Describing distributions of data

Assignment Overview

There are a variety of conventional ways to visualize data - tables, histograms, bar graphs, etc. The purpose is always to examine the distribution of variables related to your research question. You will create a plot, follow up each graphic with a table of summary statistics (for quantitative variables) or frequency and proportion table (for categorical), and then a summary paragraph that brings it all together.

Instructions

- Use the template provided: [RMD].
- Completely describe 2 categorical and 2 quantitative variables using
  - A table of summary statistics,
  - An appropriate plot with titles and axes labels,
  - A short paragraph description in full complete English sentences.

Guidiance

- What is the trend in the data? What exactly does the chart show? (Use the chart title to help you answer this question)
- Describe the shape:
  - Symmetry/Skewness - Is it symmetric, skewed right, or skewed left?
  - Modality - Is it uniform, unimodal, or bimodal?

- Describe the spread:
  - Variability - What is the approximate range of the data (x-axis)?
  - Does the variable have a lot of variability in the data (visually, are the participants responded to many different responses or mainly just one)?
- Describe the center: What is the mean/median/midpoint of the data? (Pick one or two). Don't
- Describe the outliers (note: there may not be any for every graph):
  - Are there any outliers for the variable?
  - If yes, are these true outliers or false (due to data management or input error) outliers?
- Reread your explanation for context grammer, spelling and common sense.

Submission

1. Upload the final PDF to `04 Univariate Graphing` folder in Google Drive with the file name: `univ_graphing_userid.pdf` by the due date.

Example

This example uses the `mpg` data set from the `ggplot2` package.

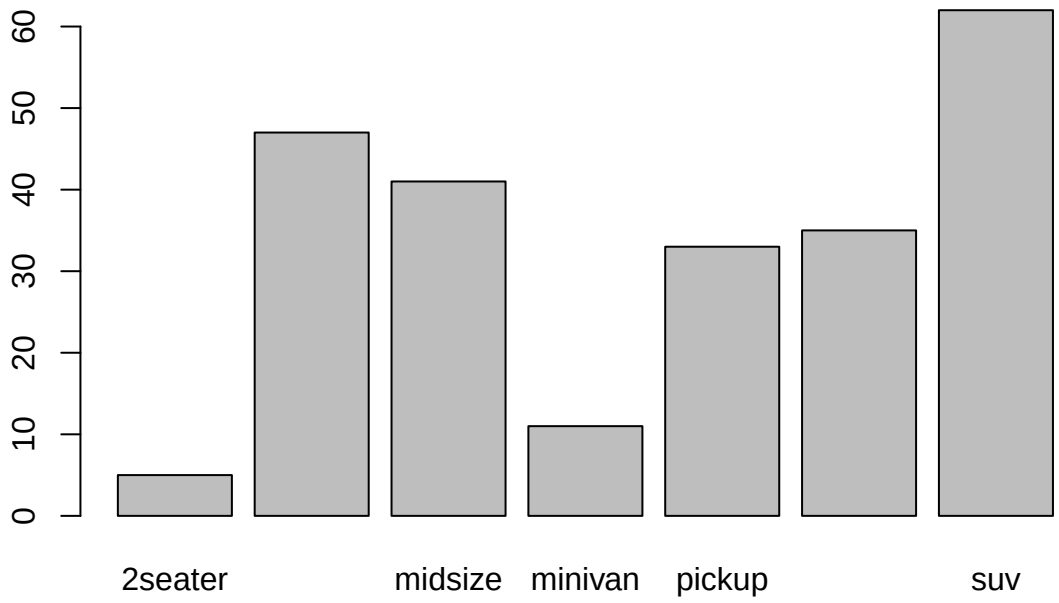
```
library(sjPlot) # For plotting using the sjp.frq() function
library(ggplot2) # For plotting using ggplot() function
library(knitr) # To make nice tables
library(descr) # For plotting using the freq() function
mpg <- ggplot2::mpg # you would load() your clean data here
knitr::opts_chunk$set(echo = TRUE, warning=FALSE, message=FALSE) # options to suppress warnings and mes
```

Example of a basic-level answer for a categorical variable

This example shows a draft style plot, direct computer output showing/copied. Poor grammar and/or sentence structure, no attempt at explaining what the variable means, extra unnecessary or incorrect information included. Typos.

class

```
freq(mpg$class)
```




```
## mpg$class
##            Frequency Percent
## 2seater            5   2.137
## compact           47  20.085
## midsize           41  17.521
## minivan           11   4.701
```

```
## pickup            33  14.103
## subcompact        35  14.957
## suv               62  26.496
## Total            234 100.000
```

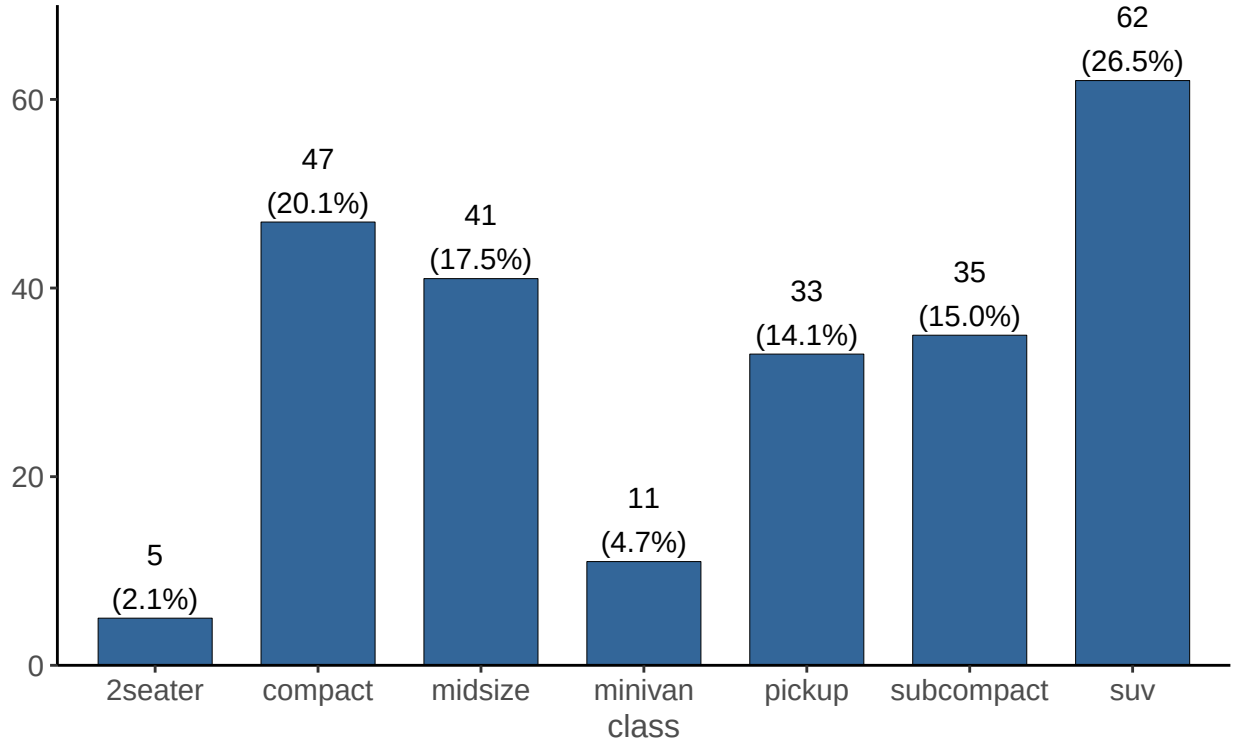
theres more suvs than compacts. 2% are 2seaters. there are 5 2seaters 47 cmpact 41 midize 11 minivans 33 pickups 35% subcompacts, 62 suv and 234 total cars.

Example of a proficient-level answer for a categorical variable

This example has a cleaned up plot, full English sentences, useful text formatting of variable names and levels. Explained what the variable was named and what it measured.

The `class` variable from the `mpg` data set is a catgorical variable that describes the type of vehicle being measured. Some levels of this categorical variable include *compact*, *pickup* and *suv*.

```
set_theme(base = theme_classic())
sjp.frq(mpg$class)
```

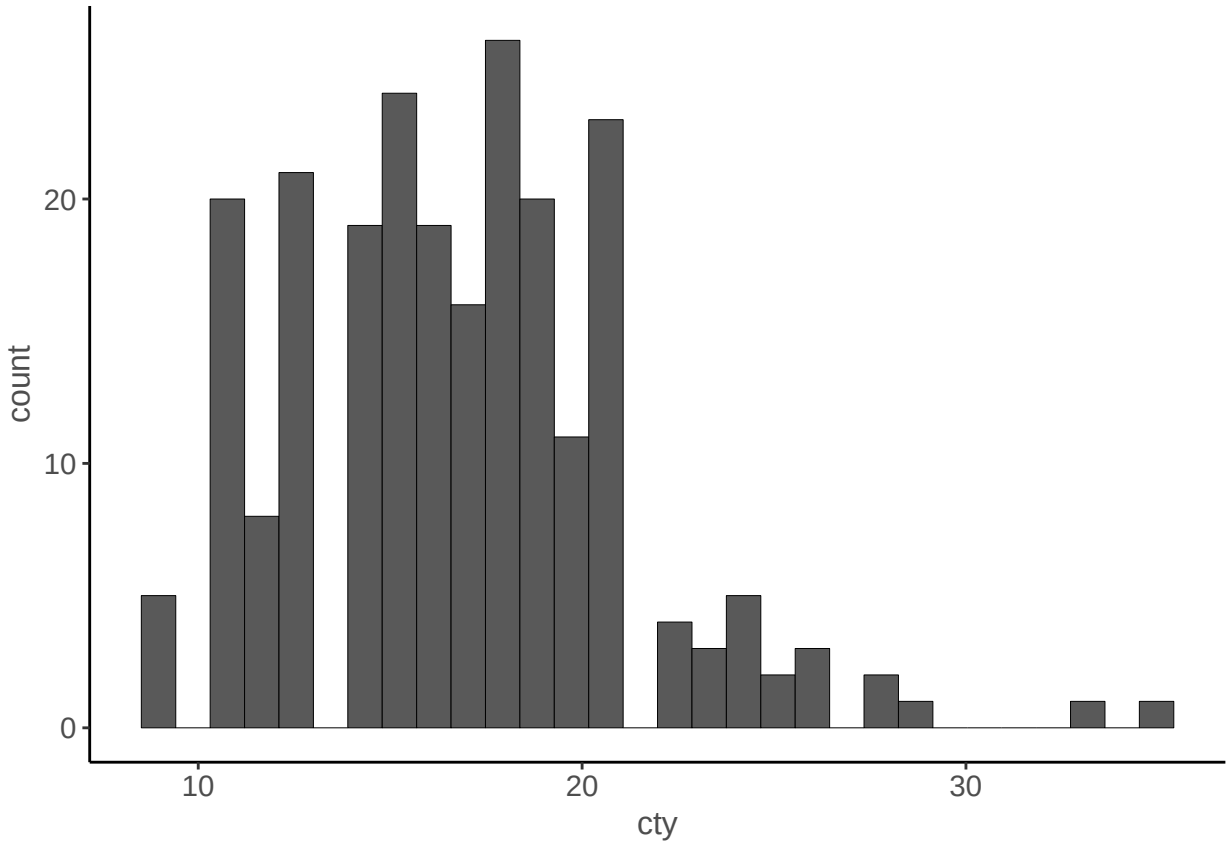


Sub compact cars are the most frequently reported type of car, making up over one-quarter (26.5%) of the cars in this data set with n=62 cars represented. The least represented car is a compact car with n=5 (2.1%) records.

Example of a basic-level answer for a quantiative variable

No english description provided, no verbal explanation of what information was gained from these plots.

```
ggplot(mpg, aes(cty)) + geom_histogram()
```




```
summary(mpg$cty)
```

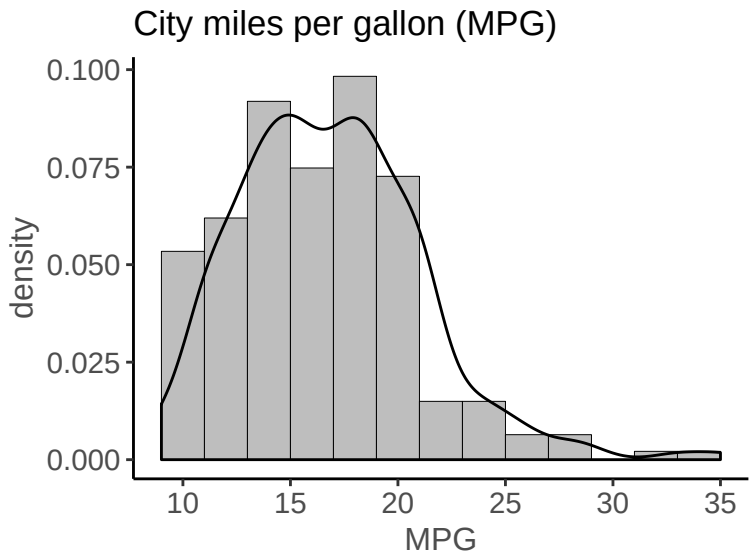
```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##    9.00   14.00   17.00   16.86   19.00   35.00
```

Example of a proficient-level answer for a quantitative variable

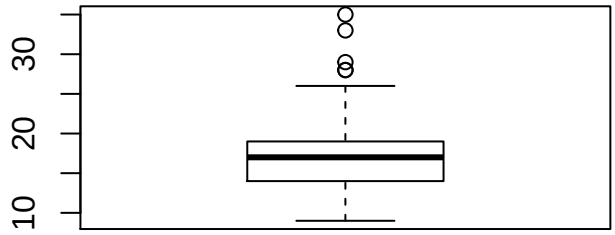
This example uses a histogram with overlaid density curve, and a boxplot to understand the shape, location and to look for outliers. Table of summary statistics present in a nicely formatted way, digits rounded appropriately. Plot cleaned up with appropriate axis and titles.

> The `cty` variable records the miles per gallon (mpg) achieved during city driving. This is a quantititative numeric variable.

```
ggplot(mpg, aes(x=cty)) + geom_histogram(aes(y=..density..),
                                         fill="grey", binwidth = 2) +
      geom_density() + xlab("MPG") +
      ggtitle("City miles per gallon (MPG)")
```




```
boxplot(mpg$cty)
```




```
kable(t(c(summary(mpg$cty), sd=sd(mpg$cty))), digits=1)
```

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.	sd
9	14	17	16.9	19	35	4.3

The MPG in the city ranges from 9 to 35, unimodal and is slightly skewed right with a mean of 16.9 close to the median of 17 and a standard deviation of 4.3mpg. The boxplot indicates that there are at least 4 upper end outliers achieving a city MPG of approximately over 28 mpg.