

# Welcome!

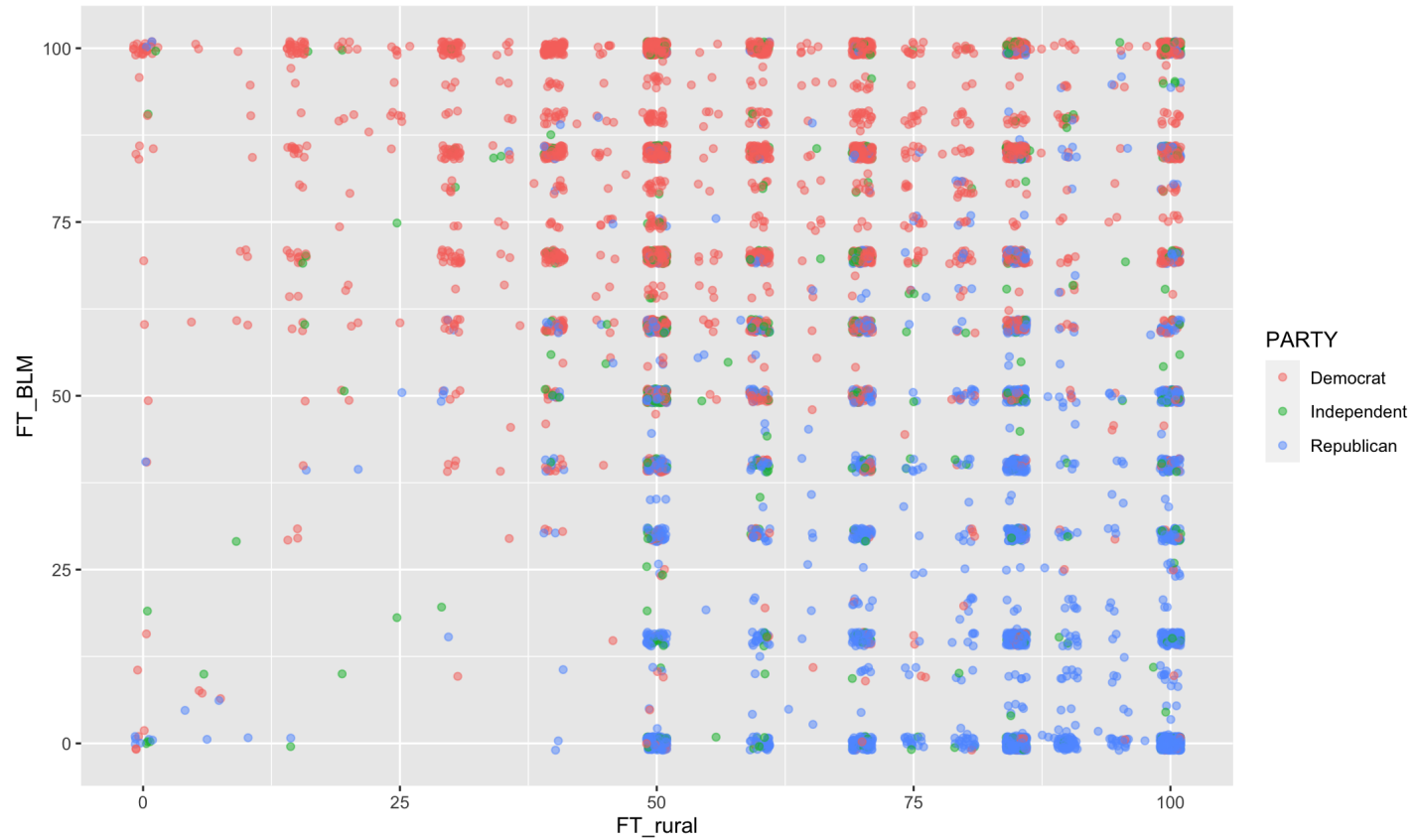
## Week 3.2: Colors and Labels

Jennifer Lin

PS 490: R Workshop

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# Last Week



# This Week -- we add color!

So your graph from last week was basic. It shows the general trends of your data but might do so in inefficient ways

- The labels on the axes do not communicate something meaningful
- The legend is poorly labeled
- R's default colors might not be the most beautiful, especially, if you are coloring/filling by a particular variable
- The default scales might not be as informative

So we will fix those problems today.

# The Label Layer

# Changing X and Y axis labels

To change the x and y axis labels, we use `xlab()` and `ylab()` respectively.

Within the parentheses, we add the new labels that we want in quotes (") as such:

```
ANES %>%  
  filter(!is.na(PARTY)) %>%  
  ggplot(aes(x = FT_rural, y = FT_BLM, color = PARTY))+  
  geom_point(position = position_jitter(1, 1), alpha = .5)+  
  xlab("Feelings towards Rural Americans")+  
  ylab("Feelings towards the BLM Movement")
```



# Adding Title, Legend Names and Subtitles

To add a title, subtitle, caption, or legend label to our graph, we can use the options provided by `labs()`

```
labs(  
  color    = "",  
  fill     = "",  
  title    = "",  
  subtitle = "",  
  caption  = ""  
)
```

- The `color/fill` option labels the legend and it is dependent on whether you used `COLOR` or `FILL` in the data layer
- `title` adds a main title to the top of the plot
- `subtitle` adds a subtitle to the top of the plot
- `caption` adds a caption to the bottom of the plot

```

ANES %>%
  filter(!is.na(PARTY)) %>%
  ggplot(aes(x = FT_rural, y = FT_BLM, color = PARTY))+
  geom_point(position = position_jitter(1, 1), alpha = .5)+
  xlab("Feelings towards Rural Americans")+
  ylab("Feelings towards the BLM Movement")+
  labs(
    color = "Political Party",
    title = "Feelings towards Rural Americans and
the BLM Movement",
    subtitle = "Analysis from the American National Elections Study",
    caption = "Data: ANES 2020",
    Author: "Jennifer Lin"
  )

```

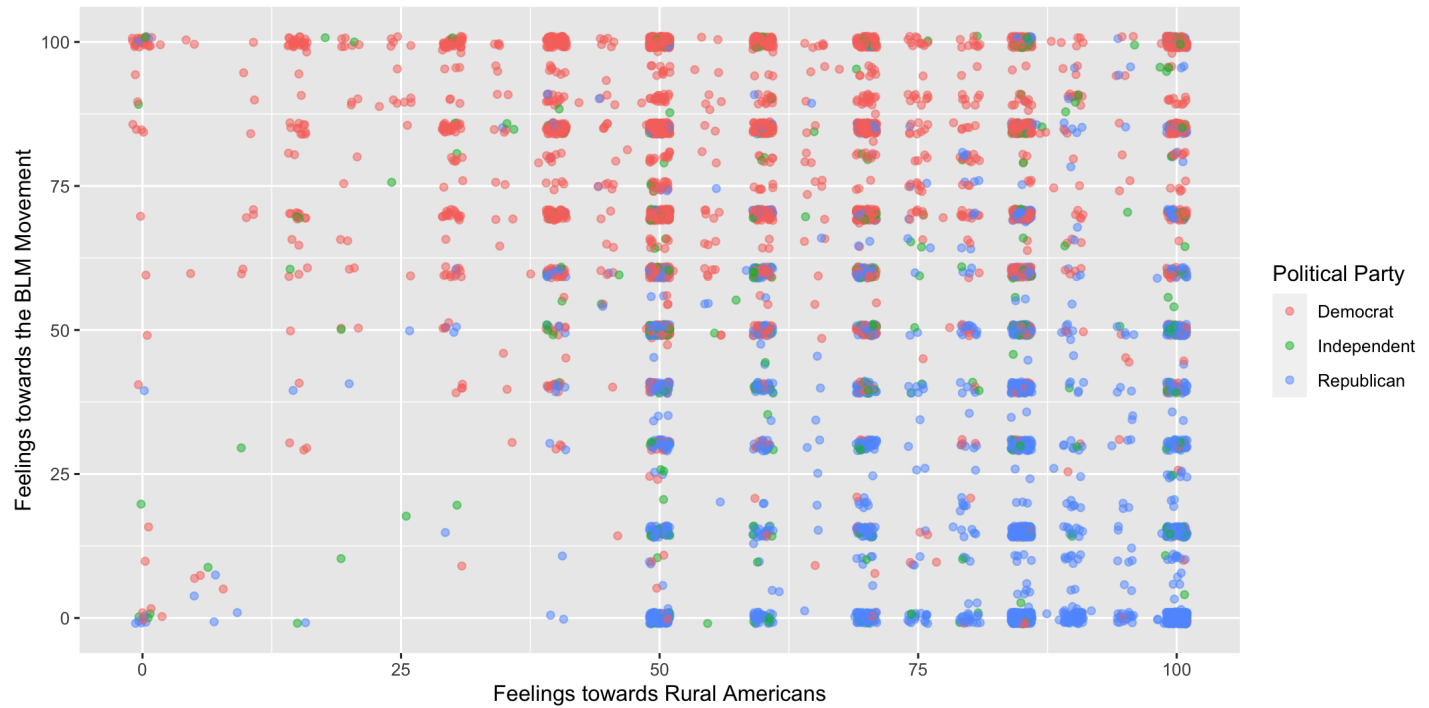
A few things to note:

1. Since it is a scatterplot, and I used color in the data layer, my label option for my legend is `color`
2. When you press ENTER to break a line in the quotes, it inserts a line break in the outcome.



# Feelings towards Rural Americans and the BLM Movement

Analysis from the American National Elections Studies



Data: ANES 2020  
Author: Jennifer Lin

# Exercise: Adding labels to your graph

1. Revisit your code from last class. Copy the results that you have from the data and graph layers onto the code for this week.
2. Using `xlab()`, `ylab()` and `labs()` to add a x axis label, y axis label, title, subtitle, legend label and optional caption.

# The Scale Layer

# Changing the Colors in Our Plots in R

`ggplot` comes with a lot of `scale_*_*`() functions. These help us override defaults.

Most `ggplot` scales come in the format of `scale_[SOMETHING]_[SOMEHOW]()`

- `[SOMETHING]` -- What do you want to scale? Color, the x-axis (x), the fill, y-axis (y)?
- `[SOMEHOW]` -- How do you want it to start the rescale process? Transformed, gradients, manual?

# Arguments

Most scales take the following arguments

- `name` = Name the thing you are scaling
- `breaks` = Locate where you want to break it
- `labels` = Assign each break point a name
- `limits` = Set upper and lower bounds (if applicable)

# Common Scale Uses

- `scale_x_continuous()`
  - `[SOMETHING]` = x-axis
  - `[SOMEHOW]` = continuously
- `scale_fill_manual()`
  - `[SOMETHING]` = shape fill
  - `[SOMEHOW]` = manually
- `scale_colour_brewer(palette = "[PALETTE NAME]")`
  - `[SOMETHING]` = color
  - `[SOMEHOW]` = Using the **R Color Brewer palette**

# scale\_color\_manual()

*If you are using a fill, this situation is the same thing, just change color to fill*

So I want to introduce my own colors to the mix since the R default colors are completely trash.

```
scale_color_manual(  
  name = "Party",  
  breaks = c("Democrat", "Republican", "Independent"),  
  values = c("Democrat" = "#3182bd", "Republican" = "#de2d26", '  
)
```

```
scale_color_manual(  
  name = "Party",  
  breaks = c("Democrat", "Republican", "Independent"),  
  values = c("Democrat" = "#3182bd", "Republican" = "#de2d26", '  
)
```

Here, I am using the `name`, `breaks` and `values` arguments

- `name` changes my legend label name from the `labs()` argument earlier (or from defaults)
- `breaks` set the categories for the legend. NOTICE that your legend will appear in this order
- `values` allows you to set colors manually. You can list the color ("red", "blue" etc) or use HEX codes (but keep them in quotes!)



```

ANES %>%
  filter(!is.na(PARTY)) %>%
  ggplot(aes(x = FT_rural, y = FT_BLM, color = PARTY))+
  geom_point(position = position_jitter(1, 1), alpha = .5)+
  xlab("Feelings towards Rural Americans")+
  ylab("Feelings towards the BLM Movement")+
  labs(
    color = "Political Party",
    title = "Feelings towards Rural Americans and
the BLM Movement",
    subtitle = "Analysis from the American National Elections Study",
    caption = "Data: ANES 2020",
    Author: "Jennifer Lin"
  )+
  scale_color_manual(
    name = "Party",
    breaks = c("Democrat", "Republican", "Independent"),
    values = c("Democrat" = "#3182bd", "Republican" = "#de2d26", "
  )

```

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# scale\_x\_continuous()

Now suppose I do not like the fact that the axis labels of my graph are too far apart, and I want to manipulate the continuous scale so that it shows more breaks.

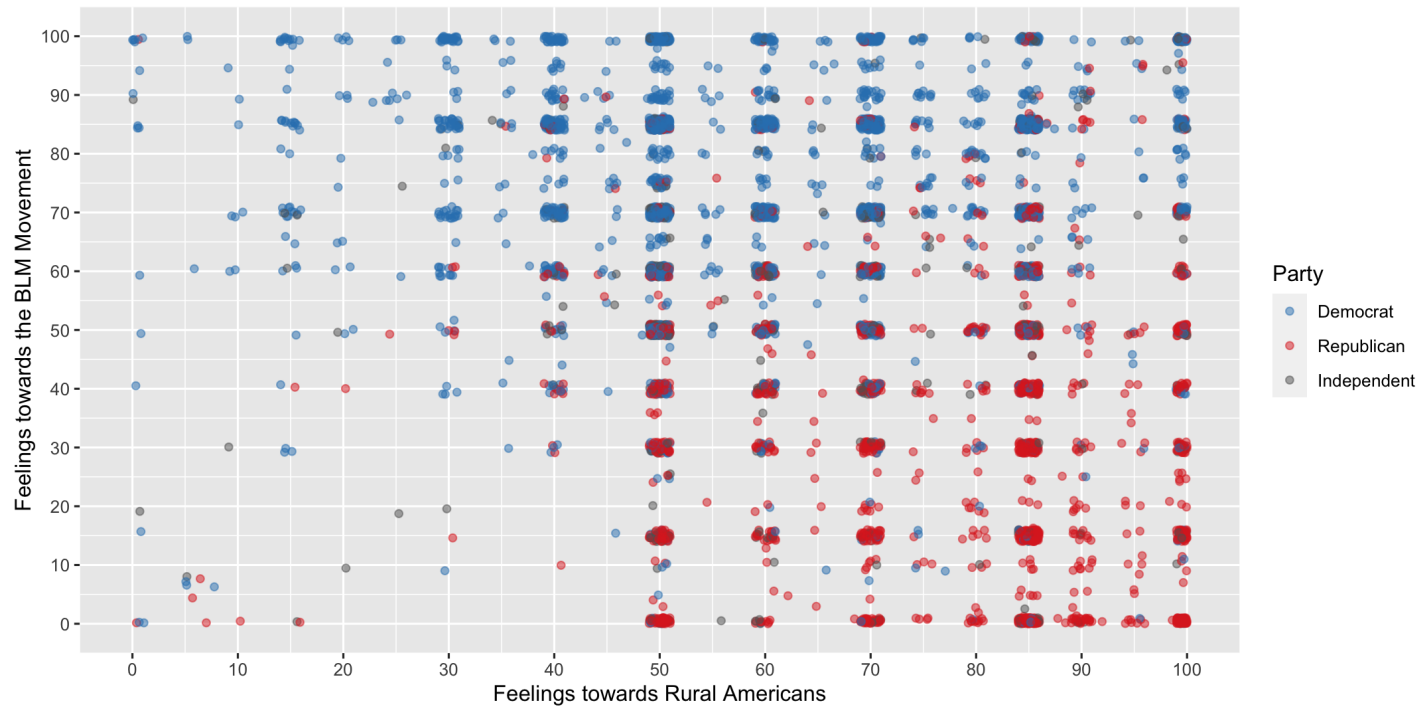
```
scale_x_continuous(  
  breaks = seq(0, 100, 10),  
  limits = c(0, 100)  
) +
```

Here, I use the `breaks` and `limits` options

- `breaks` tell R the numbers to include on the axis and how frequently I want to scale to add a new tick for a number. Since I am lazy, I am not writing all 10 numbers. Rather, I use `seq(BEGINNING, END, BY)` to count.
- `limits` tell R to cut the scale off at a certain point. In this case, I am telling it to go for the full scale (0-100)

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# Exercise: Changing your scales

1. Using the graph that you created in the last exercise, change the scales on your continuous variable
2. Change the color of your fills or lines, either by variable, or revisit your graph layer and change it globally
3. CHALLENGE: Go online and find a HEX code generator and add a color that is not an R default color (i.e. your color should include a #).

## Your Submission to the Lab Assignment for this week

1. Export the graph as a PDF using the "Export" button on the upper left hand corner of the plot window.
2. Upload your PDF AND the code, with your answers to the questions
3. Don't worry about the background or the font sizes. We will work on that next week.