STAT 491 - Lecture 1

January 11, 2018

Bayesian Thought Experiment

There are two foundational elements in a Bayesian Analysis:

1. Bayesian inference is a re-allocation of credibility across possibilities
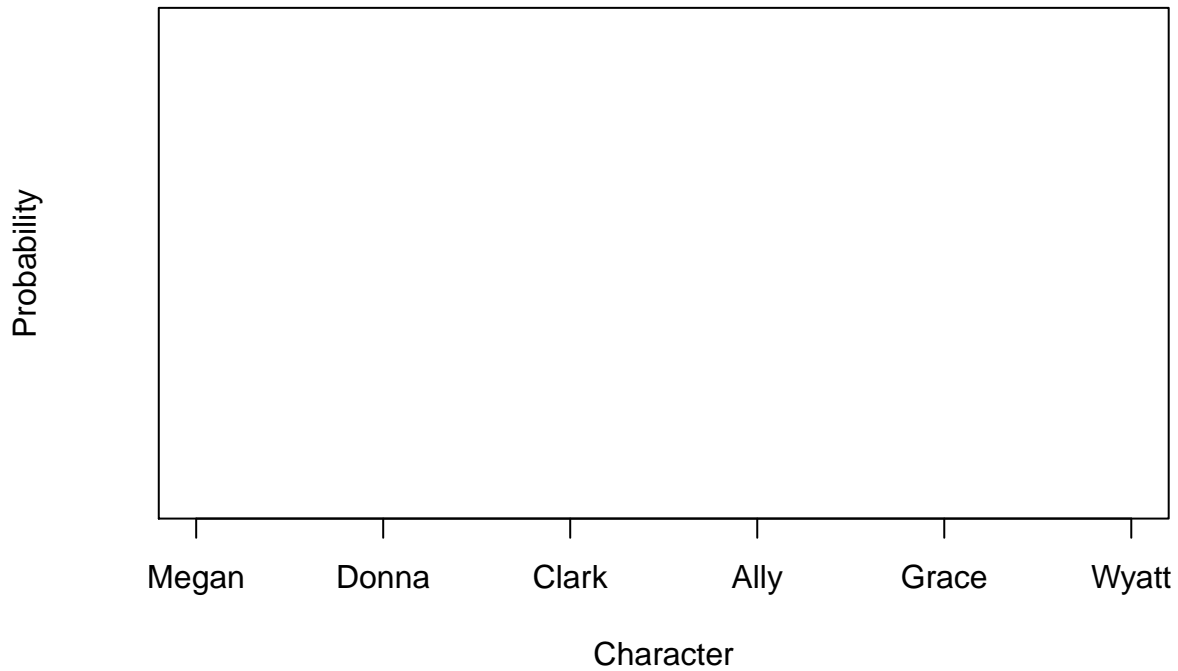2. These possibilities are parameter values in meaningful mathematical models

Guess Who Exercise

Consider the game Guess Who, where the goal is to ask questions to identify an opposing player's character.


Figure 1: Guess Who Faces

Given the line up of suspects above, construct a set of probabilities for each character. Note these should sum to one and constitute the first foundation element in Bayesian Analysis. The first set of probabilities are known as *prior* probabilities.

Formally these probabilities are parameter values in a multinomial model with one selection or object. The mathematical notation associated with this is known as a probability mass function (more details in a few weeks).
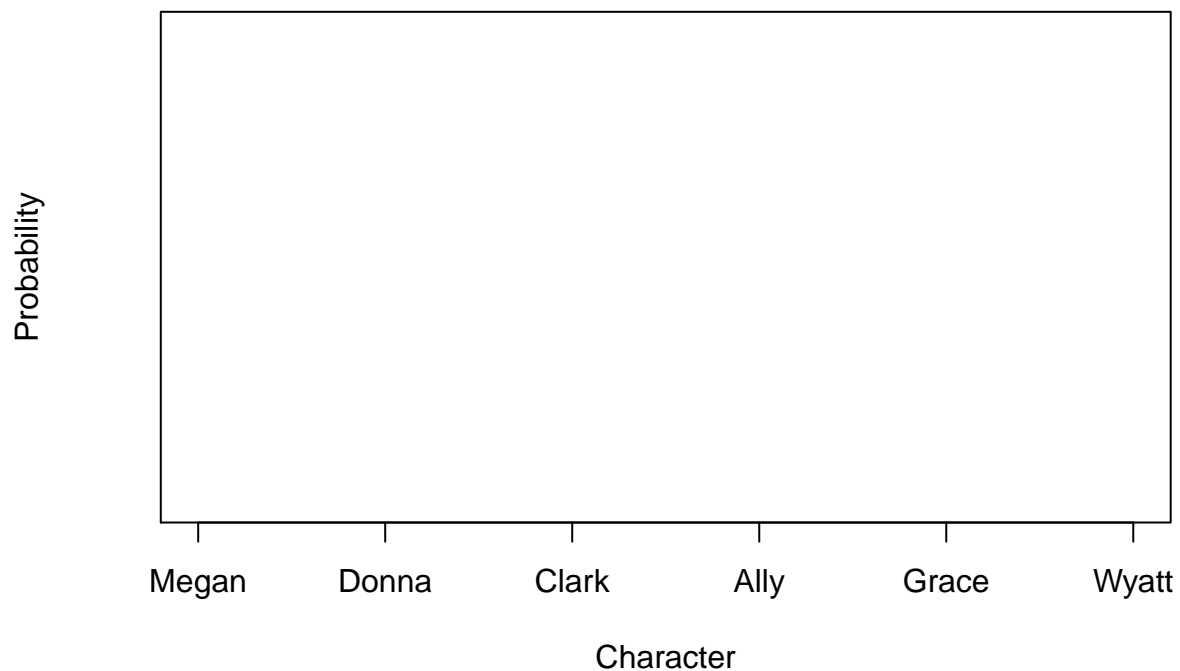
Follow the conversation and update your probabilities accordingly

- **You**: Does your character have a hat
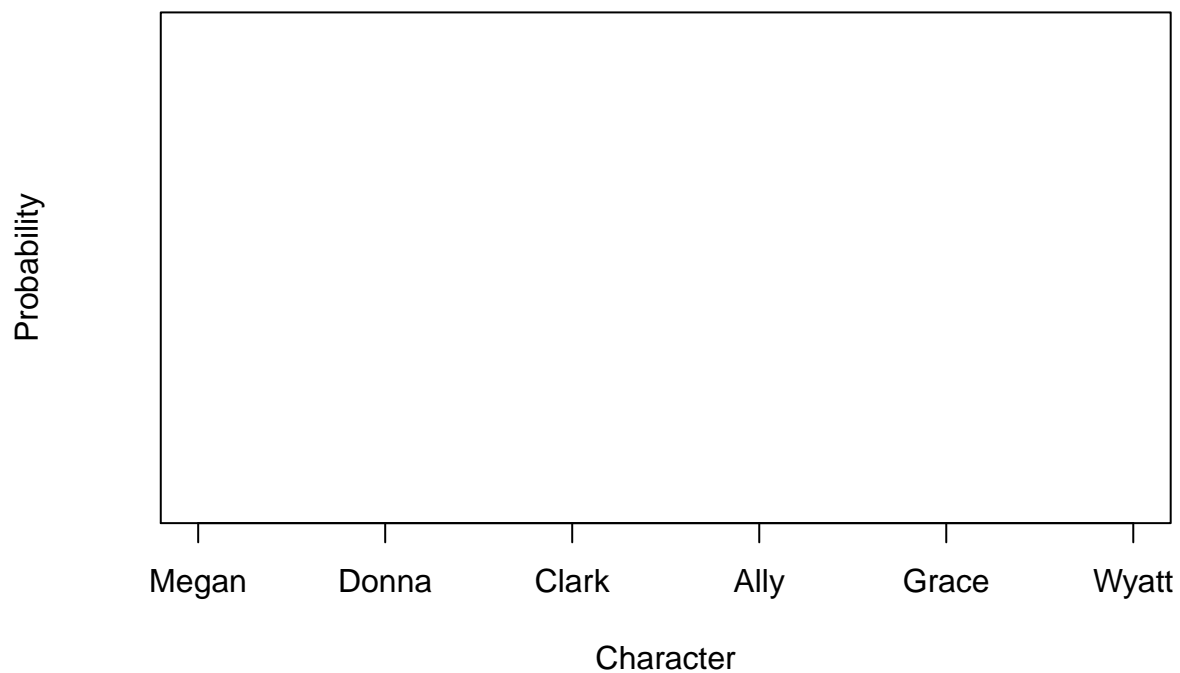- **Your adversary**: Yes
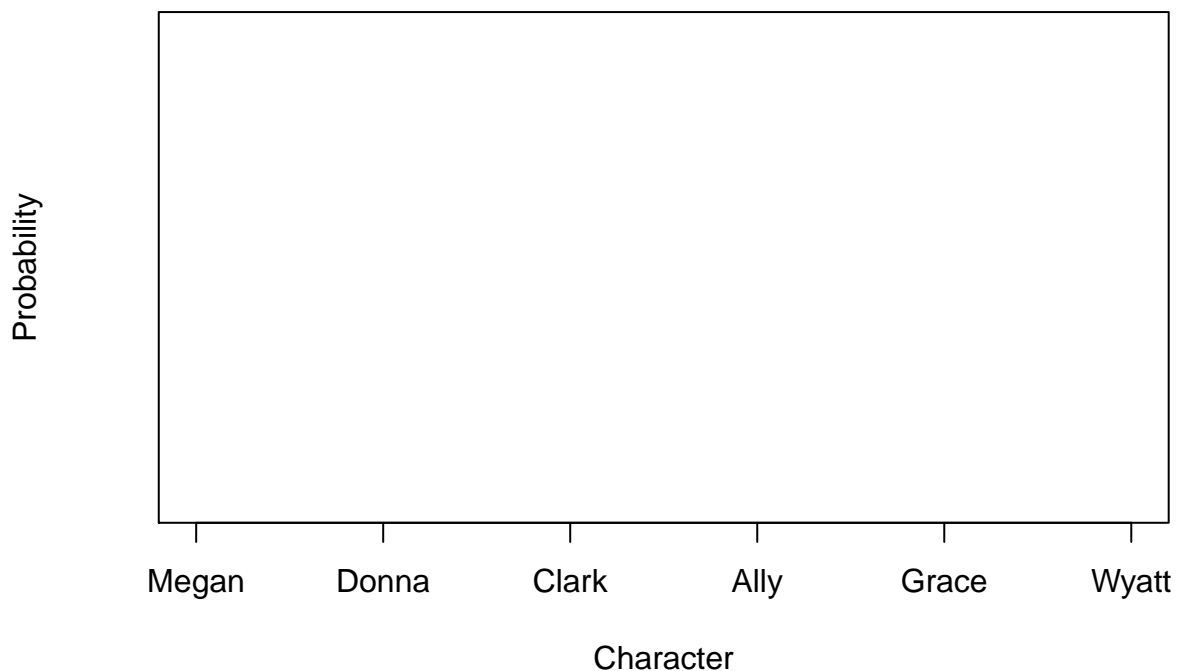
Follow the conversation and update your probabilities accordingly, again

- **You**: Is your character wearing glasses
- **Your adversary**: Yes

Follow the conversation and update your probabilities accordingly, again

- **You**: Is your character wearing purple glasses
- **Your adversary**: No

Key Points From This Exercise

- *Thinking with distributions:*

- *Specifying a prior distribution:*

- *Update distribution with additional data or evidence:*