Bayesian Cognitive Modeling: Example Experiment

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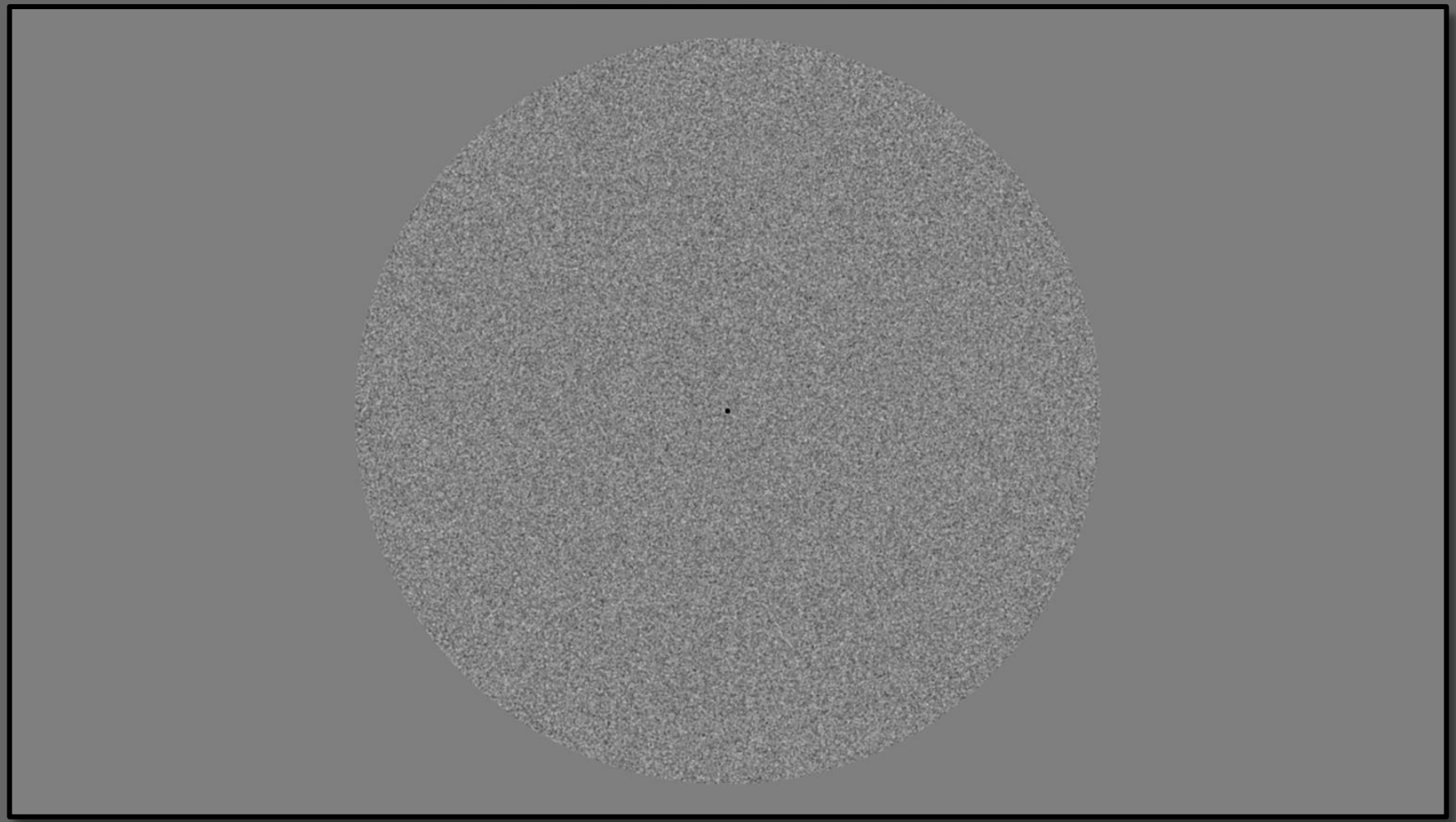
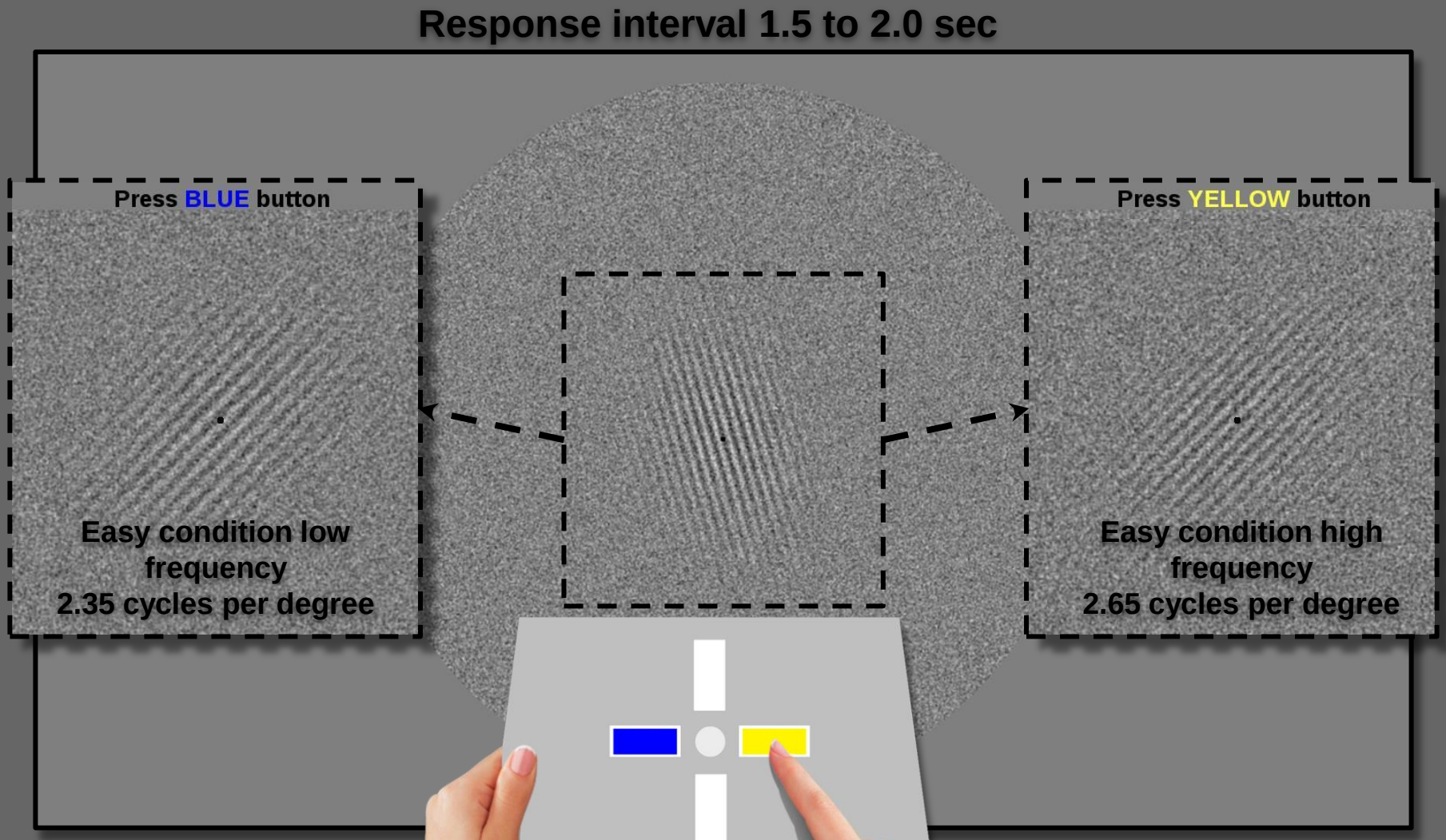
Bayesian Modeling in brms

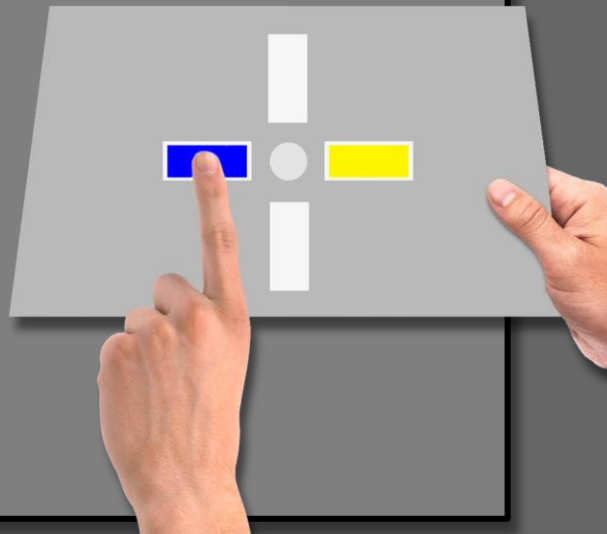
An example experiment

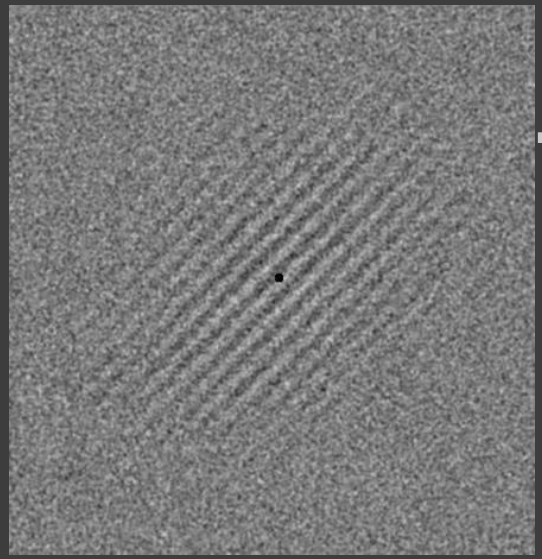
Cue interval 0.5 to 1.0 sec




Response interval 1.5 to 2.0 sec
Press BLUE button
Easy condition low frequency
2.35 cycles per degree
Press YELLOW button
Easy condition high frequency
2.65 cycles per degree

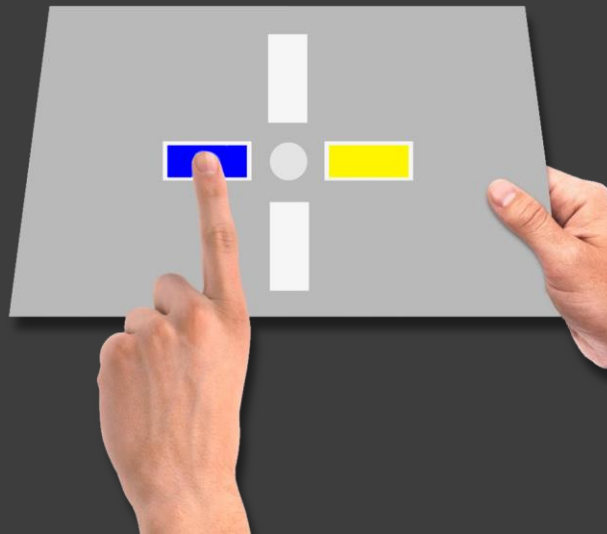
0.25 sec to collect additional responses & 1.5 to 2.0 sec ISI





One trial response time: 0.743 seconds

Time from target onset



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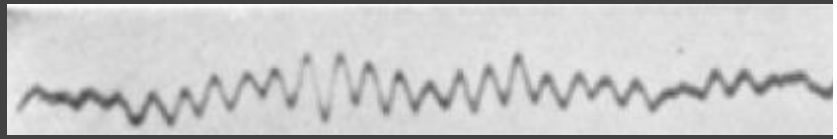

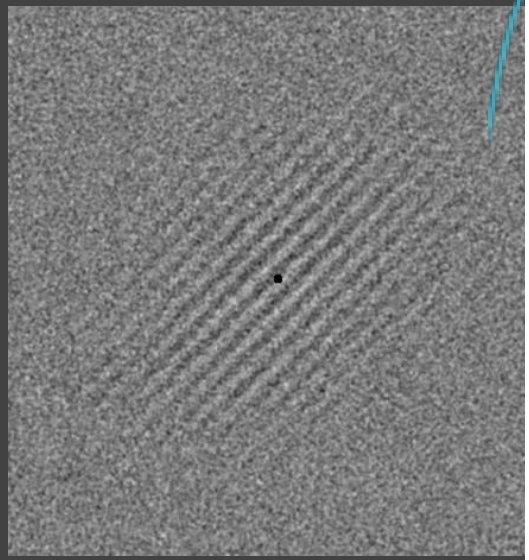

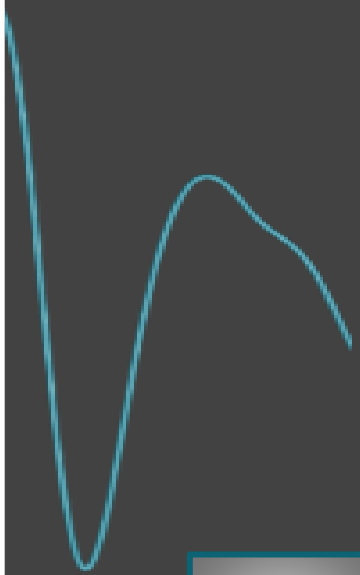

EEG

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**?