

Discrete outcome encodings: Spaghetti plots

SIADS 542: Presenting uncertainty – Week 3, Lecture 1

Matthew Kay

Assistant Professor

School of Information

University of Michigan

Roadmap

- Week 1: Introduction to uncertainty visualization
 Types of uncertainty; **small** vs **large** world
- Week 2 & 3: **Small world uncertainty**
 Continuous uncertainty encodings
 Frequency-framing uncertainty encodings
- Week 4: **Large world uncertainty**

Today

We've seen how to formally describe
continuous uncertainty encodings,
intervals, and icon arrays/dotplots

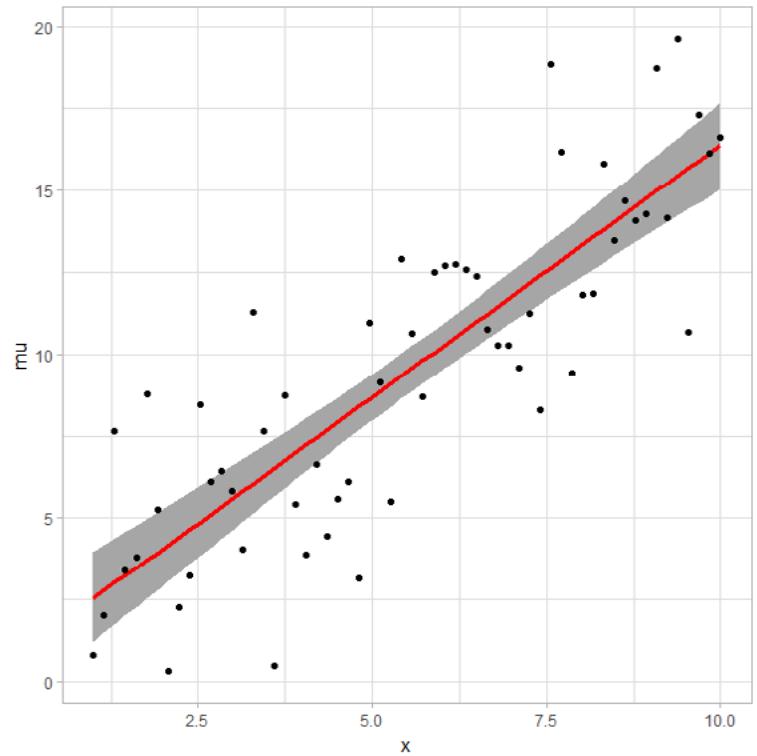
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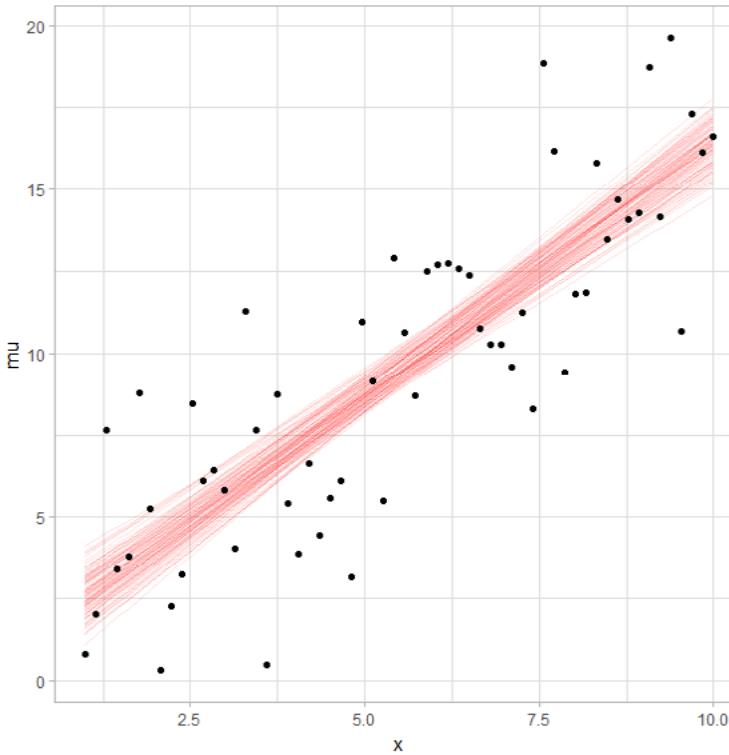
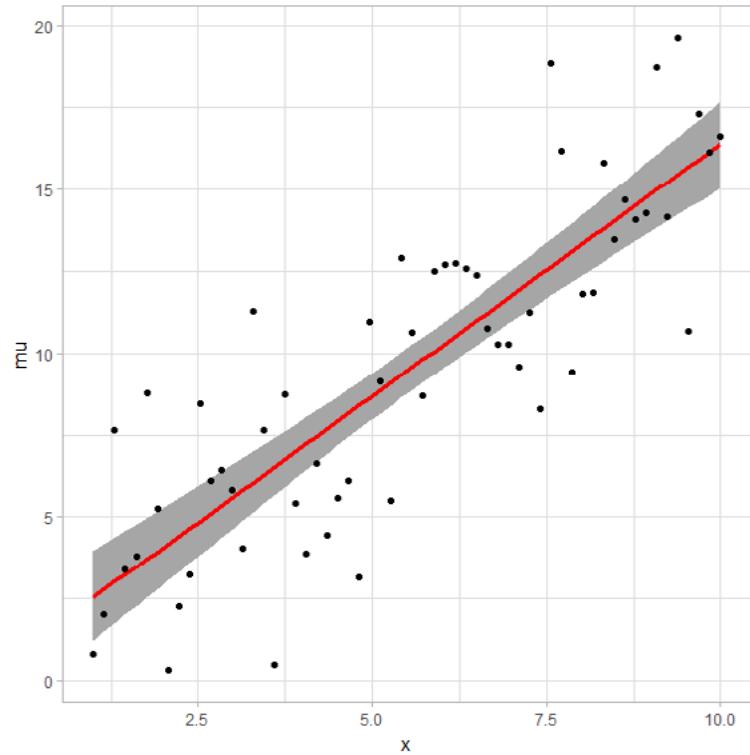
Let's look at spaghetti plots

We'll start with fit line uncertainty

Fit line uncertainty



Fit line uncertainty

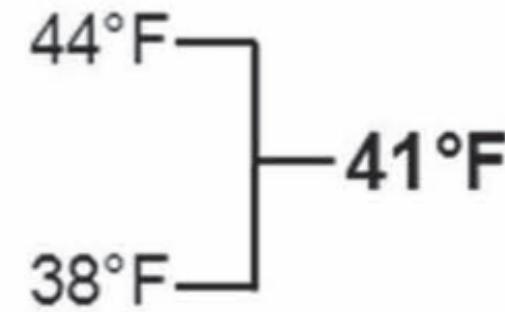
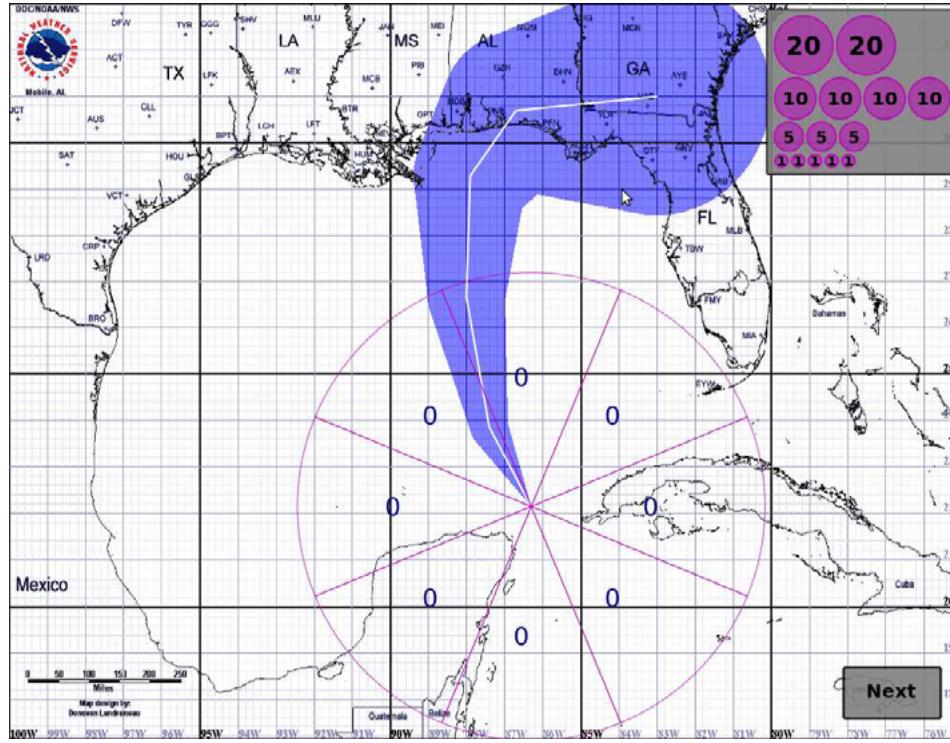




[Verch, <https://flic.kr/p/RC7hmp>]

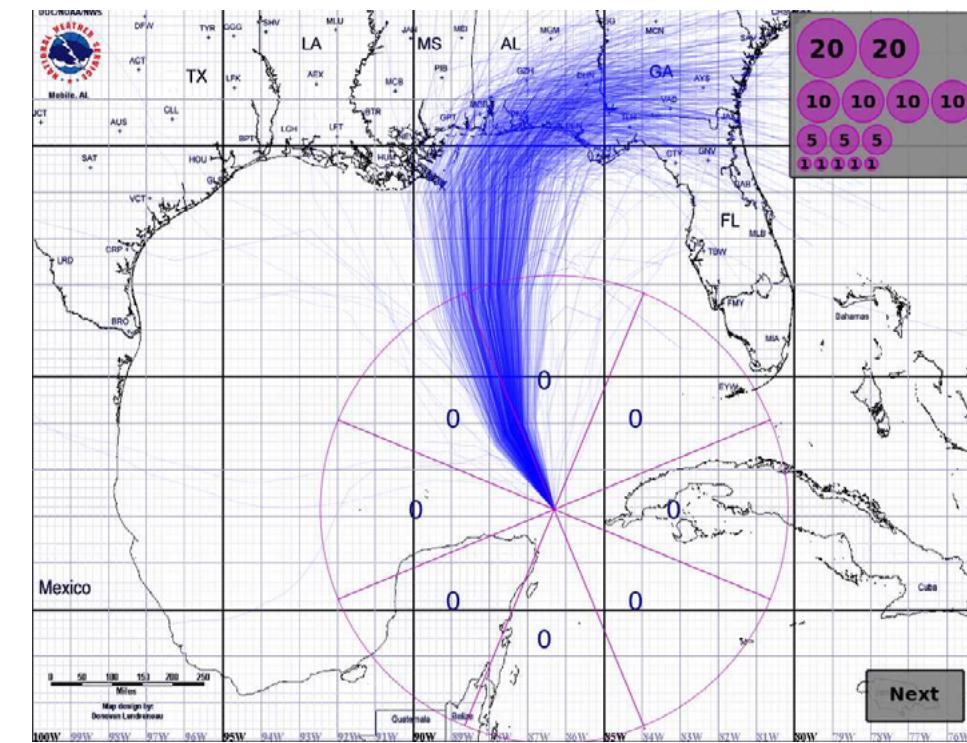
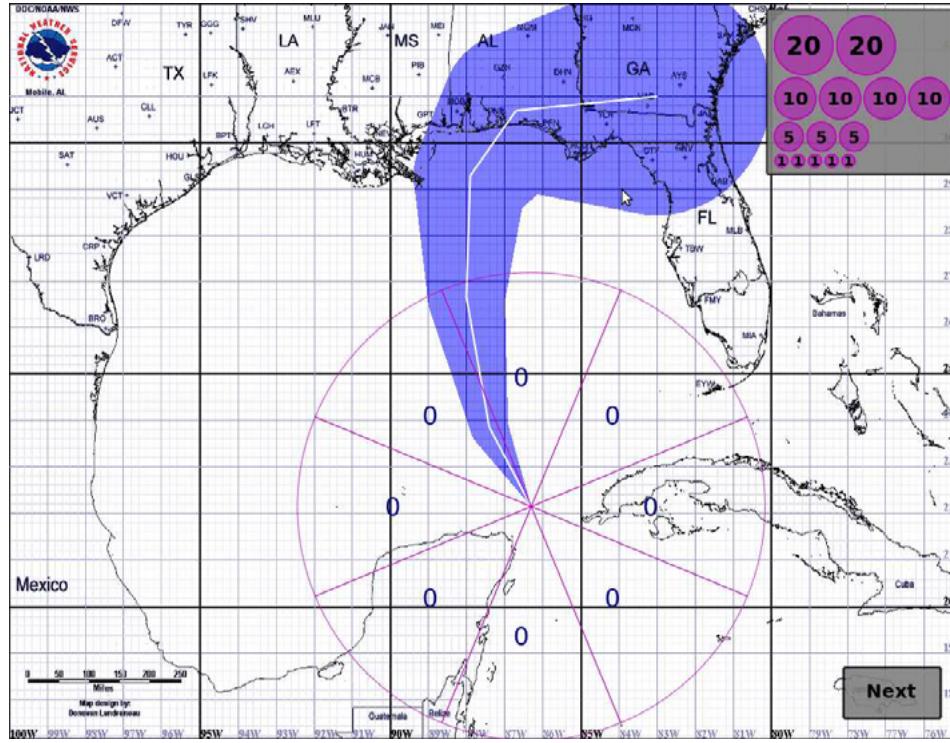
Deterministic construal errors

[Joslyn & LeClerc. Decisions With Uncertainty: The Glass Half Full. Current Directions in Psych. Science, 22(4), 2013]



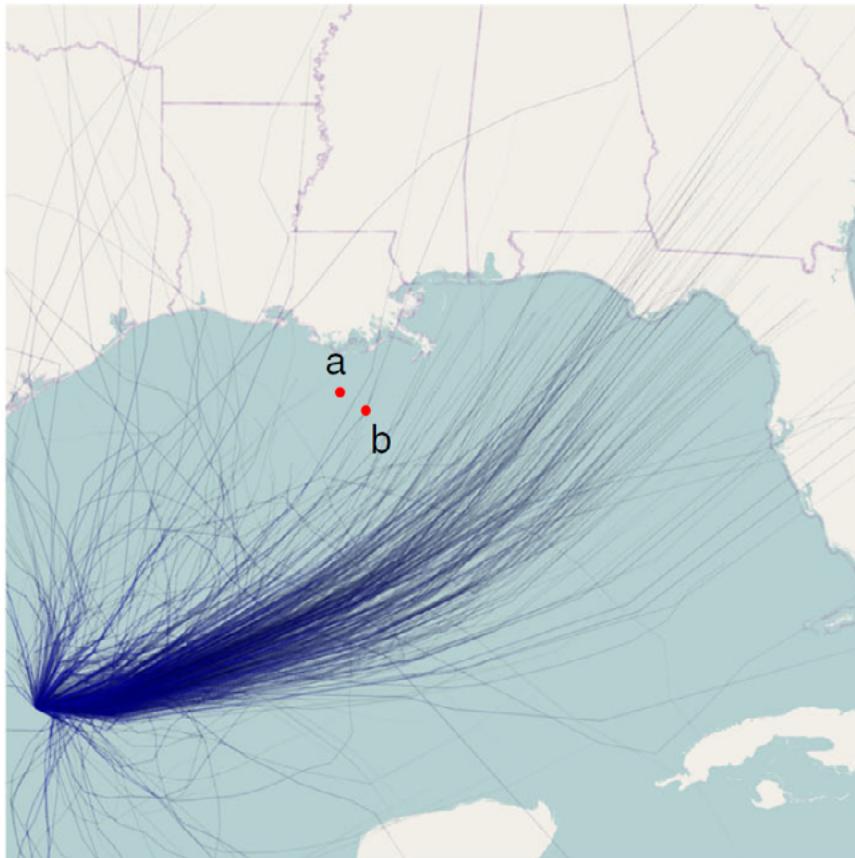
Spaghetti plots for hurricane predictions

[Cox, House, Lindell. Visualizing Uncertainty in Predicted Hurricane Tracks.
International Journal for Uncertainty Quantification, 3(2), 143–156, 2013]



(but problems with spaghettiis...)

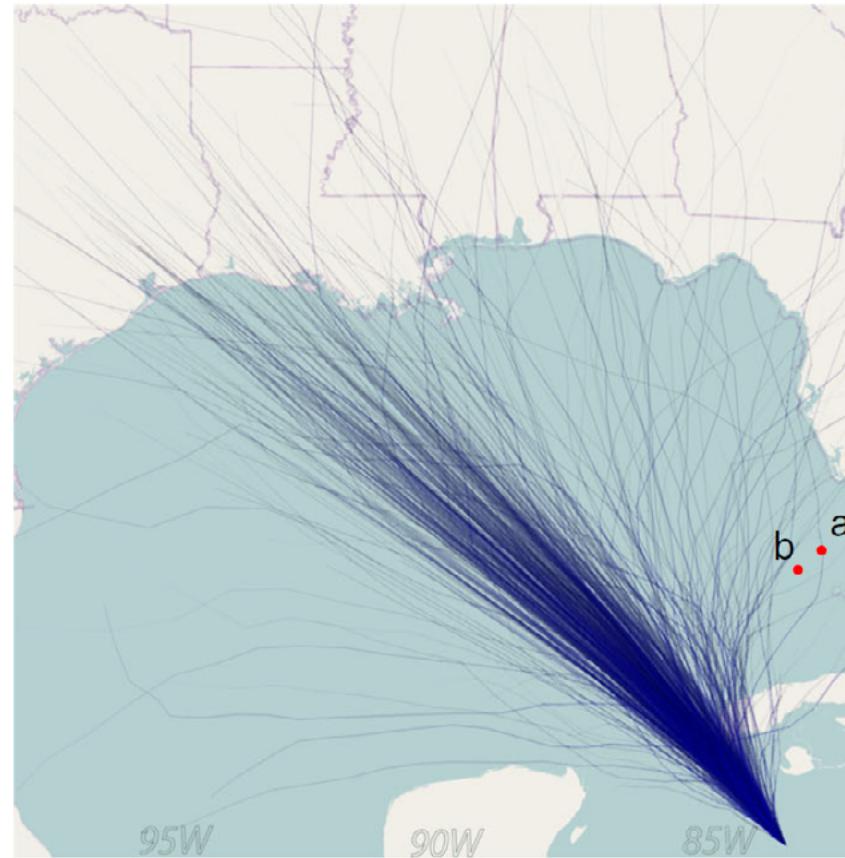
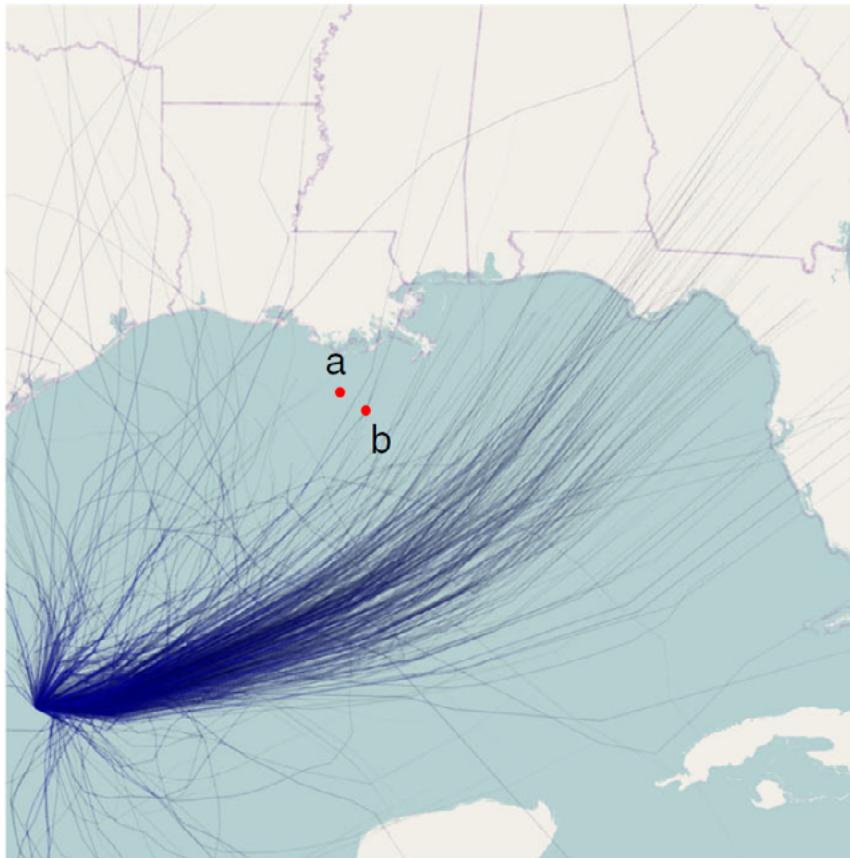
[Padilla, Ruginski, Creem-Regehr. Effects of ensemble and summary displays on interpretations of geospatial uncertainty data. Cognitive Research: Principles and Implications, 2(1), 40, 2017]



$p(b) > p(a)?$

(but problems with spaghetti...)

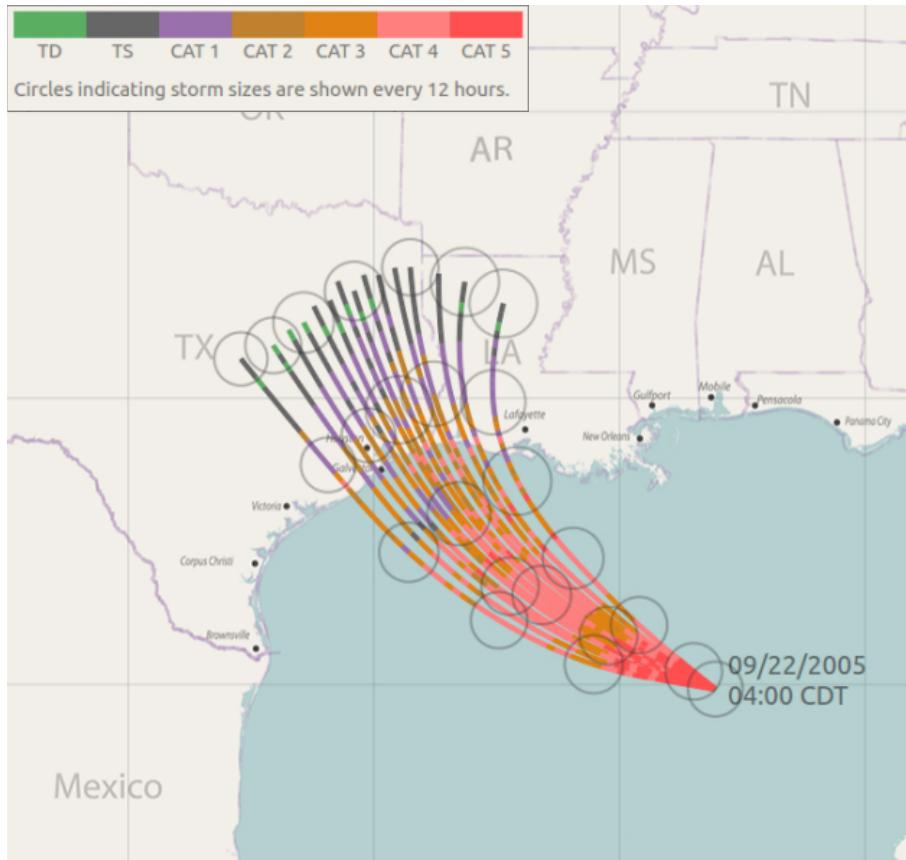
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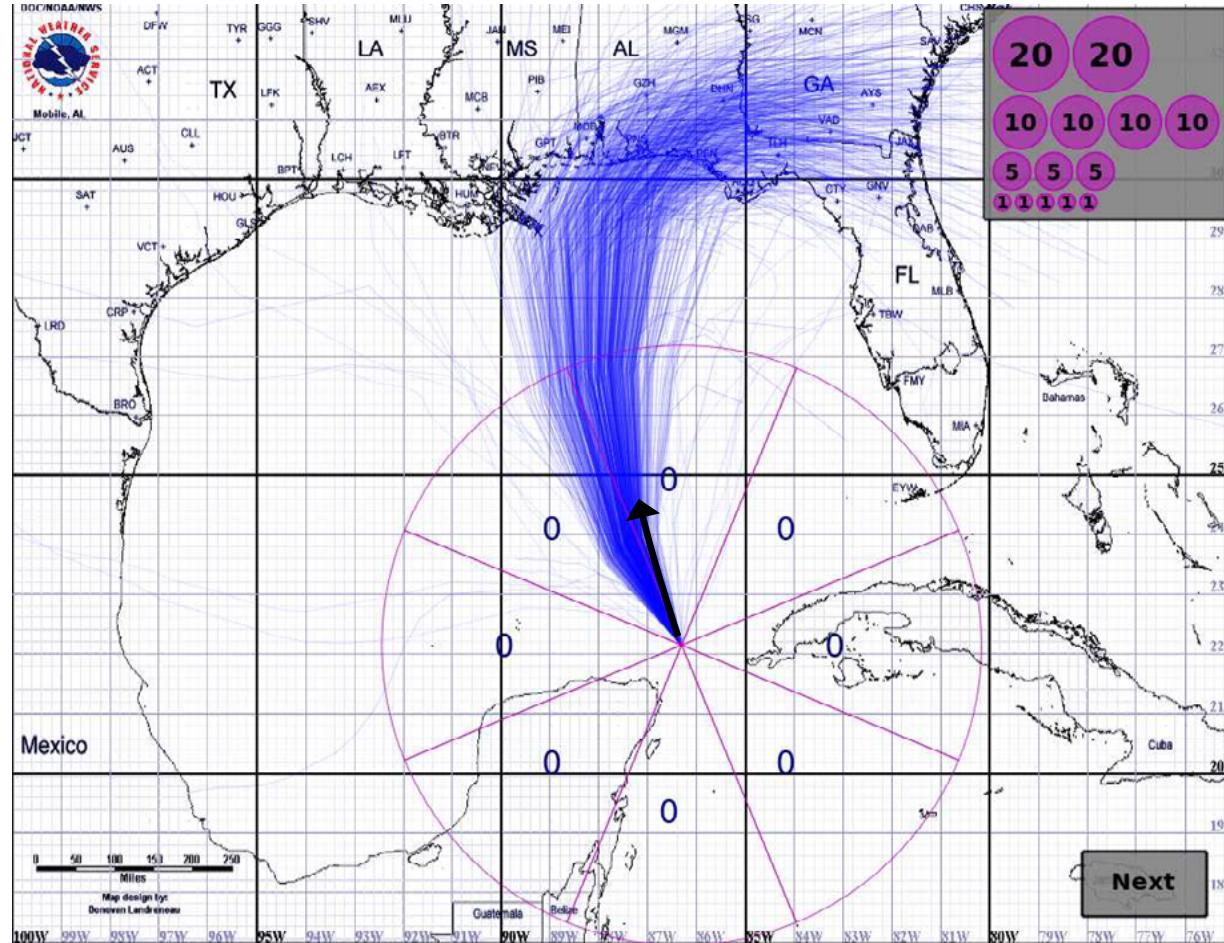
Improved spaghetti

[Liu, Padilla, Creem-Regehr, House. Visualizing uncertain tropical cyclone predictions using representative samples from ensembles of forecast tracks. IEEE transactions on visualization and computer graphics, 25(1), 882–891, 2018]

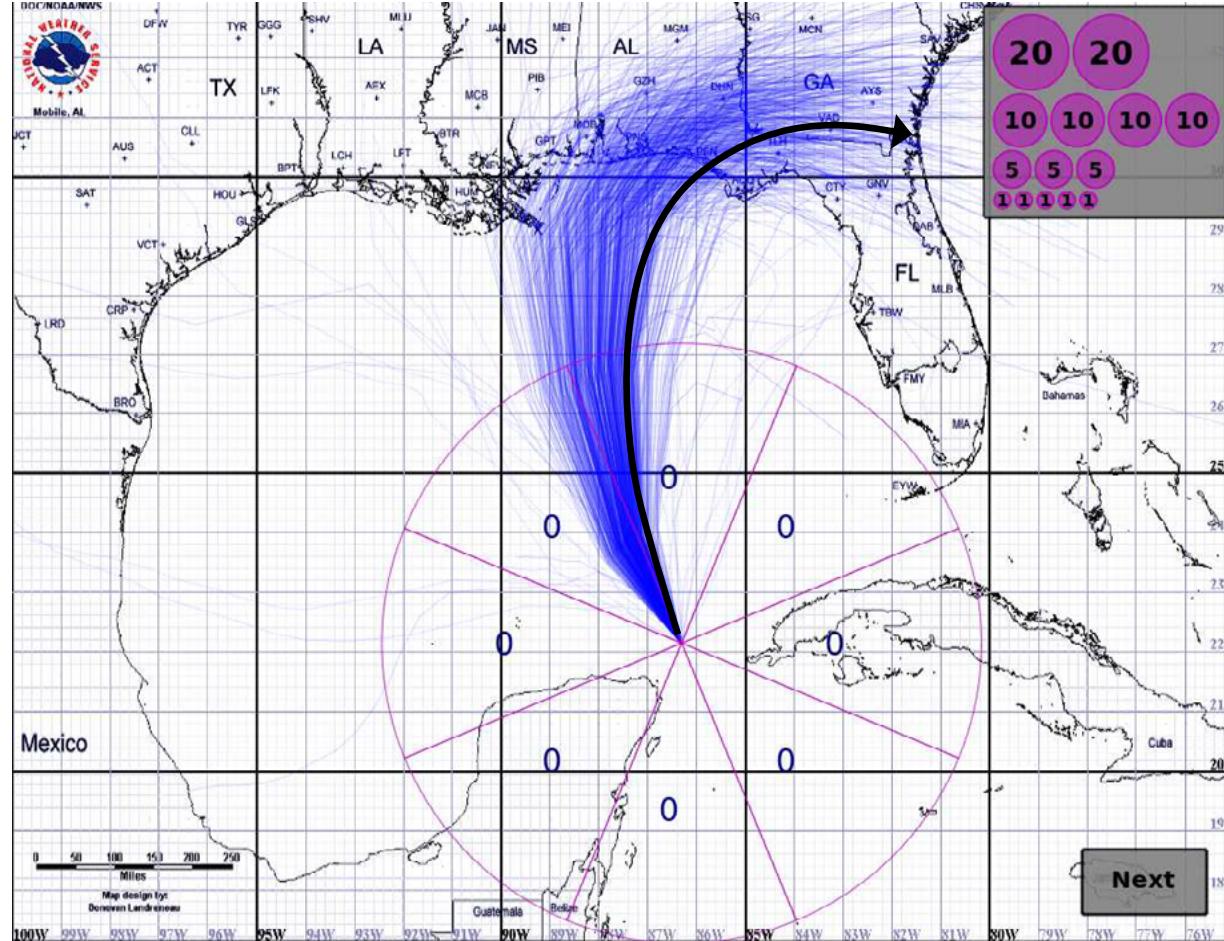


**Spaghettis help when you have
correlated distributions...**

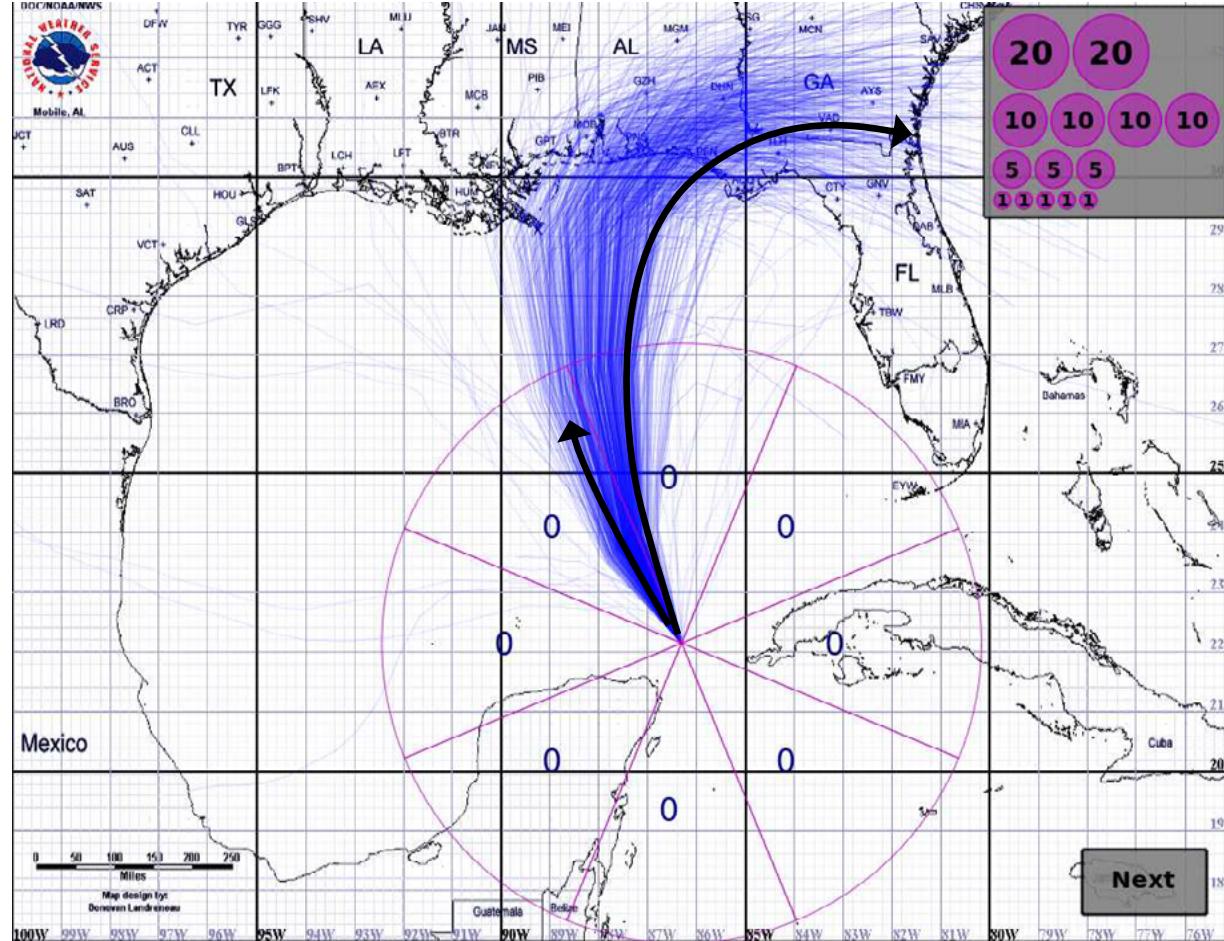
Time series data is often correlated



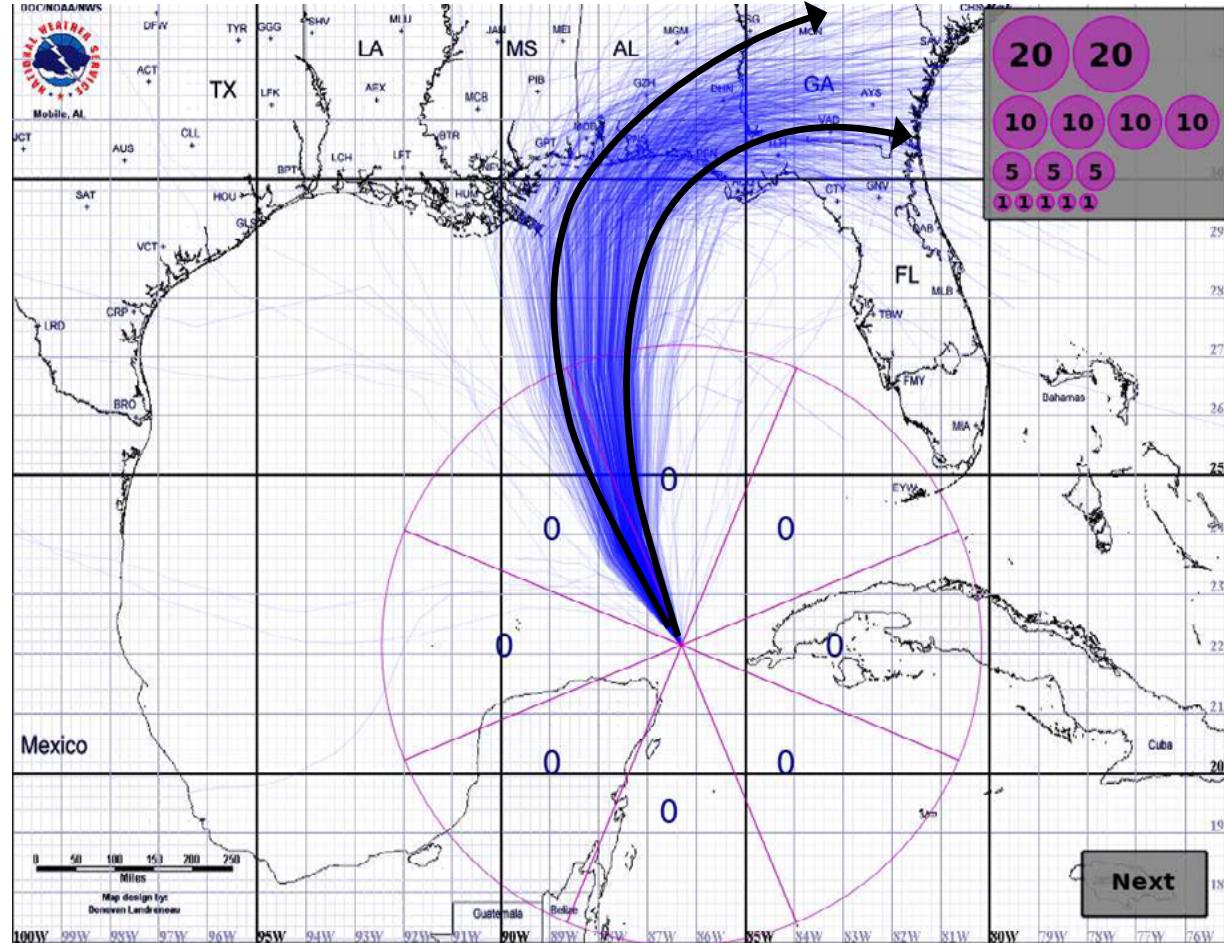
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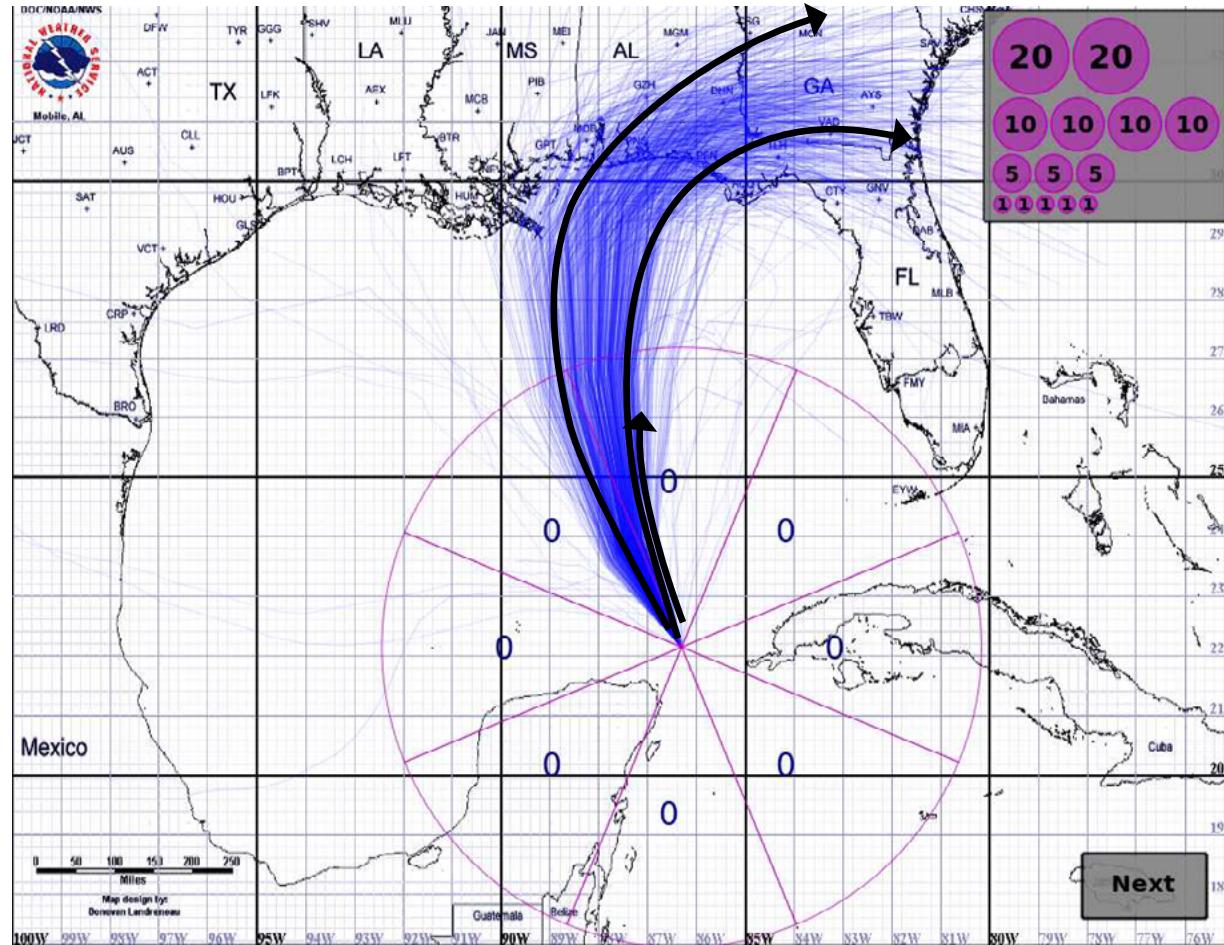
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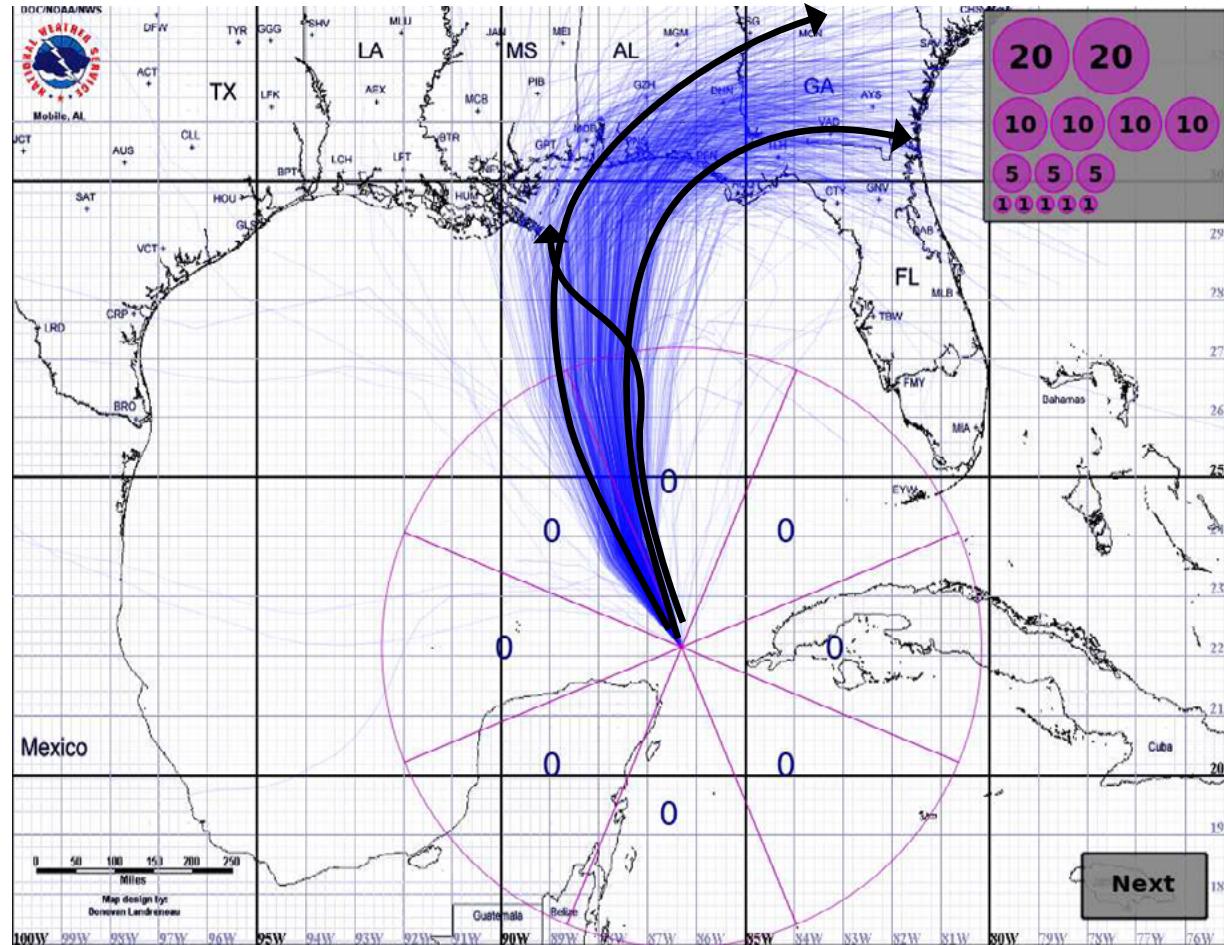
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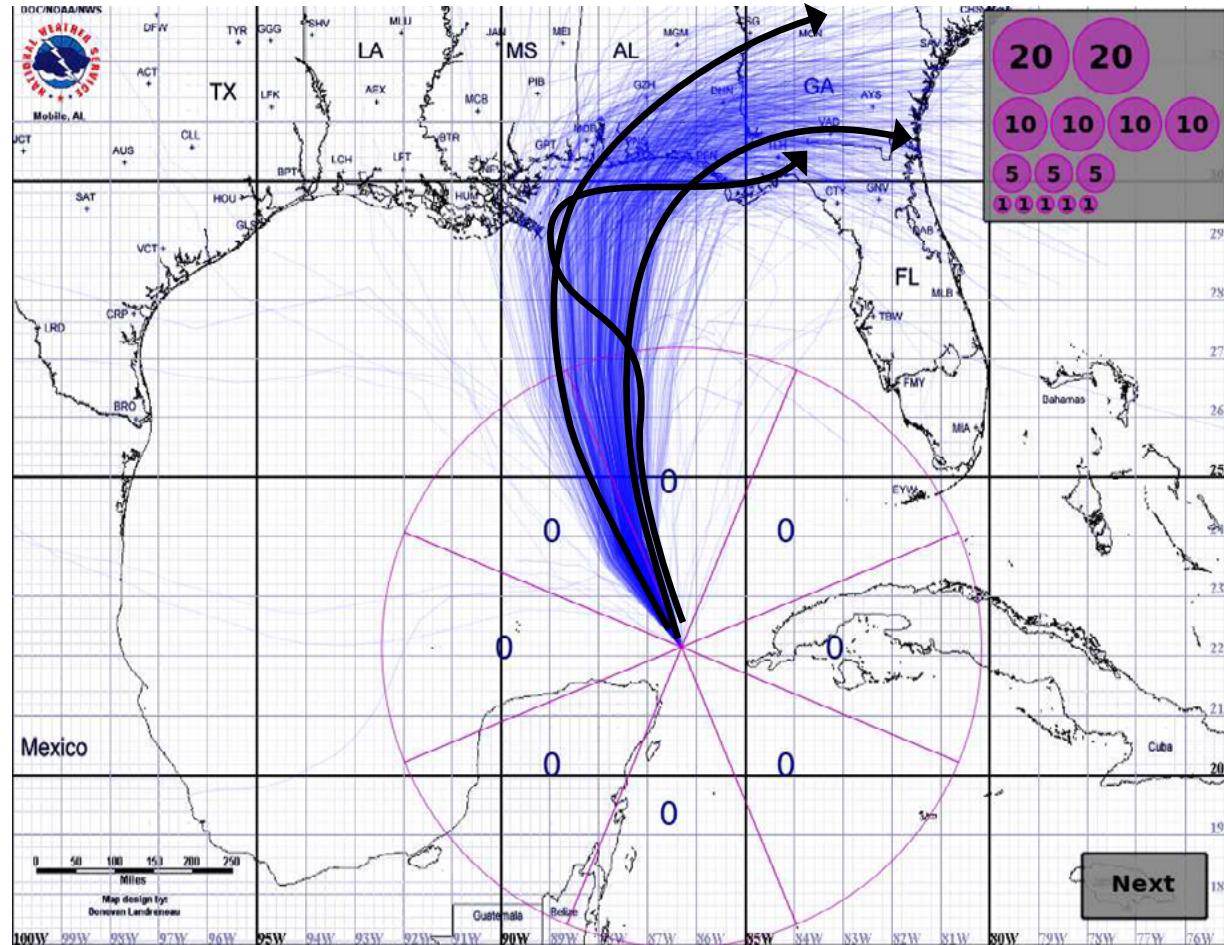
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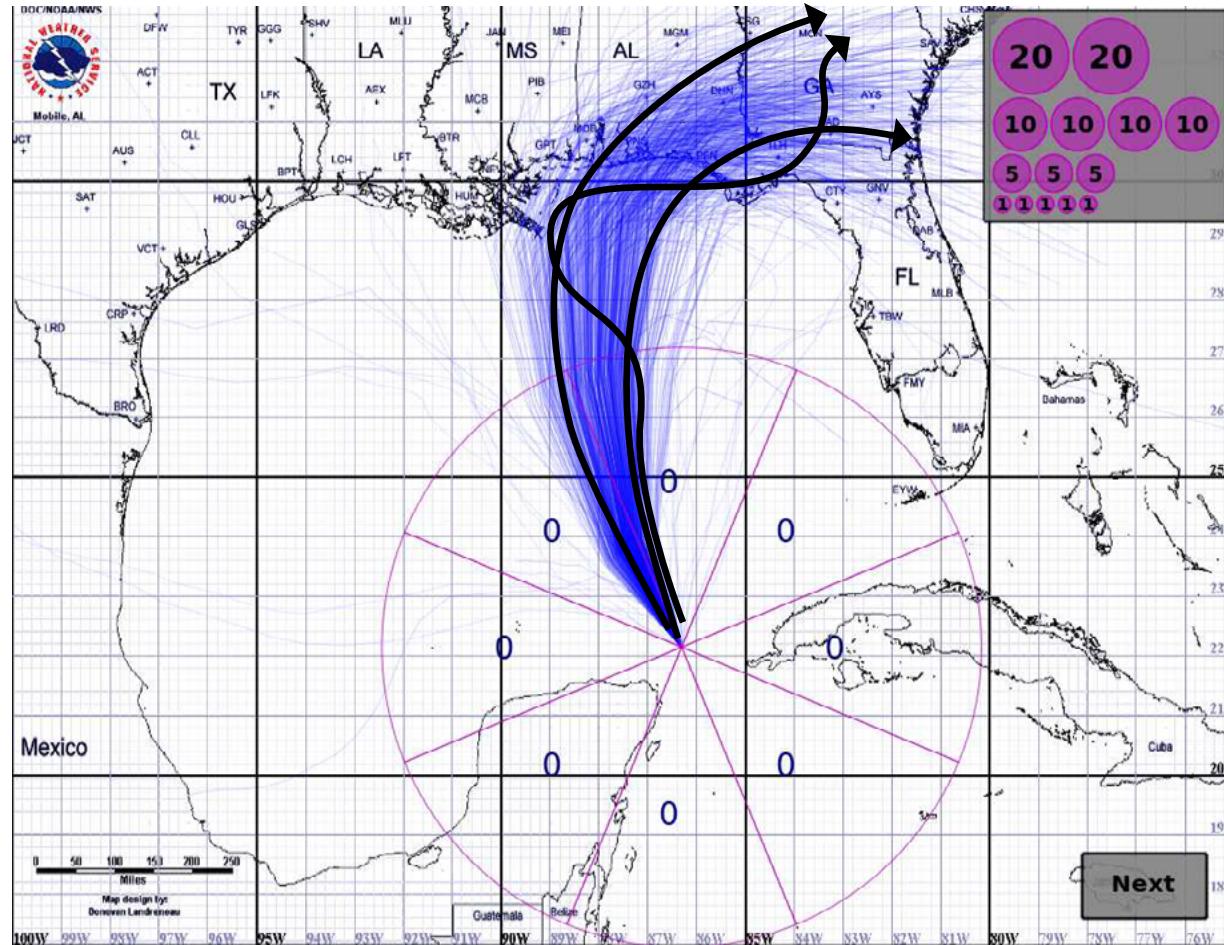
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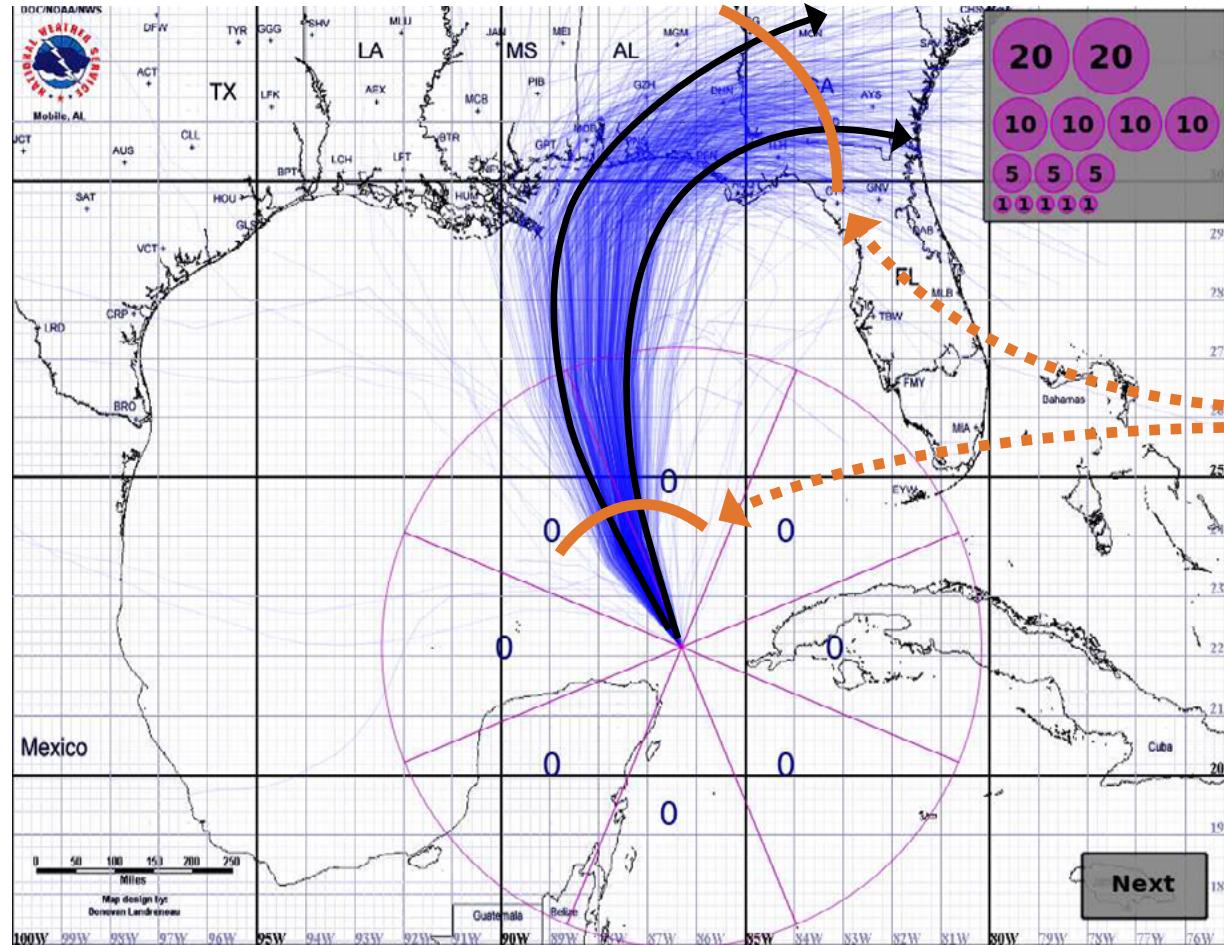
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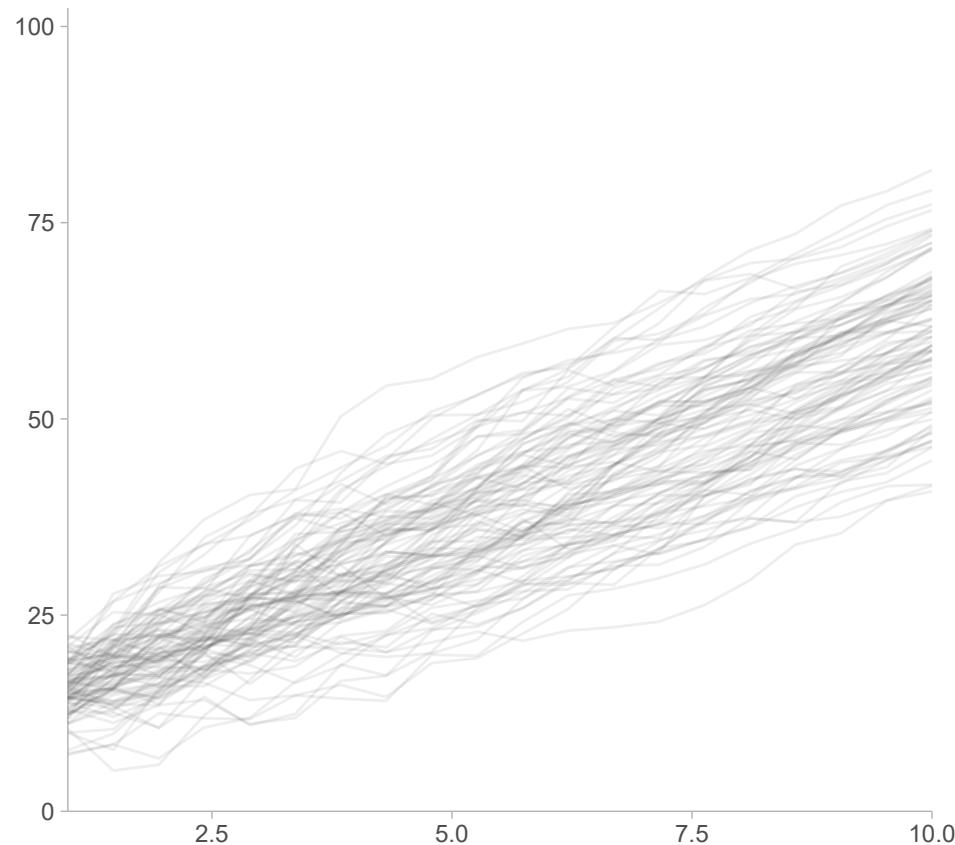
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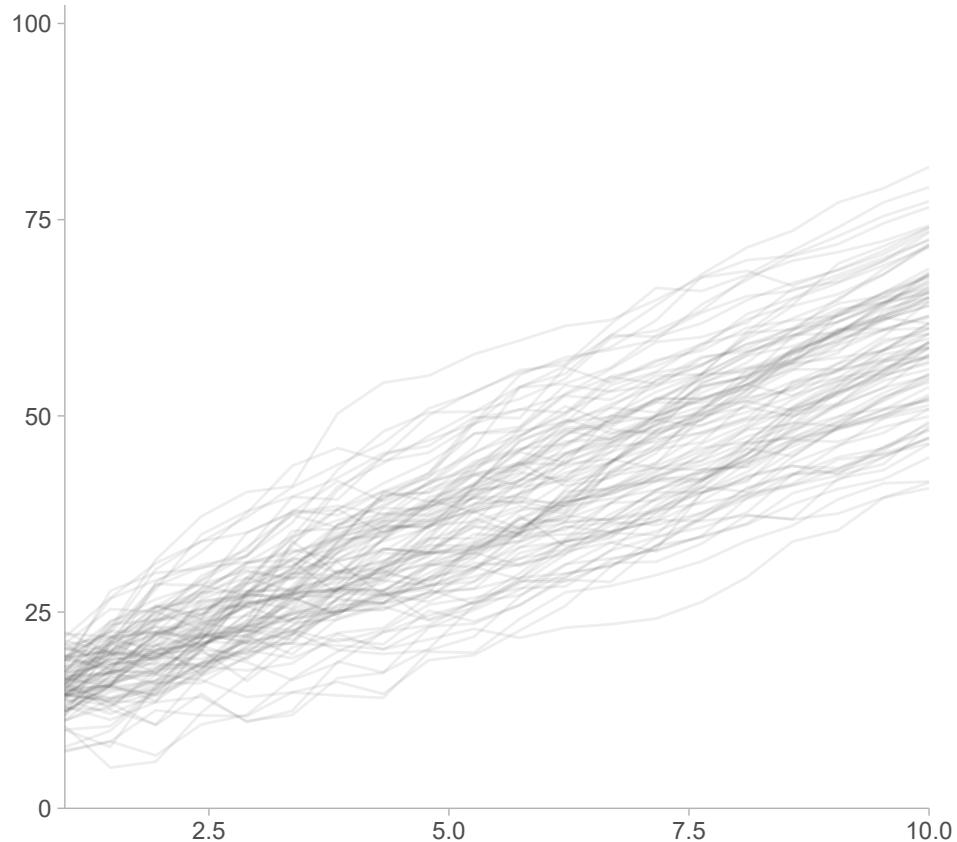
Intervals obscure correlation

High correlation

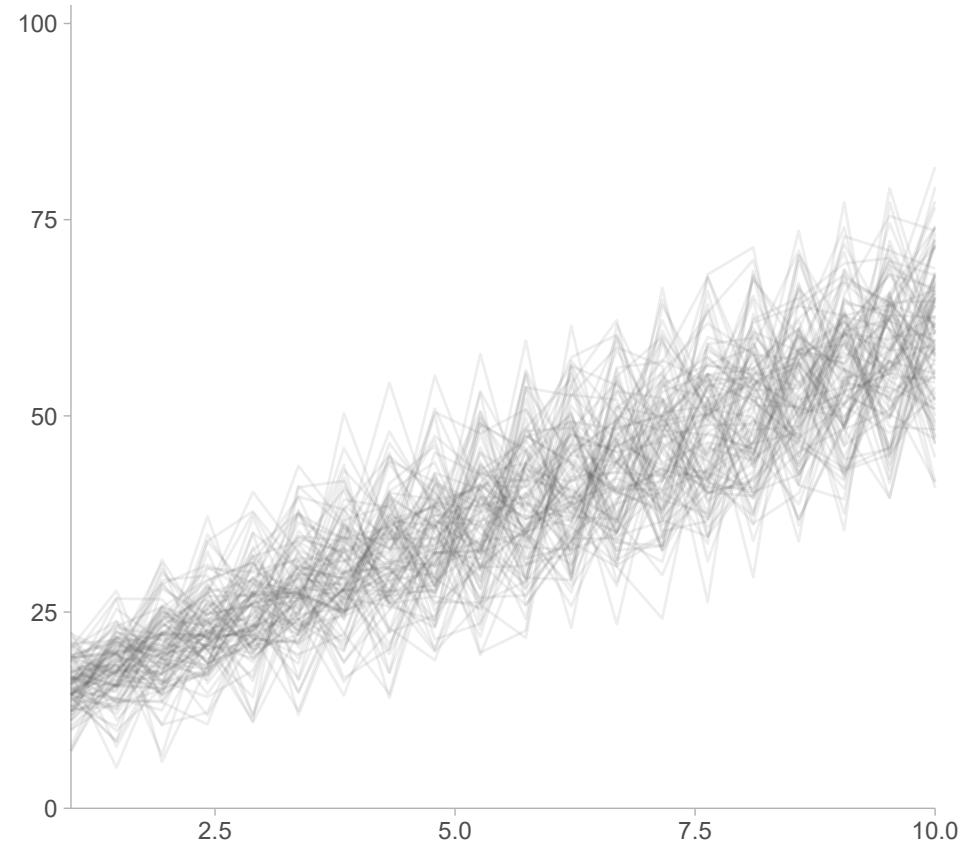


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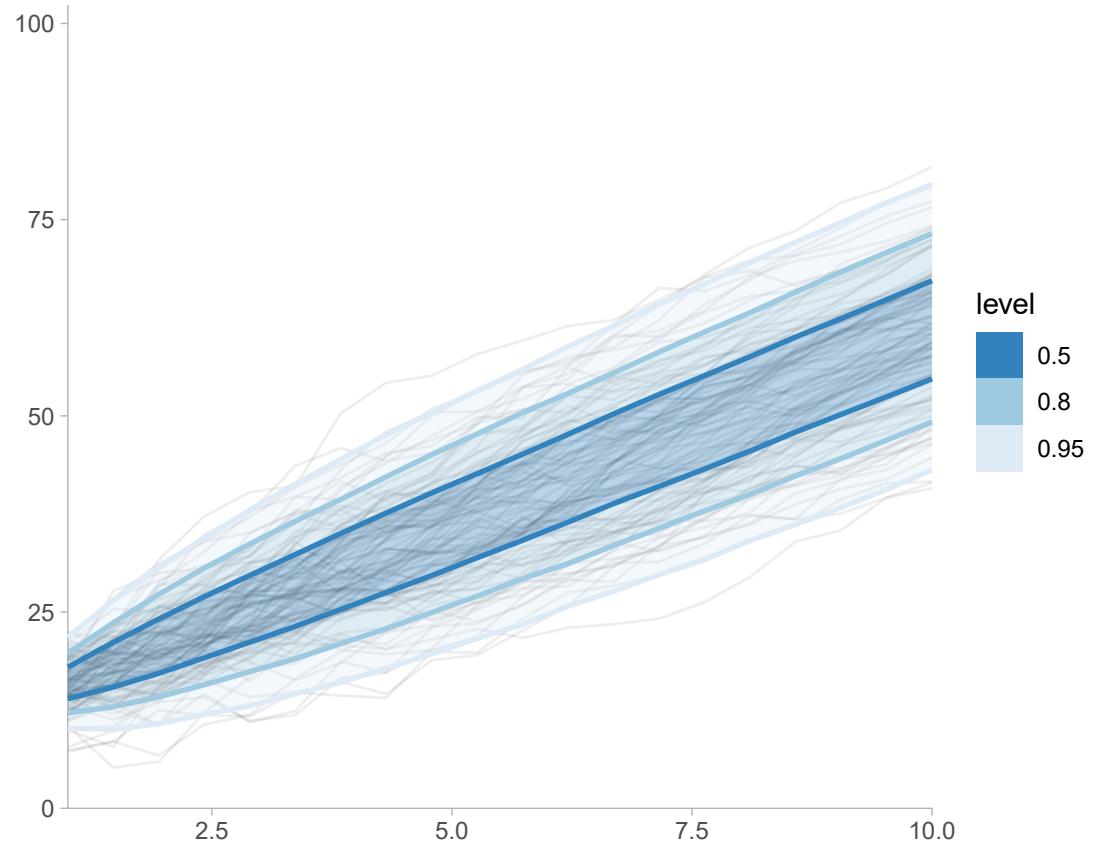


No correlation

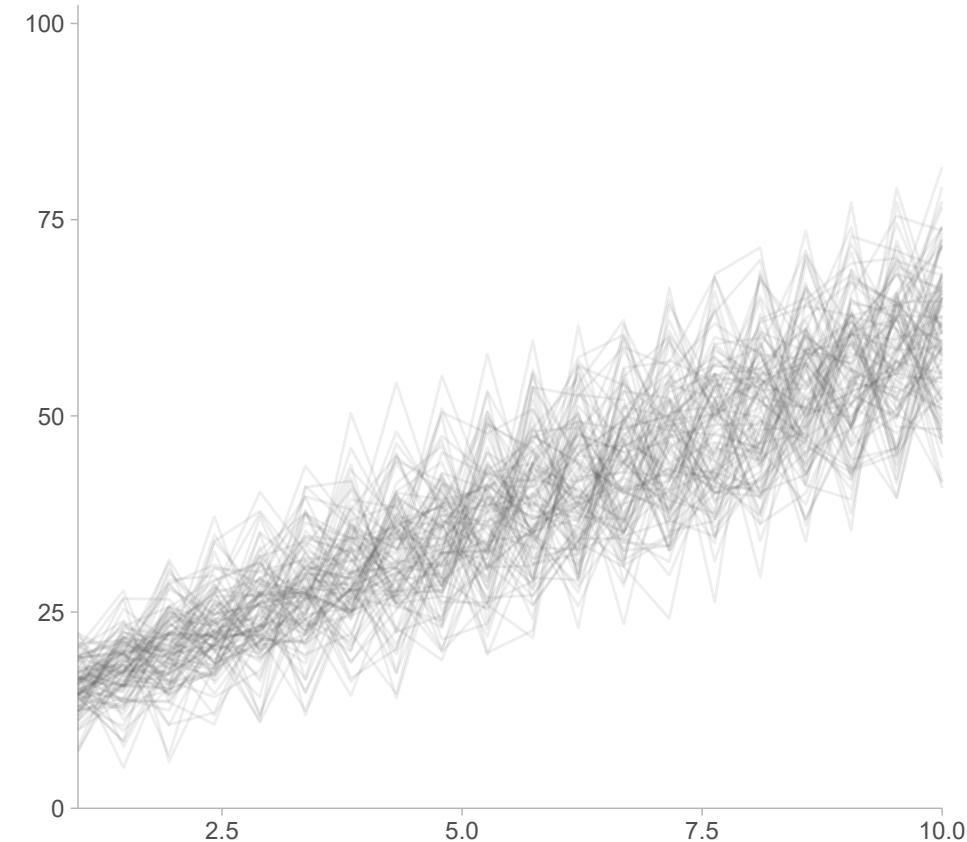


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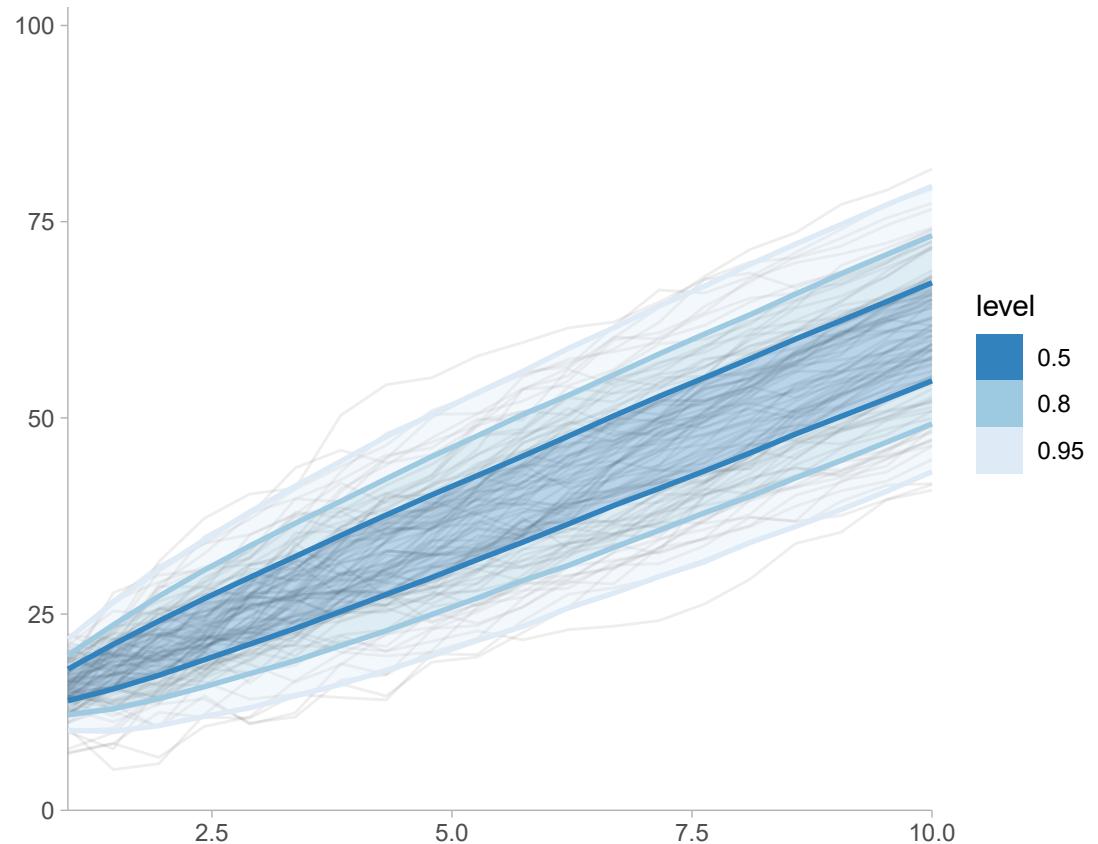


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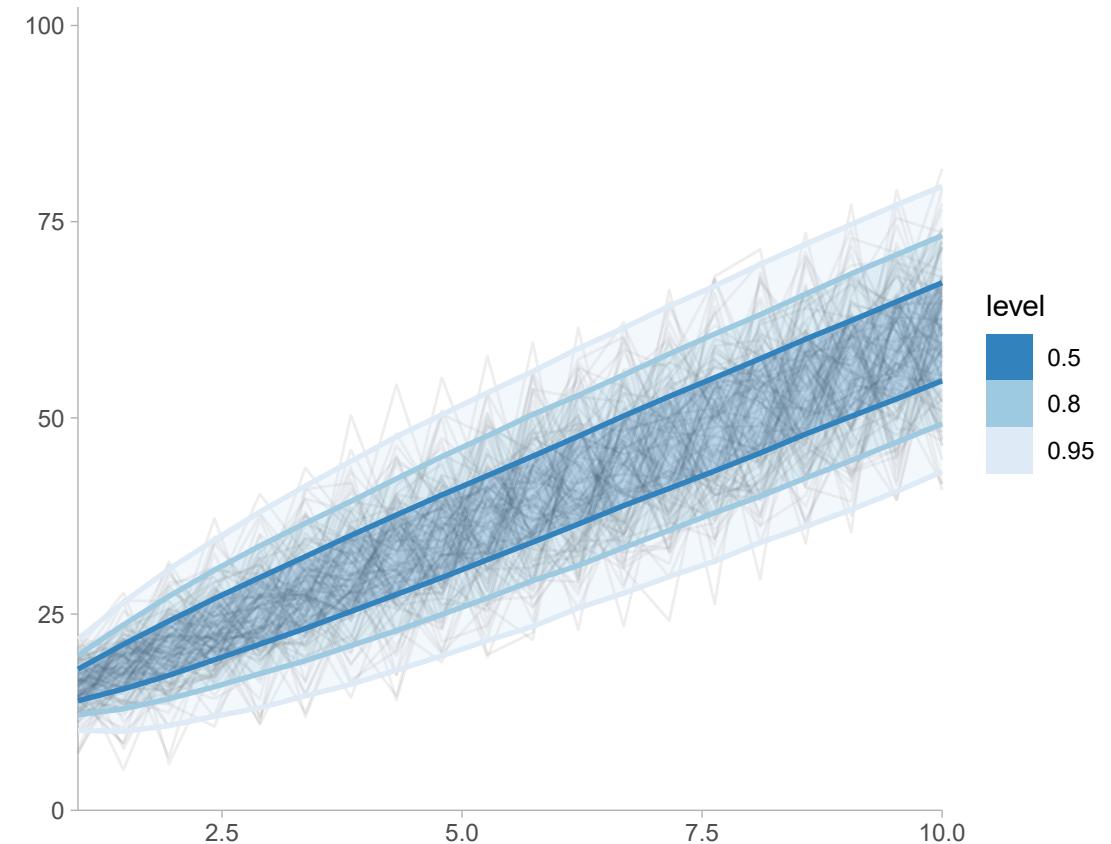


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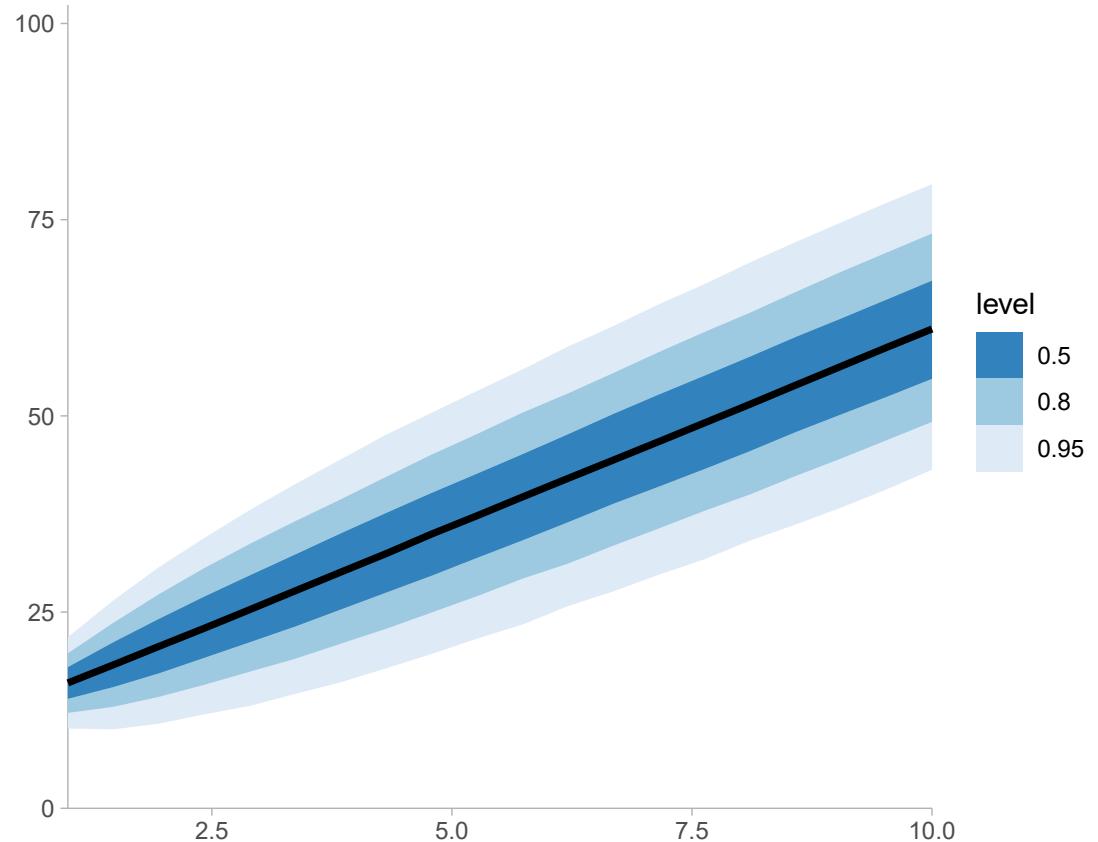


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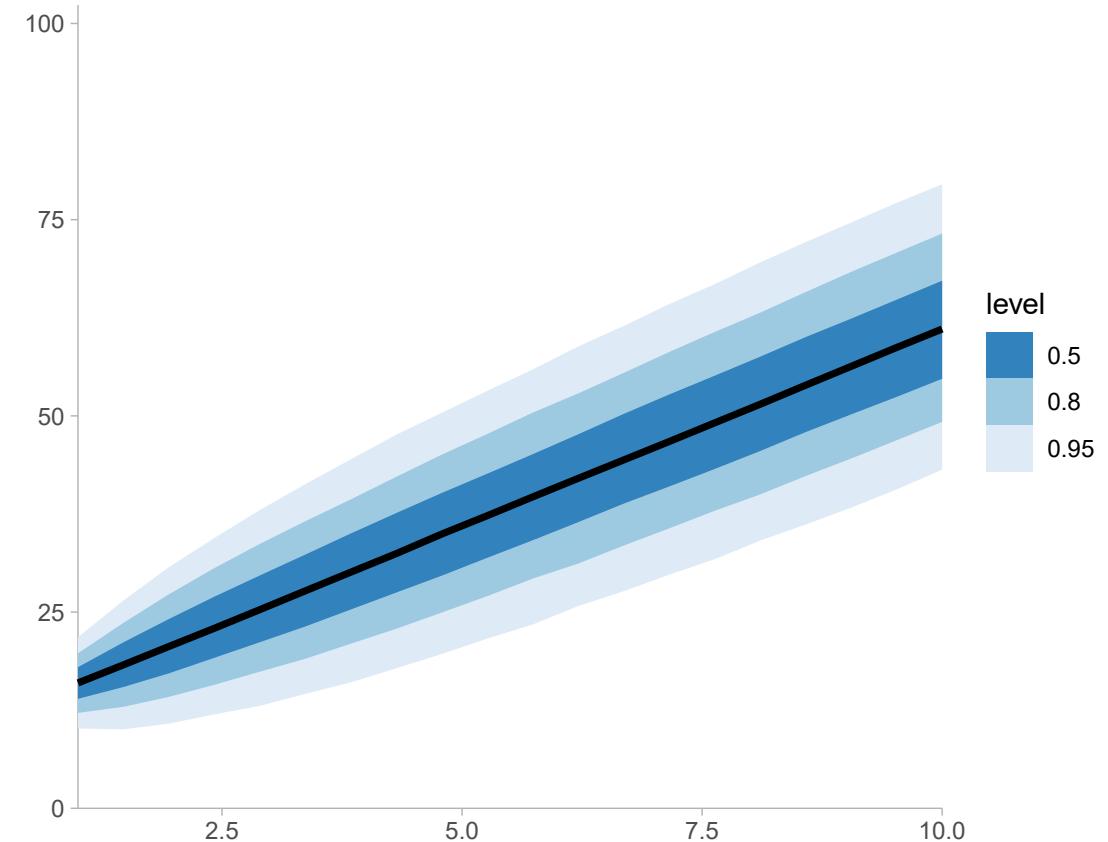


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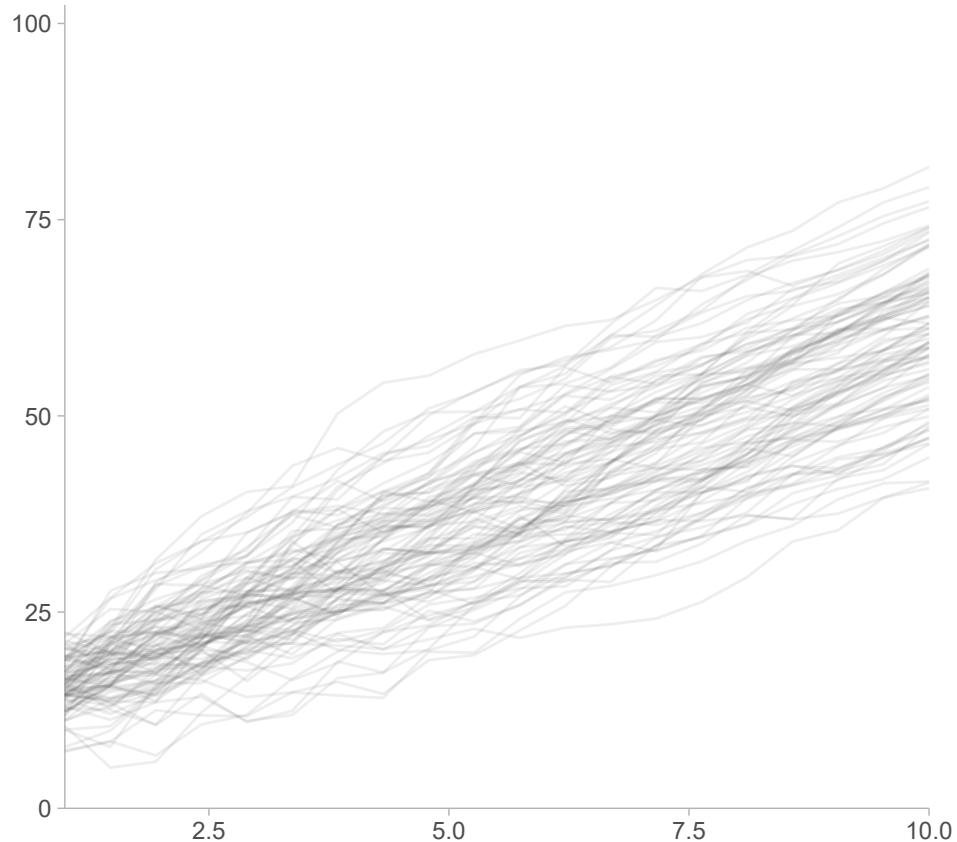


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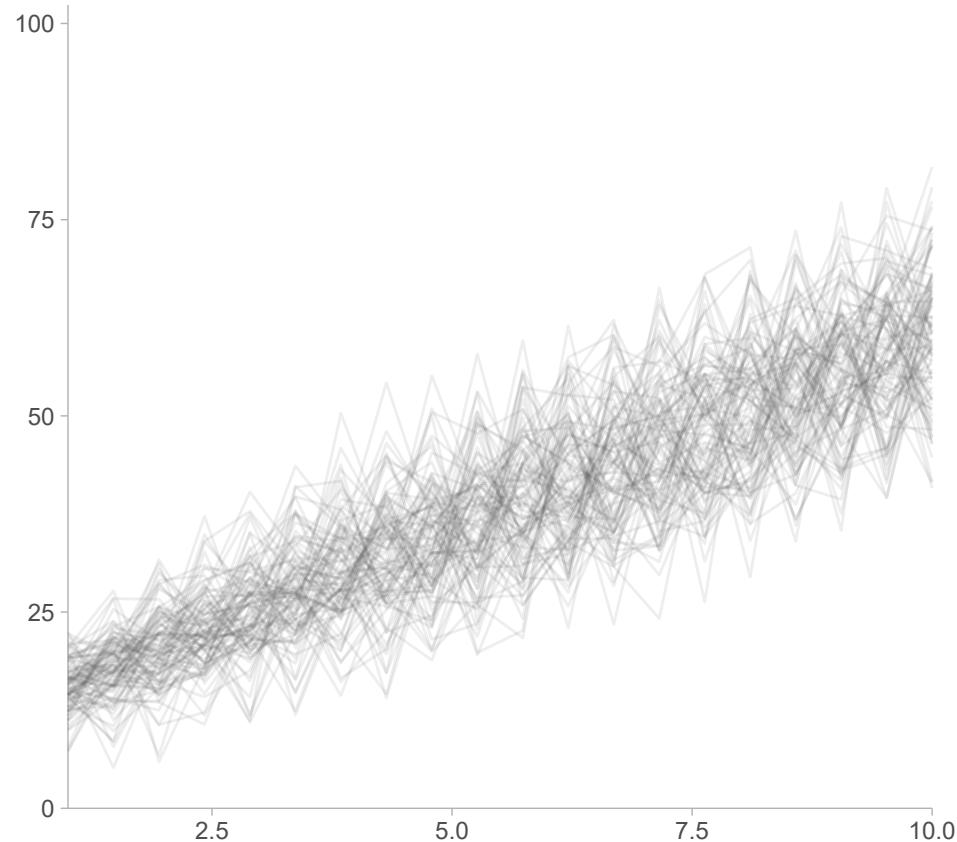


Intervals obscure correlation

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No correlation



Summing up

Spaghetti plots

Implicit encoding for spaghettiies is spatial frequency

Spaghetti plots

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Spaghetti plots mitigate deterministic construal errors

Spaghetti plots

Implicit encoding for spaghettiies is spatial frequency

Spaghetti plots mitigate deterministic construal errors

...and help show correlation between distributions

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