How do people make decisions? Why do people make the decisions they do?
Can we help them make better decisions?

- Teach decision making methods?
- Reformulate decision problems to be more easily understood?
- Create decision tools to assist people?

Who makes the best ideas?

Decision making: any time a person has to select between 2 or more options (or potential valuations?) Some people distinguish between judgement and decisions:

- Judgements: deciding which of two things is larger, more valuable, etc
- Decisions: a choice between options that commits you to a course of action and the expenditure of resources.

Tenets of rational decision making to maximise expected value/utility (Von Neumann and Morgenstern 1944)

- Completeness: an individual has definable preference between all pairs of options. i.e. A>B, A<B or A=B for every pair.
- Transitivity: if they prefer A to B and B to C, then they prefer A to C
- Independence: the preference between A and B should not be affected by the relationship between A and C or B and C.
- Continuity, etc.

**But the thing is people violate these all the time, making irrational decisions.

Uncertainty: Not knowing, for certain, what the true state of nature is (or will be at a specified point in time).
More generally, not knowing whether a statement is true or not, e.g.:

- I will get at least a Credit in my final exam in this subject
- The closing Brent Oil Price on Dec 31st 2016 will be between US$70 and US$90/barrel

Probability is the language of uncertainty

- There is a 50% chance that I will get at least a Credit in my final exam
- There is an 80% chance that the closing Brent Oil price on December 31st 2016 will be between US$70 and US$90/barrel

These are estimates, based on an individual's knowledge. Uncertainty is subjective. Not objective, they're just personal beliefs.
Uncertainty is not the problem, you can still make very good decisions that account for the range of uncertainty.
Subjective probability:

- We learn probability theory using objective examples (coins and dice, probabilities seem to be part of the system). [frequency of population]
- We learn to apply it to frequency-based examples (75% of men are less than 183cm tall, what is the probability that none of 3 randomly selected men will be 183cm or taller?)
- Neither of these makes sense for predictive, one-off, future events. (what is the probability that Tony Abbott will be re-elected as MP and PM at the next federal election?) [no frequency] -> needs subjective probability.

The peak of Mt Everest is between 8800 and 8900m above sea-level.

- True? Prob = 100%

- False? Prob = 0%
- Don't know? 0% < prob <100%

Bias refers to effects that cause us to make errors in predictions, valuations and, thus, decisions.

- Motivational biases: from a desire to be informative, make ourselves look better, undermine someone else, etc.
- Cognitive biases: resulting from the way our brains naturally work.

Heuristics and biases

Research area focused on ways in which our decisions violate rational decision making. i.e. it takes the economic DM model as given and looks for deviations, explaining these in terms of the heuristics we use in place of logical reasoning.

Anchoring & adjustments: Use any number given in the question as a starting point (anchor) and adjust from there to reach estimate, a heuristic commonly used by people when estimating values. (Tversky & Kahneman 1974)

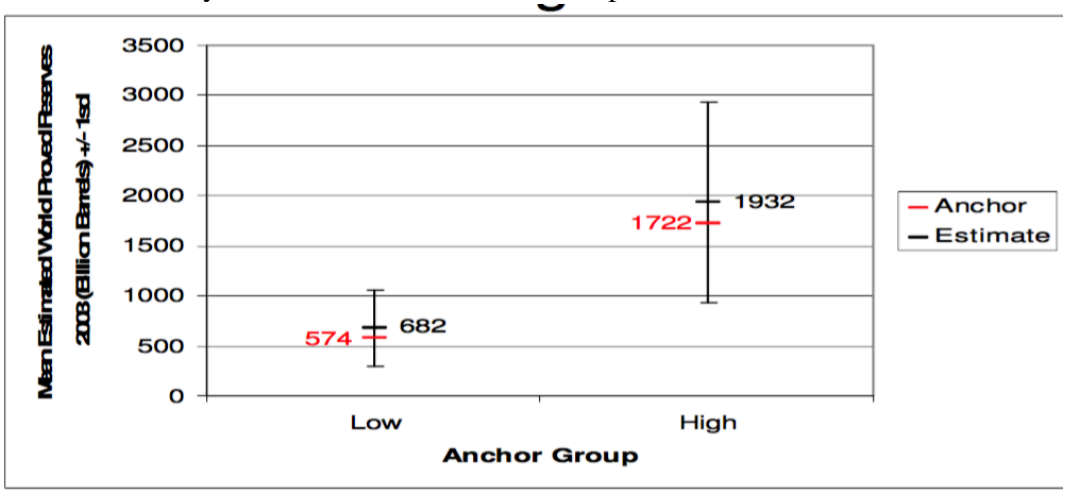
- Over reliance on the anchor. People will afford random anchors the same weight as meaningful ones. Quattrone et al (1984) asked whether the average temperature in San Francisco was greater or less than 558° and still found people anchoring on this value
- Insufficient adjustment: generally, people adjust too little so their estimates cluster near the anchor.
- Priming: sets the region of values that will be considered
- Confirmation bias: people seek reasons the anchoring value be relevant or being correct
- Adjustment: adjust away from the anchor stop when a number is reached within the region considered possible.

Alternate versions with high and low anchors:

- Were world proved oil reserves in 2009 greater or less than 1721 billion barrels?
- Were world proved oil reserves in 2009 greater or less than 573 billion barrels?

Both versions then asked

- What is your best estimate of the world proved oil reserves in 2009?



Welsh, Bratvold & Begg (2005) SPE 96423

Mean results are very close to the anchors the groups saw
Both groups show the anchoring bias