Introduction to the New Statistics - R Workbook

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Contents

1 Overview

An overview of the workbook to go here.

Info on how to install R functions etc.

2 R Basics

Some basic info for R beginners to go here.

eg how to install R, and sources of help.

This section can be skipped by anyone who already knows how to use R.

2.1 Useful Websites for Learning R

A list of useful websites, online tutorials etc for learning R to go here.

R-Studio Resources for Learning R (with links to interactive tutorials for beginners)

R Bloggers - How to Learn R

Quick-R

Cookbook for R

R Quick Reference Card

3 Picturing and Describing Data

Materials relevant to ITNS Ch 3 here.

3.1 Descriptive Statistics

Load the itns library (and in doing so, make all the itns data accessible).

```
library(itns)
```

Examples of calculating basic descriptive statistics and plots

3.2 summary()

```
summary(pen_laptop1$transcription)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##    1.00    8.00   10.70   11.53   15.20   34.70
```

3.3 Frequency Histogram

3.3.1 Single Sample

Using the pen_laptop1 dataset as an example.

3.3.2 Multiple Samples

3.4 Stacked Dot Plot

3.5 End of Chapter Exercises

4 The Normal Distribution and Sampling

ITNS Ch 4 material.

4.1 Finding Tail Areas

4.2 Finding X or z

4.3 End of Chapter Exercises

5 Confidence Intervals and Effect Sizes

Ch 5 material.

5.1 Finding Tail areas for t-values

Given any df.

5.2 Find critical t values

Given df and tail probability.

5.3 Cat's Eye Picture

5.4 End of Chapter Exercises

6 P-values, NHST and Confidence Intervals

Ch 6 material.

6.1 Calculate p-values using Z

6.2 Calculate p-values given t

ie one-sample t-test Presumably

6.3 End of Chapter Exercises

7 Independent Groups Design

Ch 7 material.

Use a function to compute:

- Descriptive stats
- Mean difference and CI
- P value (with and without assuming equal variances)
- Cohen's d, d-unbiased, noncentral T CI
- Plot with the difference axis

8 Unstandardized

t.test(Pen, Laptop)

9 Standardized

library(MBESS)

10 Cohen's d (biased)

smd(Group.1=Pen, Group.2=Laptop)

11 Cohen's d (unbiased)

smd(Group.1=Pen, Group.2=Laptop, Unbiased=T)

12 Noncentral-T Confidence Interval for D

d<-smd(Group.1=Pen, Group.2=Laptop) ci.smd(smd=d, n.1=length(Pen), n.2=length(Laptop), conf.level=.95)

12.1 End of Chapter Exercises

13 Paired Design

Ch 8 material.

Present a function that will compute mean difference, CI, p value, d and CI.

Show how to plot the difference and it's CI.

13.1 End of Chapter Exercises

14 Meta Analysis

?????

Chapter 9 material - if needed.

Maybe point readers to existing MA packages in R.

14.1 End of Chapter Exercises

15 Open Science & Planning Research

????

Maybe some functions for power and precision planning here?

15.1 End of Chapter Exercises

16 Correlation

Ch 11 material

16.1 End of Chapter Exercises

17 Regression

Ch 12 material

17.1 End of Chapter Exercises

18 Frequencies, Proportions, and Risk

Ch 13 material

18.1 End of Chapter Exercises

19 Extended Designs

Cover One way and Factorial Designs here (Ch 13 and 14).

I imagine the same function will be used for both.

19.1 End of Chapter Exercises - Ch 14

19.2 End of Chapter Exercises - Ch 15

20 Future Directions

Ch 16 material.

Robust independent groups analysis here?

20.1 End of Chapter Exercises