Review: heuristics and biases

- Ch1 & Ch2 - good intro, answers the question “why statistics”. Focuses on biases.
- Ch8 - types of variables (assumed known)

Wk1: sources of variability

- Noticing variability
    - Ch7 - tools to notice variability (? assumed known)
    - Ch25 - outliers
        - Outliers arent what you think they are. And its fine as long as they’re not errors.
- Measurement error, measurement tool
    - Stigler on aggregation?
- individual differences (and sampling variability),
    - Ch3 - intro sampling variability …. Needs more in depth development
- group differences (to be discussed later)

Wk2: describing variability across measures

- Part 1
    - Ch9 - SD as a summary statistic
    - Ch13 - theory of CIs
    - Ch14 - the SEM
- Part 2
    - Ch4 - CI for a prop
        - only excerpts on concepts are good
    - Ch5 - good intro to survival data
    - Ch6 - intro to count data (and poisson distribution)
    - Ch12 - CI for a mean

Wk3: statistical hypotheses

- Part 1
    - Start with a problem, comparison of groups. We see a difference. What might explain it?
    - Introducing p-values
        - Fisher? Pearson?
    - Introducing the null model
    - Ch34 - introduction to models
- Part 2
    - Ch18. interpreting $p<0.05$. good run down of possible explanations. Includes bayes, maybe skip that part.
    - Ch19. interpreting $p>0.05$. Again, good possible explanations.
    - Excerpts from:
        - Ch15 - p values. Misses the point of hypothesis testing

- Ch16 - significance, lots of misnomers. Categories. Good section on statistical v practical significance
- Ch17 - comparing groups with CIs.

Wk4: designing studies [assessment week]
- Ch26 - choosing a sample size
- Randomization
- Ch20 - test power
- Ch42 - sensitivity and specificity

Wk5: comparing two groups
- Ch27 - prospective groups
- Ch28 - Retrospective groups (prevalence, incidence)
- Ch29 - group survival (mortality)
- Ch30 - group means
- Ch31 - within-subject groups

Wk6: simple statistical models
- Ch33 - SLR
- Ch32 - correlation
- Ch39 - ANOVA
- Ch40 - multiple comparisons
- Ch35 - comparing models

Wk7: statistical tests
- Distribution-based tests
    - 2 vars
        - Chi-sq test / fisher exact
        - T-test / z-test
        - Pearson rho
    - An entire model
        - Chi-sq / LRtest
        - F
- Simulation-based tests
    - ?
- Ch41 - nonparametric tests
    - Signed rank
    - Rank sum
    - KW
    - Spearman rho

Wk8: no new instruction. Midterm week.

Wk9: multiple linear regression
- Ch37 - MLR
- Covariates
- ANCOVA?

Wk10: logistic and log-binomial regression
- Ch38 - logistic (odds ratio)
- Log binomial (relative risk)

Wk11: proportional hazards regression
- Ch38 - ph reg (hazard ratio)

Wk12: poisson regression [assessment week]
- ?
- (incidence, prevalence)

Wk13: other regression
- Ch36 - non-linear models
- Multivariate regression?
- GLMM?

Wk14: review
- Ch43 - meta-analysis
- Ch47 - reproducibility
- Ch44 - key concepts

Wk15: writing
- Ch45 - traps to avoid
- Ch48 - checklist for reporting methods and results
- Ch46 - capstone example

Finals week

Unused Chapters:
- Ch10 - the normal distribution and z-scores
- Ch11 - log normal distribution and geometric means
- Ch21 - noninferiority tests
- Ch22 - multiple comparison adjustments
- Ch23 - multcomp examples
- Ch24 - normality tests