

ECON 340

Economics Research Methods

Div Bhagia

Lecture 7: Data Analysis in R

So far

```
# Load Packages  
library(tidyverse)  
  
# Import data  
data <- read.csv("caschool.csv")
```

You can clear your environment before starting by using the broom on the top-right. Or add `rm(list=ls())` command on top of your R-script.

Tabulating Variables

- Variable `gr_span` reports the grade span of a school district (K-6 or K-8)

```
table(data$gr_span)
```

```
##
```

```
## KK-06 KK-08
```

```
##    61    359
```

- So 61 school districts go up to grade 6 while 359 go up to grade 8

Dplyr Syntax

- dplyr is a TidyVerse package that provides several useful functions for data manipulation
- However, dplyr uses slightly different syntax from base R.
- One key operator utilized by this package is the pipe operator `%>%`
- You can use shortcut `Cmd + Shift + M` (Mac) and `Ctrl + Shift + M` (Windows) for `%>%`
- You can think of this operator as standing for “then” in the code

Dplyr Syntax

For example, to tabulate data:

```
data %>% count(gr_span)
```

```
##   gr_span    n  
## 1   KK-06    61  
## 2   KK-08   359
```

Some Useful `dplyr` Functions

- `mutate()` adds new variables that are functions of existing variables
- `select()` picks variables based on their names
- `filter()` picks cases based on their values
- `summarise()` reduces multiple values down to a single summary
- `arrange()` changes the ordering of rows
- `group_by()` performs subsequent calculations within-group (and `ungroup()` when done)

Select Variables

```
data %>% select(computer, enrl_tot)
```

```
##      computer enrl_tot
## 1         67      195
## 2        101      240
## 3        169     1550
## 4         85      243
## 5        171     1335
## 6         25      137
## 7         28      195
## 8         66     888
## 9         35     379
```

Finding Correlation

```
# Base R
```

```
cor(data$computer, data$enrl_tot)
```

```
## [1] 0.9288821
```

```
# Tidy way
```

```
data %>% select(computer, enrl_tot) %>% cor()
```

```
##           computer  enrl_tot  
## computer 1.0000000 0.9288821  
## enrl_tot 0.9288821 1.0000000
```


Filter Observations

```
data %>% select(gr_span, computer) %>%  
  filter(gr_span=="KK-06")
```

##	gr_span	computer
## 1	KK-06	0
## 2	KK-06	742
## 3	KK-06	324
## 4	KK-06	669
## 5	KK-06	196
## 6	KK-06	560
## 7	KK-06	1048
## 8	KK-06	505

And and Or in R

To select schools in Orange county with enrollment over 5000

```
data1 <- data %>%  
  filter(county=="Orange" & enr1_tot>=5000)
```

To select schools that are either in Orange country or in LA county

```
data2 <- data %>%  
  filter(county=="Orange" | county=="Los Angeles")
```

Summarize Variables

```
# Calculating mean
```

```
data %>% summarise(mean(computer))
```

```
##      mean(computer)
```

```
## 1          303.3833
```

```
# Standard deviation and median
```

```
data %>% summarise(sd = sd(computer),  
                  med = median(comp_stu))
```

```
##           sd           med
```

```
## 1 441.3413 0.1254644
```

Creating New Variables

```
data <- data %>%  
  mutate(log_enrl = log(enrl_tot))
```

- The code takes data and adds a new column log_enrl, which is the log of enrl_tot
- It then updates the original data with this new column.

Creating New Variables

```
data <- data %>%  
  mutate(hcomp = ifelse(comp_stu >= median(comp_stu), 1, 0))
```

- Syntax: `ifelse(test_expression, x, y)`
- The returned vector has element from `x` if the corresponding value of `test_expression` is `TRUE` and `y` if it is `FALSE`
- So here `hcomp` takes value 1 whenever computers per student are above the median, and 0 otherwise. What should be the output from `mean(data$hcomp)`?

Combining group_by() and summarise()

```
data %>%  
  group_by(hcomp) %>%  
  summarise(mean(comp_stu))
```

```
## # A tibble: 2 x 2  
##   hcomp 'mean(comp_stu)'  
##   <dbl>         <dbl>  
## 1     0         0.0881  
## 2     1         0.184
```

Excercise for you

Find the county with the highest average number of computers per student (`comp_stu`) (Hint: Use `group_by(county)` and `summarise()`)