# Lab 04: BMI 5/625

## Working with Tidy Data

Alison Hill (with modifications by Steven Bedrick)

# Let's review

# Data wrangling to date!

From `dplyr`:

- `filter`
- `arrange`
- `mutate`
- `group_by`
- `summarize`
- `glimpse`
- `distinct`
- `count`
- `tally`
- `pull`
- `top_n`

Let's add from `dplyr`:

- `select`
- `rename`
- `recode`
- `case_when`

From `tidyr`:

- `gather`
- `separate`
- `spread`
- `unite`

Plus 1 other package:

- `skimr::skim`

# The Great British Baking Data Set

```
Rows: 1,772
Columns: 5
$ series    <dbl> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
$ episode   <dbl> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2,
$ baker     <chr> "Annetha", "David", "Edd", "Jasminder", "Jonathan", "Loui
$ challenge <chr> "signature", "signature", "signature", "signature", "sign
$ cake      <chr> "cake", "cake", "cake", "cake", "cake", "cake", "cake", "
```

# Un-tidy cakes

```
# A tibble: 2 x 4
  series challenge    cake pie_tart
  <fct>  <chr>       <dbl>    <dbl>
1 1      showstopper     5        5
2 1      signature      12        4
```

```
# A tibble: 2 x 4
  series challenge    cake pie_tart
  <fct>  <chr>       <dbl>    <dbl>
1 2      showstopper     8       17
2 2      signature      21        7
```

```
# A tibble: 2 x 4
  series challenge    cake pie_tart
  <fct>  <chr>       <dbl>    <dbl>
1 3      showstopper    12       17
2 3      signature      24       12
```

```
# A tibble: 2 x 4
  series challenge    cake pie_tart
  <fct>  <chr>       <dbl>    <dbl>
1 4      showstopper    27        9
2 4      signature      11       15
```

# Still un-tidy cakes

```
cakes_untidy %>%
  bind_rows()
```

```
# A tibble: 16 x 4
   series challenge    cake pie_tart
   <fct>  <chr>       <dbl>    <dbl>
 1 1      showstopper     5        5
 2 1      signature      12        4
 3 2      showstopper     8       17
 4 2      signature      21        7
 5 3      showstopper    12       17
 6 3      signature      24       12
 7 4      showstopper    27        9
 8 4      signature      11       15
 9 5      showstopper    20        6
10 5      signature       4        7
11 6      showstopper    12        0
12 6      signature      20       17
13 7      showstopper    19        3
14 7      signature      11       10
15 8      showstopper    26       12
16 8      signature      21        8
```

# Finally tidy cakes

```
cakes_tidy ← cakes_untidy %>%
  gather(bake_type, num_bakes, cake:pie_tart,
         factor_key = TRUE) %>%
  arrange(series)
cakes_tidy
```

```
# A tibble: 32 x 4
   series challenge   bake_type num_bakes
   <fct>  <chr>       <fct>         <dbl>
 1 1      showstopper cake              5
 2 1      signature   cake             12
 3 1      showstopper pie_tart          5
 4 1      signature   pie_tart          4
 5 2      showstopper cake              8
 6 2      signature   cake             21
 7 2      showstopper pie_tart         17
 8 2      signature   pie_tart          7
 9 3      showstopper cake             12
10 3      signature   cake             24
# … with 22 more rows
```

# Know Your Tidy Data

```
glimpse(cakes_tidy)
```

```
Rows: 32
Columns: 4
$ series    <fct> 1, 1, 1, 1, 2, 2, 2, 2, 3, 3, 3, 3, 4, 4, 4, 4, 5, 5, 5,
$ challenge <chr> "showstopper", "signature", "showstopper", "signature", "
$ bake_type <fct> cake, cake, pie_tart, pie_tart, cake, cake, pie_tart, pie
$ num_bakes <dbl> 5, 12, 5, 4, 8, 21, 17, 7, 12, 24, 17, 12, 27, 11, 9, 15,
```

```
library(skimr)
skim(cakes_tidy)
```

Table: Data summary

| | |
|---|---|
| Name | cakes_tidy |
| Number of rows | 32 |
| Number of columns | 4 |
| _ | |
| Column type frequency: | |
| character | 1 |
| factor | 2 |
| numeric | 1 |
| __ | |
| Group variables | None |

**Variable type: character**

```
skim(cakes_tidy) %>%
  summary()
```

Table: Data summary

| | |
|---|---|
| Name | cakes_tidy |
| Number of rows | 32 |
| Number of columns | 4 |
| _ | |
| Column type frequency: | |
| character | 1 |
| factor | 2 |
| numeric | 1 |
| __ | |
| Group variables | None |

# Benefits of Tidy Data

```r
cakes_tidy %>%
  count(challenge, bake_type, wt = num_bakes, sort = TRUE)
```

```
# A tibble: 4 x 3
  challenge   bake_type     n
  <chr>       <fct>     <dbl>
1 showstopper cake        129
2 signature   cake        124
3 signature   pie_tart     80
4 showstopper pie_tart     69
```

```
cakes_tidy %>%
  count(series, bake_type, wt = num_bakes)
```

```
# A tibble: 16 x 3
   series bake_type     n
   <fct>  <fct>     <dbl>
 1 1      cake         17
 2 1      pie_tart      9
 3 2      cake         29
 4 2      pie_tart     24
 5 3      cake         36
 6 3      pie_tart     29
 7 4      cake         38
 8 4      pie_tart     24
 9 5      cake         24
10 5      pie_tart     13
11 6      cake         32
12 6      pie_tart     17
13 7      cake         30
14 7      pie_tart     13
15 8      cake         47
16 8      pie_tart     20
```

```
library(skimr)

cakes_tidy %>%
  group_by(bake_type) %>%
  select_if(is.numeric) %>%
  skim()
```

Table: Data summary

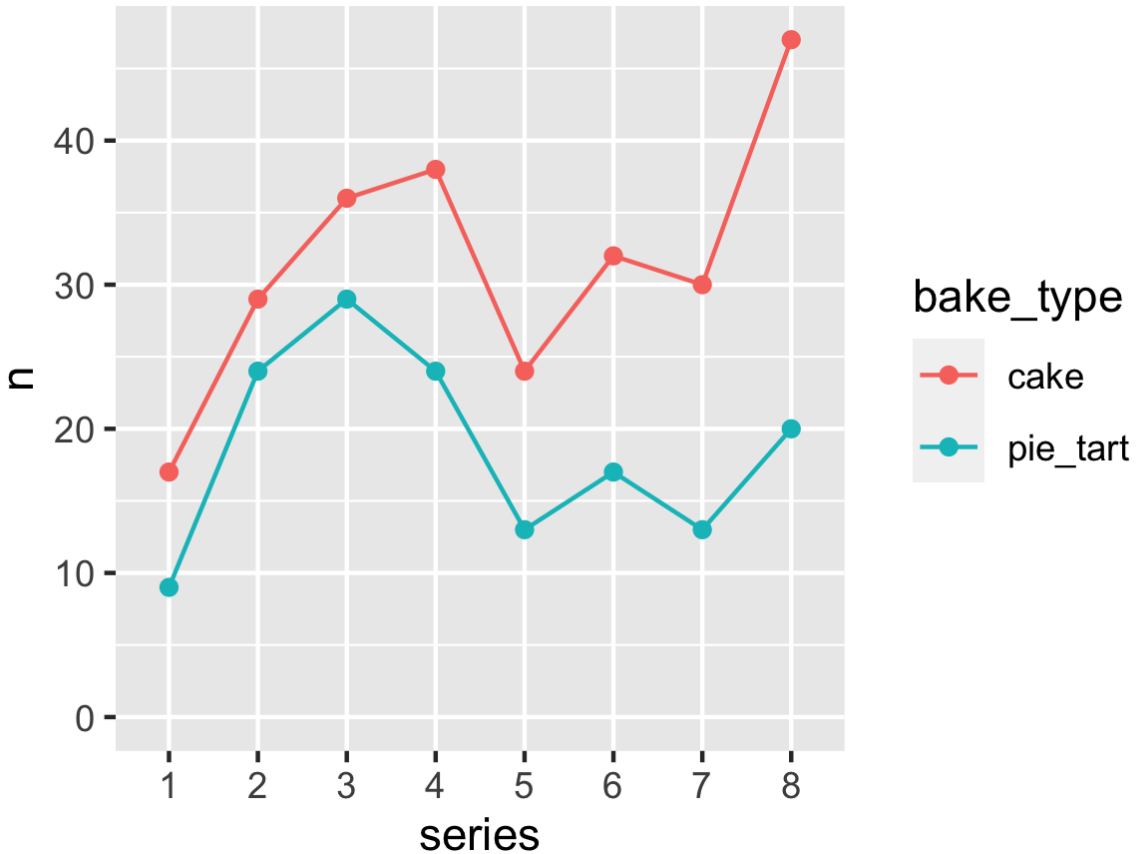
| | |
|---|---|
| Name | Piped data |
| Number of rows | 32 |
| Number of columns | 2 |
| _ | |
| Column type frequency: | |
| numeric | 1 |
| __ | |
| Group variables | bake_type |

**Variable type: numeric**

```
cakes_by_series ← cakes_tidy %>%
  count(series, bake_type, wt = num_bakes)
cakes_by_series
```

```
# A tibble: 16 x 3
   series bake_type     n
   <fct>  <fct>     <dbl>
 1 1      cake         17
 2 1      pie_tart      9
 3 2      cake         29
 4 2      pie_tart     24
 5 3      cake         36
 6 3      pie_tart     29
 7 4      cake         38
 8 4      pie_tart     24
 9 5      cake         24
10 5      pie_tart     13
11 6      cake         32
12 6      pie_tart     17
13 7      cake         30
14 7      pie_tart     13
15 8      cake         47
16 8      pie_tart     20
```

```
ggplot(cakes_by_series, aes(x = series, y = n,
                            color = bake_type,
                            group = bake_type)) +
  geom_point() +
  geom_line() +
  expand_limits(y = 0)
```



# You have 2 challenges today!

Described here Reference lab here

# Tidy Data:

http://r4ds.had.co.nz/tidy-data.html

http://moderndive.com/4-tidy.html

http://vita.had.co.nz/papers/tidy-data.html

https://github.com/jennybc/lotr-tidy#readme