

**LITTLE
QUICK FIX:
UNDERSTAND
PROBABILITY**

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Section

**The secret
is to see
everyday
life in terms
of trials and
outcomes**



What is probability and why does it matter?



Probability uses a scale from zero to one to express how confident we are that something is true, or how likely it is that some future event will occur.



Probability is a scale between impossible and certain

Probability can be expressed as a proportion, fraction or decimal between zero (0) and one (1):

- zero means impossible or definitely untrue
- one means absolutely certain
- anything inbetween might happen or be true... or might not!

Probability is vital in the social sciences because free will makes social action and attitudes highly variable. Deterministic accounts of what must happen are implausible, so we explore what makes something more or less probable.

We also use probability because our knowledge is incomplete, may be mistaken or could be improved as more evidence turns up.

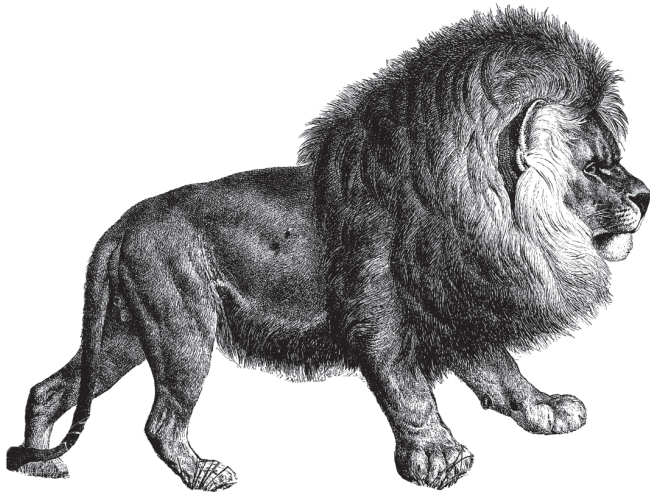
$$0 < P < 1$$

Probability describes anything that is neither impossible ($P = 0$) or totally certain ($P = 1$) as a proportion between zero and one. I'm a man. The probability that I'm pregnant is zero (impossible), the probability that I'm mortal is one (certain). The probability that the lottery ticket I've just bought will win the jackpot (in the UK weekly national draw) is about $1/14,000,000$. The forecast tells me there is a 90% chance of rain tomorrow afternoon.

As well as describing what we expect in the future, we need probability to describe our knowledge of the present. For example, the probability of a board director of any of the UK's 100 largest companies being a woman was 28% in 2017, compared with only 11% in 2007. Social behaviour and belief display such enormous variation that the best we can manage is usually to describe what makes something *more or less probable*. Rarely can we formulate more deterministic laws. Even if we could, this would require us to reconcile them with human agency and free will. Men are more likely to be made company directors than women, but that means neither that no women are directors, nor that all men are!

HOW CONFIDENT ARE WE?

A forecast of a 90% chance of rain uses probability in a second way: to describe how confident we are about our knowledge, or any conclusion we draw from evidence. It doesn't mean that it will rain 90% of the time, or over 90% of the country. It means that the probability that a forecast of rain will prove correct is 90%.





DO IT YOURSELF

YOUR TURN

*You know 10 things about
probability already*

We use the idea of probability all the time, usually informally and without being very aware of it. Write down as many words as you can that describe how (im)probable something is.

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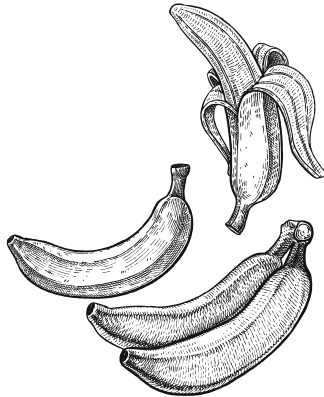
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WHAT YOU KNOW ALREADY



DO IT YOURSELF



odds
apparent
could
might
perhaps
possible
plausible
seeming

chance
hazard
danger
fortune
luck
risk
likelihood
prospect

probable answers



Got it?

Q: What are the two main reasons for using probability calculations?

Got it!

A: To describe society, so that we can distinguish general features and trends from the wide variety of individual experiences.

A: To describe how confident we are about knowledge we think we have.



We can
calculate
probabilities
using trials,
outcomes
and sample
spaces

Section



**How do
I work
out how
probable
things
are?**