Chapter 2: Causality

Data Transformation with Tidyverse Functions

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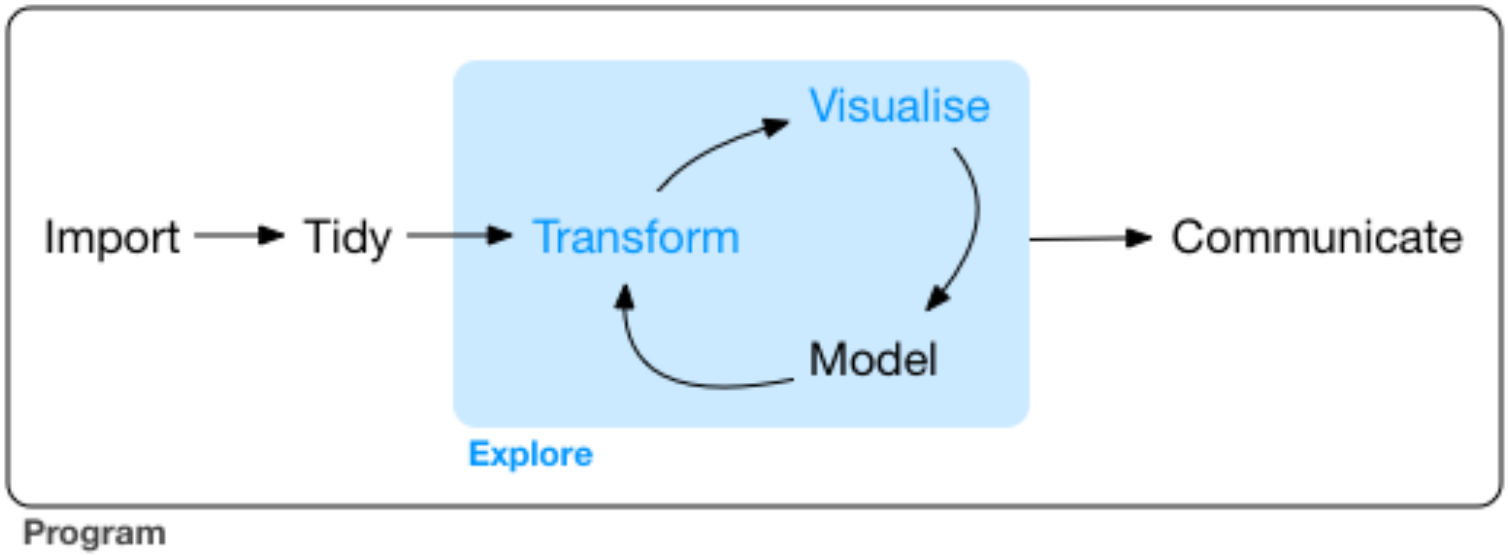
Section 1

Overview

Data Transformation



Source: R for Data Science

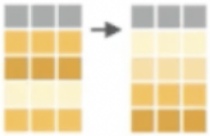

tidyr
tidyr.tidyverse.org
dplyr
dplyr.tidyverse.org

Load packages and data

```
## load packages
library(tidyverse)
library(qss)

## load data
resume <- read_csv("data/resume.csv")

# check data
resume
```

```
## # A tibble: 4,870 x 4
##    firstname sex    race   call
##    <chr>     <chr>  <chr> <dbl>
##  1 Allison   female white     0
##  2 Kristen   female white     0
##  3 Lakisha   female black     0
##  4 Latonya   female black     0
##  5 Carrie    female white     0
##  6 Jay       male   white     0
##  7 Jill      female white     0
```

dplyr from Tidyverse



arrange(.data, …)
Order rows by values of a column (low to high), use with **desc()** to order from high to low.

filter(.data, …)
Extract rows that meet logical criteria.

select(.data, …)
Extract columns by name.

mutate(.data, …)
Compute new column(s).

summarise(.data, …)
Compute table of summaries. Use **group_by()** to compute groupwise summaries.

Source: RStudio

Section 2

Subset Data

Extract Columns (select)

- select: Return columns by name/number/etc.

```
## Subset with sex and race columns
resume_sex_race <- resume %>%
  select(sex, race)
resume_sex_race
```

```
## # A tibble: 4,870 x 2
##    sex    race
##    <chr>  <chr>
##  1 female white
##  2 female white
##  3 female black
##  4 female black
##  5 female white
##  6 male   white
##  7 female white
##  8 female black
```

Extract Rows (`filter`)

- `filter`: Return rows by name/number/etc.

```
## # A tibble: 2,435 x 4
##    firstname sex    race   call
##    <chr>     <chr>  <chr> <dbl>
##  1 Lakisha   female black     0
##  2 Latonya   female black     0
##  3 Kenya     female black     0
##  4 Latonya   female black     0
##  5 Tyrone    male   black     0
##  6 Aisha     female black     0
##  7 Aisha     female black     0
##  8 Aisha     female black     0
##  9 Tamika    female black     0
## 10 Latonya   female black     0
## # ... with 2,425 more rows
```

Source: RStudio

Combining Functions

```
## subset data with white, male-sounding names
## Then, let's remove the first name
resumeWm_without_firstname <- resume %>%
  filter(race == "white" & sex == "male") %>%
  select(!firstname)
resumeWm_without_firstname
```

```
## # A tibble: 575 x 3
##    sex   race   call
##    <chr> <chr> <dbl>
##  1 male  white     0
##  2 male  white     0
##  3 male  white     0
##  4 male  white     0
##  5 male  white     0
##  6 male  white     0
##  7 male  white     0
```

Section 3

Summarize Data

summarise()

```
## callback rate for black female names
Bf_callback <- resume %>%
  filter(race == "black" & sex =="female") %>%
  summarize(callback_rate = mean(call, na.rm = TRUE))

Bf_callback
```

```
## # A tibble: 1 x 1
##   callback_rate
##           <dbl>
## 1        0.0663
```

```
## callback rate for white female names
Wf_callback <- resume %>%
  filter(race == "white" & sex == "female") %>%
  summarize(callback_rate = mean(call, na.rm = TRUE))

Wf_callback
```

```
## # A tibble: 1 x 1
##   callback_rate
##           <dbl>
## 1        0.0989
```

```
## difference between white and black women
Wf_callback - Bf_callback
```

```
##   callback_rate
## 1    0.03264689
```

Section 4

Add New Variable

mutate()

calculate target values

The way we did previously with `filter()` and `summarise()`.

create factor variable with mutate

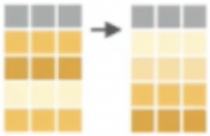
```
## create a factor variable that takes one of the four values
resume <- resume %>%
  mutate(type = case_when(race == "black" & sex == "female" ~ "BlackFemale",
                          race == "black" & sex == "male" ~ "BlackMale",
                          race == "white" & sex == "female" ~ "WhiteFemale",
                          race == "white" & sex == "male" ~ "WhiteMale",
                          TRUE ~ "Other"))

head(resume)
```

```
## # A tibble: 6 x 5
##   firstname sex    race   call type
##   <chr>     <chr>  <chr> <dbl> <chr>
## 1 Allison   female white     0 WhiteFemale
## 2 Kristen   female white     0 WhiteFemale
## 3 Lakisha   female black     0 BlackFemale
## 4 Latonya   female black     0 BlackFemale
## 5 Carrie    female white     0 WhiteFemale
## 6 Jay       male   white     0 WhiteMale
```

Section 5

Summary

Let's practice!



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Source: RStudio