VISUALIZATION

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Exploratory data analysis

- Exploratory analysis is a loosely-defined process
- Roughly, the stuff between loading data and formal analysis is "exploratory"
- This includes
  - Visualization
  - Checks for data completeness and reliability
  - Quantification of centrality and variability
  - Initial evaluation of hypotheses
  - Hypothesis generation

- Current emphasis is visualization
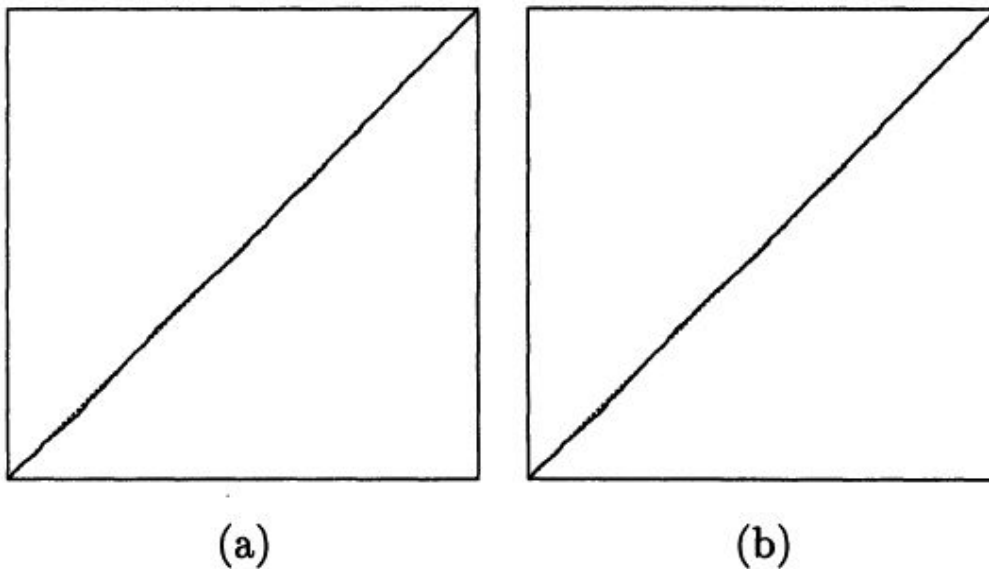
A picture is worth 1000 words

- Looking at data is critical
  – True for you as an analyst
  – True for you as a communicator

- You should make dozens, maybe even hundreds, of graphics for each dataset
  – Most of these are for your eyes only
  – A small subset are for others

A good picture is worth 1000 words

- Bad graphics are worth only a few words

A <small>good</small> picture is worth 1000 words

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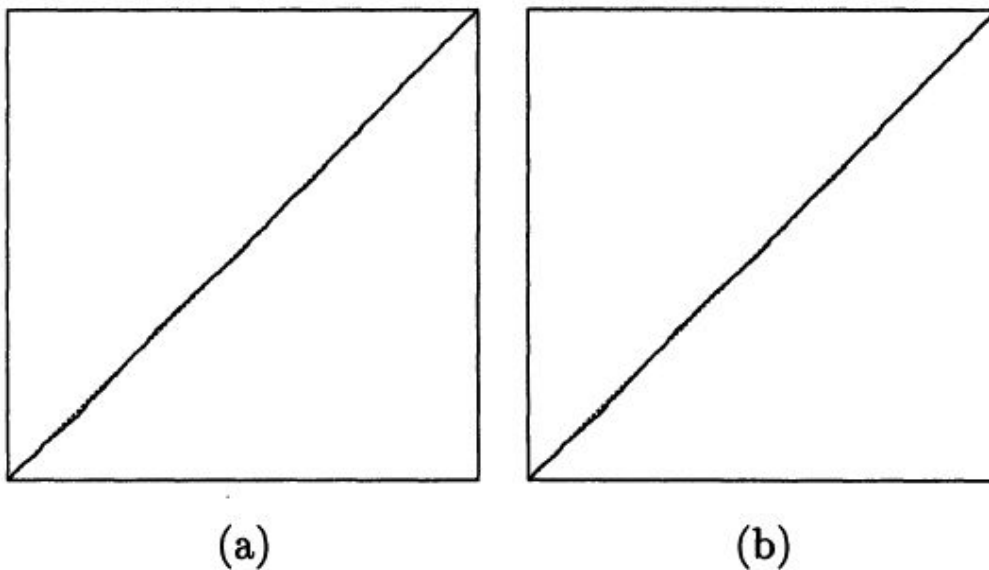

(a)   (b)

Figure 1. SRQ Plots of T_i/T_n (Vertical Axes) Against i/n (Horizontal Axes) for the Gibbs Sampler (a) and an Alternating Gibbs/Independence Sampler (b) for the Pump Failure Data Based on Runs of Length 5,000. Lines through the origin with unit slope are shown dashed; axis ranges are from 0 to 1 for all axes.

For more bad graphics, see Karl Broman's "Top Ten Worst Graphics"

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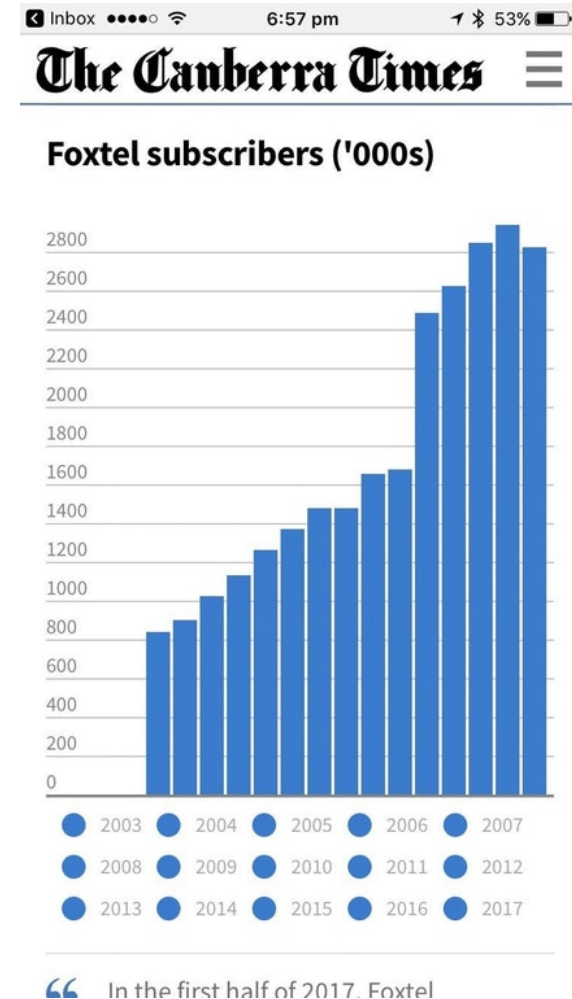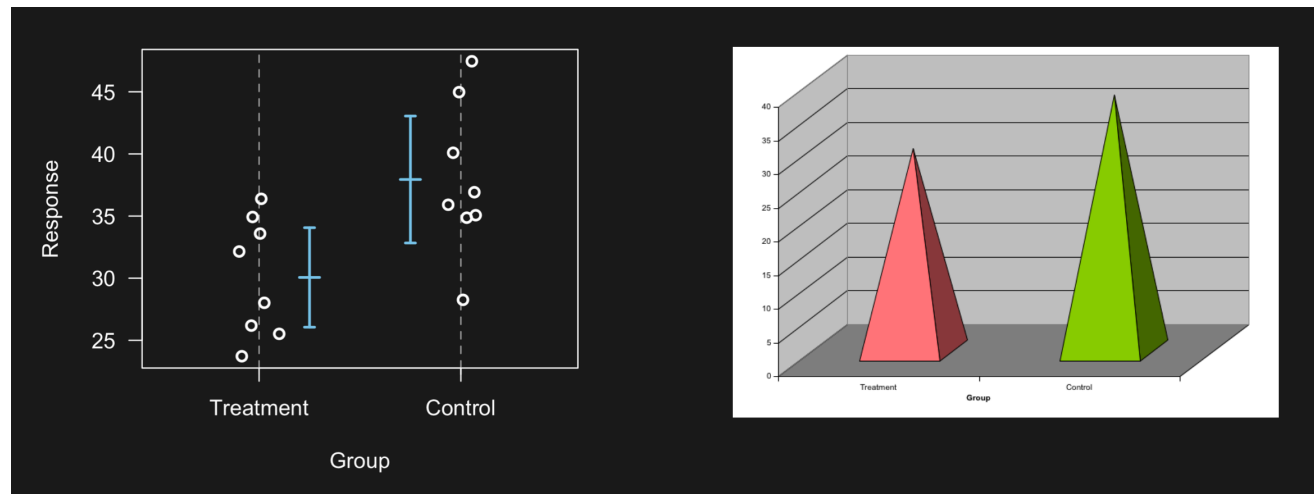- Bad graphics are worth only a few words

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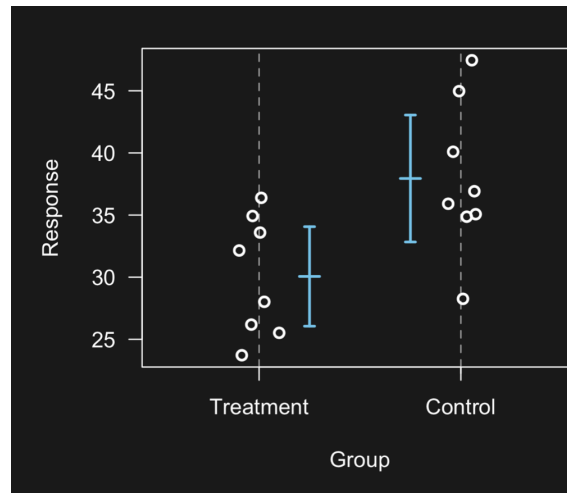
What makes a "good" picture?

- Show as much of the data as possible
- Avoid superfluous frills (e.g. 3D ...)
- Facilitate comparisons
  - Put groups in a sensible order
  - Use common axes
  - Use color to highlight groups
  - No pie charts

"Creating effective tables and figures" – talk by Karl Broman

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.@earino: There is a time and a place for pie charts

That is when you are talking about pie

Otherwise, never

#PlotCon

12:58 PM - 18 Nov 2016

"Creating effective tables and figures" – talk by Karl Broman

What makes a "good" picture?

- From the expert:

Cole Knaflic

@storywithdata

Helping rid the world of ineffective graphs, one exploding, 3D pie chart at a time! Author of #SWDbook, organizer of #SWDchallenge, hear me on #SWDpodcast.

Cole Knaflic
@storywithdata

Follow

My guiding #dataviz principles:
1. Be clear on intent
2. The right graph creates an "aha" moment
3. Don't overcomplicate
4. Get rid of the non-essential
5. Make it clear where to look
6. Words make a graph accessible
7. Audience trumps all else
#InternationalChartDay #ChartDay
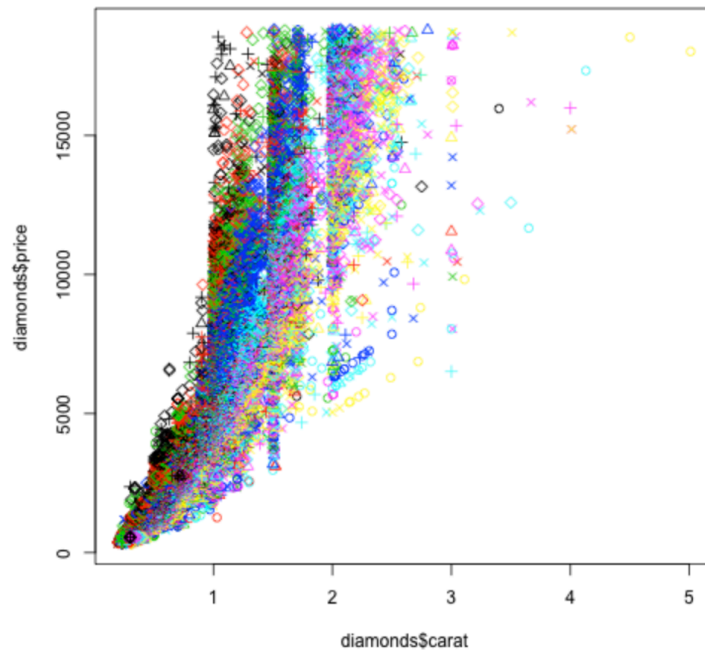
5:19 AM - 26 Apr 2018

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💬 14   ⟲ 261   ♡ 637
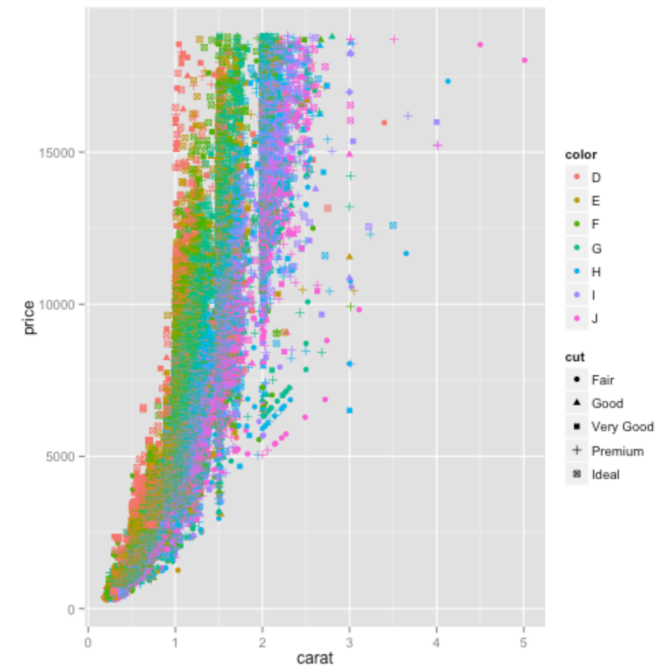
6

What makes a "good" picture?

- "Good" figures aren't necessarily "publication quality" pictures
  - Most figures are for you, and even these should be good
  - Graphics for others require more fiddly detailing than is necessary for graphics for you

Why `ggplot`?

- Makes good graphics with relative ease
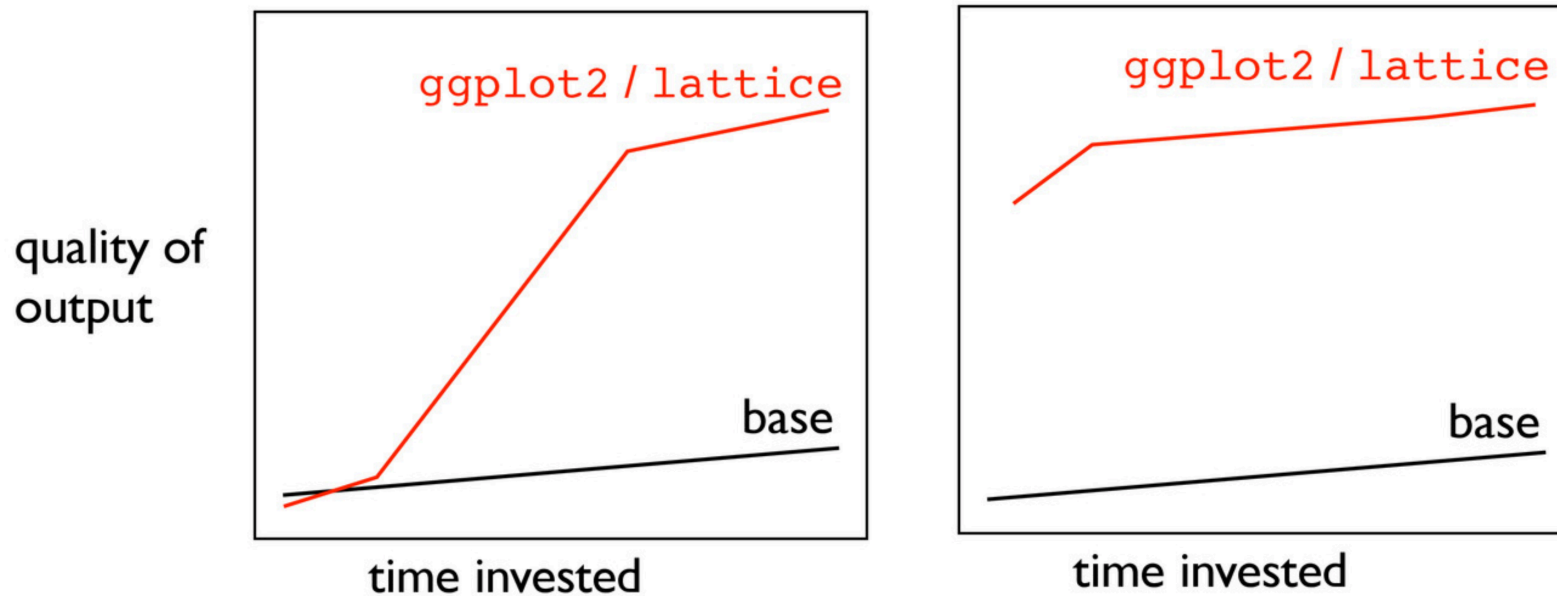 - "Relative" here is compared to base R graphics

VS

"Don't teach built-in plotting to beginners (teach ggplot2)" – blog post by David Robinson

Why ggplot?

- Cohesiveness shortens the learning curve
  - Same principles underlie all graphic types

"hello ggplot2!" – talk by Jenny Bryan

Learning ggplot

- Lots of materials
- google is your friend
  - Start searches with "ggplot"
  - StackOverflow has lots of questions and useful answers
  - Don't worry about googling stuff you "should know"

Using ggplot

- Based around the "tidy data" framework
- Trouble making a plot is often trouble with data tidiness in disguise
  - Think about how your data organization affects your ability to visualize
  - Factors can help with ordering

R for Data Science

Using ggplot

- Basic graph components
  - data
  - aesthetic mappings
  - geoms

- Advanced graph components
  - facets
  - scales
  - statistics

- A graph is built by combining these components
- Components are consistent across graph types
  - Scatterplots, bar graphs, density plots, ridge plots ...