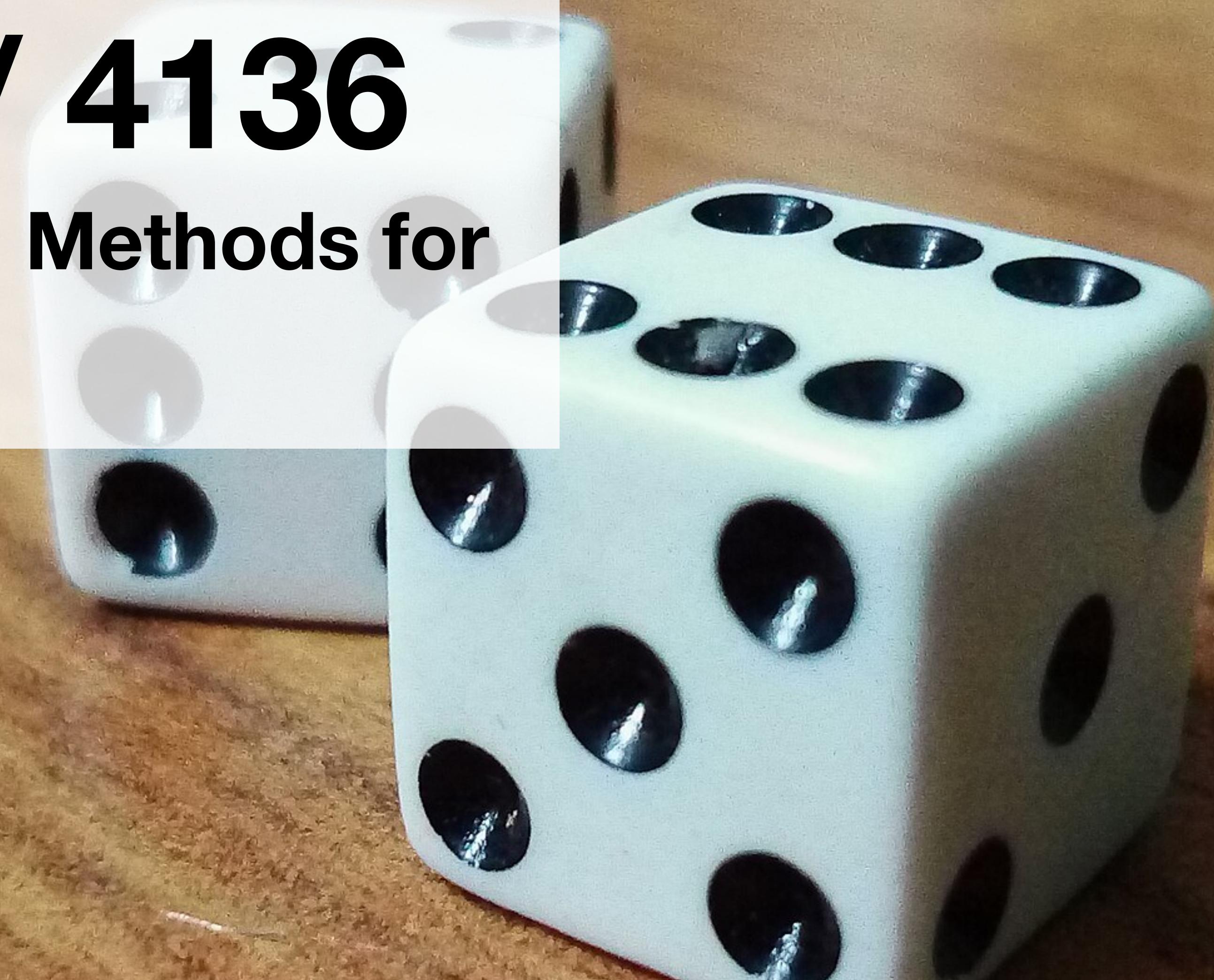


# **LING2136 / 4136**

## **Advanced Statistical Methods for Language Students**



**Session-01: Welcome**

Lecturer: Timo Roettger

**I KNOW...**

**I BELIEVE...**

I can't  
do it

# SO FAR...

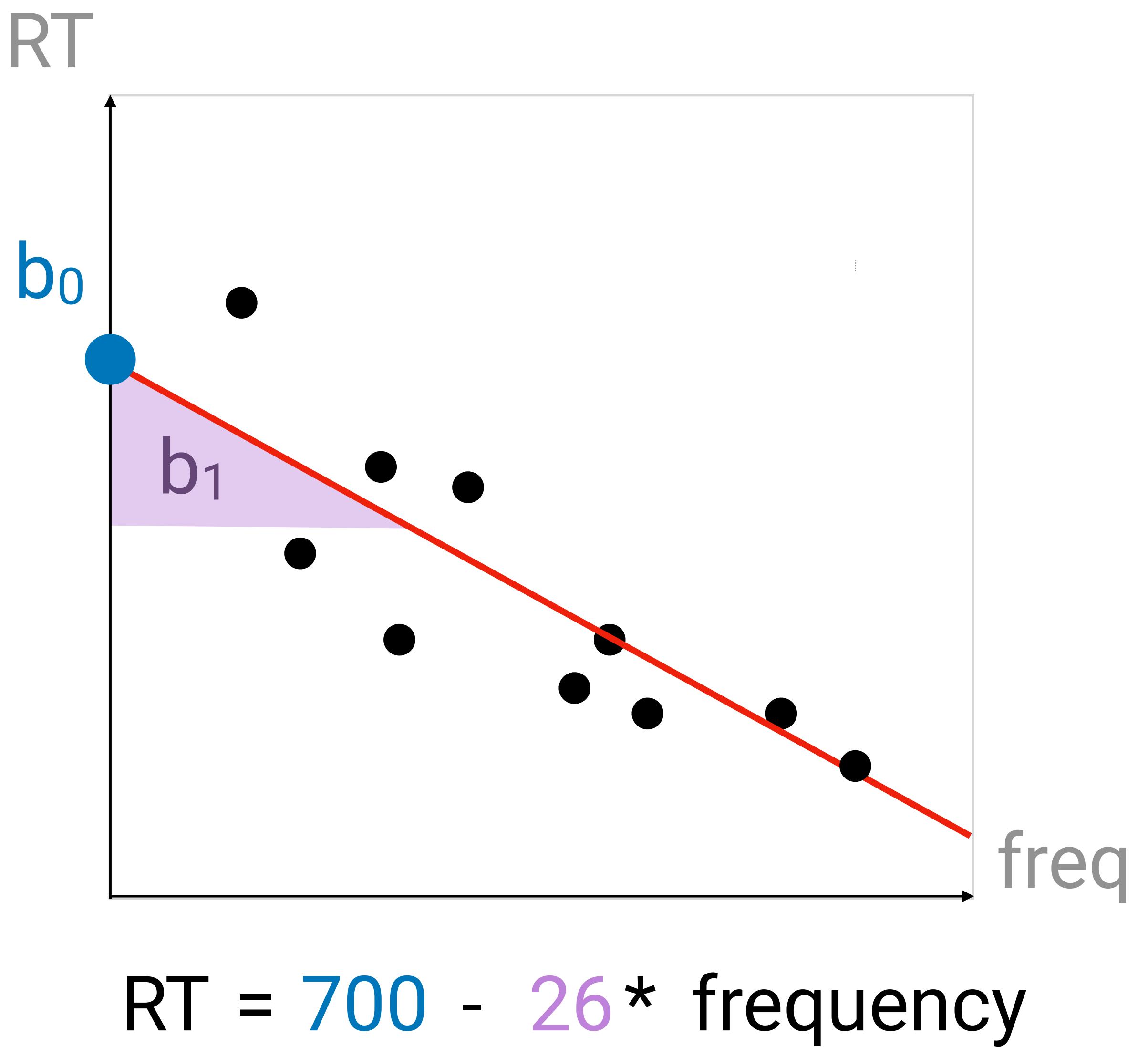
you have **basic R competence**

you can craft **informative data visualizations**

you can **describe distributions**

you can define, run, and interpret **generalized linear models**

you can draw **inference** using the **null hypothesis significance testing** framework



# EXPLICIT GOALS FOR THIS CLASS

learn all relevant aspects of **hypothesis testing** using R for  
**quantitative researchers** in 2026

advance your knowledge using the R programming language

pretty common

run and interpret **hierarchical linear models**

pretty common

**reproduce** published findings using the original code

rare

plan and create highly informative **data visualizations**

rare

make inference using the **Bayesian framework**, including

- specifying **prior** assumptions
- defining **smallest effect sizes of interest (SESOI)**
- testing hypotheses using **Bayes factor**

rare

VERY rare

VERY rare

work, collaborate, and store data in reproducible ways using **GitHub**.

rare



(AGAIN) THIS CLASS WILL BE AN  
**EMOTIONAL ROLLERCOASTER**

you in week 2

you in week 6

# UNIVERSITY CLASSROOM

I talk

you listen?



# FLIPPED CLASSROOM

you do!

I give feedback

# **WHAT YOU NEED TO DO**

## **ASSIGNMENTS**

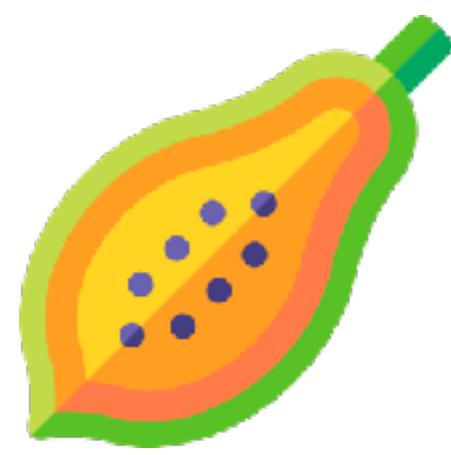
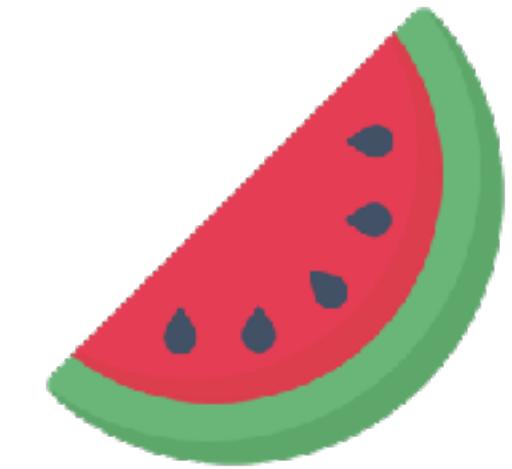
6 out of 8 weekly assignments

## **BE A GOOD BUDDY**

finish buddy group assignment and contribute

## **FINAL EXAM: 3-DAY PROJECT**

realistic data science problem from current experimental linguistics research



**Everybody needs a buddy**  
(especially when learning statistics)



# BUDDY CHALLENGE (!!!)

- Part 1** Find an **experimental linguistic** paper that  
uses **linear mixed effects models**  
reports that their model did **not converge**  
has published their **data and scripts**

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- Part 5** Re-analyse the original analyses using **ROPEs** and **Bayes Factor**

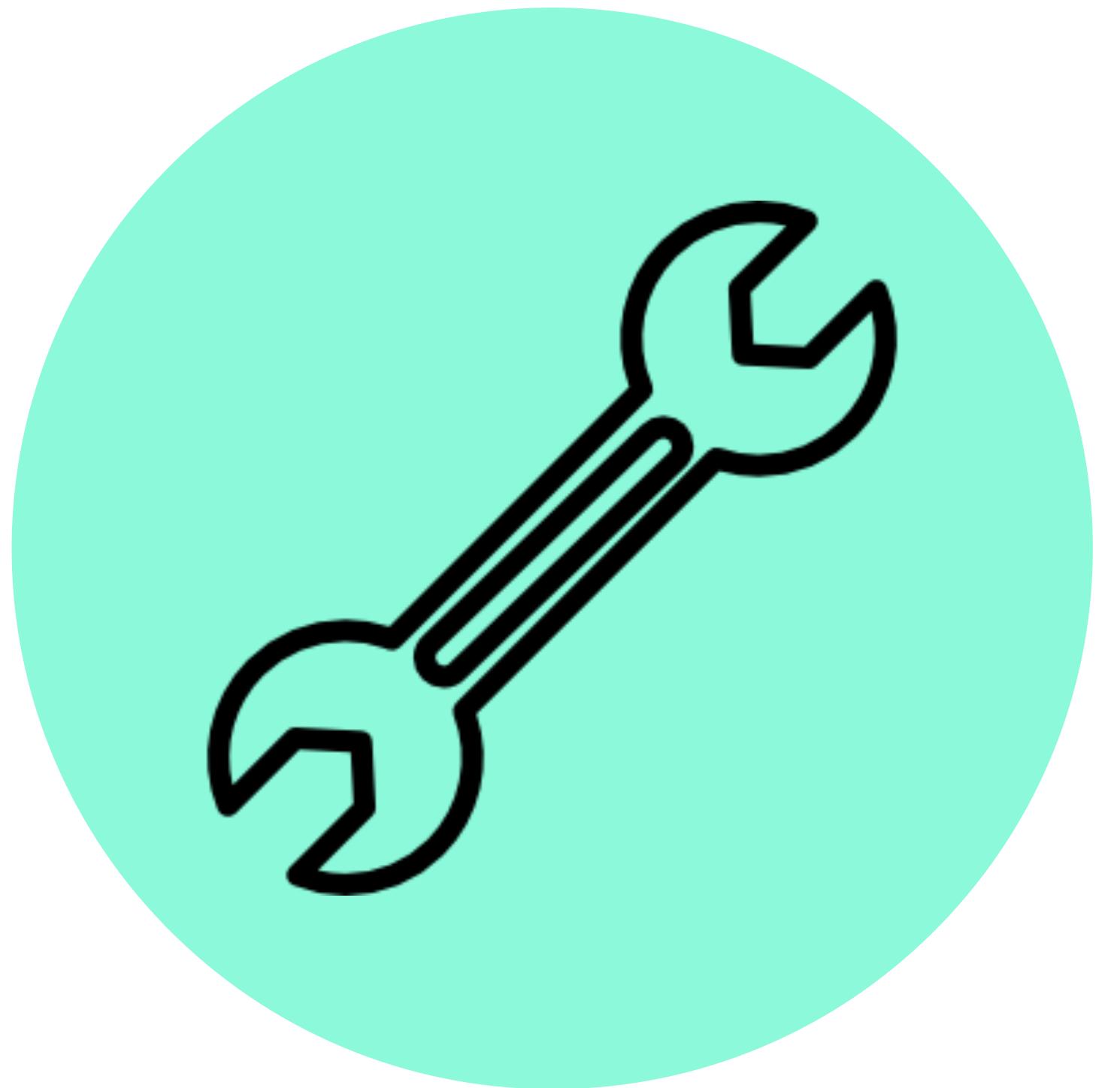
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- Part 6** **Present** your results to class on the 22nd of April

# RESOURCES

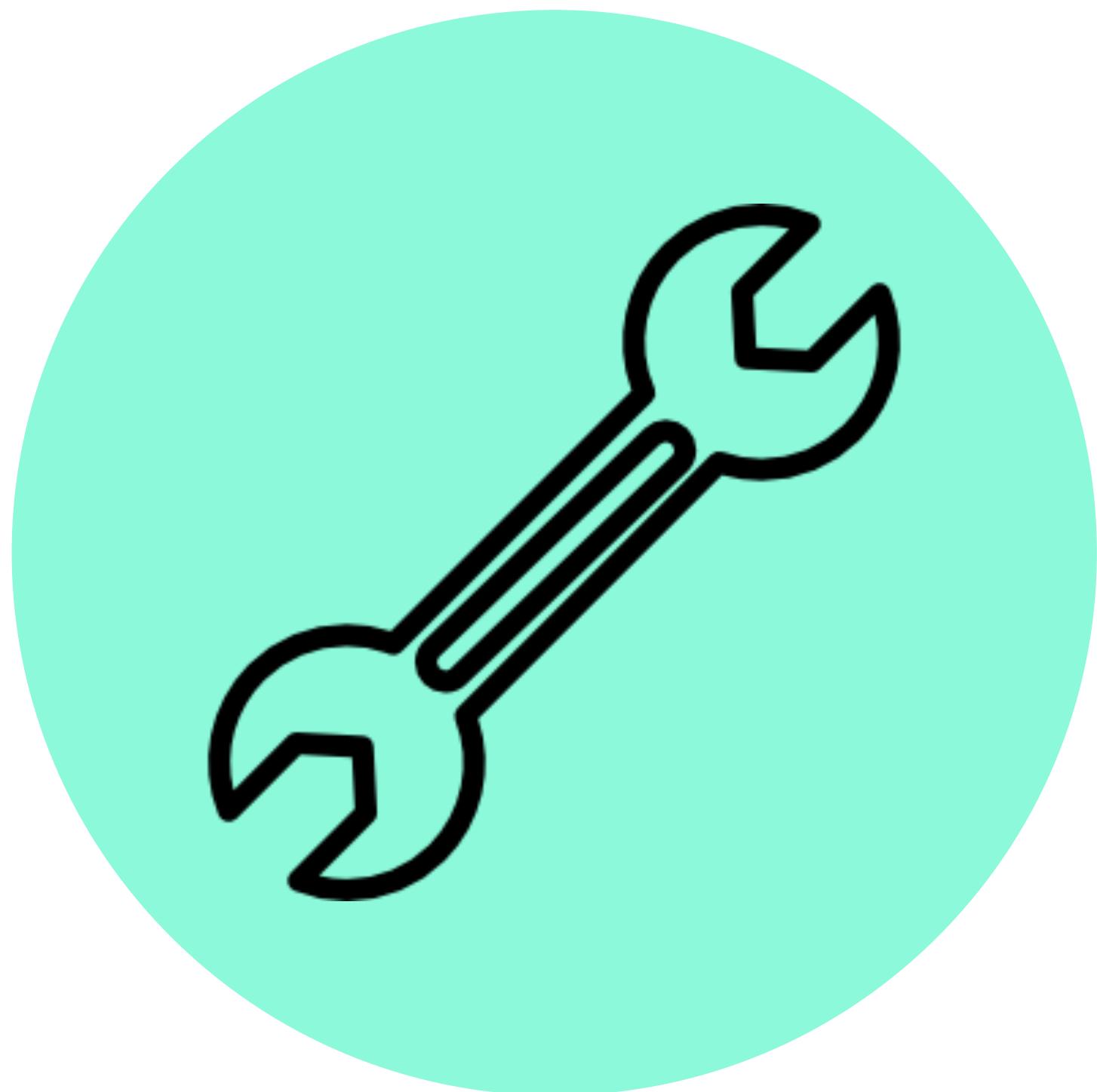


**LING2135/4135**



1. download the **entire file structure** from Canvas and store it somewhere on your computer.
2. always download materials **into their respective folders**

(scripts refer to data sets with **relative paths**, so if you change the folder structure, scripts will not work anymore)



work on `01_exercises.qmd`

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# FOR NEXT WEEK

work through Winter (2013)

## **Linear models and linear mixed effects models in R with linguistic applications**

Bodo Winter

University of California, Merced, Cognitive and Information Sciences

### **Tutorial Part 1: Linear modeling**

Linear models and linear mixed models are an impressively powerful and flexible tool for understanding the world. This tutorial is a decidedly conceptual introduction to this class of models. The focus is on ***understanding*** what these models are doing ... and then we'll spend most of the time ***applying*** this understanding, using the R statistical programming environment. The idea is to bootstrap your knowledge as quickly as possible so that you can start with your