

Catching the Unexpected

How Feature-Based Attention Tracks Violations of Prior Belief

Laqui**Team** is proud to share

Where did the story begin?

CellPress

Neuron
Article

A Switching Observer for Human Perceptual Estimation

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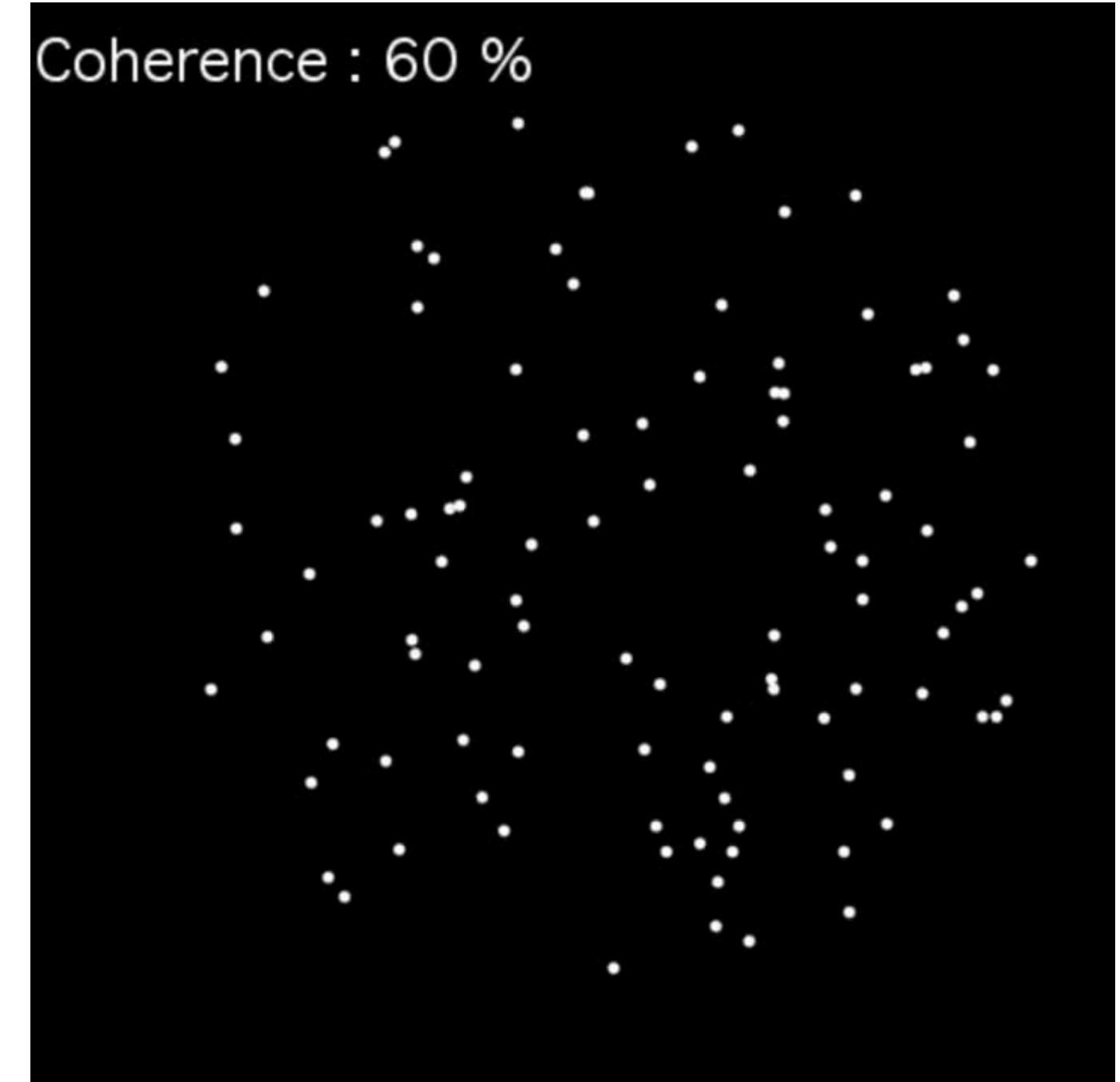
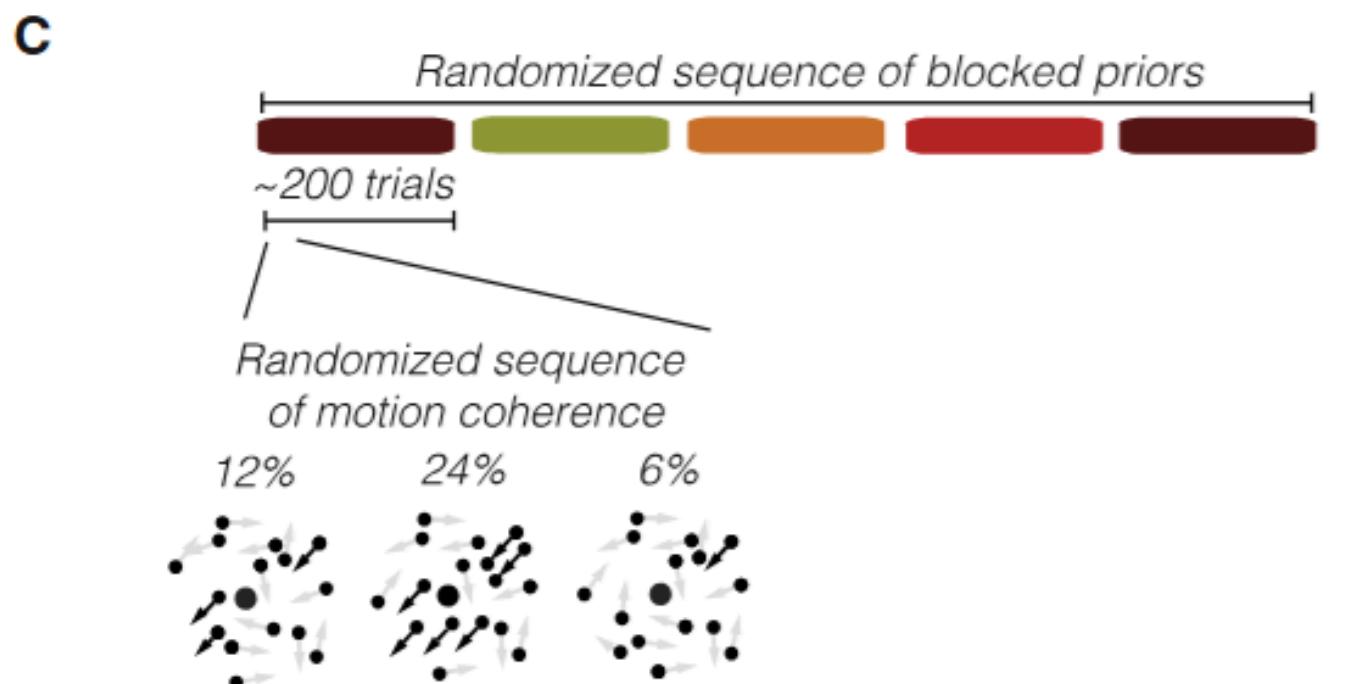
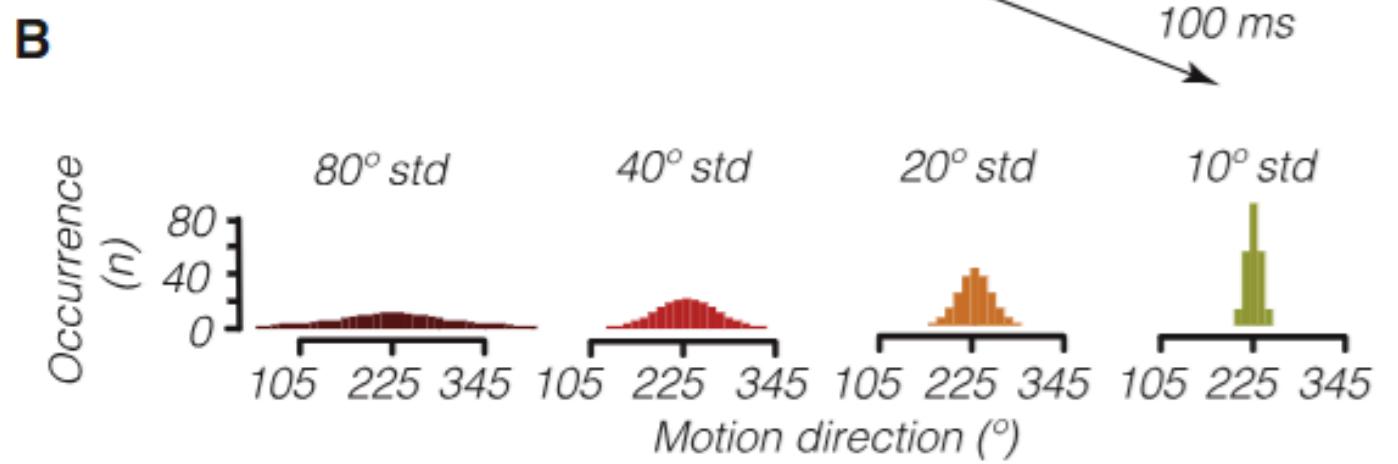
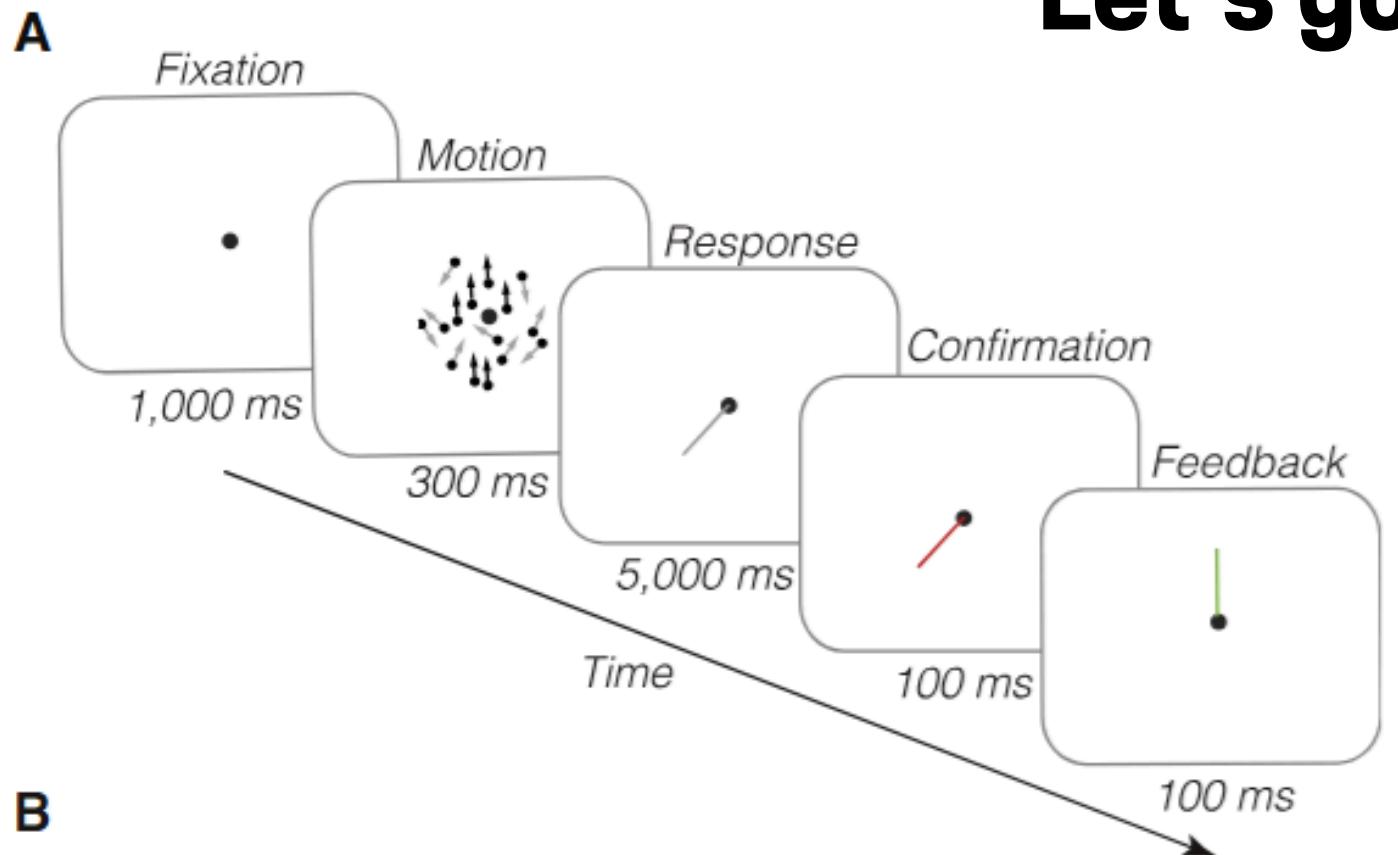
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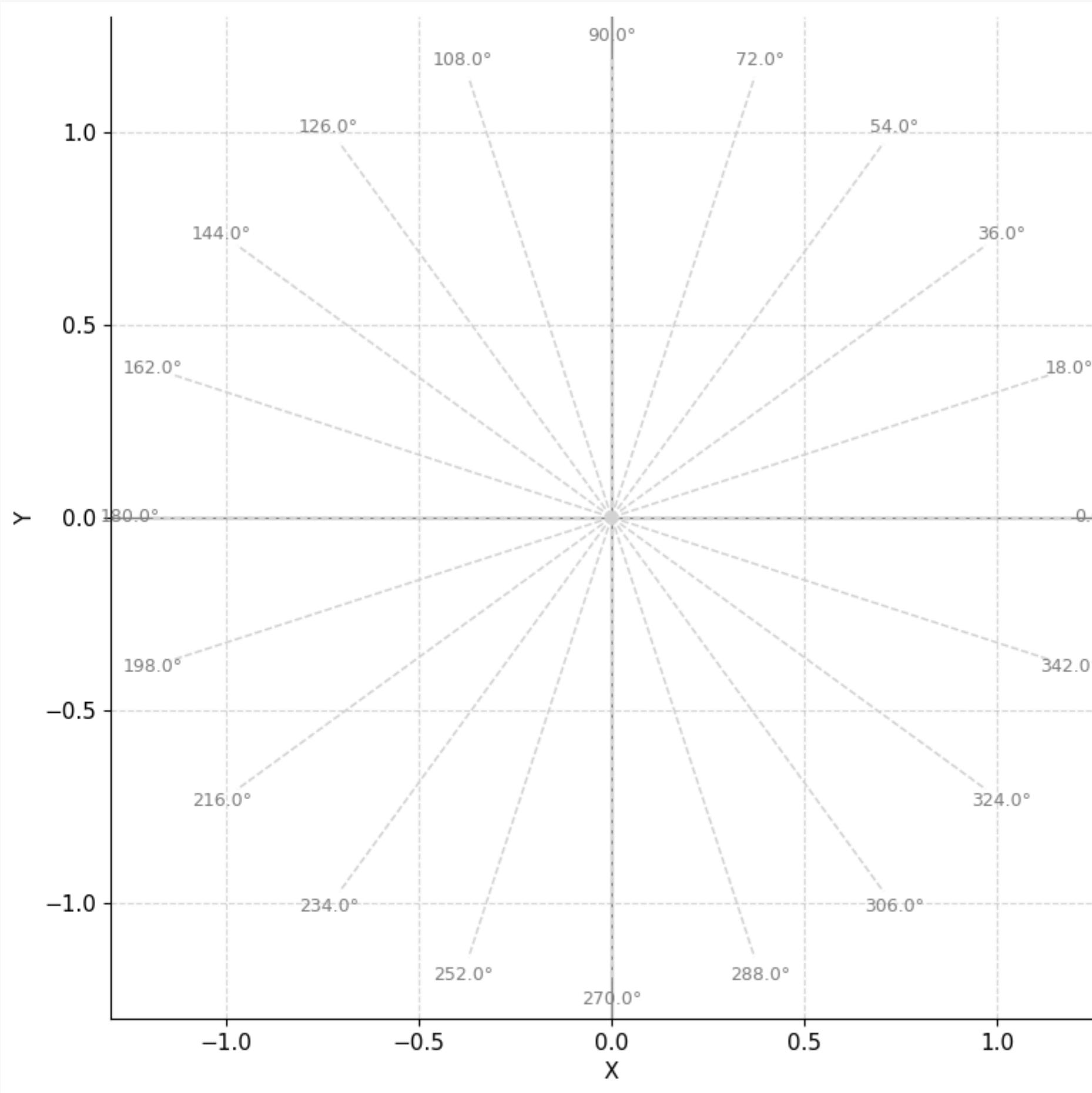
<https://doi.org/10.1016/j.neuron.2017.12.011>

Let's go a little deeper...



you can use dot motion kinematogram as a plugin from this link:

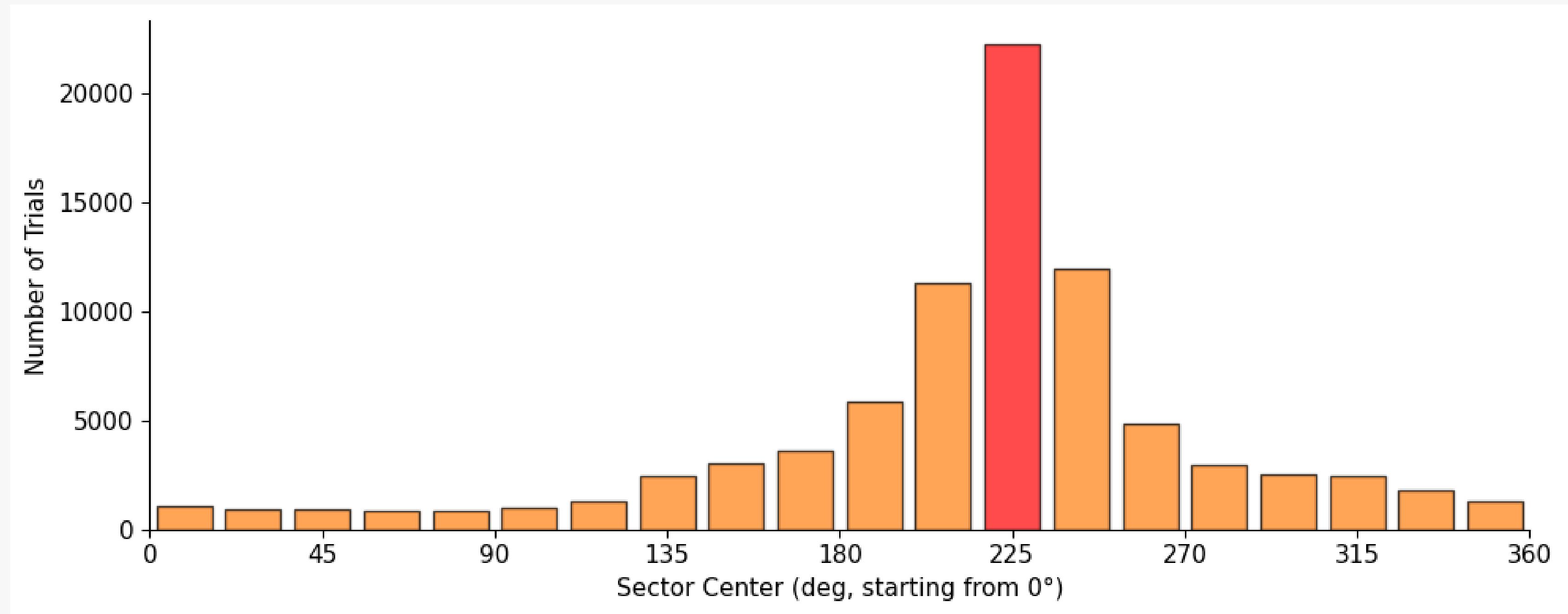
Rajananda, S., Lau, H. & Odegaard, B., (2018). A Random-Dot Kinematogram for Web-Based Vision Research. *Journal of Open Research Software*. 6(1), p.6. doi:[10.5334/jors.194](https://doi.org/10.5334/jors.194)



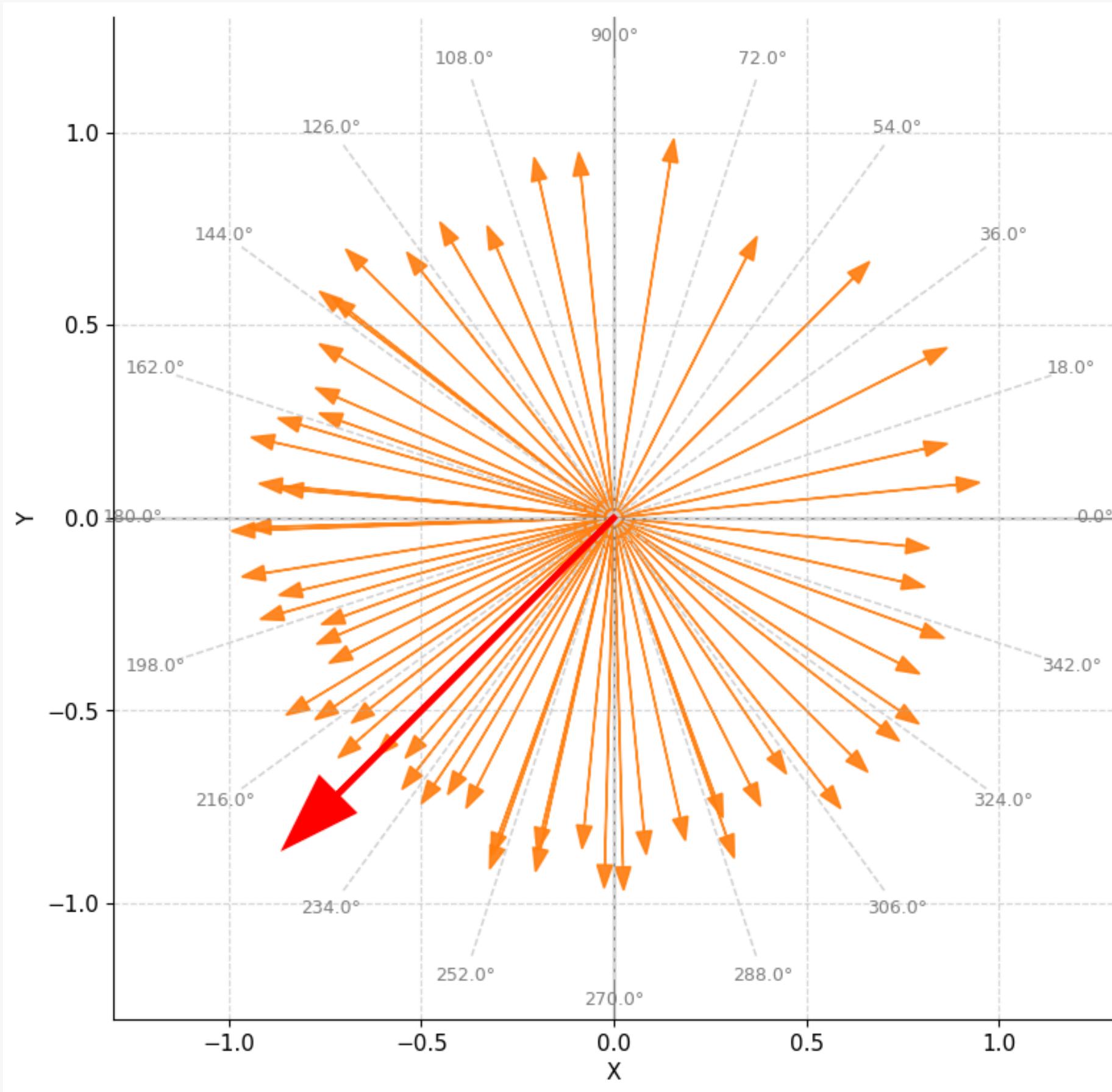
Let's **slice** our circular playground

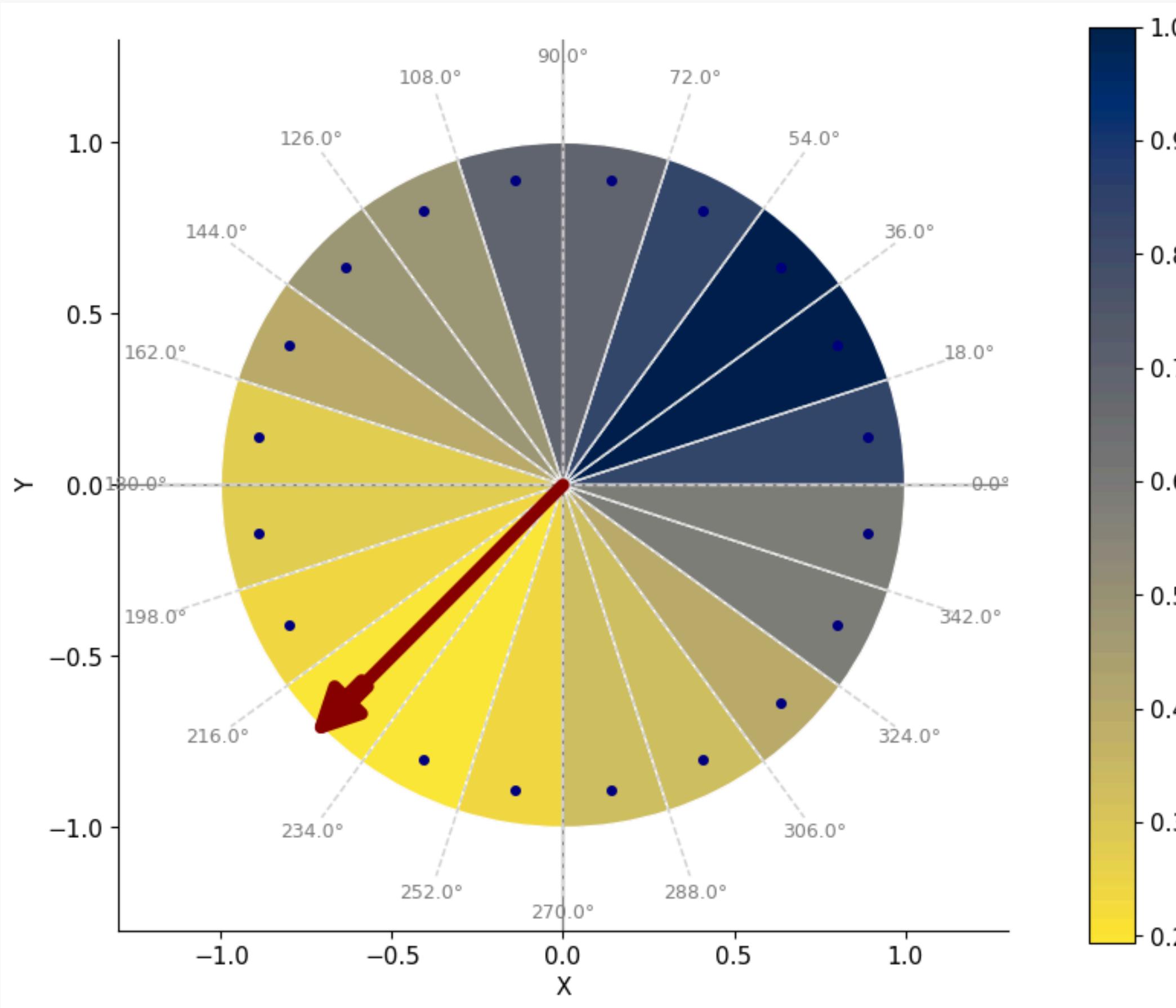
20 bins of **18°** each

The Distribution of Motion Directions



The Prior Belief

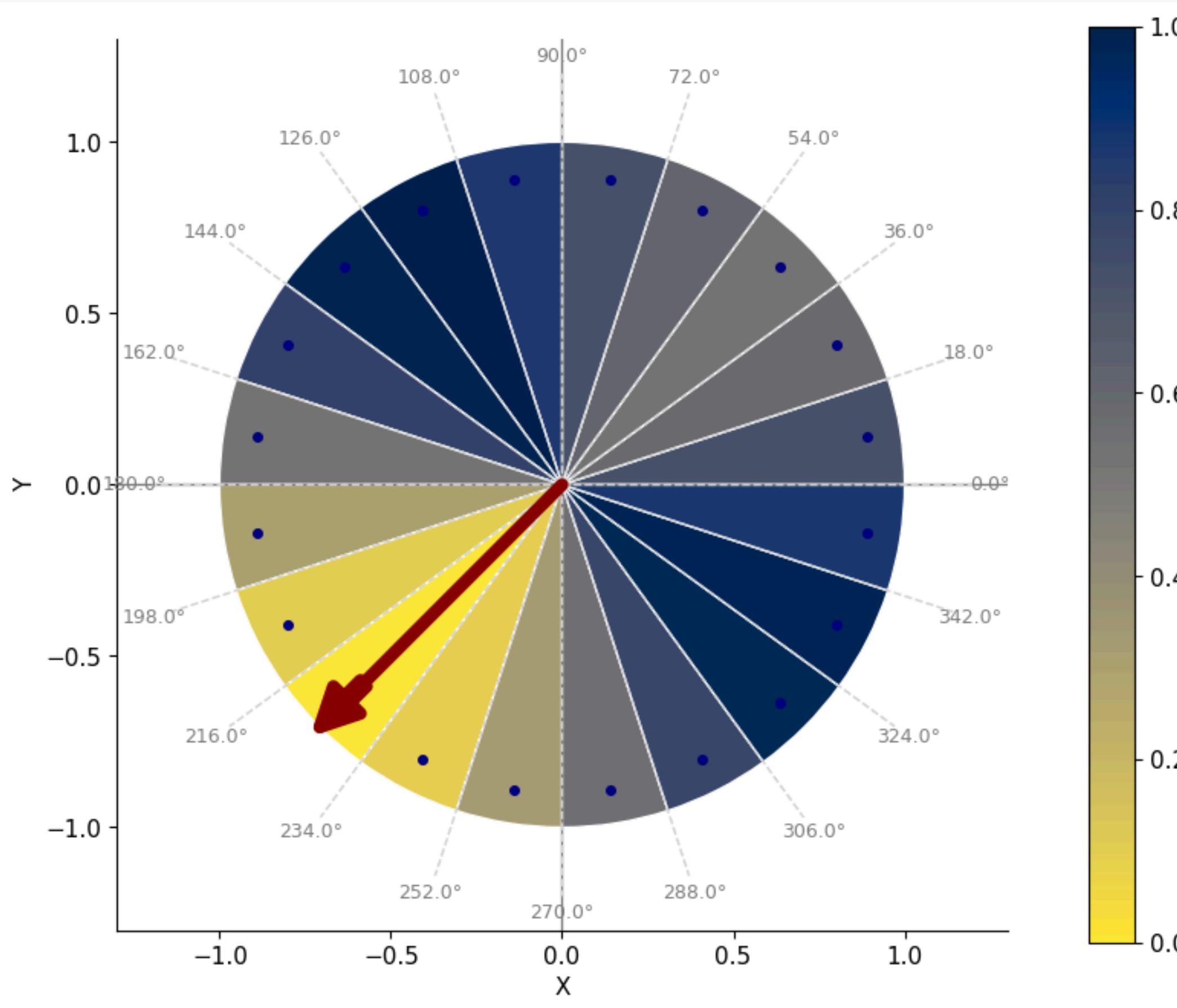




Higher error

**Expected Estimation Error
Before** analyzing the Data

lower error



Higher error

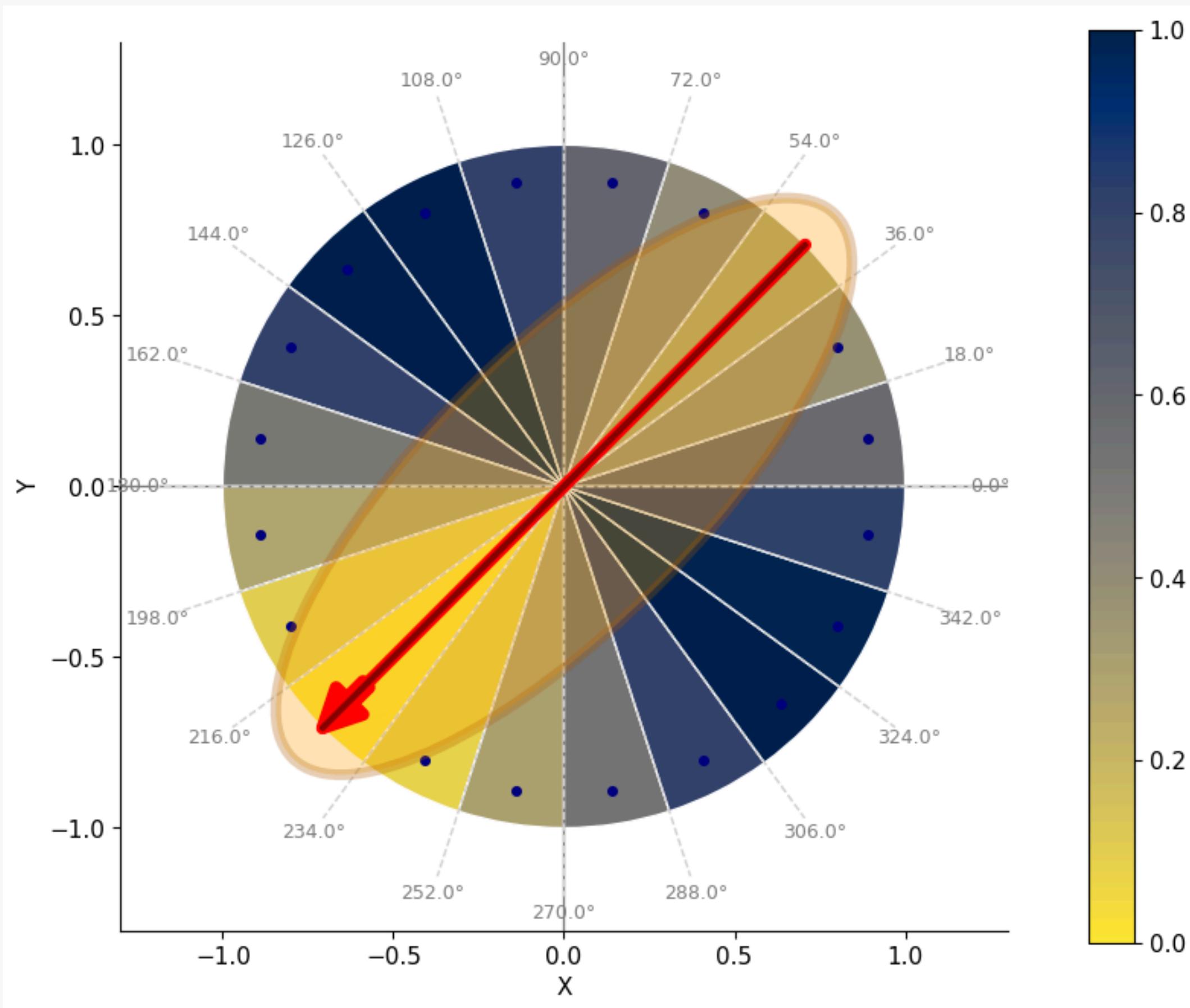
Observed Estimation Error
After analyzing the Data

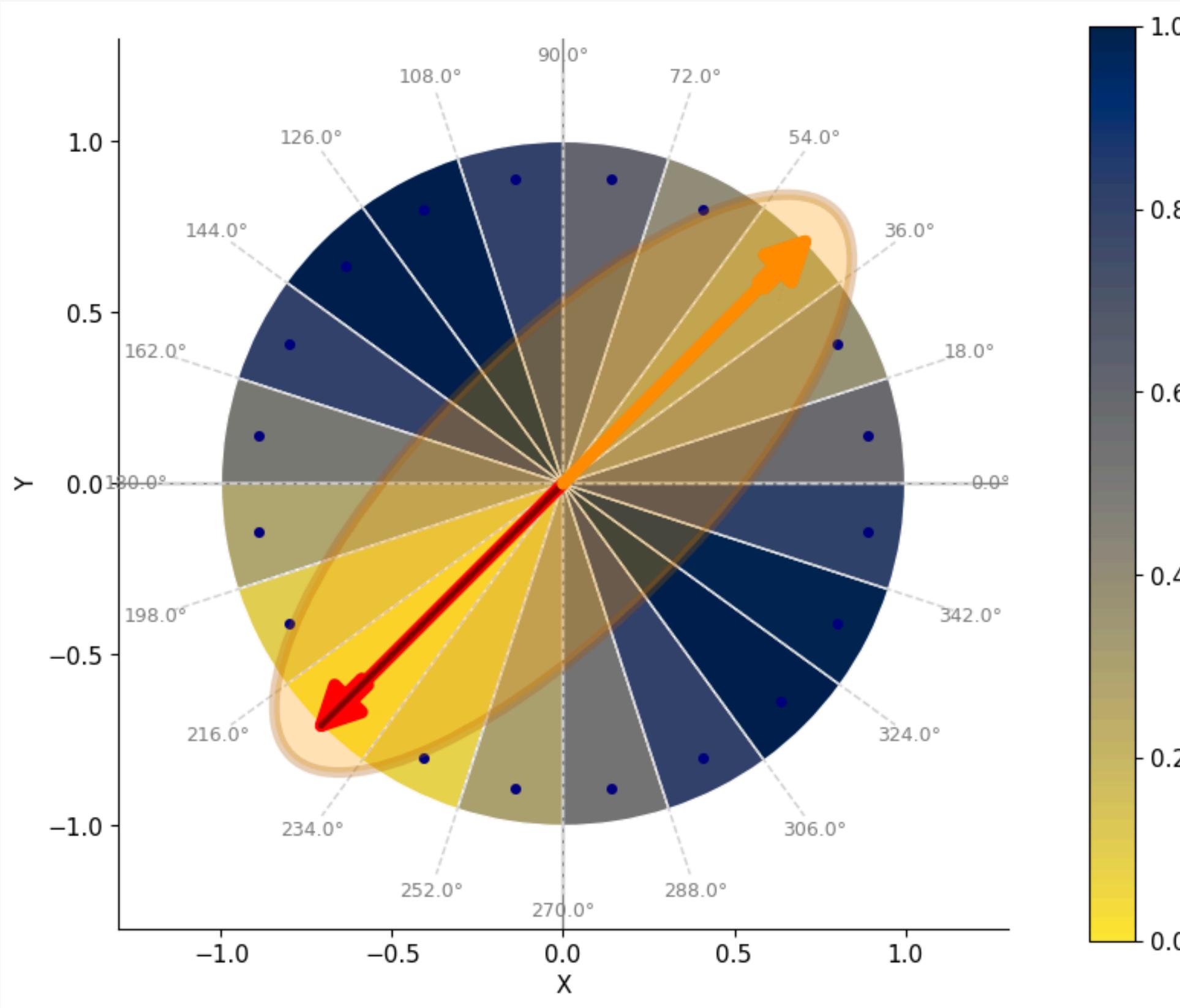
lower error

Feature-Based Attention

Feature-based attention is a visual attention mechanism that selectively enhances neural processing of a specific sensory feature (e.g., a **color**, a motion direction, or an axis).

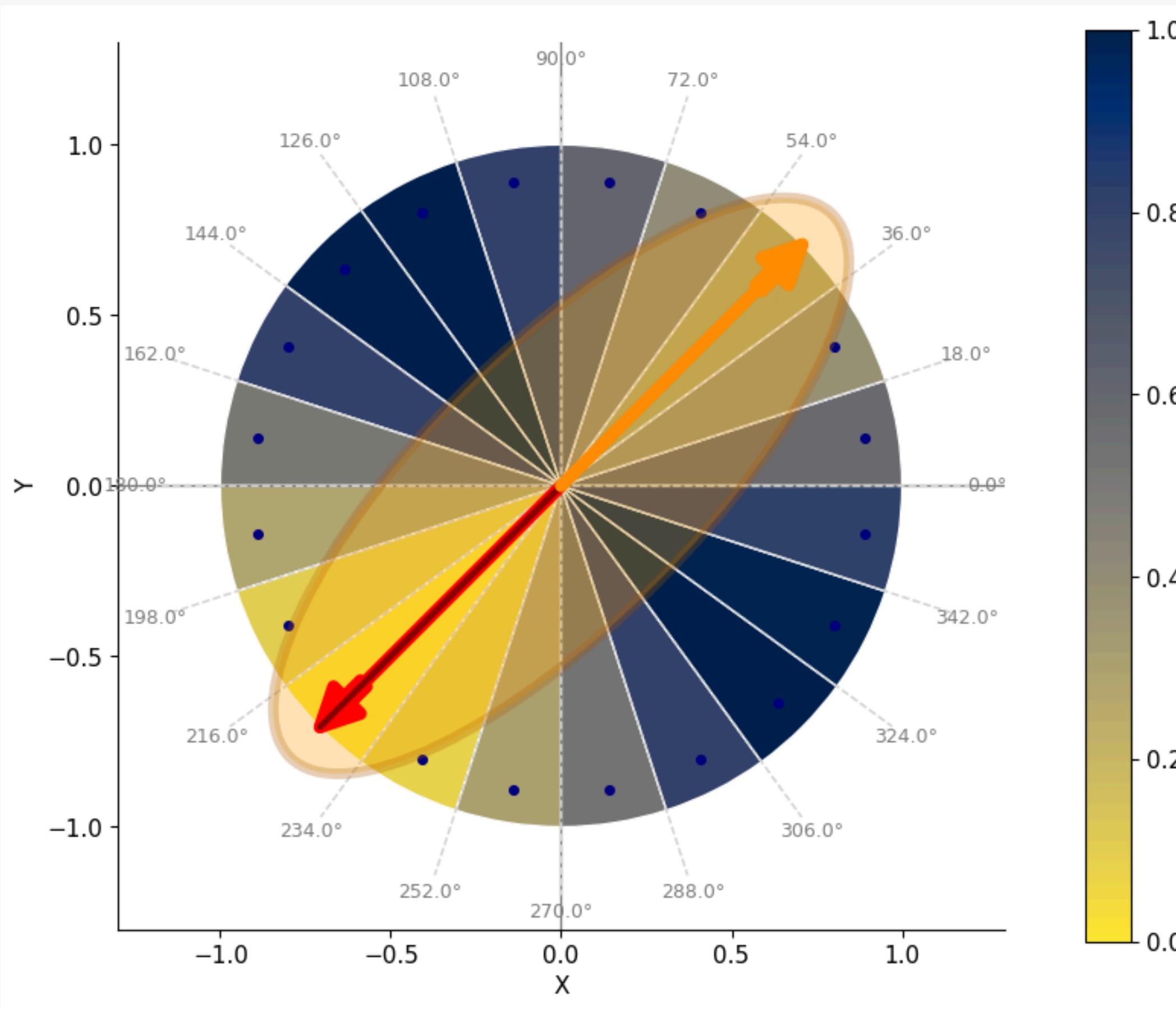
The Chosen Feature: AXIS





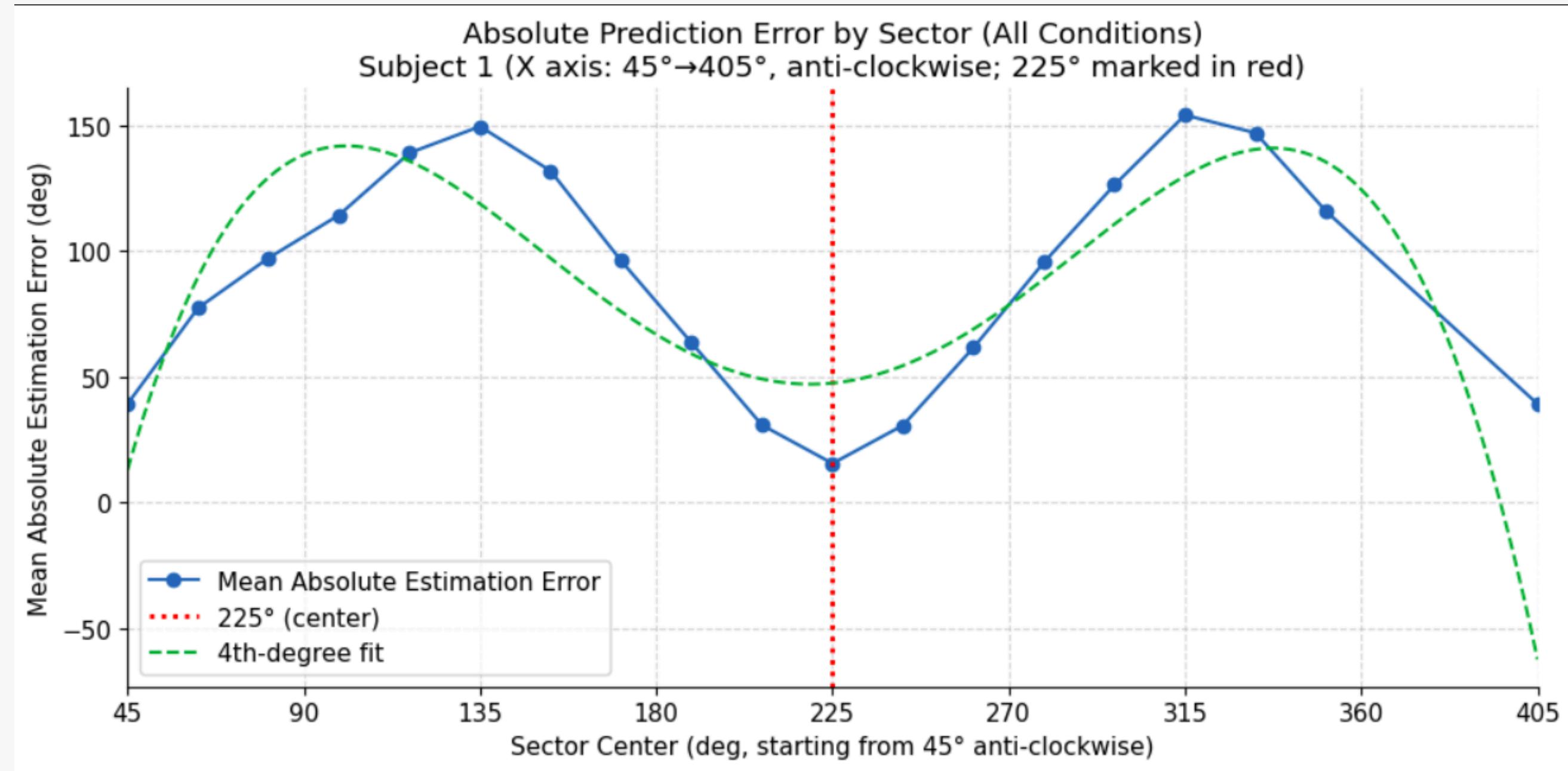
Hypothesis

stronger effect of
feature-based
attention will be
associated with lower
observed **estimation**
error.

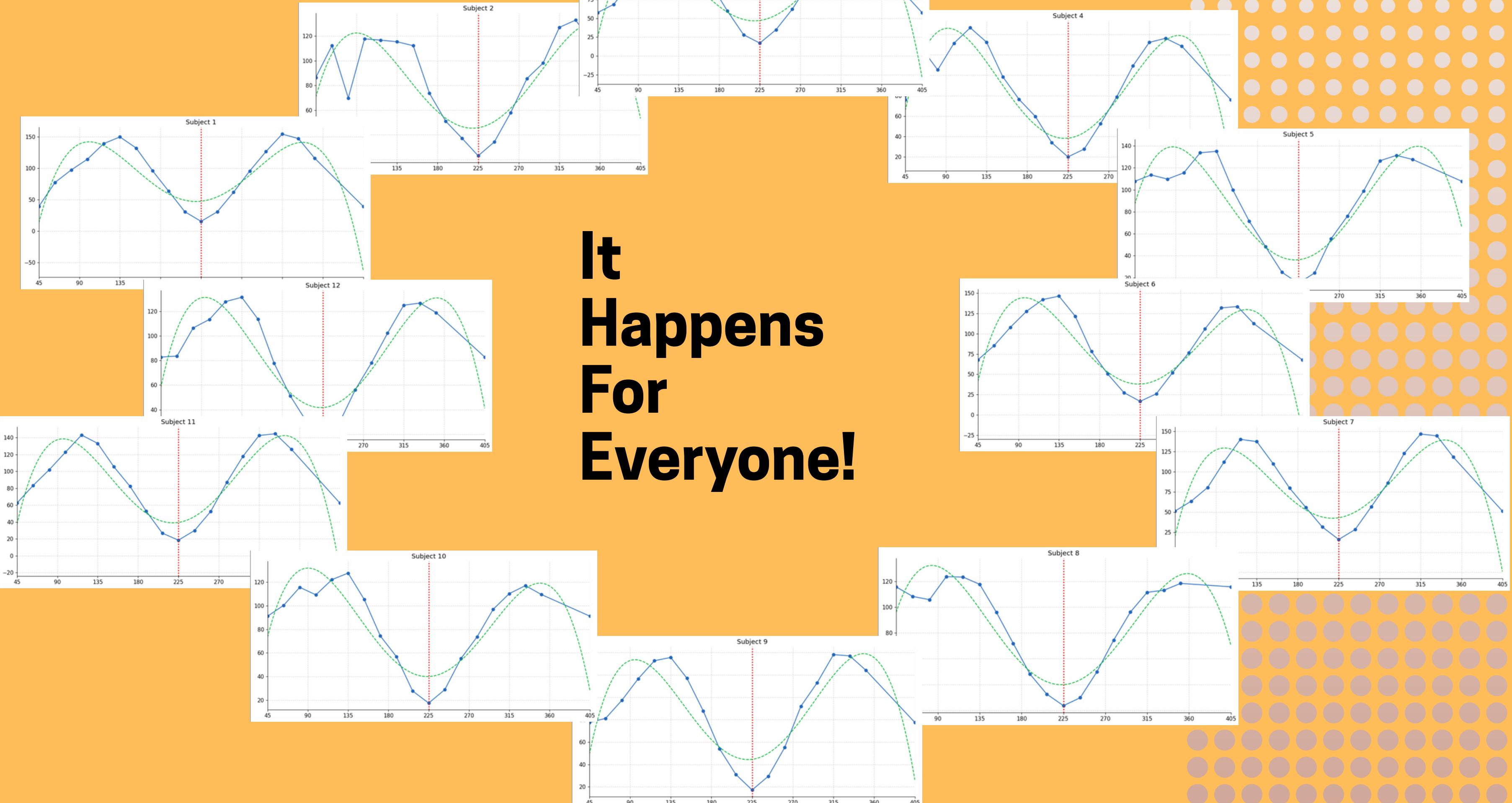


Catching the Unexpected Just Like the Expected

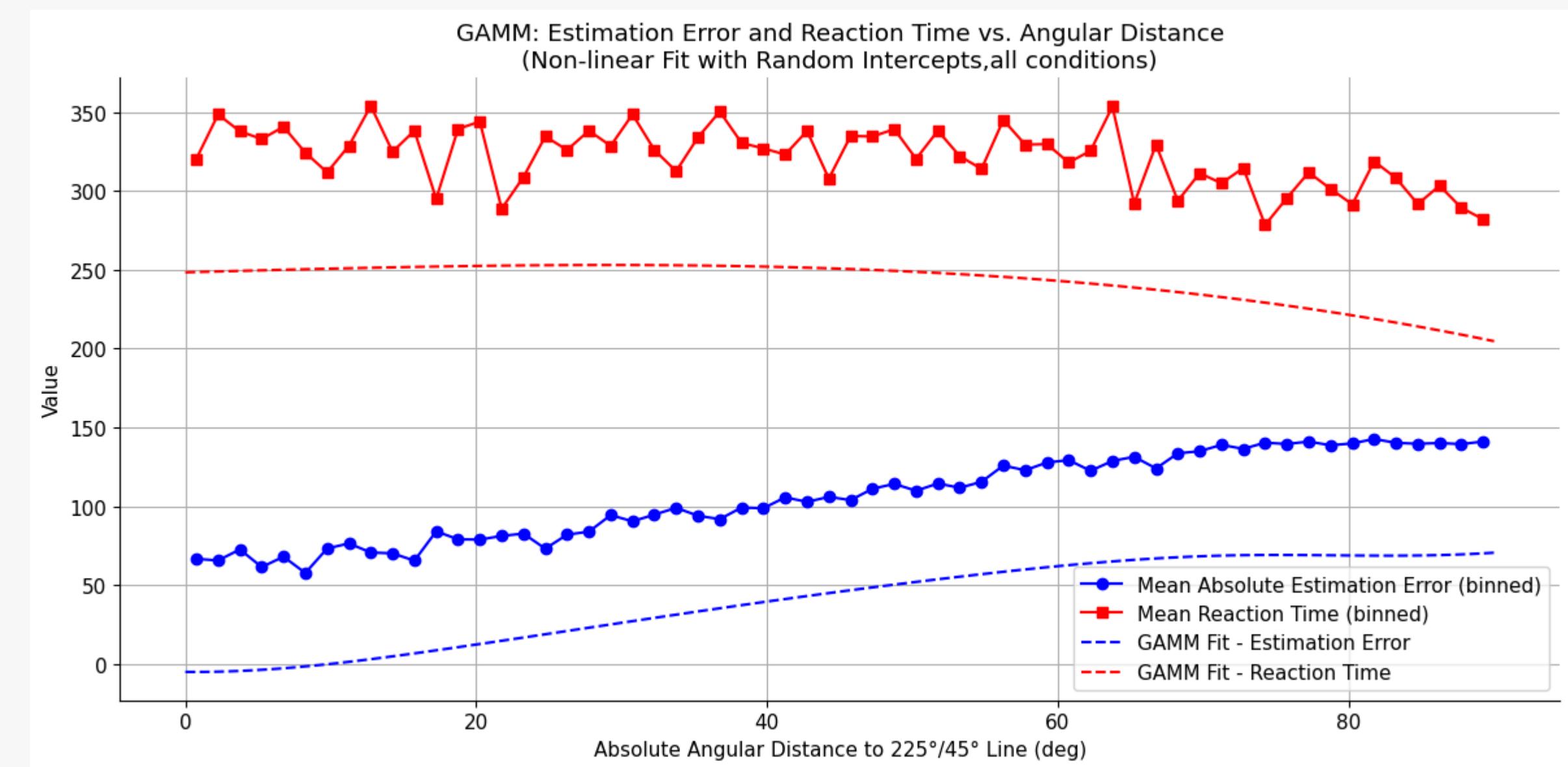
Low Error At 45°/225° Axis



**It
Happens
For
Everyone!**



Mean RT and Mean Estimation Error



Future Goals:

- Redefine prior as an Axis, not just as a direction.
- By using a circular drift-diffusion model (CDDM), we can simulate how the brain accumulates directional evidence over time and effectively model our results in motion-direction tasks.
- Investigate data behavior around 45/225 degrees in the coordinate circle. What makes them special?

More Ideas for future works:

- Ecological Contexts in Real-World Simulations



Thank you for your attention!

Laqui**Team**:
Eghlima, Mojdeh, Shahab, Mobina

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