Bayes class 4

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# Prior distributions

In this class we are going to look at choosing prior distributions.

# The properties of the model

Models must be connected to the data generating process in order to be useful. However, once a model is decided upon, the parameters of the model are properties of the model, not the data. Parameters are ideally connected to some properties of the population, but not necessarily. Think of something in the real world that is sampled. It could be very small or very big, it could be something tangible or merely an idea/opinion, it could be a habit or a rare event. Pick a partner in the class and describe this thing to them, and how it is sampled. Now write down the thing they thought of:

For the sample they gave you, what is the population?

What are the properties of the population that you might be interested in AND possibly be able to estimate from the sample?

What prior information do you have about those properties and how might you capture that prior information in the form of distributions?

# Types of prior distributions

For each of the following distributions that are used as priors, say what type of prior you think it is and why [there are at least two correct answers for each, see if you can get all of them]:

$$p\left(θ\right)∝θ^{-1}$$

$$θ\~Beta\left(0.5,0.5\right)$$

$$θ\~N\left(3,2^{2}\right)$$

$$θ\~Gamma\left(0.001,0.001\right)$$

# Example time

At this point the class will create a sample of data and try to model it in the Bayesian framework.