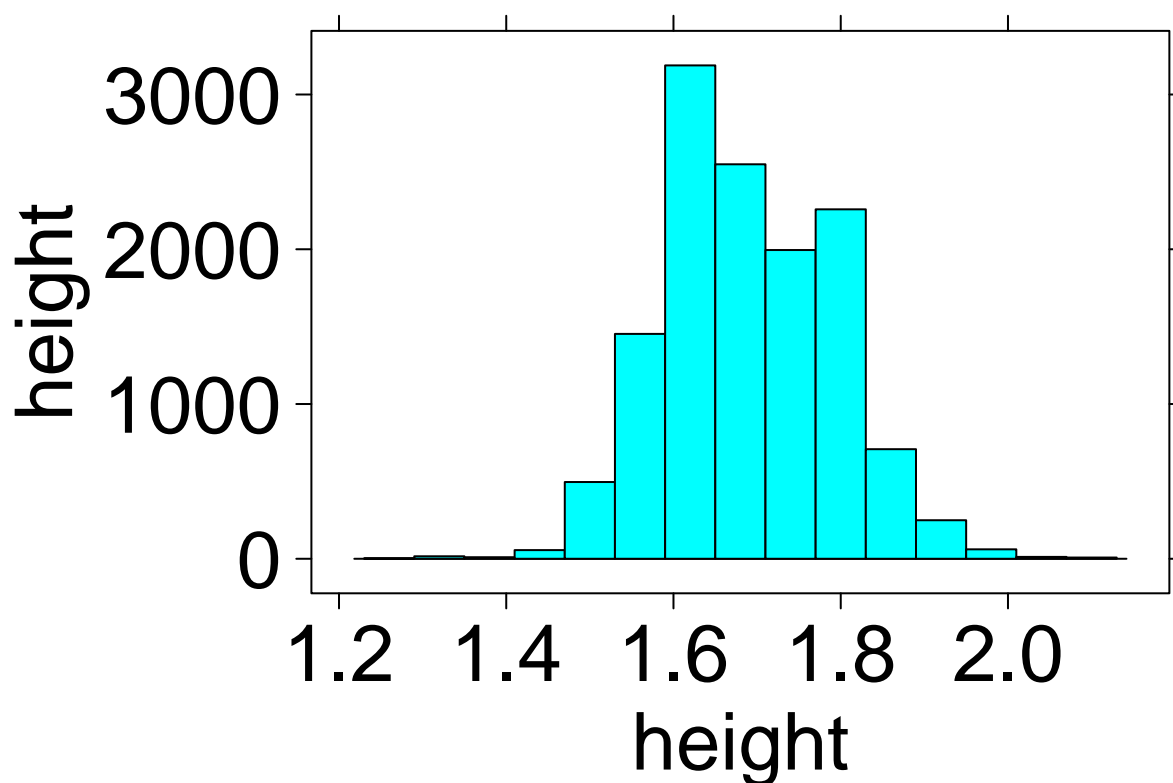


Plots of Single Variables

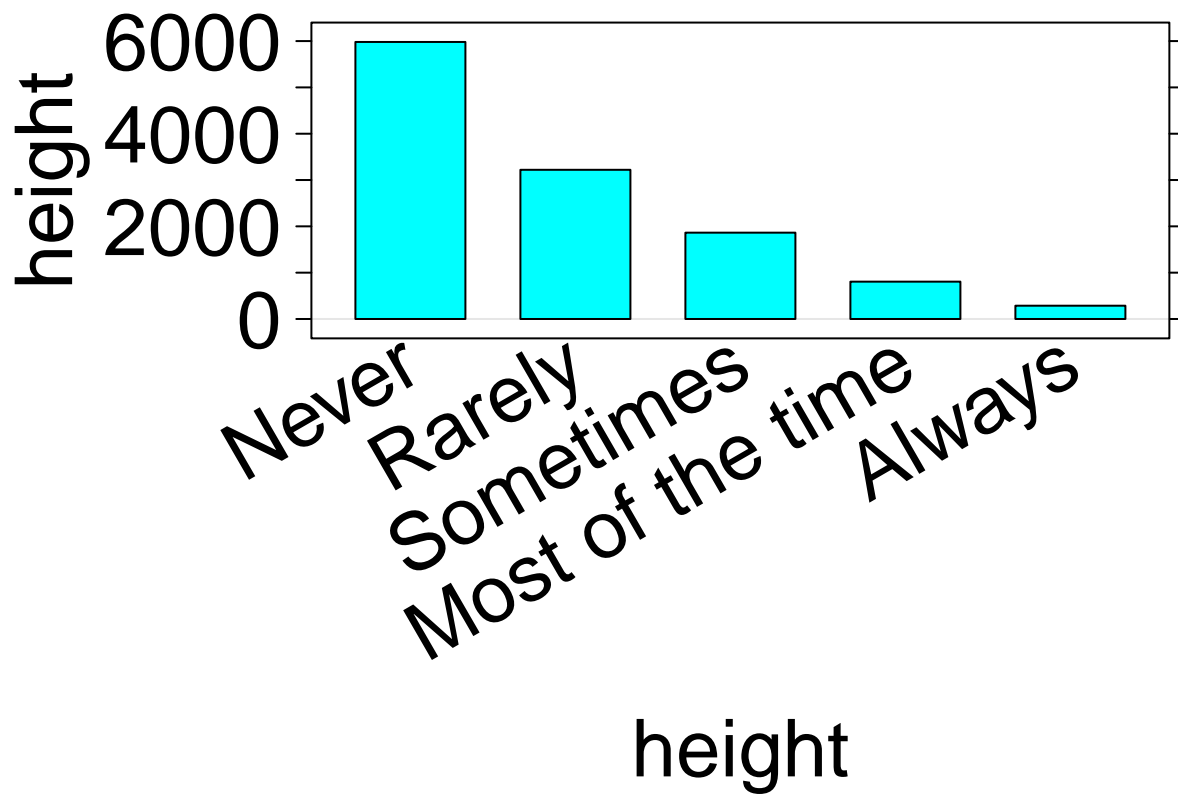
Directions: Follow along with the slides and answer the questions in **BOLDED** font in your journal.

Where'd we leave off ...

- The first lab ended...

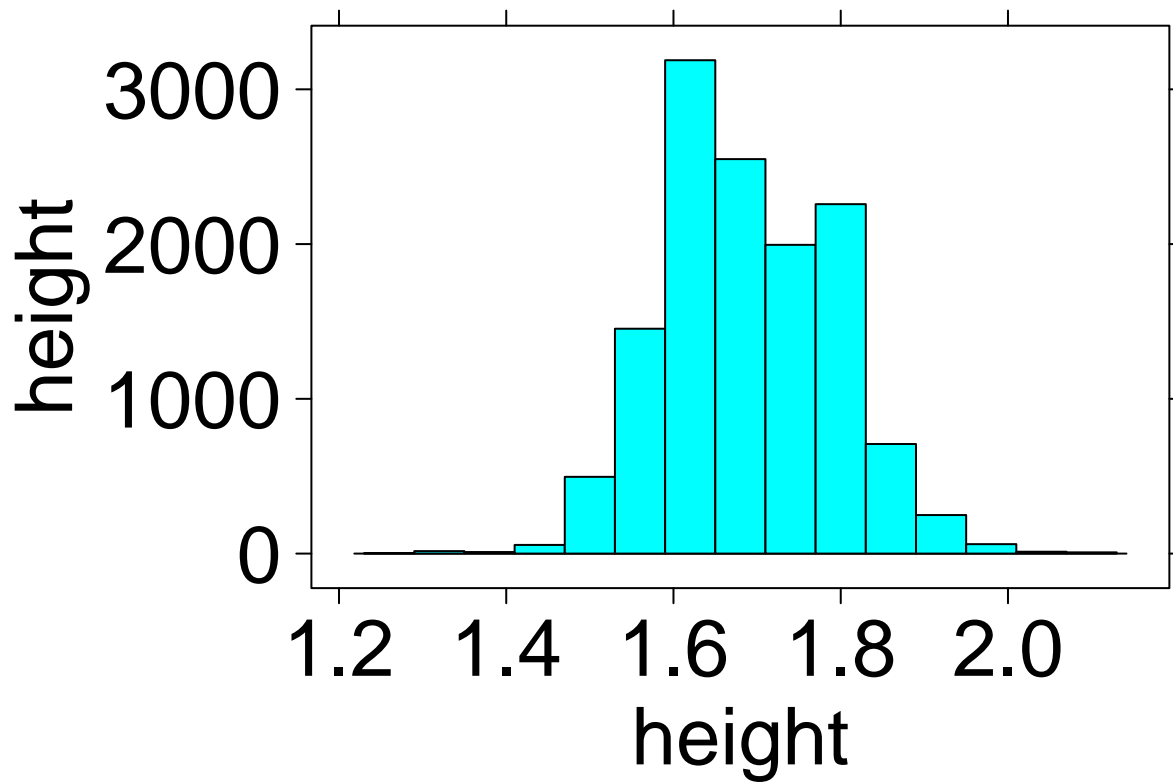


... with these two plots:

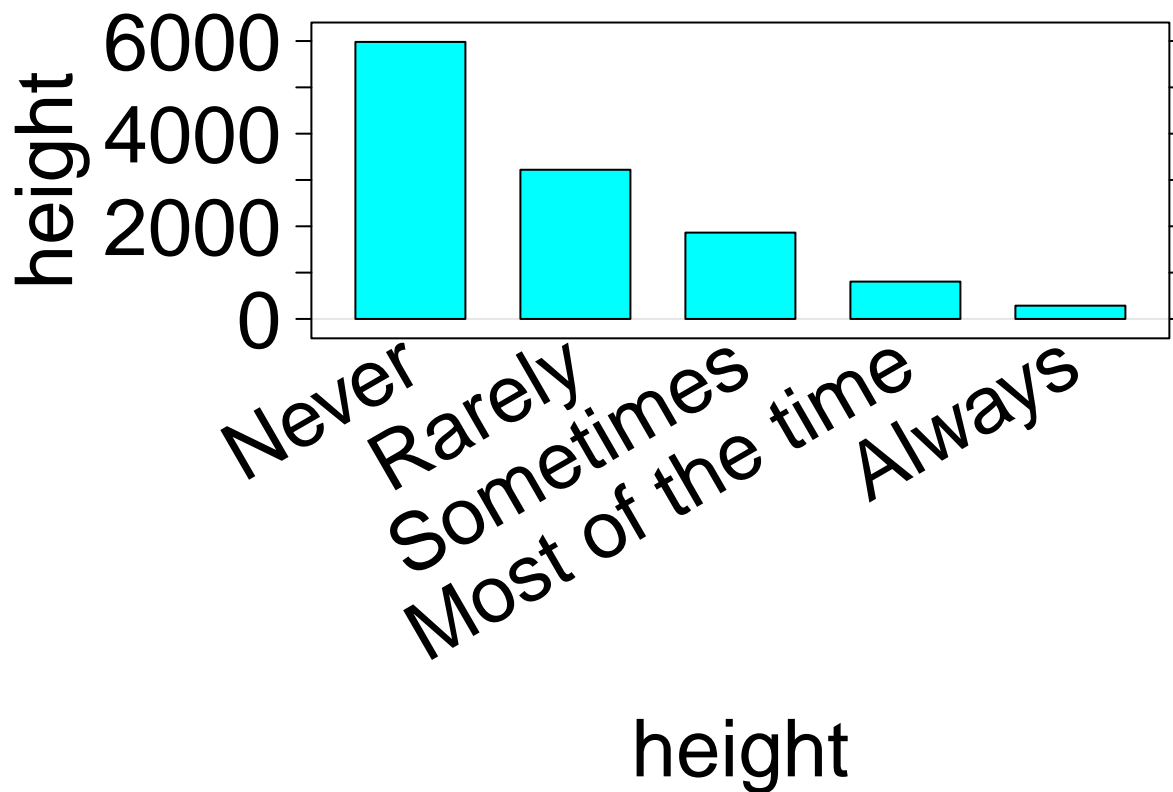


Where'd we leave off ...

- This plot has an x-axis with numbers



-
- This plot has an x-axis with categories



Interesting...

- We know then that data comes in *at least* two different varieties.
- **Numerical variables** have values that are typically measured in units
 - Ex: Feet, inches, pounds, hours, sodas per day, etc.
- **Categorical variables** have values that describe what category the observation belongs to.
 - Ex: Heads or tails, red, green or blue.

Before we start!

- Load the CDC data from before by using the following command in the console.
 - Remember how to load this data set for future labs.

```
data(cdc)
```

Categorical Variables

- Have *values* that describe the *category* an observation belongs to
- For example, view your data by typing `View(cdc)` into the console.
 - Find the **gender** of the first person in the data.
 - Which *category* of **gender** does the person belong to?

Categorical Variables

- Now type the following command into the console to view the names of the variables.

```
names(cdc)
```

- Write down 3 variables that you think are *categorical* variables and why you think that they're categories
- View your data and write down the different *values* (or categories) for each of the 3 variables you chose

Bargraphs, a.k.a. Barplots

- *Bargraphs* are one of the best ways to *visualize* categorical variables.
 - One axis (x or y) will have the different categories.
 - The other axis will have the number of observations (or *Frequency*) that fall into each category.
- Type the following into the console to create a bargraph (Hit the *Zoom* button in the plot pane to make it larger).

```
bargraph(~helmet, data = cdc)
```

- Explain what the values on the x and y axis mean. Which categories occurred the most & the least often?

More on Bargraphs

- Bargraphs are sometimes easier to read when the bars are horizontal.
 - Run the following command (Make sure to spell TRUE in all capital letters):

```
bargraph(~helmet, data = cdc,  
         horizontal = TRUE)
```

- In your opinion, are the vertical bars or horizontal bars easier to read for visualizing the helmet data. Why do you think that?

More on Bargraphs

- We also sometimes want to *split* each bar in our plot by *grouping* them into separate categories.
 - Run the following command to **group** the bars for each category based on each person's **gender**

```
bargraph(~helmet, data = cdc,  
         groups = gender,  
         horizontal = TRUE)
```

- Write out the command you would use to create this bargraph.

Your turn

- Practice making AND interpreting bargraphs using all three of the categorical variables you chose earlier in the lab
 - Choose a different categorical variable if you previously chose helmet.
- Interpret each graph by explaining:
 - What the categories are
 - Which categories occurred more or less often
- Be sure to point out any interesting discoveries you make

Numerical Variables

- Have *values* that are *measured* in *units*.
- For example, view your data by typing `View(cdc)` into the console.
 - Find the **height** of the first person in the data.
 - How tall is this person? What do you think are the units?

Watch out!

- Sometimes variables that you think would be *numerical* are actually *categorical*.
 - You might think that `age` is *numerical* because it can be measured in *years*.
- View the values of people's ages in the CDC data by running `View(cdc)` again.
 - Since the values contain the words “years old”, R interprets these values to be categories!

Numerical Variables

- List the `names` of the variables again (You can go back to look up the command if you've forgotten)
 - **Write down 3 variables that you think should be *numerical* variables**
 - **List some possible units of measurements for each variable.**
- View your data
 - **Write down any variables you thought were numeric but were actually categorical**
(See the warning on the previous slide for help)

Histograms!

- Just like how we used **bargraphs** to visualize *categorical variables*, histograms are useful for visualizing *numerical variables*
- Type the following to make a histogram for people's `height`

```
histogram(~height, data = cdc)
```

- What do the values of the x-axis mean in terms of people's heights?
- What do the *widths* of the bins mean?
- What does the *height* of each bar represent?

More on Histograms

- By changing the width of the *bins* of a histogram, we can change the amount of detail it shows.
 - Wide bins give us a very broad view of the data.
 - Narrow bins give us a very detailed view.
- A good histogram should strike a balance between being both wide & narrow

More on Histograms

- Run the following commands:

```
histogram(~weight, data = cdc,  
          nint = 3)
```

```
histogram(~weight, data = cdc,  
          nint = 30)
```

- What would you say is the typical weight of these people? How do you think this compares to your class?
- Is it unusual to weight less than 65 kilograms? Why?
- Fill in the blanks: Most people weight between _____ and _____ kilograms. Explain how you chose your values.