

Demo Session

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Statistical Modeling in R

Universidad de Concepción

19–23 January 2026

Outline

Import

get data into R

Explore

plot and summarize

Analyze

fit a regression model

Export

save results to include in a report

Philosophy

repeatable and scalable

Save spreadsheet as text file

Download cars.xlsx and open in Excel / LibreOffice

Save as cars.txt (tab-separated) and view in editor

Organize project with separate directories:

```
cars
  analysis
  data
  report
```

Write the analysis as a script

Create empty script analysis/cars.R

Type commands in the same order as they need to be run

Annotate with comments to describe what each block of code does

Try to write the script so it will run on any computer, starting with input and ending with output

Read text file into R

Use relative paths:

```
cars <- read.table("../data/cars.txt", header=TRUE)
```

Check if data look OK

cars

head(cars)

Scatterplot

```
plot(cars$speed, cars$dist)
```

Range, median, mean, etc.

```
summary(cars)
```

Fit linear regression model

```
cars.lm <- lm(dist ~ speed, data=cars)
```

```
abline(cars.lm)
```

Paste model summary

```
summary(cars.lm)
```

Copy from R and paste into Word/ LibreOffice document

Write plot to PNG file

```
png("../report/cars.png")  
  
plot(dist ~ speed, data=cars)  
  
abline(cars.lm)  
  
dev.off()
```

Insert cars.png into document

Clean up script

Delete all unnecessary lines

Add comments, if needed

Make sure the whole script runs without errors

Repeatable analysis

If you send the data files and script to colleagues,
they can repeat the analysis

- ▶ foundation of the scientific method

Easy to make changes and rerun the entire analysis

- add one year of data
- explore different modelling choices
- respond to a reviewer's comment

Easy to repeat the analysis for many datasets

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