



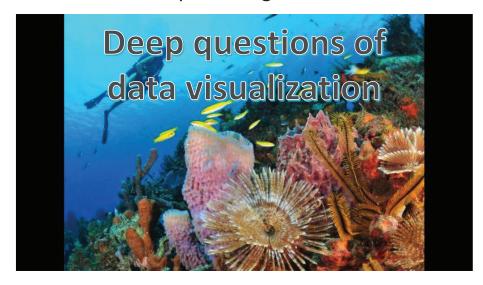
# Deep Questions of Data Visualization



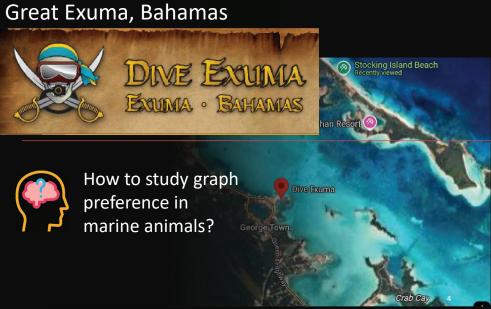
Michael Friendly
Psych 6135
https://friendly.github.io/6135



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



# Deep Questions Research Institute Great Exuma, Bahamas



Research team\* aboard the MV Playfair

Divers suit up



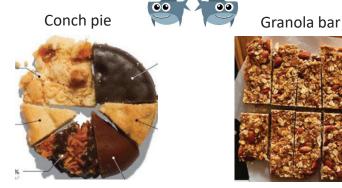


\* Thanks for technical assistance from Dive Exuma

## Shark experiment: Pies vs. Bars

Do sharks prefer conch pie charts or granola bar charts?

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

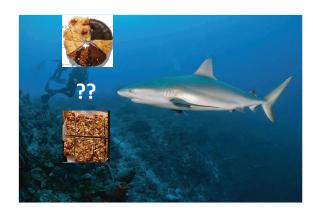


Sample stimulus items

## Shark experiment: Pies vs. Bars

Results: Sharks show an overwhelming preference for conch pie

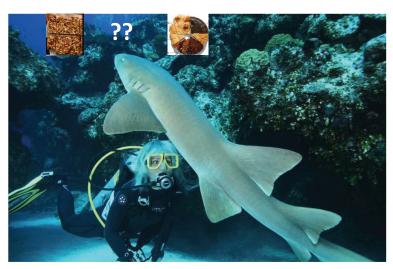
Choice	n
Pie	45
Bar	4
Diver *	1



<sup>\*</sup> Ethics disclosure: All divers were volunteers. None were consumed in this experiment.

## Shark experiment

One experimental trial:



#### 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



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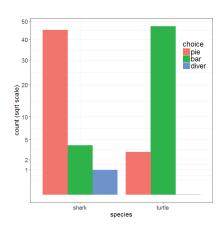
# Visualizing the results

Successful visualizations require some time for reflection

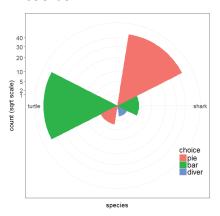


Visualizing the results

#### 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





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#### 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





