

Bayesian Cognitive Modeling: Example Experiment

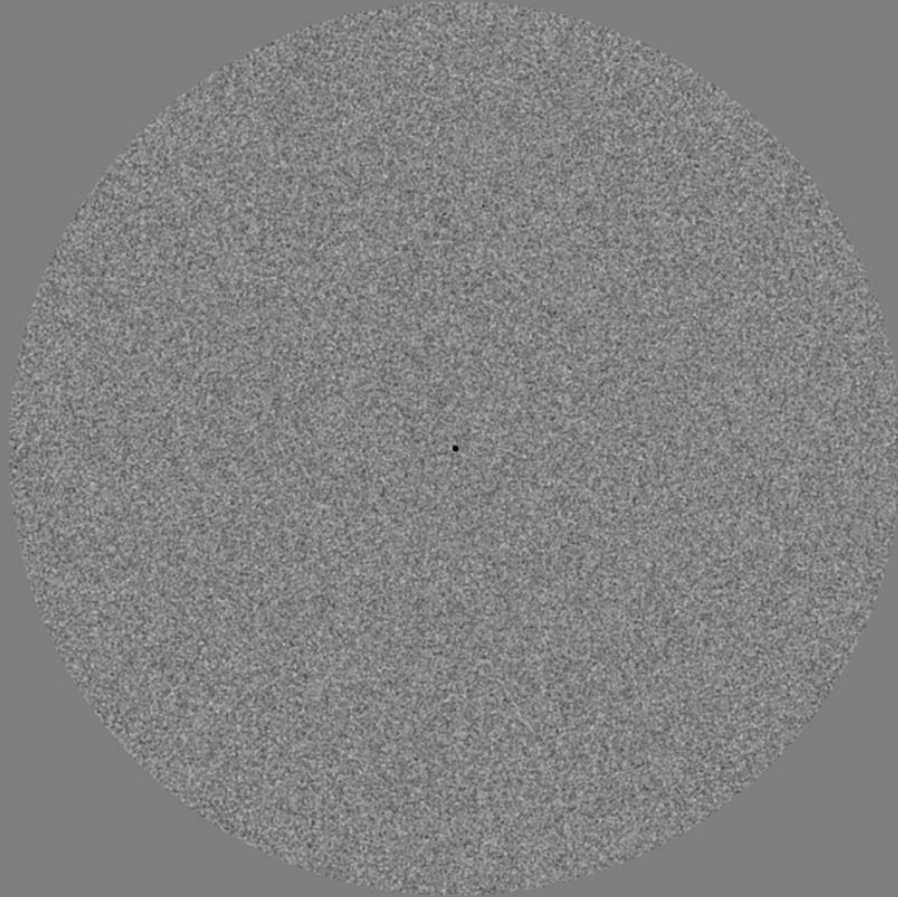
Michael D. Nunez

29-August-2022

Bayesian Modeling in brms

An example experiment

Cue interval 0.5 to 1.0 sec



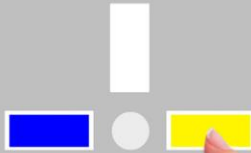
Response interval 1.5 to 2.0 sec

Press **BLUE** button

Press **YELLOW** button

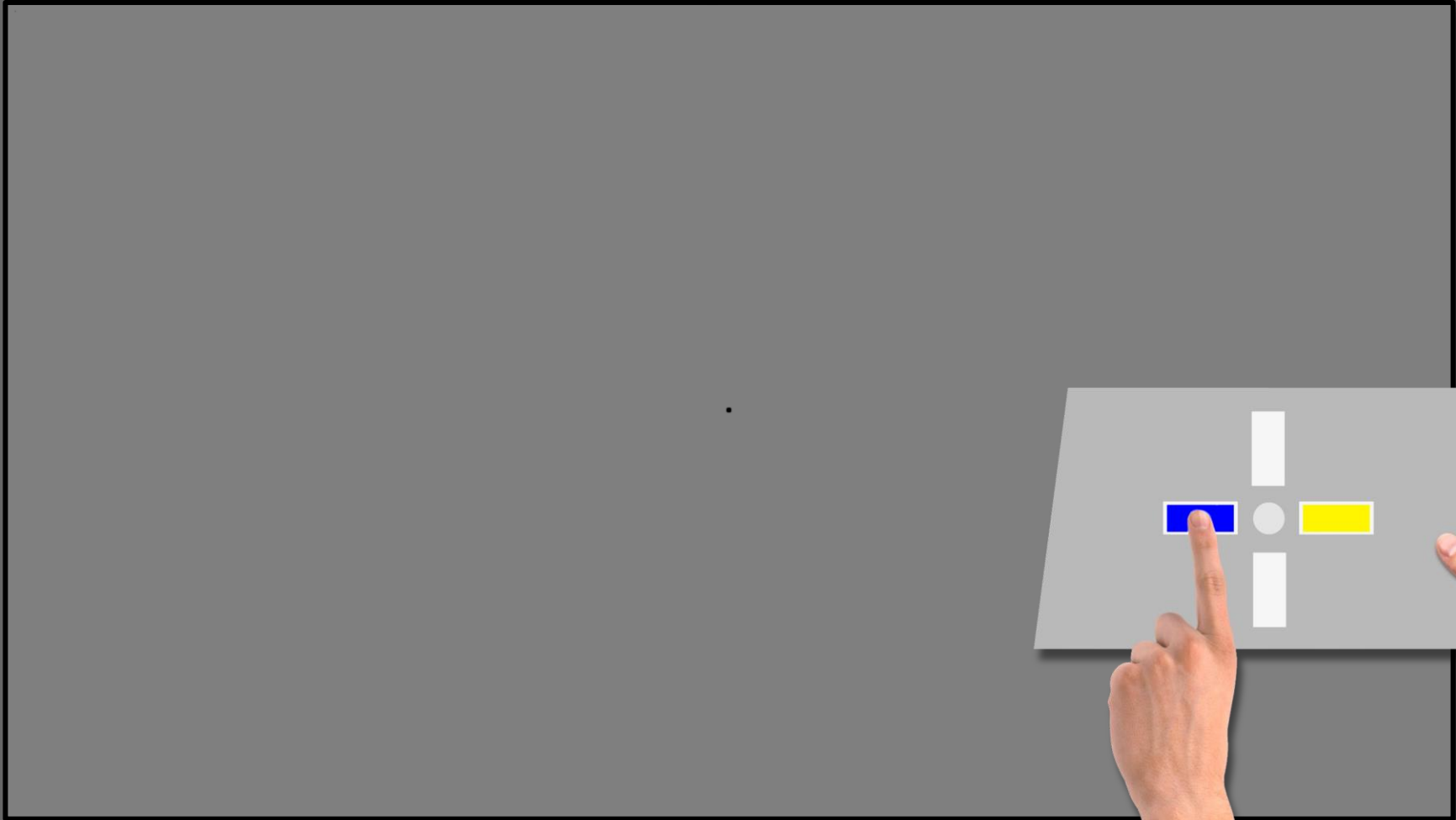
Easy condition low
frequency
2.35 cycles per degree

Easy condition high
frequency
2.65 cycles per degree



0.25 sec to collect additional responses &

1.5 to 2.0 sec ISI



Real data from this experiment

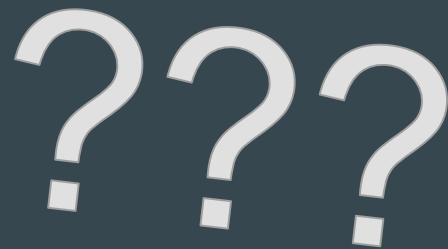
	Roos	Eduardo	Yasemin
Accuracy	67.7%	76.4%	79.2%
Mean Response Time (Mean RT)	769 ms	896 ms	938 ms

Which participant is *better* at the task? Roos? Eduardo? Yasemin?

Roos is the fastest at this task!

...But **Yasemin** gave the most correct responses!

...But **Eduardo** gave many accurate responses and was somewhat fast!



Individual Differences and The Speed-Accuracy Tradeoff

	Roos	Eduardo	Yasemin
Accuracy	67.7%	76.4%	79.2%
Mean Response Time (Mean RT)	769 ms	896 ms	938 ms

- We suspect there are individual differences in ability.
- But we also suspect that Roos ignored instructions and decided to answer quickly, while Yasemin preferred to answer accurately.
- How do we compare the *ability* of Roos and Yasemin given that they had two different *strategies* related to the speed-accuracy tradeoff?