

2017-01-23-intro-rstudio-rmarkdown

Rick O. Gilmore

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Today's topics

- Introduction to RStudio
- Introduction to R Markdown

RStudio

- An integrated development environment (IDE) for R

Components of RStudio

- Code editor
- R console
- Integrated help
- Image viewer
- Integration with git and other version-control packages
- Project management

RStudio in the cloud

- RStudio can be run in a browser from a server running RStudio Server
- Demo
 - Running this under Amazon Web Services (AWS) free tier
- Instructions for doing this yourself can be found [here](#)

R Markdown

- Markdown
 - Mark-up language to make it easy to write HTML
- R Markdown special type of Markdown
 - Allows for “literate” programming, mixing text, analysis, figures
 - Adds to Markdown syntax

Markdown syntax

- Text formatting
 - *italics* by surrounding text with single asterisks or underscores: ***italics*** or ***italics***
 - **boldface** by surrounding text with double asterisks or underscores: ****boldface**** or ****boldface****
 - ~~strikethrough~~ by surrounding text with double tildes: **~~strikethrough~~**
 - Clickable URLs by surrounding link text with square brackets and URL with parentheses: **[Clickable URLs] (<http://www.psu.edu>)**

Markdown syntax

- Paragraph formatting
 - Headings with level specified by the number of hash (#) marks
 - Lists (bullet and enumerated)
 - Block quotes
 - Code blocks

```
# This is a Heading 1
## This is a Heading 2
### This is a Heading 3
```

I put these in quotes here because these hash marks also separate different slides (more on this later).

- An item
 - A nested item
 - * A doubly-nested item
- Another item

Code:

```
- An item
  - A nested item
    - A doubly-nested item
- Another item
```

1. An enumerated item
 - A nested item
2. A second enumerated item

Code:

```
1. An enumerated item
  - A nested item
1. A second enumerated item
```

Notice how the numbers are incremented automatically!

```
Four score and seven years ago, some famous President spoke infamous words that would live on
throughout history. These words are famous enough that I want to highlight them with a block
quote.
```

```
> Four score and seven years ago, some famous President
> spoke infamous words that would live on throughout history.
> These words are famous enough that I want to highlight them with a block quote.
```

More on Markdown syntax

- Images can be inserted using this syntax ![Alt text](/path/to/img.jpg)
- Clickable links using <http://www.psu.edu>
- Comments – won't print in rendered output – <!-- This is a comment -->

R Markdown additions

- .Rmd extension
- Combine text, code, images, figures, video
- “Computable” reports, documents, slide shows, notebooks
- Output in multiple formats from the same file (next week)

Make some data

```
x = rnorm(n = 100, mean = 0, sd = 1)    #  $N(0, 1)$ 
y = rnorm(n = 100, mean = 2, sd = 0.5) #  $N(2, 0.5)$ 
```

Summary of x, y

```
summary(x)
```

```
##      Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
## -2.24800 -0.66640  0.18670  0.09825  0.67240  3.37900
```

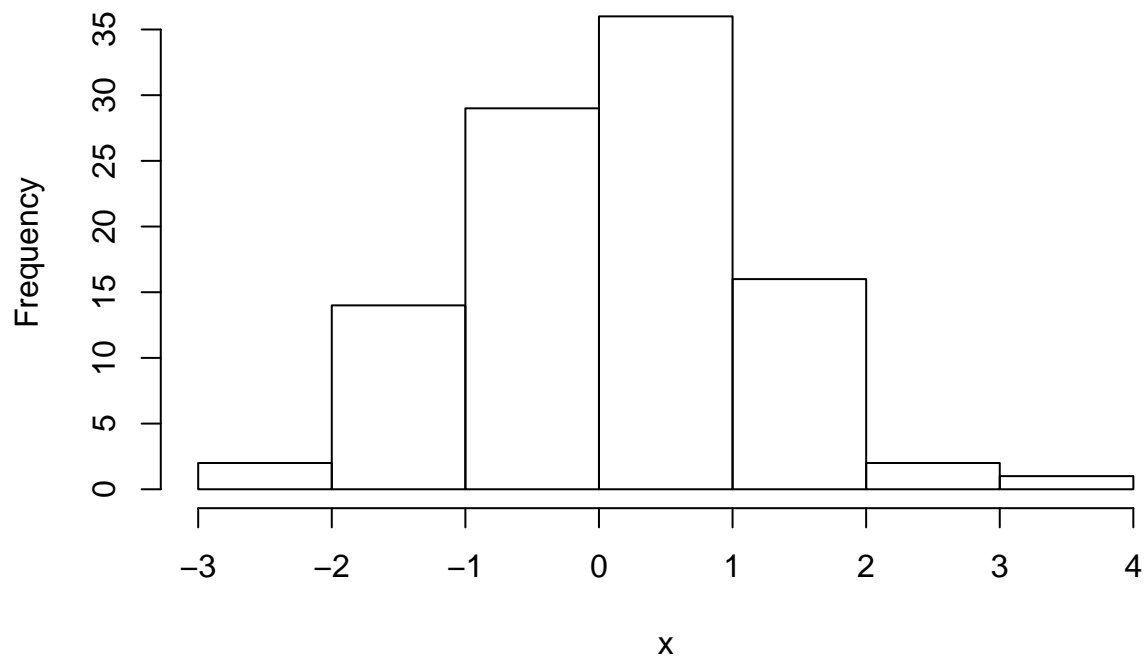
```
summary(y)
```

```
##      Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##  0.4753  1.6370  2.0040  1.9730  2.2920  3.1940
```

Histogram of x

```
hist(x)
```

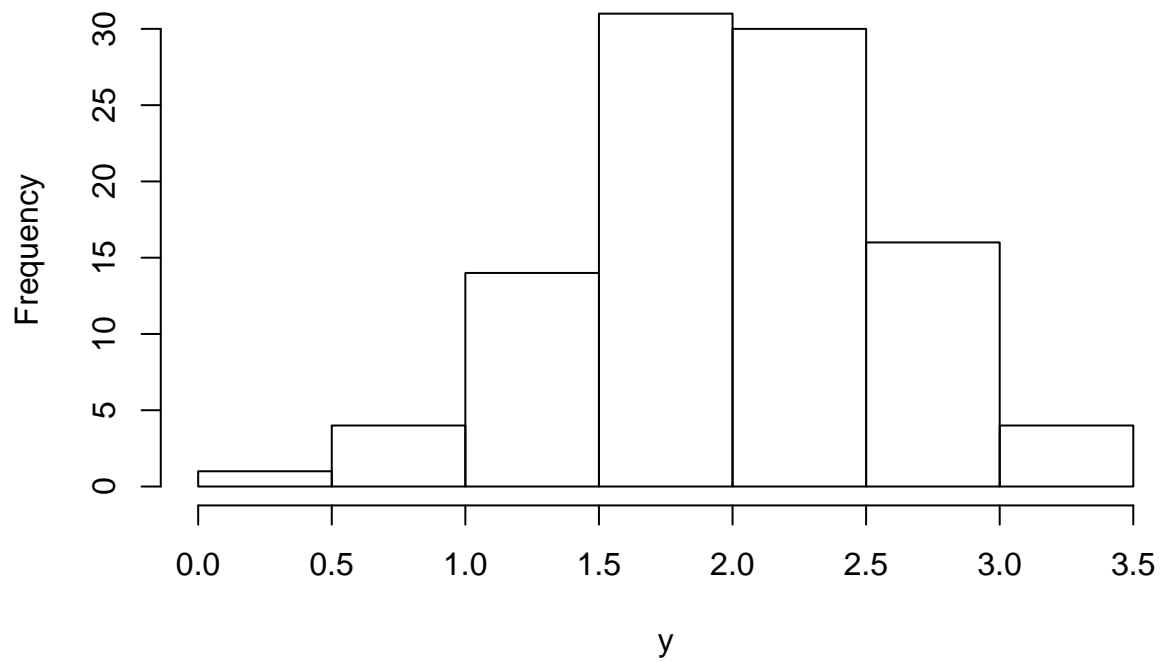
Histogram of x



Histogram of y

```
hist(y)
```

Histogram of y



Embed figure saved locally

```

```

height parameter is optional, but useful.

Embed figure from the web

```

```

Embed YouTube video

```
<iframe width="420" height="315" src="https://www.youtube.com/embed/9hUy9ePyo6Q" frameborder="0" allowfullscreen></iframe>
```

- YouTube gives you code to cut and paste.
-

Printing computed variables

```
summ.x = summary(x)
summ.y = summary(y)
names(summ.x) # Figure out variable names for indexing
```

```
## [1] "Min."    "1st Qu." "Median"  "Mean"    "3rd Qu." "Max."
```

Index by variable name: X lies within the range of [-2.248, 3.379].

Index by numeric index: The (y-x) difference in means is 1.87475.

Calculate and report: The correlation between x and y is -0.0769647.