

# The babynames data

DATA MANIPULATION WITH DPLYR



**James Chapman**

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# The babynames data

babynames

```
# A tibble: 332,595 x 3
  year name      number
  <dbl> <chr>    <int>
1  1880 Aaron      102
2  1880 Ab         5
3  1880 Abbie     71
4  1880 Abbott     5
5  1880 Abby       6
6  1880 Abe       50
7  1880 Abel        9
8  1880 Abigail   12
9  1880 Abner     27
10 1880 Abraham    81
# ... with 332,585 more rows
```

# Frequency of a name

```
babynames %>%  
  filter(name == "Amy")
```

```
# A tibble: 28 x 3  
  year name  number  
  <dbl> <chr>  <int>  
1  1880 Amy     167  
2  1885 Amy     240  
3  1890 Amy     275  
4  1895 Amy     303  
5  1900 Amy     335  
6  1905 Amy     269  
7  1910 Amy     287  
8  1915 Amy     624  
9  1920 Amy     624  
10 1925 Amy     560  
# ... with 18 more rows
```

# Amy plot

```
babynames_filtered <- babynames %>%  
  filter(name == "Amy")
```

```
library(ggplot2)
```

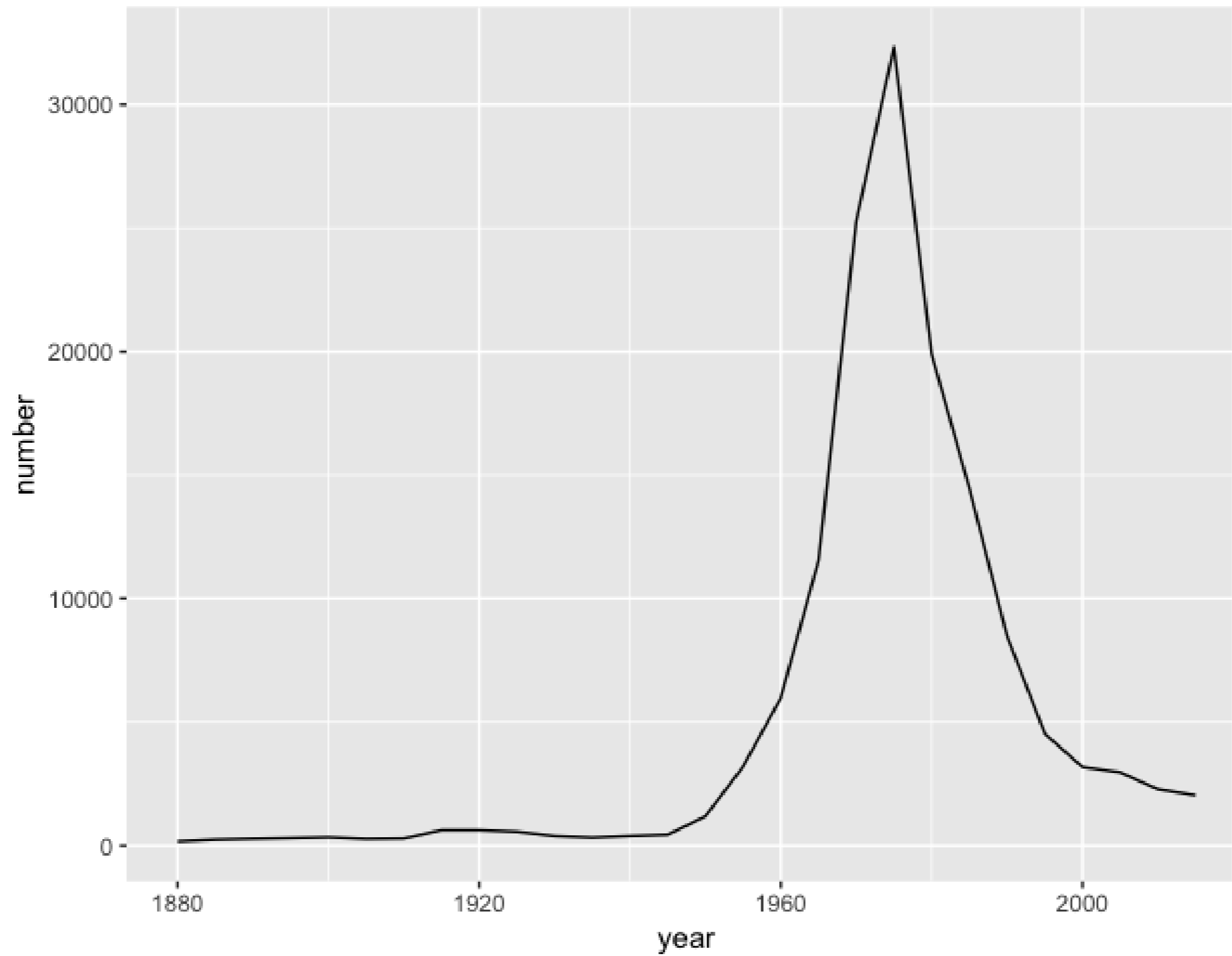
```
ggplot(babynames_filtered, aes(x = year, y = number))
```

# Amy plot

```
babynames_filtered <- babynames %>%  
  filter(name == "Amy")
```

```
library(ggplot2)
```

```
ggplot(babynames_filtered, aes(x = year, y = number)) +  
  geom_line()
```



# Filter for multiple names

- `%in%` : used to filter for multiple values

```
babynames_multiple <- babynames %>%  
  filter(name %in% c("Amy", "Christopher"))
```

# When was each name most common?

```
babynames %>%  
  group_by(name) %>%  
  slice_max(number, n = 1)
```

```
# A tibble: 54,881 x 3  
# Groups:   name [48,040]  
  year name      number  
  <dbl> <chr>    <int>  
1  1880 Arch        61  
2  1880 Bird         17  
3  1880 Ednah         6  
4  1880 Erasmus         5  
5  1880 Garfield    122  
6  1880 Harve         17  
7  1880 Lidie          7  
8  1880 Loula         13  
9  1880 Lovisa         5  
10 1880 Lulie          8  
# ... with 54,871 more rows
```



# Let's practice!

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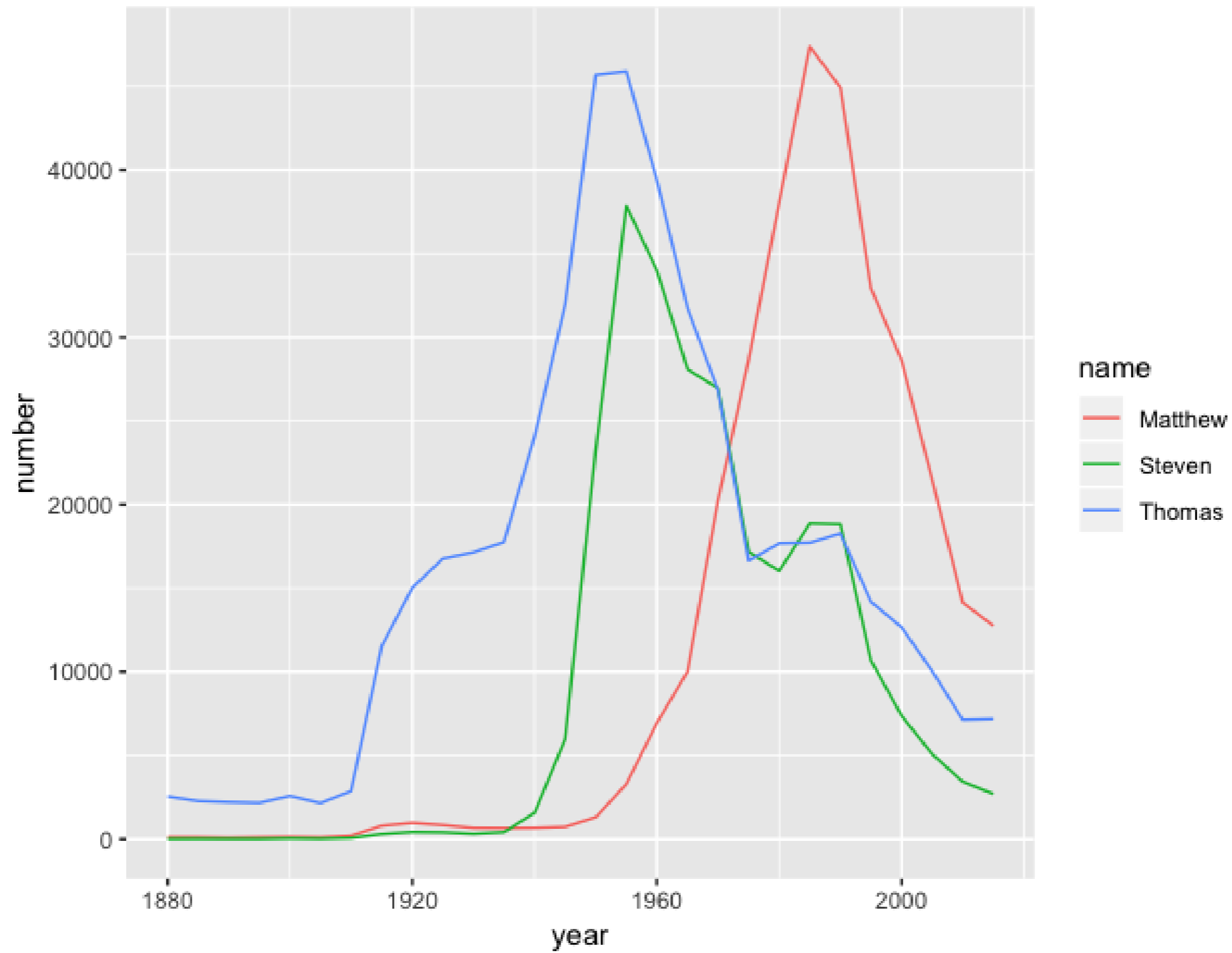
# Grouped mutates

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# Review: `group_by()` and `summarize()`

```
babynames %>%  
  group_by(year) %>%  
  summarize(year_total = sum(number))
```

```
# A tibble: 28 x 2  
  year year_total  
  <dbl>   <int>  
1  1880   201478  
2  1885   240822  
3  1890   301352  
4  1895   350934  
5  1900   450148  
6  1905   423875  
7  1910   590607  
8  1915  1830351  
9  1920  2259494  
10 1925  2330750  
# ... with 18 more rows
```

# Combining `group_by()` and `mutate()`

```
babynames %>%  
  group_by(year) %>%  
  mutate(year_total = sum(number))
```

```
# A tibble: 332,595 x 4  
# Groups:   year [28]  
   year name      number year_total  
  <dbl> <chr>    <int>     <int>  
1  1880 Aaron      102     201478  
2  1880 Ab         5     201478  
3  1880 Abbie      71     201478  
4  1880 Abbott      5     201478  
5  1880 Abby        6     201478  
6  1880 Abe        50     201478  
7  1880 Abel        9     201478  
8  1880 Abigail    12     201478  
9  1880 Abner      27     201478  
10 1880 Abraham     81     201478  
# ... with 332,585 more rows
```

# ungroup()

```
babynames %>%  
  group_by(year) %>%  
  mutate(year_total = sum(number)) %>%  
  ungroup()
```

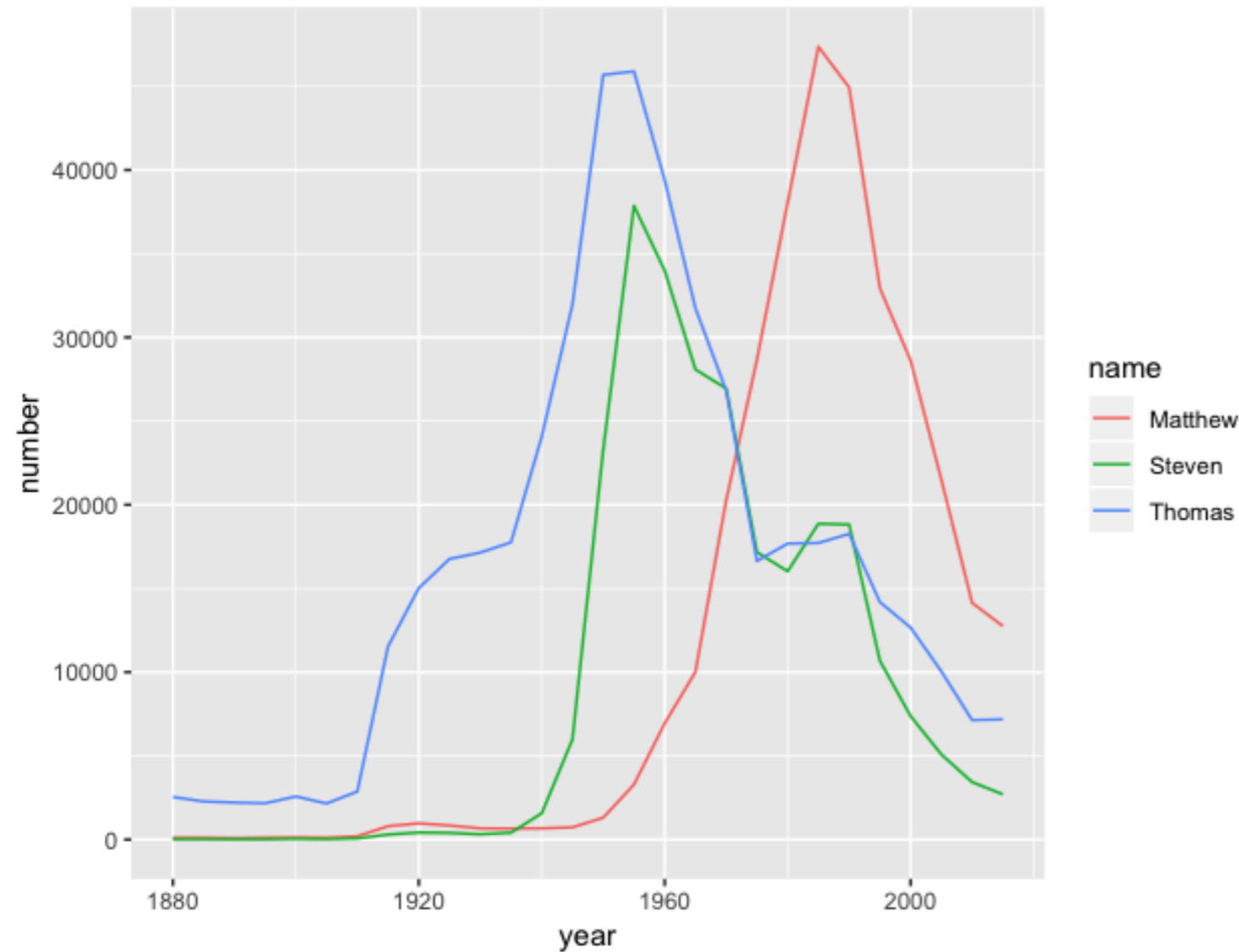
```
# A tibble: 332,595 x 4  
  year name      number year_total  
  <dbl> <chr>    <int>    <int>  
1  1880 Aaron      102    201478  
2  1880 Ab         5     201478  
3  1880 Abbie     71     201478  
4  1880 Abbott     5     201478  
5  1880 Abby       6     201478  
6  1880 Abe       50     201478  
7  1880 Abel       9     201478  
8  1880 Abigail   12     201478  
9  1880 Abner    27     201478  
10 1880 Abraham   81     201478  
# ... with 332,585 more rows
```

# Add the fraction column

```
babynames %>%  
  group_by(year) %>%  
  mutate(year_total = sum(number)) %>%  
  ungroup() %>%  
  mutate(fraction = number / year_total)
```

```
# A tibble: 332,595 x 5  
  year name      number year_total fraction  
  <dbl> <chr>    <int>    <int>    <dbl>  
1  1880 Aaron      102    201478 0.000506  
2  1880 Ab         5     201478 0.0000248  
3  1880 Abbie     71     201478 0.000352  
4  1880 Abbott     5     201478 0.0000248  
5  1880 Abby       6     201478 0.0000298  
6  1880 Abe       50     201478 0.000248  
7  1880 Abel       9     201478 0.0000447  
8  1880 Abigail   12     201478 0.0000596  
9  1880 Abner    27     201478 0.000134  
10 1880 Abraham   81     201478 0.000402  
# ... with 332,585 more rows
```

# Comparing visualizations





# Let's practice!

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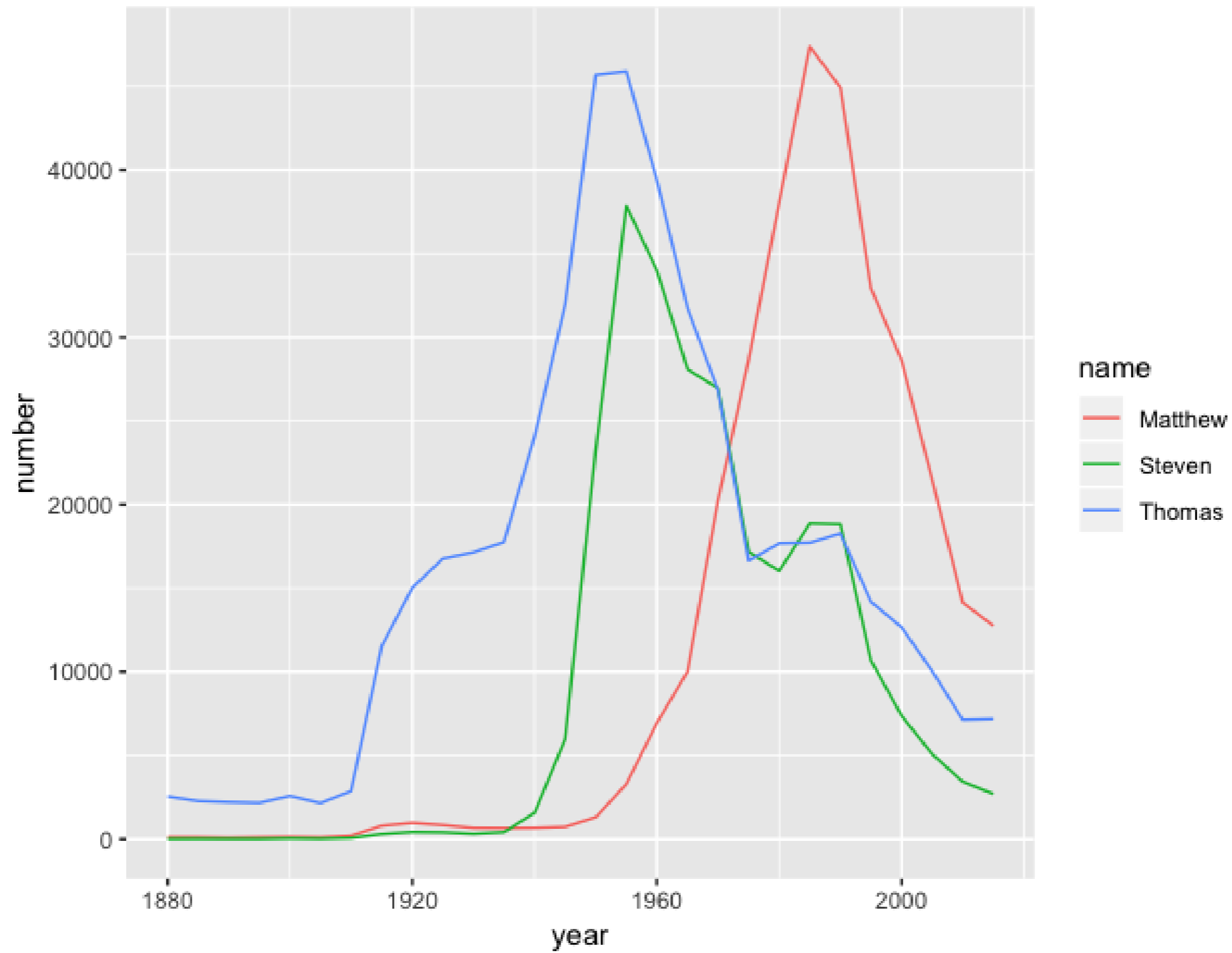
# Window functions

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# Window function

```
v <- c(1, 3, 6, 14)
```

```
v
```

```
1 3 6 14
```

```
lag(v)
```

```
NA 1 3 6
```

# Compare consecutive steps

```
v
```

```
1 3 6 14
```

```
lag(v)
```

```
NA 1 3 6
```

```
v - lag(v)
```

```
NA 2 3 8
```

# Changes in popularity of a name

```
babynames_fraction <- babynames %>%  
  group_by(year) %>%  
  mutate(year_total = sum(number)) %>%  
  ungroup() %>%  
  mutate(fraction = number / year_total)
```

# Matthew

```
babynames_fraction %>%  
  filter(name == "Matthew") %>%  
  arrange(year)
```

```
# A tibble: 28 x 5  
  year name      number year_total fraction  
  <dbl> <chr>    <int>    <int>    <dbl>  
1  1880 Matthew    113    201478 0.000561  
2  1885 Matthew    111    240822 0.000461  
3  1890 Matthew     86    301352 0.000285  
4  1895 Matthew    112    350934 0.000319  
5  1900 Matthew    130    450148 0.000289  
6  1905 Matthew    107    423875 0.000252  
7  1910 Matthew    197    590607 0.000334  
8  1915 Matthew    798   1830351 0.000436  
9  1920 Matthew    967   2259494 0.000428  
10 1925 Matthew    840   2330750 0.000360  
# ... with 18 more rows
```

# Matthew over time

```
babynames_fraction %>%  
  filter(name == "Matthew") %>%  
  arrange(year) %>%  
  mutate(difference = fraction - lag(fraction))
```

```
# A tibble: 28 x 6  
  year name      number year_total fraction difference  
  <dbl> <chr>    <int>    <int>    <dbl>    <dbl>  
1  1880 Matthew    113    201478 0.000561 NA  
2  1885 Matthew    111    240822 0.000461 -0.0000999  
3  1890 Matthew     86    301352 0.000285 -0.000176  
4  1895 Matthew    112    350934 0.000319  0.0000338  
5  1900 Matthew    130    450148 0.000289 -0.0000304  
6  1905 Matthew    107    423875 0.000252 -0.0000364  
7  1910 Matthew    197    590607 0.000334  0.0000811  
8  1915 Matthew    798   1830351 0.000436  0.000102  
9  1920 Matthew    967   2259494 0.000428 -0.00000801  
10 1925 Matthew    840   2330750 0.000360 -0.0000676  
# ... with 18 more rows
```



# Biggest jump in popularity

```
babynames_fraction %>%  
  filter(name == "Matthew") %>%  
  arrange(year) %>%  
  mutate(difference = fraction - lag(fraction)) %>%  
  arrange(desc(difference))
```

```
# A tibble: 28 x 6  
  year name      number year_total fraction difference  
  <dbl> <chr>      <int>      <int>      <dbl>      <dbl>  
1  1975 Matthew    28665    3014943 0.00951    0.00389  
2  1970 Matthew    20265    3604252 0.00562    0.00286  
3  1985 Matthew    47367    3563364 0.0133     0.00223  
4  1980 Matthew    38054    3439117 0.0111     0.00156  
5  1965 Matthew    10015    3624610 0.00276    0.00109  
6  1960 Matthew     6942    4152075 0.00167    0.000853  
7  1955 Matthew     3287    4012691 0.000819   0.000447  
8  1915 Matthew      798    1830351 0.000436   0.000102  
9  1950 Matthew     1303    3502592 0.000372   0.0000967  
10 1910 Matthew      197     590607 0.000334   0.0000811  
# ... with 18 more rows
```

# Changes within every name

```
babynames_fraction %>%  
  arrange(name, year) %>%  
  group_by(name) %>%  
  mutate(difference = fraction - lag(fraction)) %>%  
  ungroup() %>%  
  arrange(desc(difference))
```

```
# A tibble: 332,595 × 6  
  year name      number year_total fraction difference  
  <dbl> <chr>      <int>      <int>      <dbl>      <dbl>  
1  1935 Shirley    42790    2088487  0.0205     0.0137  
2  1985 Ashley    47509    3563364  0.0133     0.0110  
3  1955 Debra     50630    4012691  0.0126     0.0109  
4  1975 Jason     52486    3014943  0.0174     0.00981  
5  1970 Jennifer 46276    3604252  0.0128     0.00863  
6  1965 Lisa     60443    3624610  0.0167     0.00854  
7  1940 Judith   22462    2301630  0.00976    0.00790  
8  1925 Betty    32897    2330750  0.0141     0.00790  
9  1950 Deborah  29111    3502592  0.00831    0.00776  
10 1945 Linda   41572    2652029  0.0157     0.00767  
# ... with 332,585 more rows
```

# Let's practice!

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# Congratulations!

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# Summary

## Transforming:

- `select()`
- `filter()`
- `mutate()`
- `arrange()`

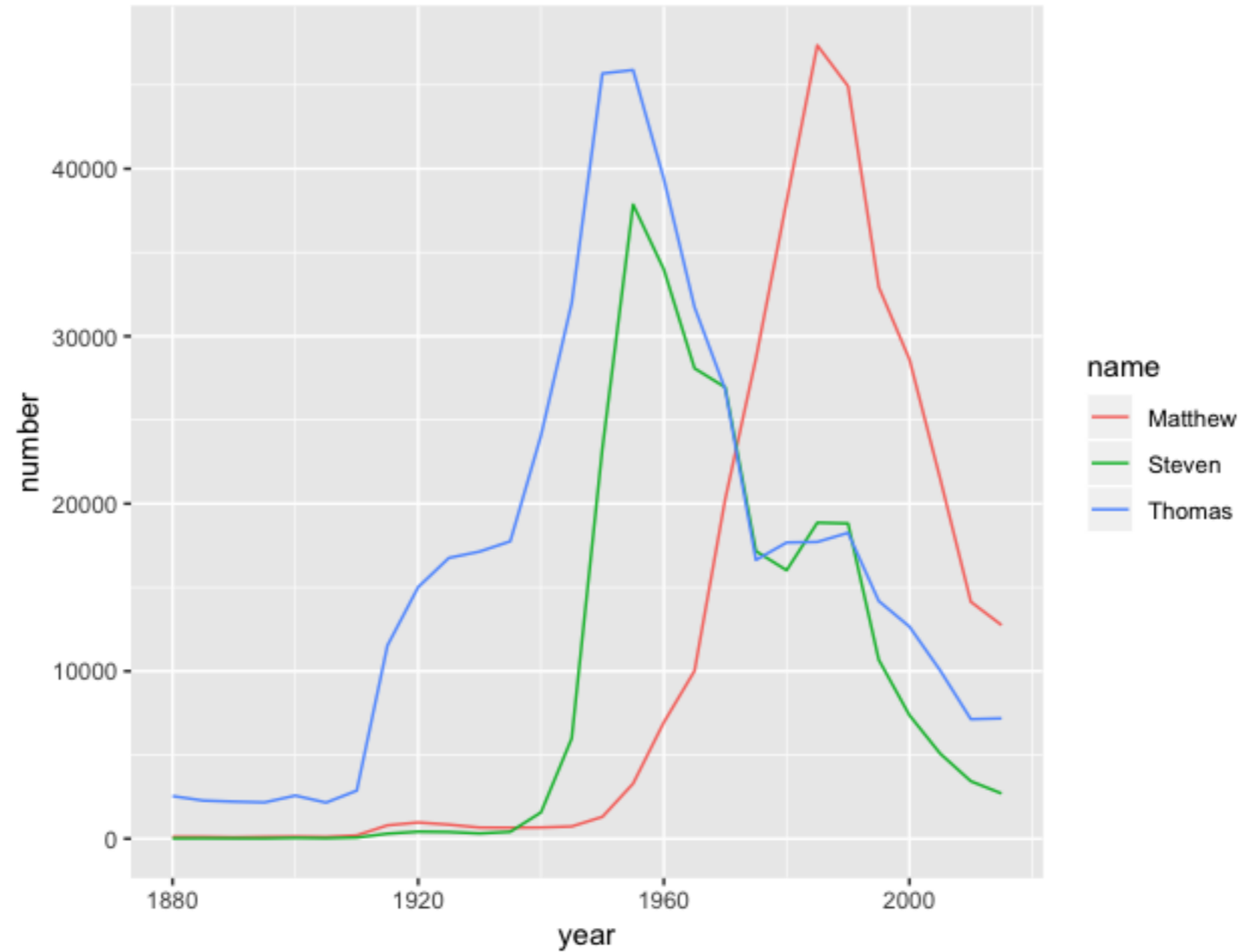
## Aggregating:

- `count()`
- `group_by()`
- `summarize()`

# Verbs table

	<b>Keeps only specified variables</b>	<b>Keeps other variables</b>
<b>Can't change values</b>	select	rename
<b>Can change values</b>	transmute	mutate

# babynames data



# Other DataCamp courses

## Other dplyr courses:

- Joining Data with dplyr
- Programming with dplyr

## Other Tidyverse courses:

- Reshaping Data with tidyr
- Modeling with Data in the Tidyverse
- Machine Learning in the Tidyverse
- Categorical Data in the Tidyverse



# Congratulations!

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