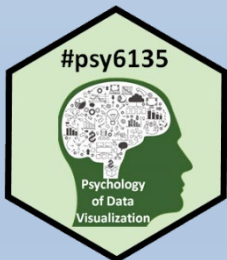


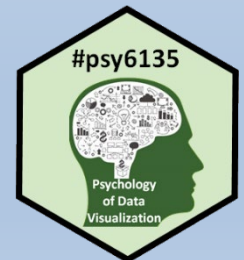


Deep Questions of Data Visualization



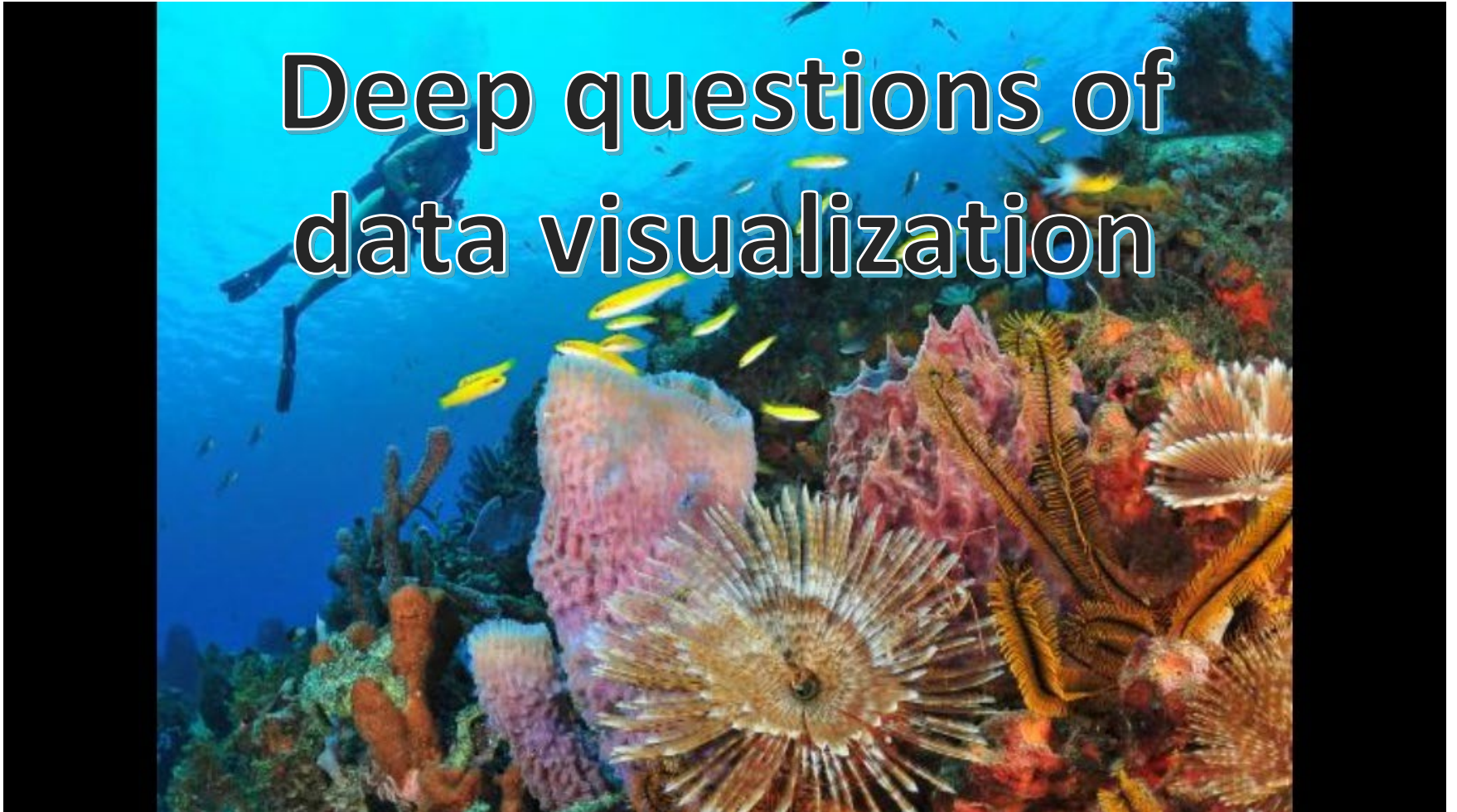
Michael Friendly
Psych 6135

<https://friendly.github.io/6135>



While you were enjoying a relaxing week without classes, I was working hard, pondering the:

**Deep questions of
data visualization**

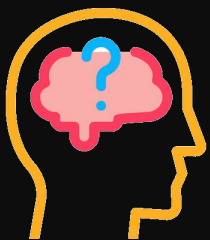


Deep Questions Research Institute

Great Exuma, Bahamas



DIVE EXUMA
EXUMA • BAHAMAS



How to study graph
preference in
marine animals?



Crab Cay

Research team* aboard the *MV* *Playfair*

Divers suit up



* Thanks for technical assistance from Dive Exuma

Shark experiment: Pies vs. Bars

Do sharks prefer **conch pie charts** or **granola bar charts**?

Design: Two-alternative forced-choice, $n=50$ trials

Conch pie



Granola bar



Sample
stimulus
items

Shark experiment

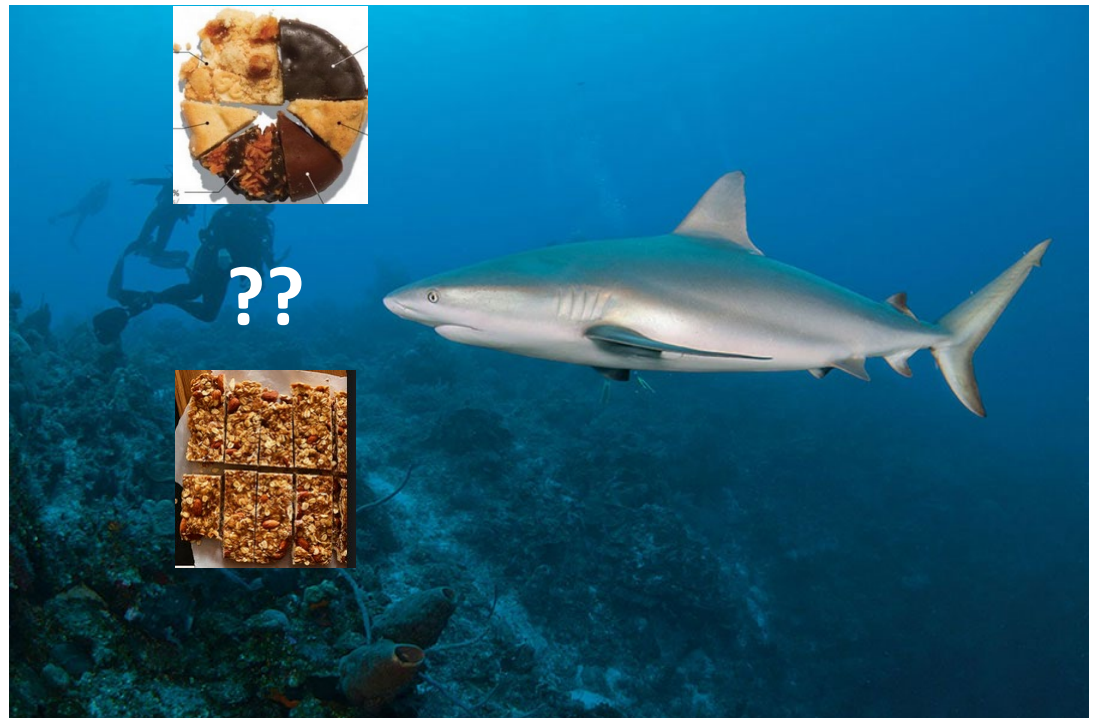
One experimental trial:



Shark experiment: Pies vs. Bars

Results: Sharks show an overwhelming preference for conch pie

Choice	n
Pie	45
Bar	4
Diver *	1



* Ethics disclosure: All divers were volunteers. None were consumed in this experiment.

Turtle experiment

Does this generalize? What about turtles?

Results: Turtles show an overwhelming preference for granola bar charts

Choice	n
Pie	3
Bar	47
Diver	0



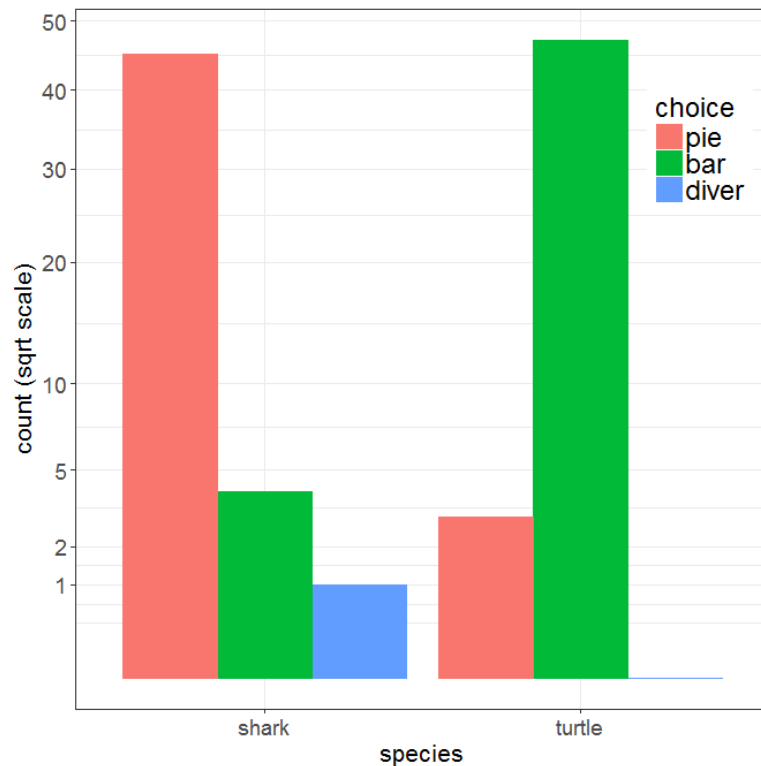
Visualizing the results

Successful visualizations require some time for reflection

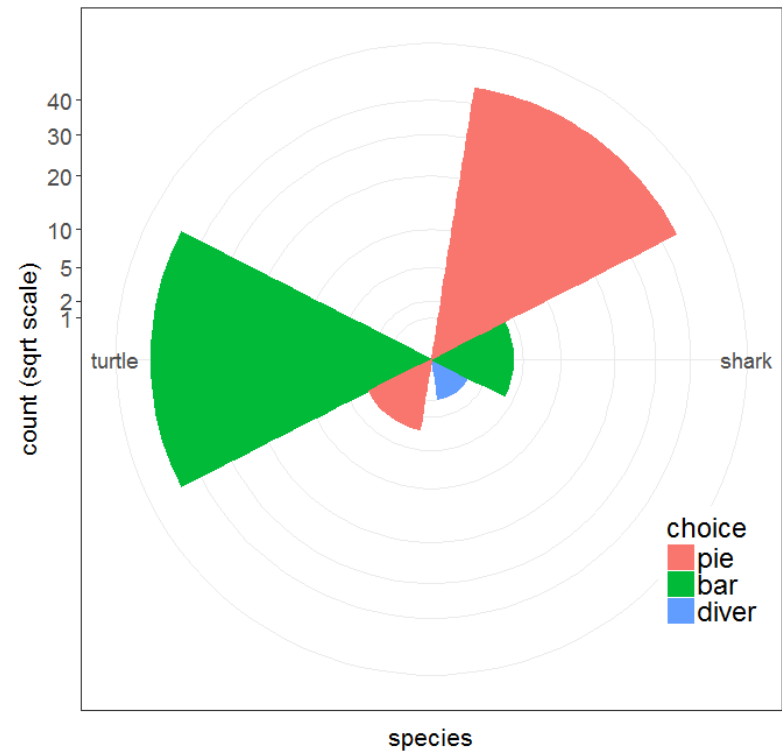


Visualizing the results

Bar chart



Windrose = bar chart + polar coords



Which do you prefer? Is there something better before I publish this?

The *Red Stripe* Award



The research reported* here was given the February 2024 *Red Stripe Award* by the **Deep Question Research Institute**



* This research was **not** supported by the National Sciences and Engineering Research Council of Canada

Further research

- Include the obvious and necessary control conditions in a 2 x 2 factorial design (chart type × food type):
 - conch bar charts vs. conch pie charts
 - granola pie charts vs. granola bar charts



Further research

- Extend this to another species:
 - dolphins: known to be much smarter than sharks and turtles; is graphical preference related to intelligence?
 - parrot fish, groupers, lobsters: what can we do??
- Investigate influence of **color** on graph preference
 - This can be also be studied as a function of depth, because colors become more muted at greater depth

