G7 - Results

HCI/PSYCH 522
Iowa State University

April 26, 2022

Results

- Written prose
  - Sentences
  - Paragraphs
- Statistical results
  - Descriptive statistics
    - Figure(s)
    - Table(s)
  - "Manuscript statements"
    - Model fit
    - Point estimates with confidence/credible intervals
  - Inference
    - Generalization to a larger population?
    - Cause-and-effect
  - Behind the scenes statistics (do not include code/output)
    - Assessing model assumptions

Written prose

https://www.bartleby.com/141/

Write in full sentences and paragraphs.

- Make the paragraph the unit of composition: one paragraph to each topic.
- As a rule, begin each paragraph with a topic sentence; end it in conformity with the beginning.
- Avoid a succession of loose sentences.

Descriptive statistics

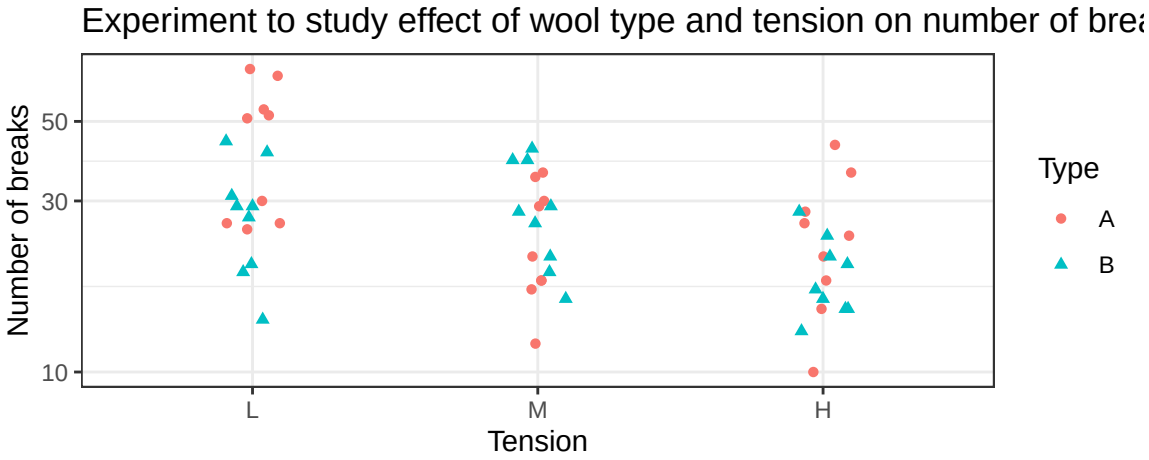
https://en.wikipedia.org/wiki/Descriptive_statistics

Definition

Descriptive statistics provide simple summaries about the sample and about the observations that have been made. Such summaries may be either quantitative, i.e. summary statistics, or visual, i.e. simple-to-understand graphs.

Make sure to discuss the tables and figures in the prose. Consider one paragraph per table or figure.

Figures


Experiment to study effect of wool type and tension on number of brea
Number of breaks
50
30
10
L
M
H
Tension
Type
A
B

Tables

Table 1 contains estimated mean number of breaks based on a Poisson regression model with wool type and tension as the independent variables.

Table 1: Estimated mean number of breaks with 95% confidence intervals

wool	L	M	H
A	40 (37, 44)	29 (26, 32)	24 (21, 27)
B	33 (30, 36)	24 (21, 26)	19 (17, 22)

As can be seen from the table, wool type B and high tension generally have smaller estimated mean number of breaks.

Manuscript statements

Within the prose include plain English statements with statistical support.

For warpbreaks data analysis,

> *A Poisson regression model was fit using number of breaks as the dependent variable and wool type and tension level as the independent variables. Model diagnostics were checked and no clear deviations from model assumptions were observed. Averaging over the levels of tension, wool type A had 23% more estimated breaks than wool type B with a 95% confidence interval (11, 36). Averaging over wool type, low tension caused more breaks than medium and high with an increase of 38% (20, 59) and 68% (45, 95), respectively. Medium tension caused more breaks than high tension with an increase of 22% (4, 43).*

Behind-the-scenes statistics

```r
# Plotting data
ggplot(warpbreaks %>%
         rename(Type = "wool"),
       aes(x=tension, y=breaks, color = Type, shape = Type)) +
  geom_jitter(width = 0.1, height = 0) +
  scale_y_log10() +
  labs(title = "Experiment to study effect of wool type and tension on number of breaks",
       x = "Tension",
       y = "Number of breaks")

# Fit model
m <- glm(breaks ~ wool + tension, data = warpbreaks, family = poisson)

# Check model assumptions
resid_panel(m, plots = c("resid","qq","index","cookd"), qqbands = TRUE)

# Obtain values for table and prose
em <- emmeans(m, ~ wool + tension)
ci <- confint(em, type = "response")

et <- em <- emmeans(m, pairwise ~ tension)
ct <- confint(et, type = "response")$contrast

ew <- em <- emmeans(m, pairwise ~ wool)
cw <- confint(ew, type = "response")$contrast
```