (directly or indirectly)
- participants tested in a semantic priming experiment
  - novel – familiar words were paired based on whether the pairs were **related** or **unrelated** and whether there was **direct/indirect co-occurrence**



	related	unrelated
direct	dodish-horse	foobly-horse
indirect/shared	geck-horse	mipp-horse

# semantic priming and co-occurrences

- **reaction time** to identify targets was faster when they were preceded by novel pseudowords/primers with which they directly co-occurred or shared co-occurrence in training
- pattern did not differ for direct and indirect co-occurrences
- **inference**: co-occurrences in natural language can drive semantic integration of new words

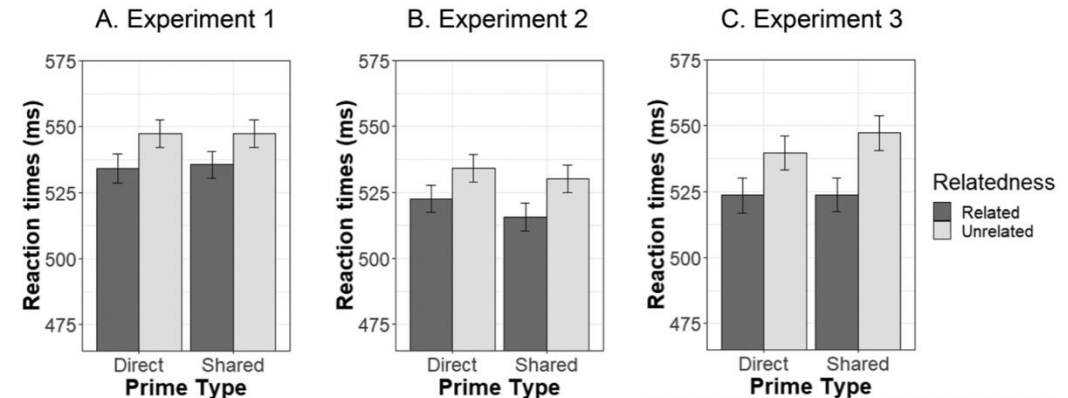


# other experiments

- experiment 1
  - foobly-apple / dodish-horse
- experiment 2
  - foobing-apple / doding-horse
- experiment 3
  - longer prime duration (1500 ms)

Figure 4

Mean Reaction Times for Direct and Shared Co-Occurrence Primes Across Three Experiments

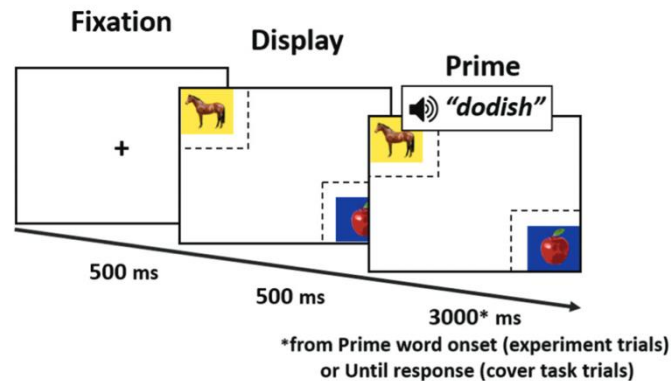


Note. Error bars indicate the standard errors of the means.

# other experiments

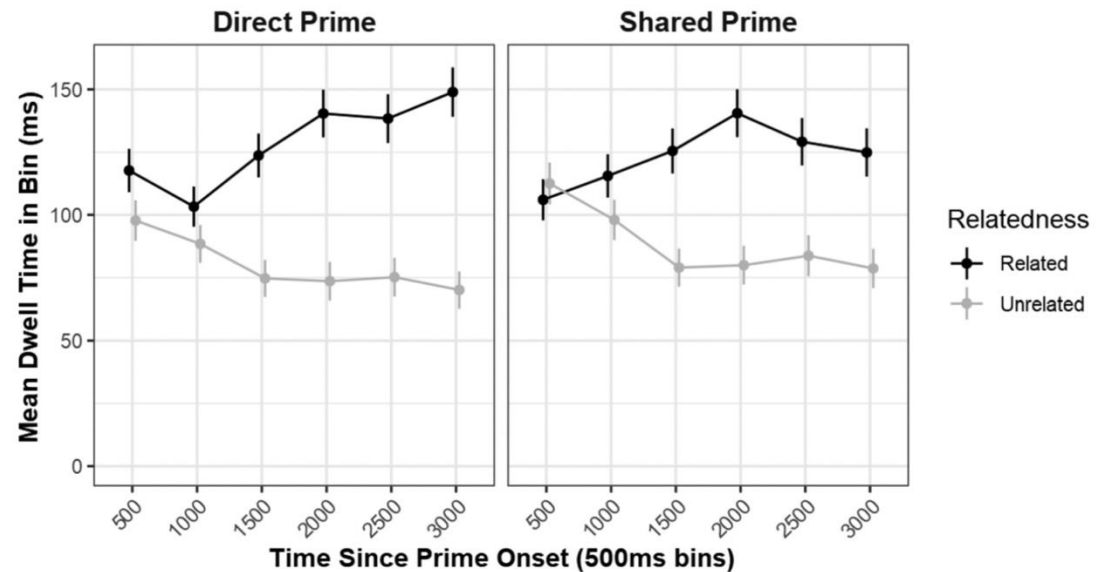
- experiment 4
  - visual word paradigm
  - eye tracking

Figure 7  
Timing of Events in the Eye Tracking Paradigm in Experiment 4



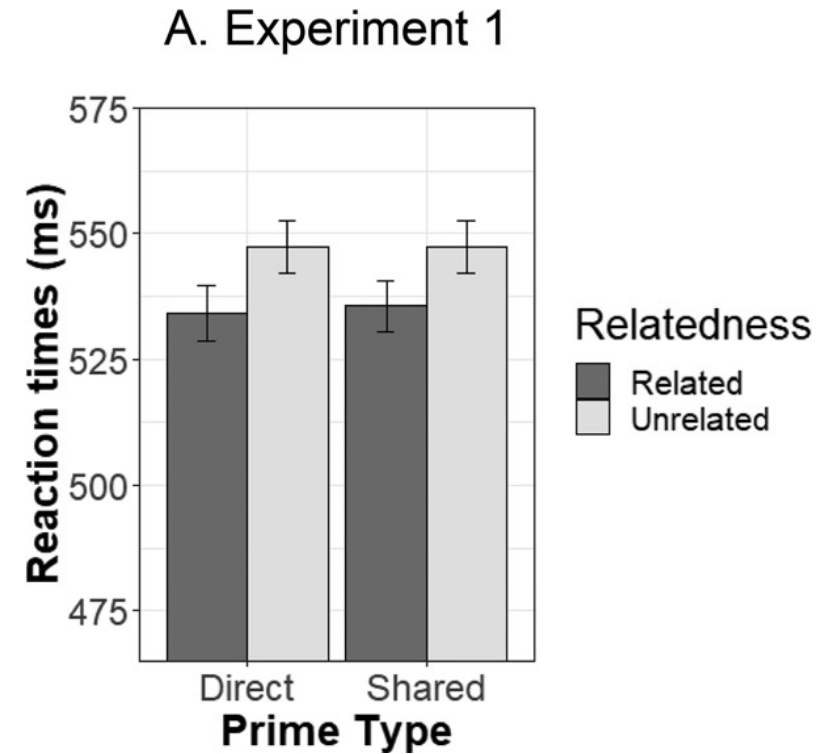
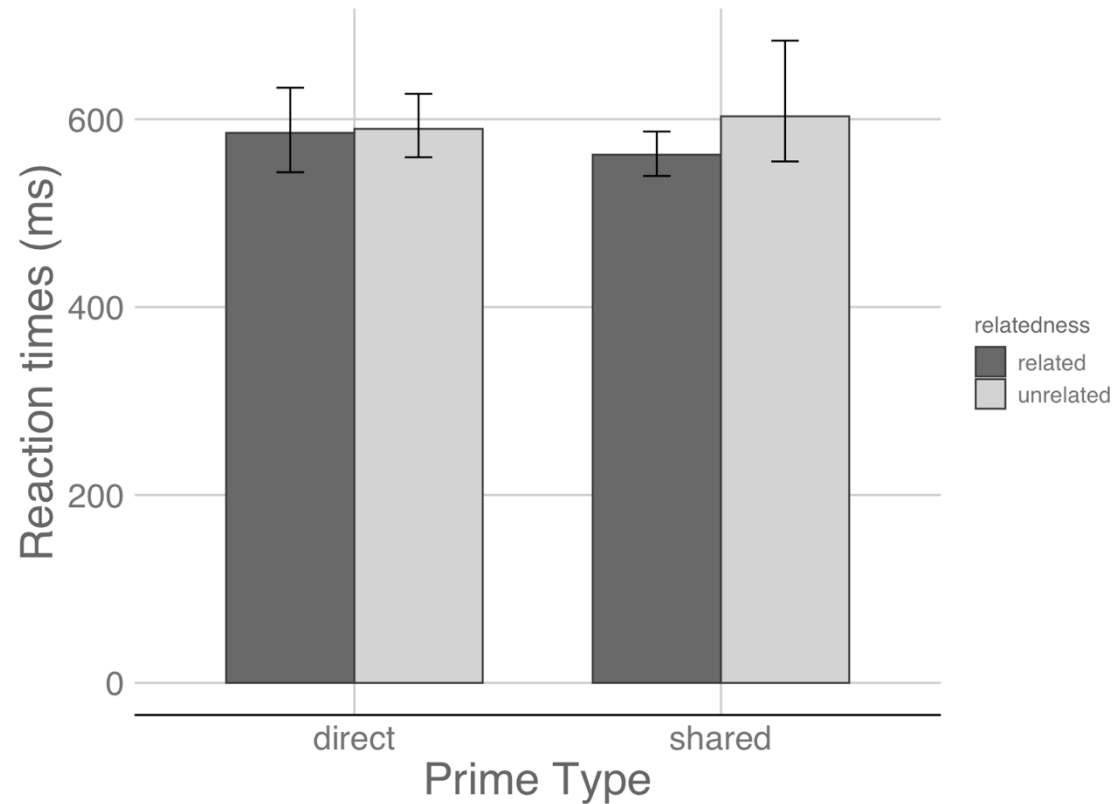
Note. Dashed lines depict areas of interest. See the online article for the color version of this figure.


Figure 8  
Average Looking Time to Related and Unrelated Pictures in Each 500-ms Time Bin Over the 3,000 ms Following Direct Prime Onset (Left) and Shared Prime Onset (Right)



Note. Error bars depict standard errors of the mean.

# class data (N = 52) vs. Savic et al.'s data





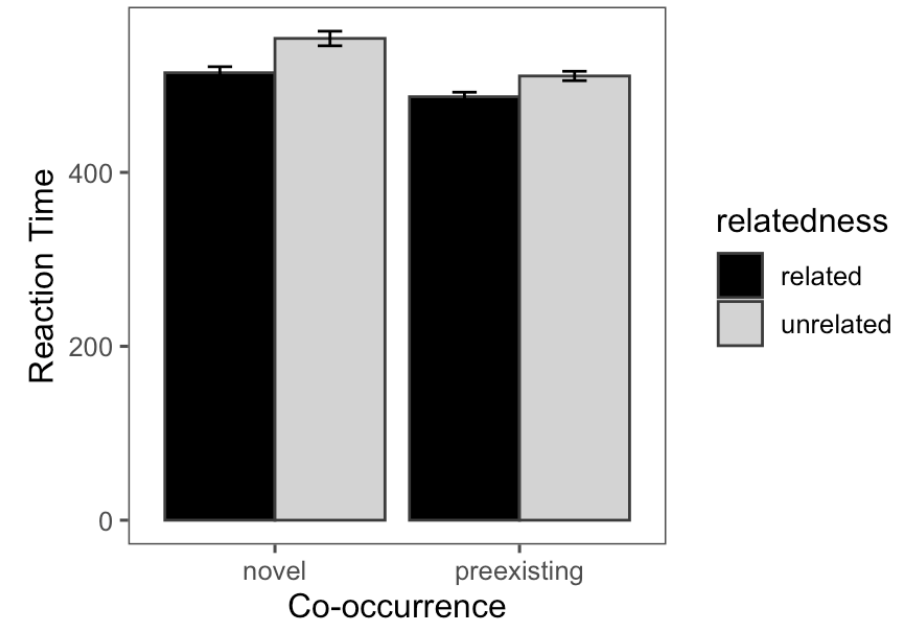
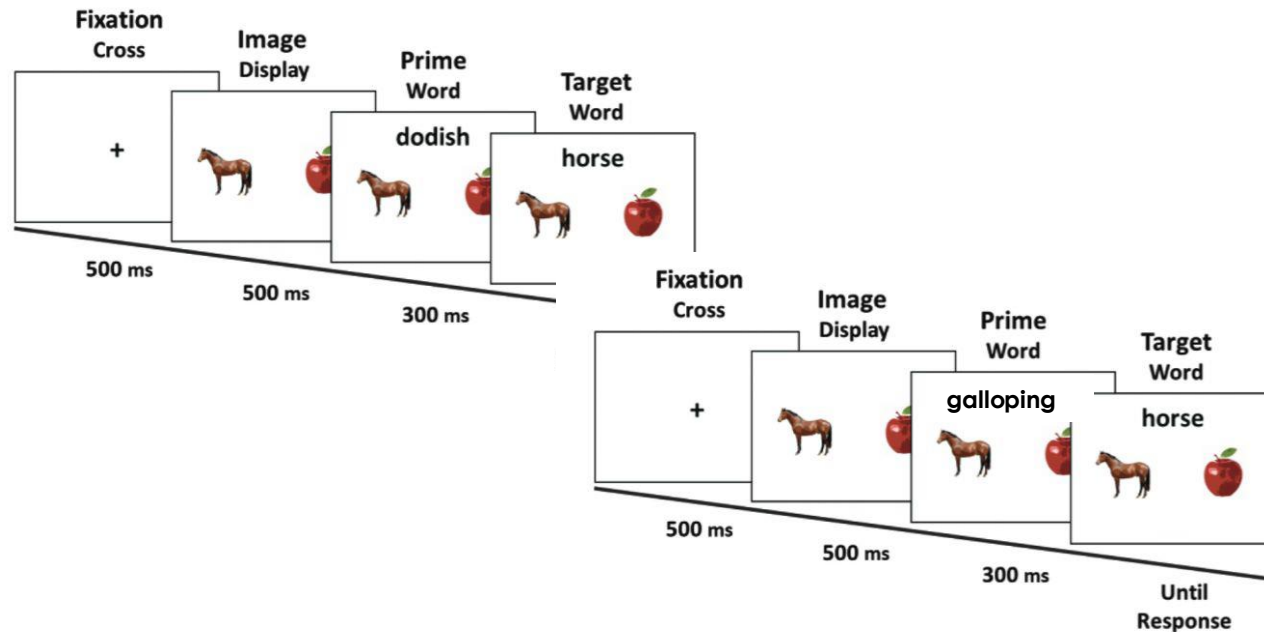
questions/thoughts

# fall 2023 studies

- three groups followed up on the original study
- [project narratives available](#)

# fall 2023 studies / strength of association

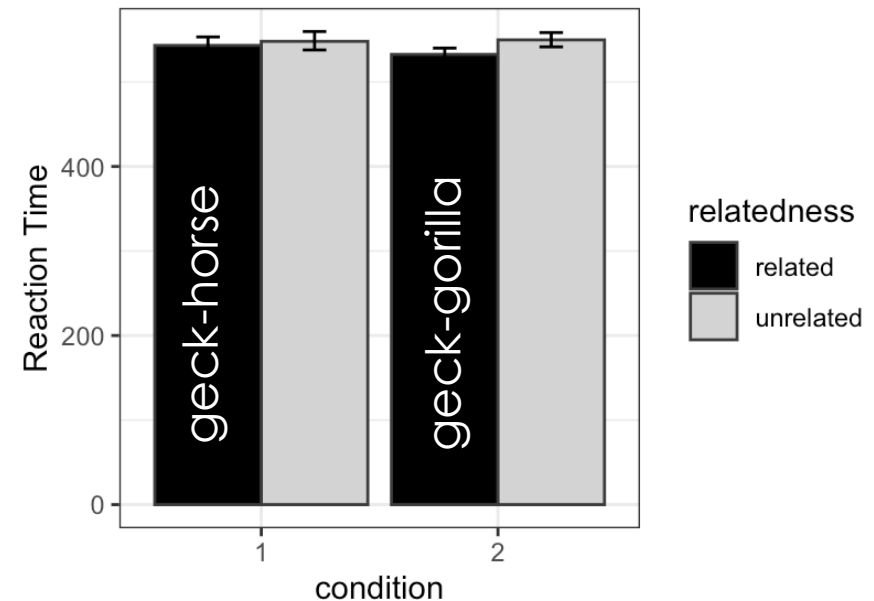
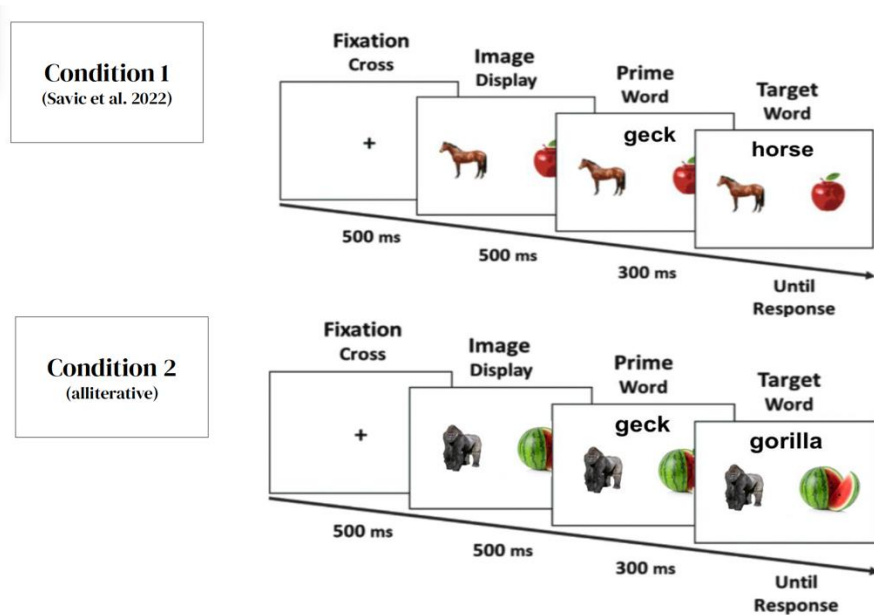
- once a new word association is learned (**dodish-horse**), is this association stronger, weaker, or equal to previously learned associations (**galloping-horse**)?





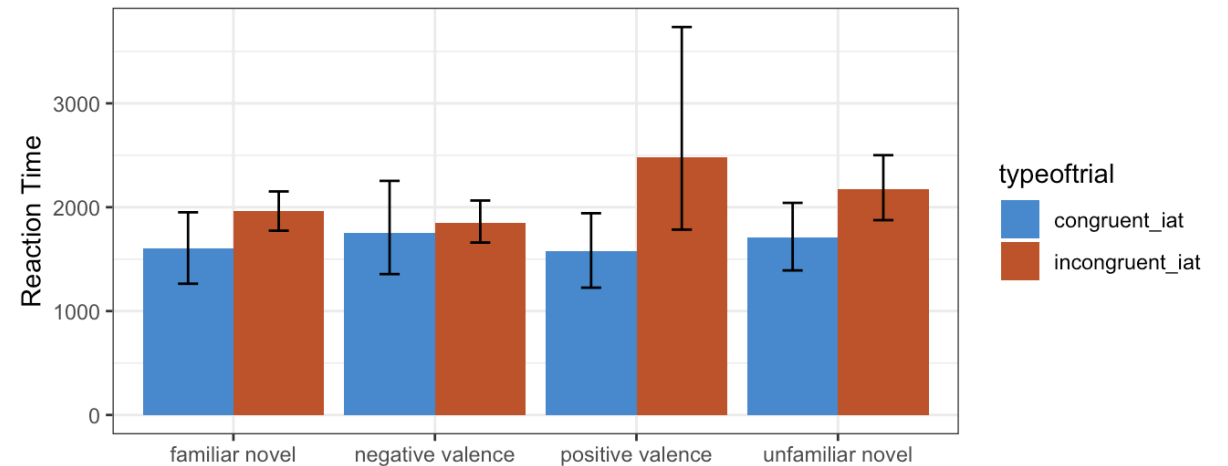
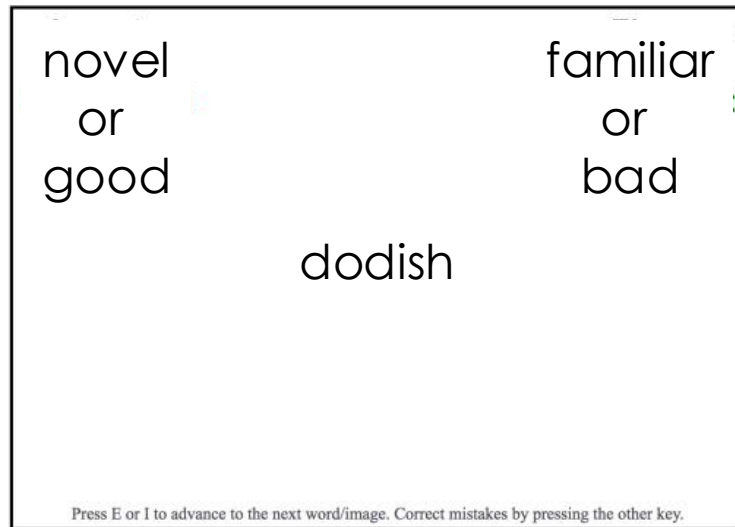
# fall 2023 studies / influence of alliteration

- are indirectly learned associations stronger when there is a sound-based relationship (geck-**gorilla** vs. geck-**horse**)?



# fall 2023 studies / valence and meaning

- do you learn anything about the novel word beyond its association with the older word?



# possible questions to explore

- is **association** the same as **meaning**?
- does the **type of relationship** matter for learning?
- are **words** and **facts** learned the same way?

# week 1 reflection: QALMRI

- QALMRI: a tool to glean important information from empirical papers in psychology
- for multi-experiment papers, write a new QALMRI for each experiment or make sections inside one QALMRI

Q uestion

A lternatives

L ogic

M ethods

R esults

I nferences

# to-do's

## Apply



At the end of this week, you will be submitting the following:

- [Week 1 Reflection \(due Sunday\)](#)
- [CITI training certificate \(due Sunday\)](#)



## 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 [QALMRI + SPARK tutorial](#) on the course website
- 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.

- Submit your Week 1 reflection and CITI certificate (due Sunday, see the [Apply](#) section)