[The language of probability]

We often draw on particular language when talking about probability day to day when making predictions:

Is it **likely** to rain today?
I'm **hopeful** that I will win!
I'm **certain** that the train will be on time.
It's **highly unlikely** that it will snow this year.
It's **impossible** that his description of the event could be accurate.

We may also assign numerical values, although some of these are usually only meant as rough estimates:

There is a **50/50** chance of me getting the job.
There is a **90%** probability that they'll win the championship.
Whether using these rough estimates or obtaining precise probabilities, a probability is a number between 0 and 1 that indicates the likelihood of something happening relative to this scale, where 0 indicates impossibility, 1 indicates certainty (it *has* to happen, or it is *impossible* that it won't happen) and 0.5 means that it should happen as many times as it doesn't.

When calculating probabilities more formally, there are several ways of determining the probability of an event, and we incorporate a number of key terms. 'Event' is one of them, and is a description about something that could happen in terms of success or failure, e.g. growing to a height of 2 metres, being born a woman, rolling a 6 on a die. Some other methods for predicting what the probability of an event occurring include:

Gathering real data – e.g. if an insurance company determines the risk of theft when visiting a particular country by counting the number of times theft occurs as a fraction of the number of tourists visiting the country each year;

'Real' simulation – imitating a real situation incorporating a device that accurately models the probability, e.g. when using a coin to predict birth genders or when car companies do a series of crash tests to determine the probability of structural failure in their cars. Each test is referred to as a trial;

Computer simulation – imitating a real situation using computer models, which can tally millions of trials very quickly, that accurately take account each of the probabilistic elements. A simple computer simulation might just use a random number generator to estimate the odds of flipping three heads in a sequence of 12 coin tosses, while more complicated ones look at the energy generation of wind farms based on the likely weather conditions and wind turbine parameters;

Theoretical calculation – some probabilities can be calculated exactly using rules and theoretical values based on combining probabilities and understanding the sample space – the set of possible outcomes and their relative likelihood.

We will touch on each of these methods in this topic, first turning to the fundamentals of a success fraction.