Week 9: Factors & Pull Requests

Miscellany

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Fall 2022

1. Log in to DuckWeb
2. On the Main Menu, click the Course Surveys link
3. Click "Open the Course Surveys site"
4. Choose the course you want to evaluate

Factors & Pull Requests

Week 9

Agenda

- Citations
- Final Project Review
- Discuss factors and factor re-leveling
- Walk through a *pull request (PR)*
- Quick note on `ggplot()`: `group =` & `color/fill =`

Overall Purpose

- Understand factors and how to manipulate them
- Understand how to complete a *pull request (PR)*

Homework 8

Citation Styles

(cheat sheet)

Citation Styles

Citation Style (using the tag)	Output
@Briggs11	Briggs and Weeks (2011)
[see @Baldwin2014; @Caruso2000]	(see Baldwin et al. 2014; Caruso 2000)
[@Linn02, p. 9]	(Linn and Haug 2002, p. 9)
[-@Goldhaber08]	(2008)

Reminder

Also, cite R!

```r
citation()
```

```
##
## To cite R in publications use:
##
##   R Core Team (2022). R: A language and environment for statistical
##   computing. R Foundation for Statistical Computing, Vienna, Austria.
##   URL https://www.R-project.org/.
##
## A BibTeX entry for LaTeX users is
##
##   @Manual{,
##     title = {R: A Language and Environment for Statistical Computing},
##     author = {{R Core Team}},
##     organization = {R Foundation for Statistical Computing},
##     address = {Vienna, Austria},
##     year = {2022},
##     url = {https://www.R-project.org/},
##   }
##
## We have invested a lot of time and effort in creating R, please cite it
## when using it for data analysis. See also 'citation("pkgname")' for
```

And the packages you used!

```
citation("tidyverse")
```

```
##
## Wickham H, Averick M, Bryan J, Chang W, McGowan LD, François R,
## Grolemund G, Hayes A, Henry L, Hester J, Kuhn M, Pedersen TL, Miller E,
## Bache SM, Müller K, Ooms J, Robinson D, Seidel DP, Spinu V, Takahashi
## K, Vaughan D, Wilke C, Woo K, Yutani H (2019). "Welcome to the
## tidyverse." _Journal of Open Source Software_, *4*(43), 1686. doi:
## 10.21105/joss.01686 (URL: https://doi.org/10.21105/joss.01686).
##
## A BibTeX entry for LaTeX users is
##
##   @Article{,
##     title = {Welcome to the {tidyverse}},
##     author = {Hadley Wickham and Mara Averick and Jennifer Bryan and Winston Chang and Lucy D'Agostino
##     year = {2019},
##     journal = {Journal of Open Source Software},
##     volume = {4},
##     number = {43},
##     pages = {1686},
##     doi = {10.21105/joss.01686},
##   }
```

Final Project

Final Project - Data Prep Script

- Expected to be a work in progress
- Provided to your peers so they can learn from you as much as you can learn from their feedback

Peer Review

- Understand the purpose of the exercise
- Conducted as a professional product
- Should be **very** encouraging
- Zero tolerance policy for inappropriate comments

Final Project – Presentation

Groups are expected to present for about **25-30 minutes** (split evenly among members). Group order randomly assigned.

Email me your presentation by midnight 11/29 so I can share through my machine.

Final Project – Presentation

Presentation cover the following:

- Share your journey (everyone, at least for a minute or two)
- Discuss challenges you had along the way
- Celebrate your successes
- Discuss challenges you are still facing
- Discuss substantive findings
- Show off your cool figures!
- Discuss next R hurdle you want to address

Final Project – Paper

- R Markdown document
  - Abstract, Intro, Methods, Results, Discussion, References
  - Should be brief: 3,500 words max
- No code displayed - should look similar to a manuscript being submitted for publication
- Include at least 1 table
- Include at least 2 plots
- Should be fully open, reproducible, and housed on GitHub
  - I should be able to clone your repository, open the R Studio Project, and reproduce the full manuscript (by knitting the R Markdown doc)

Final Project

The following functions:

- `pivot_longer()`
- `mutate()`
- `select()`
- `filter()`
- `pivot_wider()`
- `group_by()`
- `summarize()`

Scoring Rubric

Check the syllabus for Presentation and Final Paper scoring rubrics

Revisiting git

Before we jump in...

...let's revisit git

Talk with neighbor. What do these terms mean? Talk about them in the order you would encounter them in your workflow

- *clone*
- *pull*
- *stage*
- *commit*
- *push*
- *repo*
- *remote*

03:00

Factors

just the basics

When do we really want factors?

Generally two reasons to declare a factor

1. Only finite number of categories
    - treatment/control
    - income categories
    - performance levels
    - etc.
2. Use in modeling

Creating factos

Imagine you have a vector of months

```
months_4 <- c("Dec", "Apr", "Jan", "Mar")
```

We could store this as a string, but there are issues with this:

- There are only 12 possible months
  - factors will help us weed out values that don't conform to our predefined levels, which helps safeguard against typos, etc.
- You can't sort this vector in a meaningful way
  - default is alphabetic sorting

```
sort(months_4)
```

```
## [1] "Apr" "Dec" "Jan" "Mar"
```

Define it as a factor

```
months_4 <- factor(months_4, levels = c("Jan", "Feb", "Mar", "Apr", "May", "Jun", "Jul", "Aug", "Sep
months_4
```

```
## [1] Dec Apr Jan Mar
## Levels: Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
```

Now we can sort

```
sort(months_4)
```

```
## [1] Jan Mar Apr Dec
## Levels: Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
```

Accessing and modifying levels

Uset the `levels()` function

```r
levels(months_4)
```

```
##  [1] "Jan" "Feb" "Mar" "Apr" "May" "Jun" "Jul" "Aug" "Sep" "Oct" "Nov" "Dec"
```

Provides an error check of sorts

```r
months_4[5] <- "Jam"
```

```
## Warning in `[<-.factor`(`*tmp*`, 5, value = "Jam"): invalid factor level, NA
## generated
```

```r
months_4
```

```
## [1] Dec  Apr  Jan  Mar  <NA>
## Levels: Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
```

What if we don’t specify levels?

If you define a factor without specifying the levels, it will assign them alphabetically

```
mnths <- factor(c("Dec", "Apr", "Jan", "Mar"))
```

```
mnths
```

```
## [1] Dec Apr Jan Mar
## Levels: Apr Dec Jan Mar
```

{forcats}

- When working with factors, we can use the `{forcats}` package
  - `for cat`egorical variables
  - anagram of factors
- Part of the `{tidyverse}` so should be good to go
- All functions start with `fct_`
  - use the autofill in RStudio

Change level order - `fct_inorder()`

In order they are entered

```r
(mnths <- factor(c("Dec", "Apr", "Jan", "Mar")))
```

```
## [1] Dec Apr Jan Mar
## Levels: Apr Dec Jan Mar
```

```r
mnths %>%
  factor(., levels = c("Jan", "Mar", "Apr", "Dec")) %>%
  sort(.)
```

```
## [1] Jan Mar Apr Dec
## Levels: Jan Mar Apr Dec
```

Change level order - fct_inorder()

In order they are entered

```
(mnths <- factor(c("Dec", "Apr", "Jan", "Mar")))
```

```
## [1] Dec Apr Jan Mar
## Levels: Apr Dec Jan Mar
```

```
mnths %>%
  factor(., levels = c("Jan", "Mar", "Apr", "Dec")) %>%
  fct_inorder() %>%
  sort(.)
```

```
## [1] Dec Apr Jan Mar
## Levels: Dec Apr Jan Mar
```

Change level order - `fct_infreq()`

In order of frequency

```r
c("b", "b", "c", "a", "a", "a") %>%
    fct_infreq()
```

```
## [1] b b c a a a
## Levels: a b c
```

This can be **especially** useful for plotting

```r
ggplot(aes(x, fct_infreq(y))
```

Investigate factors

- `{tidyverse}` gives you convenient way to evaluate factors
  - `count()`
  - `geom_bar()` or `geom_col())` with `{ggplot2}`
- But don't forget about the base function `unique()`
  - e.g., `unique(df$factor_variable)`

General Social Survey (GSS)

```r
forcats::gss_cat
```

```
## # A tibble: 21,483 x 9
##     year marital         age race  rincome        partyid     relig denom tvhours
##    <int> <fct>         <int> <fct> <fct>          <fct>       <fct> <fct>   <int>
##  1  2000 Never married    26 White $8000 to 9999  Ind,near ~ Prot~ Sout~      12
##  2  2000 Divorced         48 White $8000 to 9999  Not str r~ Prot~ Bapt~      NA
##  3  2000 Widowed          67 White Not applicable Independe~ Prot~ No d~       2
##  4  2000 Never married    39 White Not applicable Ind,near ~ Orth~ Not ~       4
##  5  2000 Divorced         25 White Not applicable Not str d~ None  Not ~       1
##  6  2000 Married          25 White $20000 - 24999 Strong de~ Prot~ Sout~      NA
##  7  2000 Never married    36 White $25000 or more Not str r~ Chri~ Not ~       3
##  8  2000 Divorced         44 White $7000 to 7999  Ind,near ~ Prot~ Luth~      NA
##  9  2000 Married          44 White $25000 or more Not str d~ Prot~ Other       0
## 10  2000 Married          47 White $25000 or more Strong re~ Prot~ Sout~       3
## # ... with 21,473 more rows
```

```r
gss_cat %>%
  count(partyid)
```

```
## # A tibble: 10 x 2
##    partyid                n
##    <fct>              <int>
##  1 No answer            154
##  2 Don't know             1
##  3 Other party          393
##  4 Strong republican   2314
##  5 Not str republican  3032
##  6 Ind,near rep        1791
##  7 Independent         4119
##  8 Ind,near dem        2499
##  9 Not str democrat    3690
## 10 Strong democrat     3490
```

```r
levels(gss_cat$partyid)
```

```
##  [1] "No answer"          "Don't know"         "Other party"
##  [4] "Strong republican"  "Not str republican" "Ind,near rep"
##  [7] "Independent"        "Ind,near dem"       "Not str democrat"
## [10] "Strong democrat"
```

```
unique(gss_cat$partyid)
```

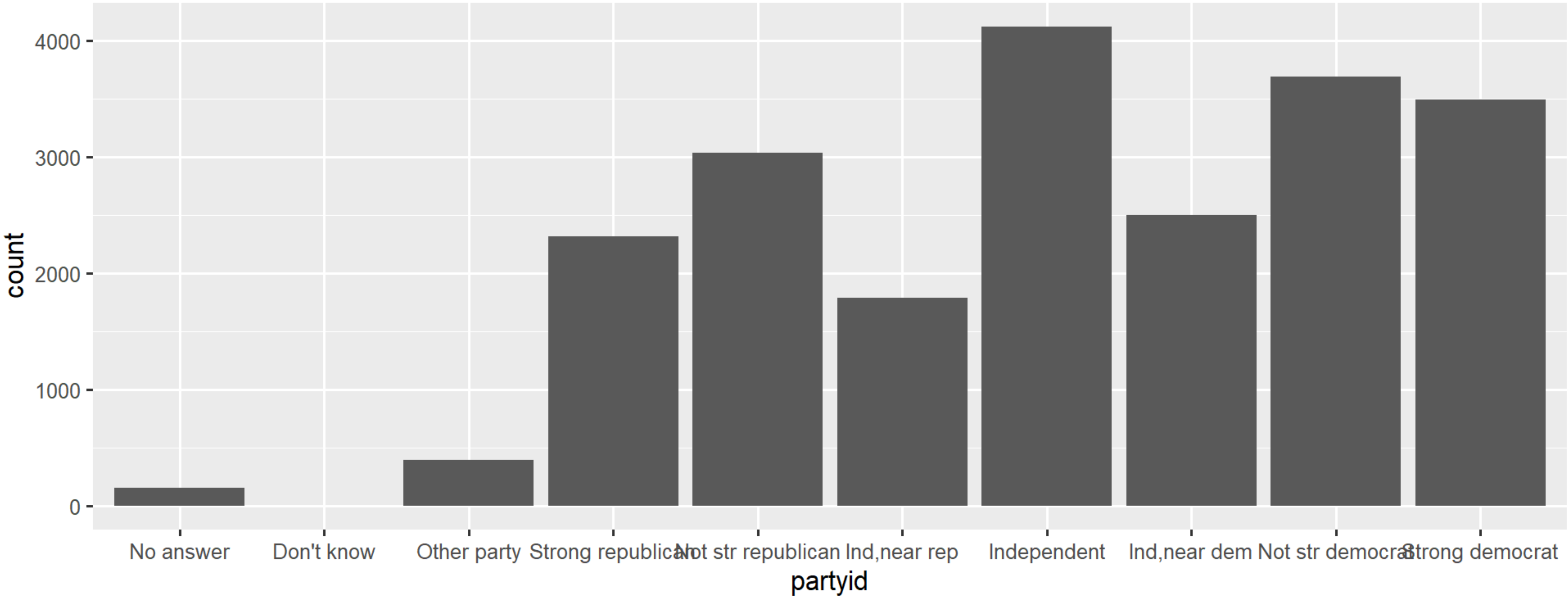
```
##  [1] Ind,near rep       Not str republican Independent        Not str democrat
##  [5] Strong democrat    Ind,near dem       Strong republican  Other party
##  [9] No answer          Don't know
## 10 Levels: No answer Don't know Other party ... Strong democrat
```

How many `unique` categories are there (if you have a lot)?

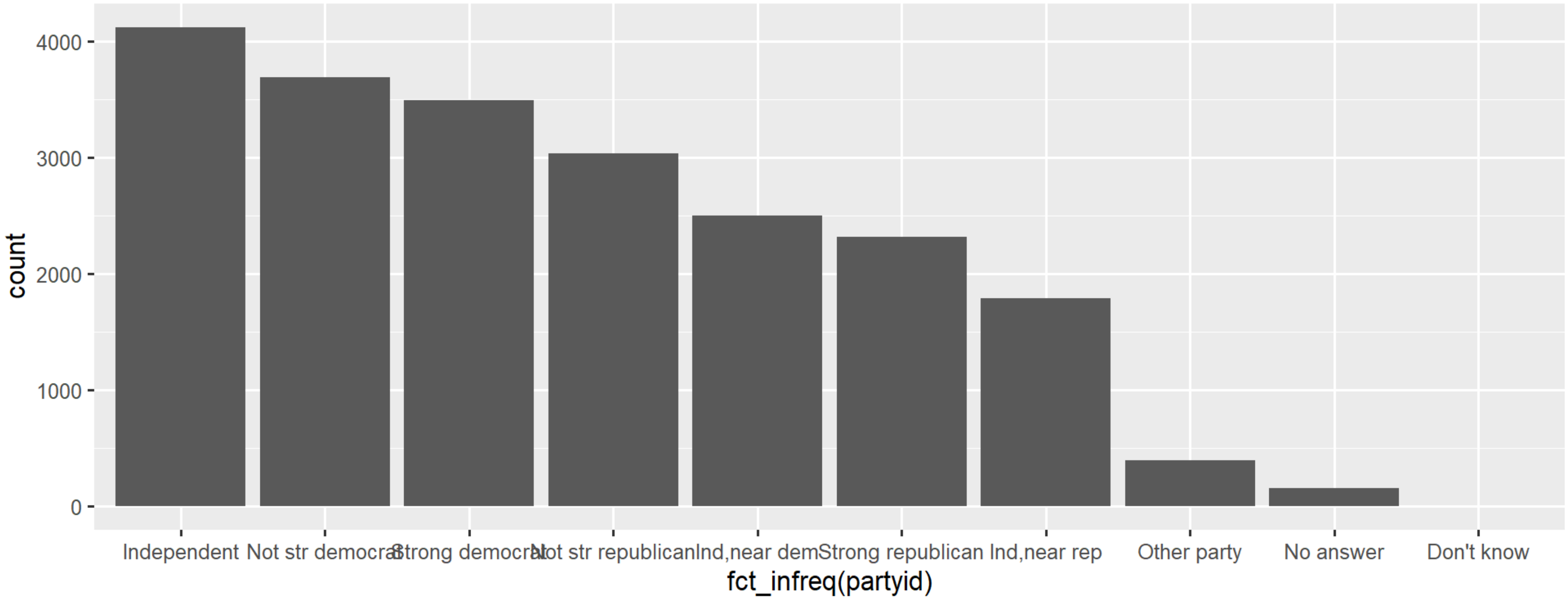
```
length(unique(gss_cat$partyid))
```

```
## [1] 10
```

```
ggplot(gss_cat, aes(partyid)) +
    geom_bar()
```



```
ggplot(gss_cat, aes(fct_infreq(partyid))) +
  geom_bar()
```



Change level order – fct_relevel()

Change level order by hand

- *probably one I use most*

```
fct_relevel(variable_name,
            "first_level",
            "second_level",
            "third_level",
            ...)
```

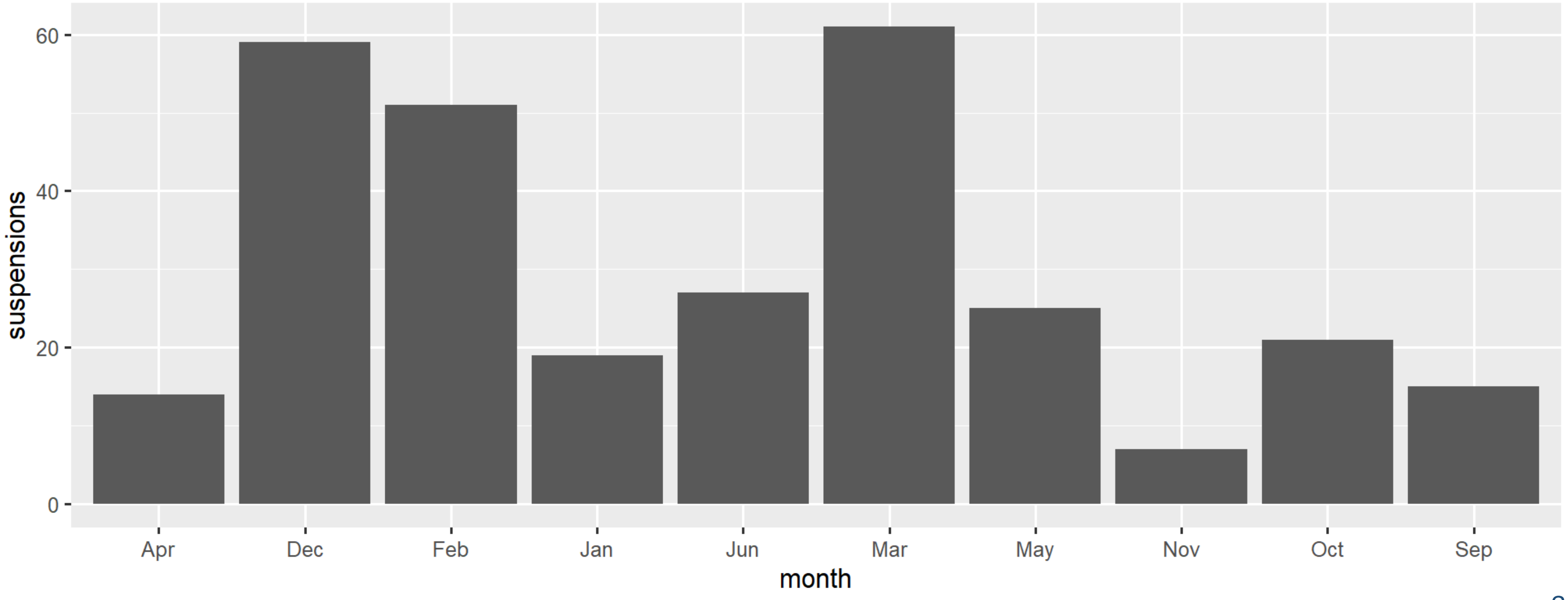
```r
set.seed(3000)
tibble(
 month = c("Jan", "Feb", "Mar", "Apr", "May", "Jun", "Sep", "Oct", "Nov", "Dec"),
 suspensions = sample(c(5:75), size = 10)
)
```

```
## # A tibble: 10 x 2
##    month suspensions
##    <chr>       <int>
##  1 Jan            19
##  2 Feb            51
##  3 Mar            61
##  4 Apr            14
##  5 May            25
##  6 Jun            27
##  7 Sep            15
##  8 Oct            21
##  9 Nov             7
## 10 Dec            59
```

```r
set.seed(3000)
tibble(
 month = c("Jan", "Feb", "Mar", "Apr", "May", "Jun", "Sep", "Oct", "Nov", "Dec"),
suspensions = sample(c(5:75), size = 10)
)
```

```
## # A tibble: 10 x 2
##    month suspensions
##    <chr>       <int>
##  1 Jan            19
##  2 Feb            51
##  3 Mar            61
##  4 Apr            14
##  5 May            25
##  6 Jun            27
##  7 Sep            15
##  8 Oct            21
##  9 Nov             7
## 10 Dec            59
```

```
set.seed(3000)
tibble(
 month = c("Jan", "Feb", "Mar", "Apr", "May", "Jun", "Sep", "Oct", "Nov", "Dec"),
 suspensions = sample(c(5:75), size = 10)
) %>%
  ggplot(aes(month, suspensions)) +
  geom_col()
```



```
set.seed(3000)
tibble(
 month = c("Jan", "Feb", "Mar", "Apr", "May", "Jun", "Sep", "Oct", "Nov", "Dec"),
 suspensions = sample(c(5:75), size = 10)
) %>%
  mutate(month = fct_relevel(month,
                    "Sep", "Oct", "Nov", "Dec", "Jan", "Feb", "Mar", "Apr", "May"))
```

```r
set.seed(3000)
tibble(
 month = c("Jan", "Feb", "Mar", "Apr", "May", "Jun", "Sep", "Oct", "Nov", "Dec"),
 suspensions = sample(c(5:75), size = 10)
) %>%
  mutate(month = fct_relevel(month,
                    "Sep", "Oct", "Nov", "Dec", "Jan", "Feb", "Mar", "Apr", "May")) %>%
  ggplot(aes(month, suspensions)) +
  geom_col()
```

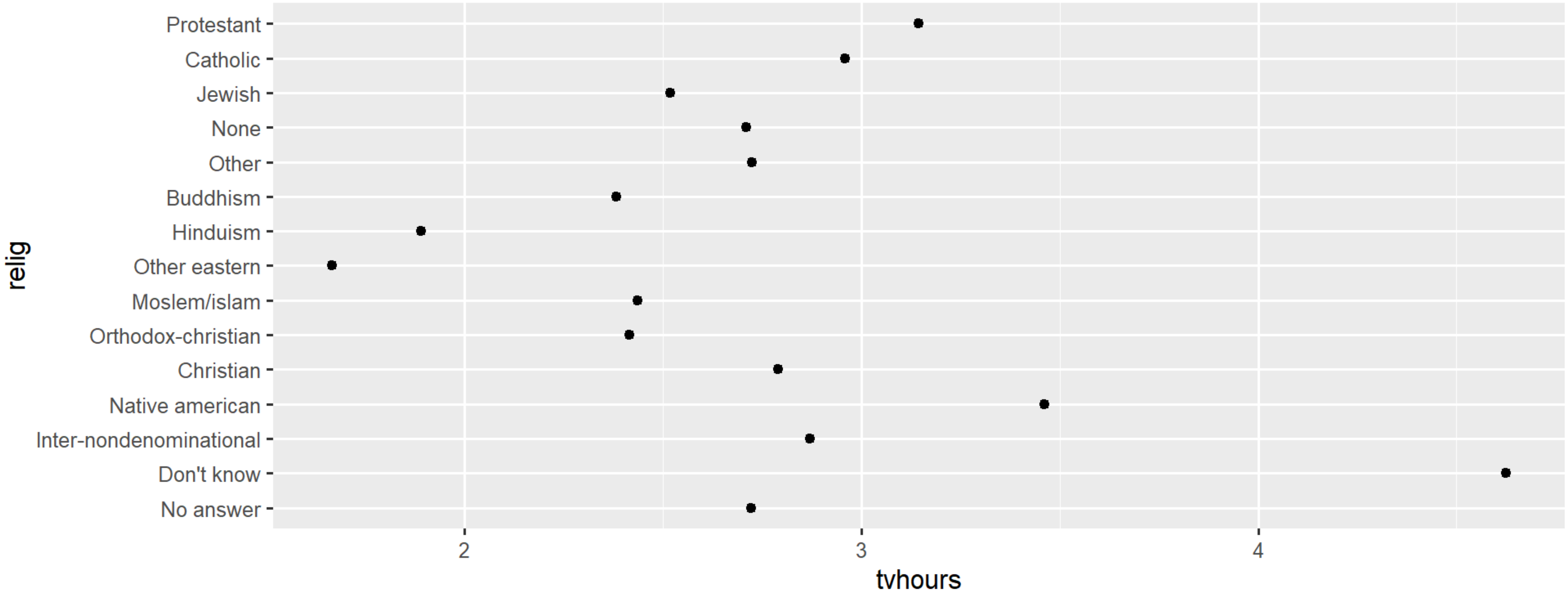
Change level order - fct_reorder()

Reorder according to another variable

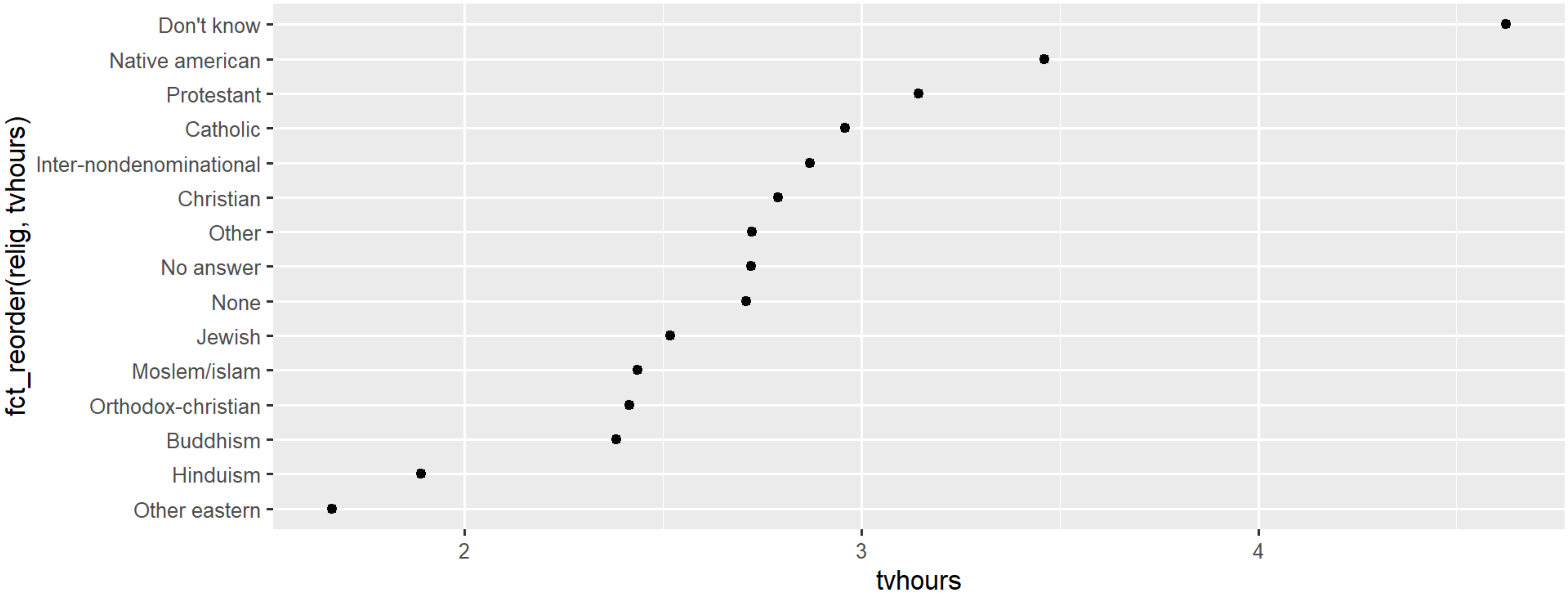
```
(relig_summary <- gss_cat %>%
  group_by(relig) %>%
  summarise(tvhours = mean(tvhours, na.rm = TRUE),
            n = n()))
```

```
## # A tibble: 15 x 3
##    relig                   tvhours     n
##    <fct>                     <dbl> <int>
##  1 No answer                  2.72    93
##  2 Don't know                 4.62    15
##  3 Inter-nondenominational    2.87   109
##  4 Native american            3.46    23
##  5 Christian                  2.79   689
##  6 Orthodox-christian         2.42    95
##  7 Moslem/islam               2.44   104
##  8 Other eastern              1.67    32
##  9 Hinduism                   1.89    71
## 10 Buddhism                   2.38   147
## 11 Other                      2.73   224
```

```
ggplot(relig_summary, aes(tvhours, relig)) +
  geom_point()
```



```
ggplot(relig_summary, aes(tvhours, fct_reorder(relig, tvhours))) +
    geom_point()
```



Or `mutate()` the factor reorder

```r
relig_summary %>%
  mutate(relig = fct_reorder(relig, tvhours)) %>%
  ggplot(aes(tvhours, relig)) +
  geom_point()
```

Quick aside for error bars

```
(relig_summary_eb <- gss_cat %>%
  group_by(relig) %>%
  summarise(tvhours_mean = mean(tvhours, na.rm = TRUE),
            tvhours_se   = sqrt(var(tvhours, na.rm = TRUE) /
                                  length(na.omit(tvhours))),
            n = n()))
```

```
## # A tibble: 15 x 4
##    relig                   tvhours_mean tvhours_se     n
##    <fct>                          <dbl>      <dbl> <int>
##  1 No answer                       2.72     0.326     93
##  2 Don't know                      4.62     3.01      15
##  3 Inter-nondenominational         2.87     0.363    109
##  4 Native american                 3.46     1.13      23
##  5 Christian                       2.79     0.126    689
##  6 Orthodox-christian              2.42     0.355     95
##  7 Moslem/islam                    2.44     0.269    104
##  8 Other eastern                   1.67     0.449     32
##  9 Hinduism                        1.89     0.197     71
## 10 Buddhism                        2.38     0.235    147
## 11 Other                           2.73     0.203    224
## 12 None                            2.71     0.0590  3523
```

Quick aside for error bars

```
(relig_summary_eb <- gss_cat %>%
  group_by(relig) %>%
  summarise(tvhours_mean = mean(tvhours, na.rm = TRUE),
            tvhours_se   = sqrt(var(tvhours, na.rm = TRUE) /
                                  length(na.omit(tvhours))),
            n = n()))
```

```
## # A tibble: 15 x 4
##    relig                   tvhours_mean tvhours_se     n
##    <fct>                          <dbl>      <dbl> <int>
##  1 No answer                       2.72     0.326     93
##  2 Don't know                      4.62     3.01      15
##  3 Inter-nondenominational         2.87     0.363    109
##  4 Native american                 3.46     1.13      23
##  5 Christian                       2.79     0.126    689
##  6 Orthodox-christian              2.42     0.355     95
##  7 Moslem/islam                    2.44     0.269    104
##  8 Other eastern                   1.67     0.449     32
##  9 Hinduism                        1.89     0.197     71
## 10 Buddhism                        2.38     0.235    147
## 11 Other                           2.73     0.203    224
## 12 None                            2.71     0.0590  3523
```

Quick aside for error bars

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(relig_summary_eb <- gss_cat %>%
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  summarise(tvhours_mean = mean(tvhours, na.rm = TRUE),
            tvhours_se   = sqrt(var(tvhours, na.rm = TRUE) /
                                  length(na.omit(tvhours))),
            n = n()))
```

```
## # A tibble: 15 x 4
##    relig                   tvhours_mean tvhours_se     n
##    <fct>                          <dbl>      <dbl> <int>
##  1 No answer                       2.72     0.326     93
##  2 Don't know                      4.62     3.01      15
##  3 Inter-nondenominational         2.87     0.363    109
##  4 Native american                 3.46     1.13      23
##  5 Christian                       2.79     0.126    689
##  6 Orthodox-christian              2.42     0.355     95
##  7 Moslem/islam                    2.44     0.269    104
##  8 Other eastern                   1.67     0.449     32
##  9 Hinduism                        1.89     0.197     71
## 10 Buddhism                        2.38     0.235    147
## 11 Other                           2.73     0.203    224
## 12 None                            2.71     0.0590  3523
```

Quick aside for error bars

```r
(relig_summary_eb <- gss_cat %>%
  group_by(relig) %>%
  summarise(tvhours_mean = mean(tvhours, na.rm = TRUE),
            tvhours_se   = sqrt(var(tvhours, na.rm = TRUE) /
                                  length(na.omit(tvhours))),
            n = n()))
```

```
## # A tibble: 15 x 4
##    relig                   tvhours_mean tvhours_se     n
##    <fct>                          <dbl>      <dbl> <int>
##  1 No answer                       2.72     0.326     93
##  2 Don't know                      4.62     3.01      15
##  3 Inter-nondenominational         2.87     0.363    109
##  4 Native american                 3.46     1.13      23
##  5 Christian                       2.79     0.126    689
##  6 Orthodox-christian              2.42     0.355     95
##  7 Moslem/islam                    2.44     0.269    104
##  8 Other eastern                   1.67     0.449     32
##  9 Hinduism                        1.89     0.197     71
## 10 Buddhism                        2.38     0.235    147
## 11 Other                           2.73     0.203    224
## 12 None                            2.71     0.0590  3523
```

Quick aside for error bars

```
ggplot(relig_summary_eb,
       aes(tvhours_mean, fct_reorder(relig, tvhours_mean))) +
  geom_errorbarh(aes(xmin = tvhours_mean - 1.96 * tvhours_se,
                     xmax = tvhours_mean + 1.96 * tvhours_se),
                 color = "cornflowerblue") +
  geom_point()
```

Quick aside for error bars

```
ggplot(relig_summary_eb,
       aes(tvhours_mean, fct_reorder(relig, tvhours_mean))) +
  geom_errorbarh(aes(xmin = tvhours_mean - 1.96 * tvhours_se,
                     xmax = tvhours_mean + 1.96 * tvhours_se),
                 color = "cornflowerblue") +
  geom_point()
```

Quick aside for error bars

```
ggplot(relig_summary_eb,
       aes(tvhours_mean, fct_reorder(relig, tvhours_mean))) +
  geom_errorbarh(aes(xmin = tvhours_mean - 1.96 * tvhours_se,
                     xmax = tvhours_mean + 1.96 * tvhours_se),
                 color = "cornflowerblue") +
  geom_point()
```

Quick aside for error bars

```
ggplot(relig_summary_eb,
       aes(tvhours_mean, fct_reorder(relig, tvhours_mean))) +
  geom_errorbarh(aes(xmin = tvhours_mean - 1.96 * tvhours_se,
                     xmax = tvhours_mean + 1.96 * tvhours_se),
                 color = "cornflowerblue") +
  geom_point()
```

Modifying factor levels - `fct_recode()`

Make modifying factors more explicit

`fct_recode(var_name, "new level" = "old level"...`

```
gss_cat %>%
  mutate(partyid = fct_recode(partyid,
    "Republican, strong" = "Strong republican",
    "Republican, weak" = "Not str republican",
    "Independent, near rep" = "Ind, near rep",
    "Independent, near dem" = "Ind, near dem",
    "Democrat, weak" = "Not str democrat",
    "Democrat, strong" = "Strong democrat")) %>%
  count(partyid)
```

```
gss_cat %>%
  mutate(partyid = fct_recode(partyid,
    "Republican, strong" = "Strong republican",
    "Republican, weak" = "Not str republican",
    "Independent, near rep" = "Ind, near rep",
    "Independent, near dem" = "Ind, near dem",
    "Democrat, weak" = "Not str democrat",
    "Democrat, strong" = "Strong democrat")) %>%
  count(partyid)
```

```
## # A tibble: 10 x 2
##    partyid                n
##    <fct>              <int>
##  1 No answer            154
##  2 Don't know             1
##  3 Other party          393
##  4 Republican, strong  2314
##  5 Republican, weak    3032
##  6 Ind,near rep        1791
##  7 Independent         4119
##  8 Ind,near dem        2499
##  9 Democrat, weak      3690
## 10 Democrat, strong    3490
```

Collapsing levels - fct_recode()

fct_recode() can also be used to collapse levels easily

```
gss_cat %>%
  mutate(partyid = fct_recode(partyid,
    "Republican, strong"    = "Strong republican",
    "Republican, weak"      = "Not str republican",
    "Independent, near rep" = "Ind,near rep",
    "Independent, near dem" = "Ind,near dem",
    "Democrat, weak"        = "Not str democrat",
    "Democrat, strong"      = "Strong democrat",
    "Other"                 = "No answer",
    "Other"                 = "Don't know",
    "Other"                 = "Other party")) %>%
  count(partyid)
```

```
gss_cat %>%
  mutate(partyid = fct_recode(partyid,
    "Republican, strong"    = "Strong republican",
    "Republican, weak"      = "Not str republican",
    "Independent, near rep" = "Ind,near rep",
    "Independent, near dem" = "Ind,near dem",
    "Democrat, weak"        = "Not str democrat",
    "Democrat, strong"      = "Strong democrat",
    "Other"                 = "No answer",
    "Other"                 = "Don't know",
    "Other"                 = "Other party")) %>%
  count(partyid)
```

```
## # A tibble: 8 x 2
##   partyid                n
##   <fct>              <int>
## 1 Other                548
## 2 Republican, strong  2314
## 3 Republican, weak    3032
## 4 Independent, near rep 1791
## 5 Independent         4119
## 6 Independent, near dem 2499
## 7 Democrat, weak      3690
## 8 Democrat, strong    3490
```

Collapsing levels - `fct_collapse()`

`fct_collapse()` is one of the more useful functions in `{forcats}`

- Collapse all categories into Republican, Democrat, Independent, or Other

```r
gss_cat %>%
  mutate(partyid = fct_collapse(partyid,
         Other = c("No answer", "Don't know", "Other party"),
         Rep = c("Strong republican", "Not str republican"),
         Ind = c("Ind,near rep", "Independent", "Ind,near dem"),
         Dem = c("Not str democrat", "Strong democrat")
  )) %>%
  count(partyid)
```

```
## # A tibble: 4 x 2
##   partyid     n
##   <fct>   <int>
## 1 Other     548
## 2 Rep      5346
## 3 Ind      8409
## 4 Dem      7180
```

Collapsing levels - `fct_lump_?()`

`fct_lump_?()` - "lump" a bunch of categories together

- `fct_lump_n(factor_variable, n)`: lumps all levels except for the `n` most frequent (or least frequent if `n` < 0) into "Other" level
- `fct_lump_min(factor_variable, min)`: lumps levels that appear fewer than `min` times
- `fct_lump_prop(factor_variable, prop)`: lumps levels that appear in fewer `prop` × `n` times

Collapsing levels - `fct_lump_n()`

Collapse to n = 9 religious groups: top 8 groups plus "Other"

```
gss_cat %>%
  mutate(rel = fct_lump_n(relig, 9)) %>%
  count(rel)
```

```
## # A tibble: 9 x 2
##   rel                         n
##   <fct>                   <int>
## 1 Inter-nondenominational   109
## 2 Christian                 689
## 3 Moslem/islam              104
## 4 Buddhism                  147
## 5 None                     3523
## 6 Jewish                    388
## 7 Catholic                 5124
## 8 Protestant              10846
## 9 Other                     553
```

Collapsing levels - fct_lump_min()

Collapse to all religious groups that appear less than min = 200 into "Other"

```
gss_cat %>%
  mutate(rel = fct_lump_min(relig, min = 200)) %>%
  count(rel)
```

```
## # A tibble: 6 x 2
##   rel             n
##   <fct>       <int>
## 1 Christian     689
## 2 None         3523
## 3 Jewish        388
## 4 Catholic     5124
## 5 Protestant 10846
## 6 Other         913
```

Collapsing levels - `fct_lump_prop()`

Collapse to all religious groups that appear less than `prop` = 10% into "Other"

```
gss_cat %>%
  mutate(rel = fct_lump_prop(relig, prop = .10)) %>%
  count(rel)
```

```
## # A tibble: 4 x 2
##   rel             n
##   <fct>       <int>
## 1 None         3523
## 2 Catholic     5124
## 3 Protestant 10846
## 4 Other        1990
```

Missing levels

```
levels(gss_cat$race)
```

```
## [1] "Other"          "Black"          "White"          "Not applicable"
```

```
gss_cat %>%
  count(race)
```

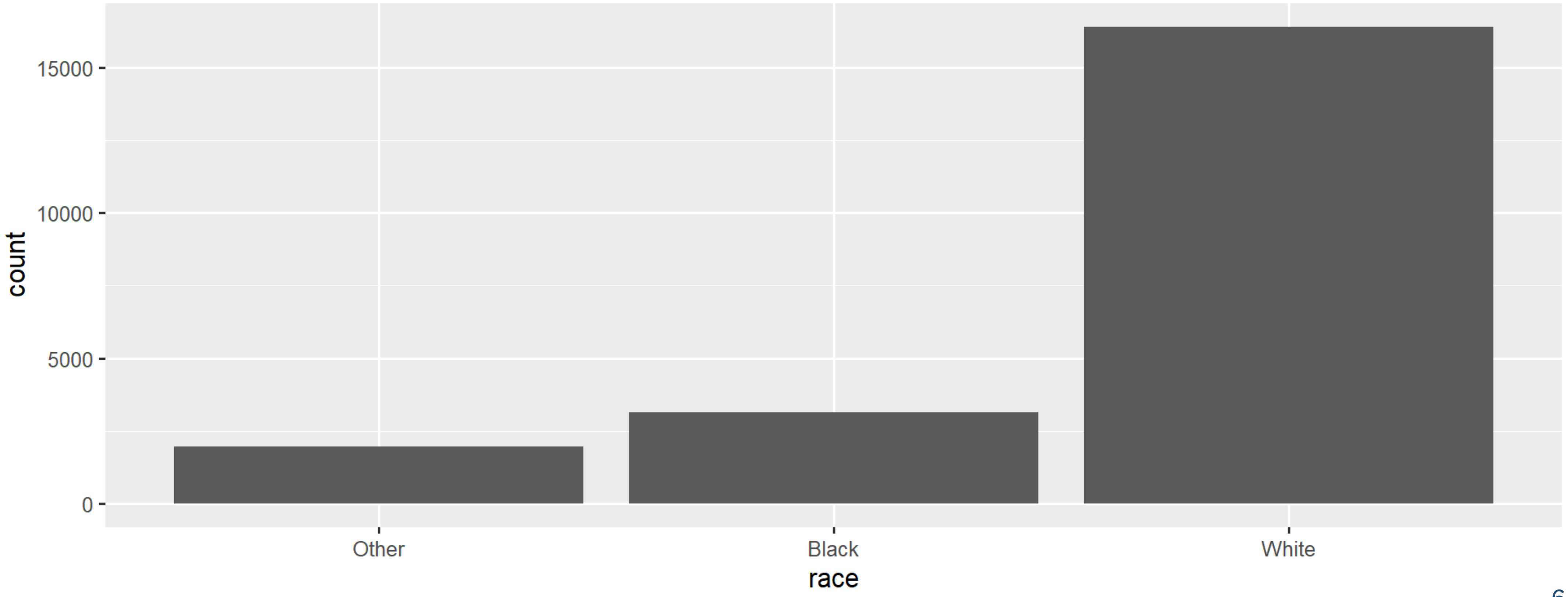
```
## # A tibble: 3 x 2
##   race      n
##   <fct> <int>
## 1 Other  1959
## 2 Black  3129
## 3 White 16395
```

```
table(gss_cat$race)
```

```
## 
##          Other          Black          White Not applicable 
##           1959           3129          16395              0
```

Missing levels

```
ggplot(gss_cat, aes(race)) +
    geom_bar()
```



Missing levels

```r
ggplot(gss_cat, aes(race)) +
    geom_bar() +
    scale_x_discrete(drop = FALSE)
```

Review

`fct_inorder()`: Levels ordered as entered

`fct_infreq()`: Change level order in order of frequency (largest first)

`fct_relevel()`: Change level order by hand

`fct_reorder()`: Change level order according to another variable

`fct_recode()`: Recode (collapse) levels into new named levels

`fct_collapse()`: Recode many levels into fewer levels

`fct_lump_?()`: Recode all levels into "Other":

- except for the `n` most frequent - `fct_lump_n()`
- that appear fewer than `min` times - `fct_lump_min()`
- that appear less than `prop`% - `fct_lump_prop()`

Pull Requests

Peer Review of Data Prep Script

Expectations

Feedback:

1. Note at least three areas of strength

2. Note at least one thing you learned from reviewing their script

3. Note at least one and no more than three areas for improvement

Making your code publicly available can feel daunting

- The purpose of this portion of the final project is to help us all learn from each other
- We are all learning
    - Be constructive in your feedback
    - Be kind
- Under no circumstances will negative comments be tolerated
    - Any comments that could be perceived as negative, and outside the scope of the code, will result in an immediate score of zero

Peer Review GitHub Process

1. Locate GitHub repo of assigned peer to review

2. Fork the repo

3. Clone the repo

4. Provide script feedback

    - edit the .Rmd file directly
    - edit code
    - provide comments in code and/or text (`Ctrl/Command + Shift + C`)
    - *commit* & *push*

5. Create Pull Request (PR)

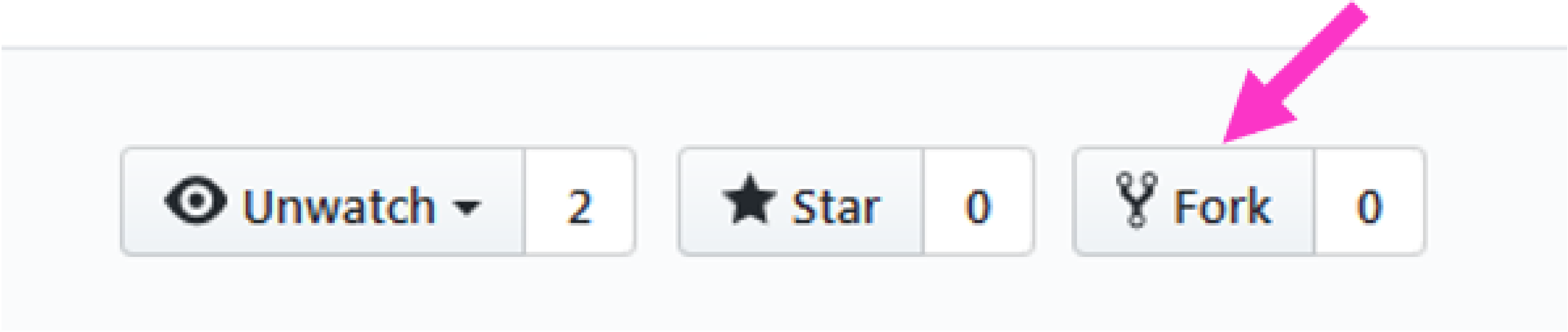
- Write brief summary of the PR that includes
    - >= 3 strengths
    - >= 1 thing you learned
    - 1 to 3 three areas of improvement

1. Locate GitHub repo of assigned peer to review

Student	Repo to Review	File to Review
Sabreen NoorAli	https://github.com/emaduneme/EDLD_651_Ghana	Main Markdown.Rmd
Alex Newson	https://github.com/haithamanbar/Oregon-made	Final Project.Rmd
Seulbi Lee	https://github.com/tianwalker44/EDLD_Final	NEW_Final_Groupof5.Rmd
Tony Daza	https://github.com/emaduneme/EDLD_651_Ghana	Main Markdown.Rmd
Deanna Strayer	https://github.com/emaduneme/EDLD_651_Ghana	Main Markdown.Rmd
Sam Lorenzo	https://github.com/seul-b/edld-final	in-progress.Rmd
Emmanuel Maduneme	https://github.com/haithamanbar/Oregon-made	Final Project.Rmd
Megan Denneny	https://github.com/tianwalker44/EDLD_Final	NEW_Final_Groupof5.Rmd
Laura Gattis	https://github.com/tianwalker44/EDLD_Final	NEW_Final_Groupof5.Rmd
Tian Walker	https://github.com/seul-b/edld-final	in-progress.Rmd
Rachel Miller-Moudgil	https://github.com/seul-b/edld-final	in-progress.Rmd
Brittany Spinner	https://github.com/haithamanbar/Oregon-made	Final Project.Rmd
Dominik Graetz	https://github.com/haithamanbar/Oregon-made	Final Project.Rmd
Amber Somarriba	https://github.com/seul-b/edld-final	in-progress.Rmd
Erick Njue	https://github.com/seul-b/edld-final	in-progress.Rmd
Haitham Anbar	https://github.com/tianwalker44/EDLD_Final	NEW_Final_Groupof5.Rmd
Maria Coronado Cabrera	https://github.com/emaduneme/EDLD_651_Ghana	Main Markdown.Rmd
Tram Anh Hoang	https://github.com/tianwalker44/EDLD_Final	NEW_Final_Groupof5.Rmd

2. Fork the repo

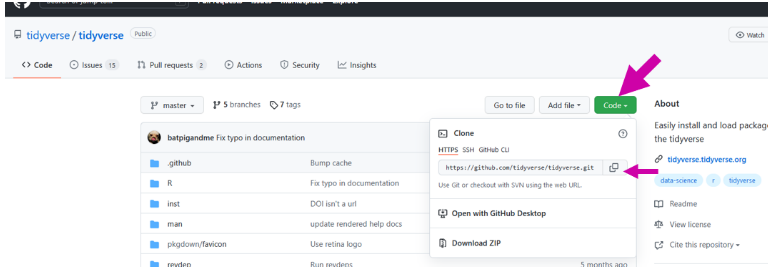
1. Navigate to the (host) GitHub repo
2. Click Fork in the upper right corner
3. Where to fork? – **your GitHub account**



3. Clone the repo

(1) Clone the repo

- copy the URL

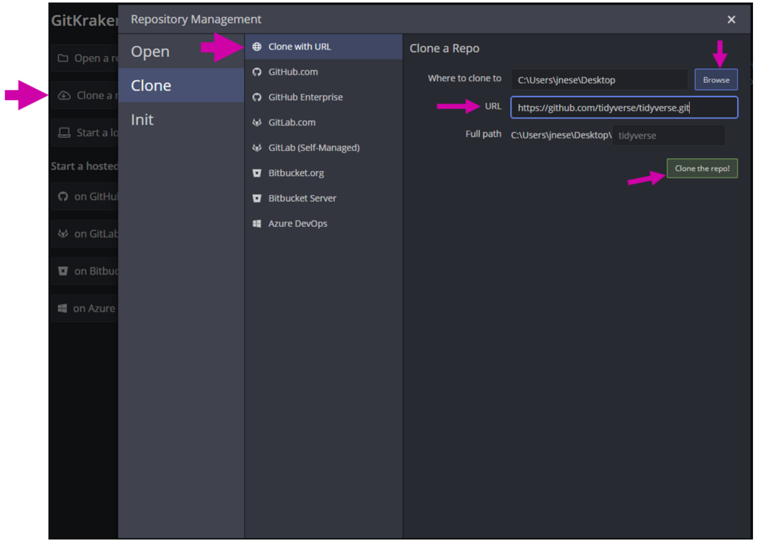


`https://github.com/tidyverse/tidyverse.git`

Use Git or checkout with SVN using the web URL.

(2) Open GitKraken

- *Clone with URL*
- Where will it live on your local machine?
    - it's own folder, with no other RProjects



Where to clone to: C:\Users\jnese\Desktop

URL: https://github.com/tidyverse/tidyverse.git

Full path: C:\Users\jnese\Desktop\ tidyverse

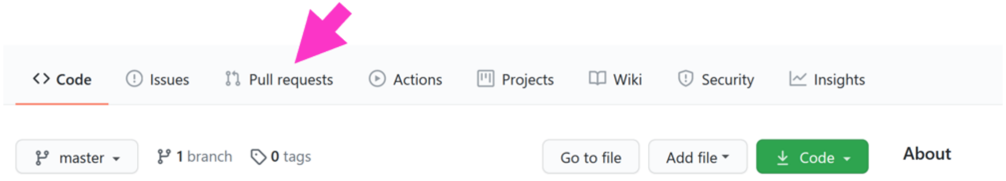
4. Provide script feedback

- Open `RProj` in your *local* (i.e., on your machine)
- Find the .Rmd document you will be reviewing
  - it should be an Rmd document
- Make your edits/comments
  - edit code as you like
  - include a comment for each edit!
  - Provide comments in code **and/or** text (`Ctrl/Command + Shift + C`)
- Commit as you go (if you are working on this across sessions/days)
- **Push only when you are finished**

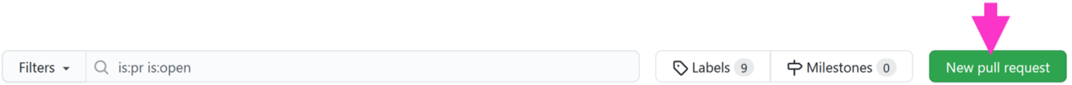
5. Create Pull Request (PR)

(1) Navigate back to the (host) GitHub repo

(2) Click “Pull requests”

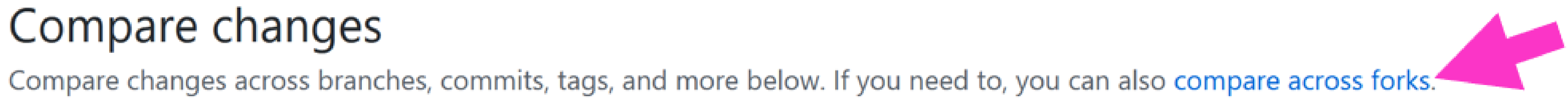


(3) Click “New pull request”



5. Create Pull Request (PR)

(4) Click "*Compare across forks*"

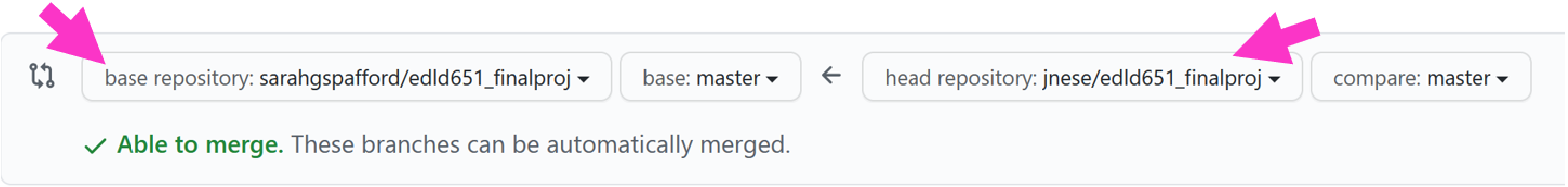


Compare changes

Compare changes across branches, commits, tags, and more below. If you need to, you can also compare across forks.

Use drop-downs so that:

- *host* repo is on **left**
- *your* repo is on the **right**



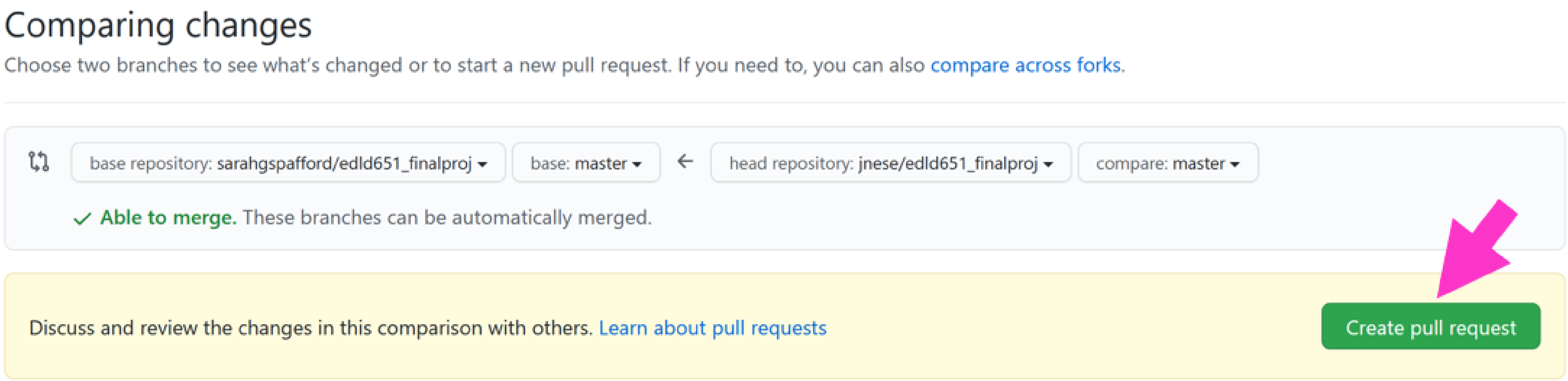
base repository: sarahgspafford/edld651_finalproj ▾ | base: master ▾ ← head repository: jnese/edld651_finalproj ▾ | compare: master ▾

✓ Able to merge. These branches can be automatically merged.

You will be able view the changes you made to the .Rmd document

5. Create Pull Request (PR)

(5) Click "*Create pull request*"



Comparing changes

Choose two branches to see what's changed or to start a new pull request. If you need to, you can also compare across forks.

base repository: sarahgspafford/edld651_finalproj ▾ base: master ▾ ← head repository: jnese/edld651_finalproj ▾ compare: master ▾

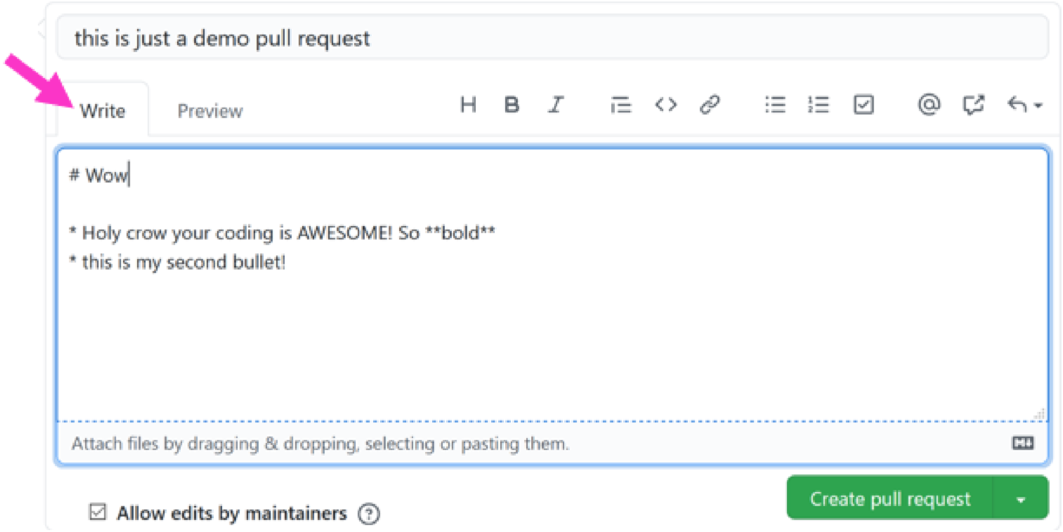
✓ Able to merge. These branches can be automatically merged.

Discuss and review the changes in this comparison with others. Learn about pull requests

5. Create Pull Request (PR)

Write a brief summary list of the PR that includes

- >= 3 strengths
- >= 1 thing you learned
- 1 to 3 three areas of improvement
- **Use markdown formatting, headers or list!**

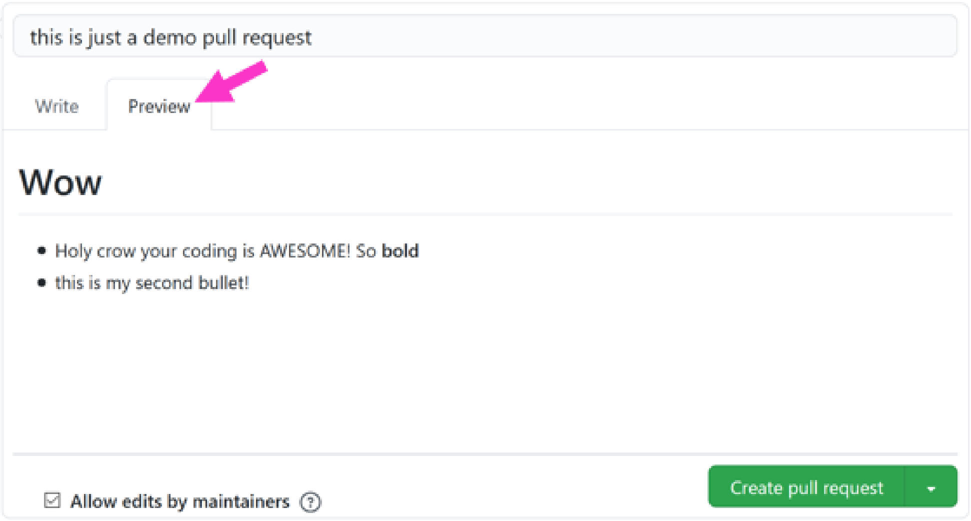


this is just a demo pull request

```
# Wow

* Holy crow your coding is AWESOME! So **bold**
* this is my second bullet!
```

Write
Preview
H
B
I
Attach files by dragging & dropping, selecting or pasting them.
☑ Allow edits by maintainers
Create pull request



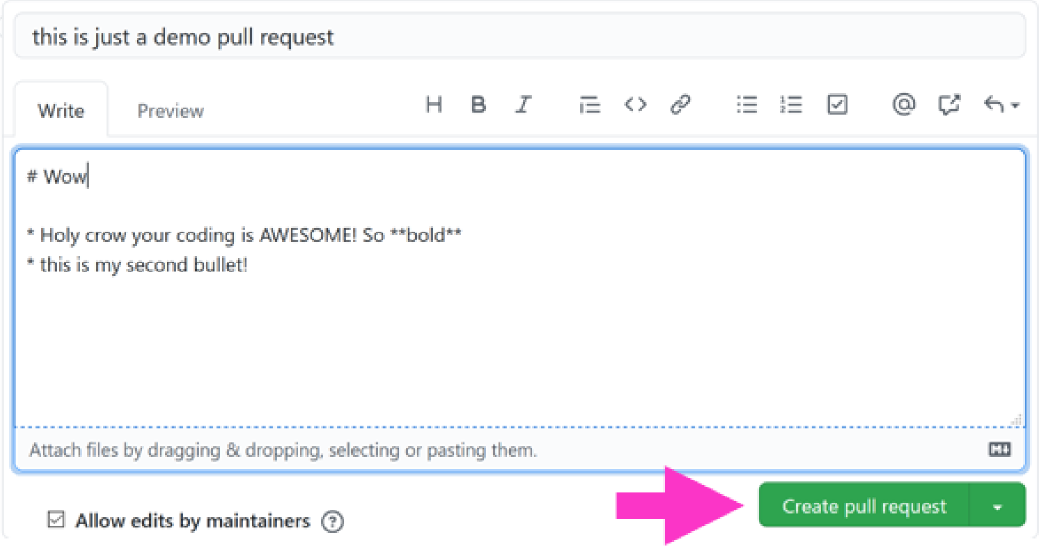
this is just a demo pull request

Wow

- Holy crow your coding is AWESOME! So **bold**
- this is my second bullet!

5. Create Pull Request (PR)

(6) Click "*Create pull request*" when you're done

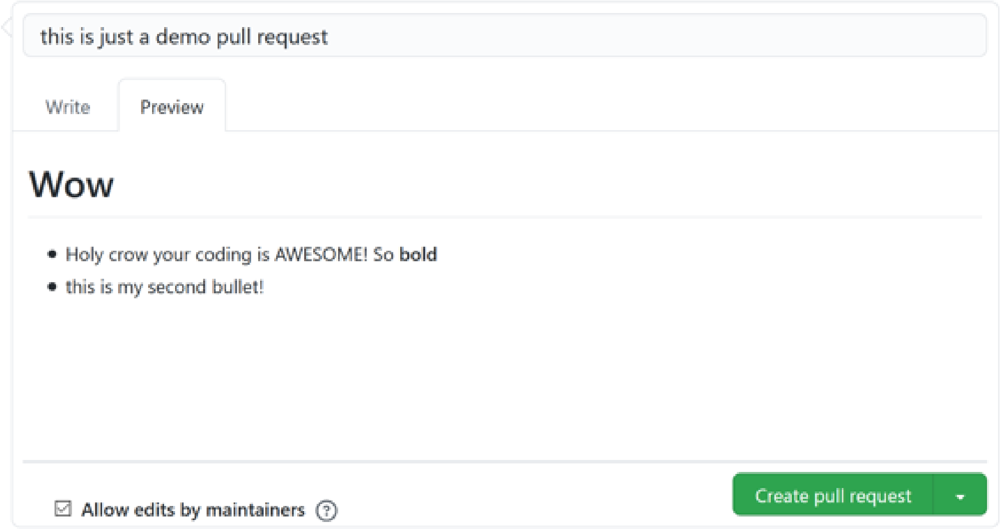


this is just a demo pull request

```
# Wow

* Holy crow your coding is AWESOME! So **bold**
* this is my second bullet!
```

Write
Preview
H B I
Attach files by dragging & dropping, selecting or pasting them.
☑ Allow edits by maintainers
Create pull request



this is just a demo pull request

Wow

- Holy crow your coding is AWESOME! So **bold**
- this is my second bullet!

5. Create Pull Request (PR)

Recap

(1) Navigate back to the (host) GitHub repo

(2) Click "*Pull requests*"

(3) Click "*New pull request*"

(4) Click "*Compare across forks*"

- Use drop-downs so that:
  - Host repo is on the left, your repo is on the right
- View changes (5) Click "*Create pull request*"
- Write brief summary list of the PR that includes
  - >= 3 strengths
  - >= 1 thing you learned
  - 1 to 3 three areas of improvement
  - **Use markdown formatting, headers, or list!** (6) Click "*Create pull request*"

Reviewing your PRs

You will get an email from GitHub

1. Click on first link, for PR
2. Click "*Commits*" tab
3. Click on "*File changes*" to see changes
4. Copy/paste all desired changes
5. Don’t close "*Close PR*" just yet; I want to review

Next time

Before next class

- Final Project
    - Final Project: Peer Review of Script
    - Final Project: Presentations - email me your content before class
- Homework
    - **Homework 10**