Motivation : ① Determine which sequential sampling models manage to extend to biased prior scenarios. How well do these models capture the distribution of choices at various exogenous response times?

② Provide striking evidence that the standard Bayesian model breaks in an exogenous response time paradigm.

③ Document how priors are manipulated.

Models : ① • Models that look at KL divergence between prior ("default distribution") and posterior ("choice probability distribution").
• Cheyette + Piantadosi (2020) numerosity estimation model

• Bayesian models that sample from the posterior.

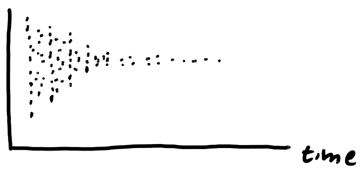
② • Bayesian models that optimally respond to posterior.

③ • DDM (simple and w/ collapsing bounds).

Cheyette :

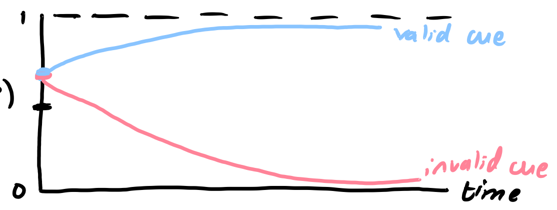
Choice probability distributions are (1) initially wide and (2) always centered on the true value.

Estimation Task Numerosity estimate

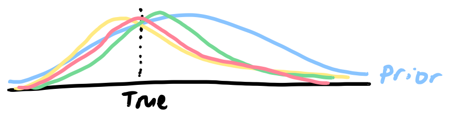


Randomness in choice ↓ in response time.

Binary Task

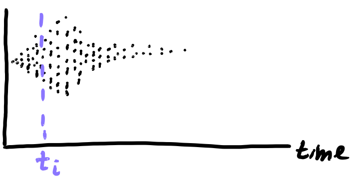


Bayesian :



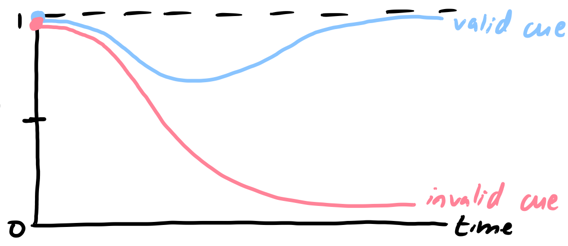
The Bayesian MAP estimate will land close to the true value, relative to the variance of samples. Part of the key is that with a biased prior, responses should be very predictable.

Estimation Task Numerosity estimate

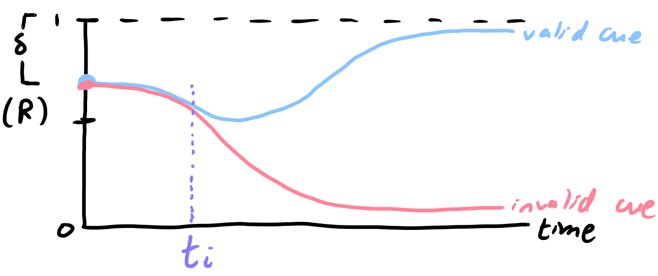


Randomness in choice starts low, rises, then dips again.

Binary Task

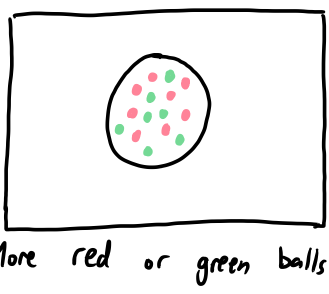


Expectation :
(I feel that DDM predictions will look like this.)



This δ-deviation from the standard Bayesian model is very interesting.
Also, evidence that looks like this might be evidence against the KL-divergence models.

Task :



More red or green balls?

• Use 52-48 proportions.
• Exogenous RTs.
• Induce 60-40 priors.
• Small circle to limit attention effects.

Notes : ① Need an adaptive algorithm to select a time t when subjects exhibit more randomness. Expect subjects to have different t_i.

② Subjects cannot know the exogenous RT.

③ Careful w/ how you influence priors.

④ Look carefully at deliberation time. We dont have much control over how quickly subjects respond, but we dont want them to deliberate after the observation time has ended.