

Drawing Estimates from the Posterior

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Drawing Estimates from the Posterior

- In this class we will learn how to draw estimates from a posterior distribution.
- In the theoretical world (when the posterior has a closed mathematical expressions), this implies calculating complicated integrals to cancel out (or average) different variables.
- In the practical world, same results can be obtained using **samples** from the posterior.
- Another reason to learn to work with posterior samples is that methods like MCMC produce nothing but samples from the posterior.
- This class is based on Chapter 3 of [McElreath, 2020].

Sampling to summarize

- Once your model produces a posterior distribution, the model's work is done.
- But your work has just begun.
- It is necessary to summarize and interpret the posterior distribution.
- Exactly how it is summarized depends upon your purpose.
- Common questions include:
 - How much posterior probability lies below some parameter value?
 - How much posterior probability lies between two parameter values?
 - Which parameter value marks the lower 5% of the posterior probability?
 - Which range of parameter values contains 90% of the posterior probability?
 - Which parameter value has highest posterior probability?

Sampling to summarize

- These simple questions can be usefully divided into questions about:
 - intervals of defined boundaries
 - intervals of defined probability mass
 - point estimates
- We'll see how to approach these questions using samples from the posterior.

Sampling from a grid-approximate posterior

- Before beginning to work with samples, we need to generate them.
- Here's a reminder for how to compute the posterior for the globe tossing model, using grid approximation:
 - How much posterior probability lies below some parameter value?
 - How much posterior probability lies between two parameter values?
 - Which parameter value marks the lower 5% of the posterior probability?
 - Which range of parameter values contains 90% of the posterior probability?
 - Which parameter value has highest posterior probability?

Conclusions

- Blabla



McElreath, R. (2020).

Statistical rethinking: A Bayesian course with examples in R and Stan.

CRC press.