**Cognitive Biases**

**Sunk Cost Effect**

* The sunk cost trap is the tendency for people to escalate commitment to a course of action in which they have a substantial prior investment of time, money and or other resources
* Sunk cost is a cost that has already been incurred and cannot be recovered
* Behavioural economics says that sunk costs do, in fact, influence actors’ decisions because humans are prone to loss aversion and framing effects. In light of such cognitive quirks, it is unsurprising that people frequently fail to behave in ways the economists deem “rational”
* Overly optimistic probability bias, whereby after an investment the evaluation of one’s investment reaping dividends is increased
  + Horse example, asked better before they made a bet and after they made a bet of the chances of their horse winning
  + Went from 3.48 to 4.81 on 7 point scale because of their bet commitment
* The requisite of personal responsibility – sunk cost appears to operate chiefly in those who feel personal responsibility for the investments that are to be viewed as suck cost
* The ticket example, bought a ticket but movie is shit. People have strong misgiving about “wasting” resource and feel obliged to go to the movie despite not really wanting to – feel they have passed the point of no return.
* Logical form
  + X has already been invested in project Y. Z more investment would be needed to complete project Y and otherwise X will be lost. Therefore Z is justified
* Example1
  + I have already paid a consultant 1000 to look into the pros and cons of new business. He advised that I shouldn’t move forward because of the declining market. However if I don’t move forward, that 1000 will have been wasted, so I better move forward anyway
* Example 2
  + Two ski trips, 100 and for 50
  + Trips overlap, have to choose which one to go on
  + Over half chose the one for 100
  + This is the fallacy at work, because the money is gone no matter what
  + You can’t get it back. The fallacy prevents you from realising the best choice is to do whatever promises the better experience in the future, not which negates the feelings of loss in the past
* Example 3
  + Go to a movie which costs 10. When you open your wallet you notice you are missing 10. Would you still buy the ticket?
  + 12% said they would not
  + Now in second situation you have bought a ticket already for 10. When you go up to hand it in you realise you lost it. Would you go back and buy another ticket?
  + 54% said they would not go back
  + The situation is the exact same but the scenario feels different
  + It seems as if the money was assigned to a specific purpose and then lost, and loss sucks
* The price paid becomes a benchmark for the value, whereas the price paid should be irrelevant
* Can think of it as focusing on the past cost rather than the future utility
* Common phrases:
  + “throwing good money after bad”
  + “when you are in a hole, stop digging”
  + “I’ve started so I’ll finish”
  + “I’ve come this far”
  + “doubling down”
* Sunk costs drive wars, push up prices in auctions and keep failed political policies alive. It fills your home with things you no longer want or use. Every garage sale is a funeral for someone’s sunk costs
* Also known as concorde fallacy
* Related to cognitive dissonance when people think of themselves one way but act In another way they will try to rationalise it

**Cognitive Dissonance**

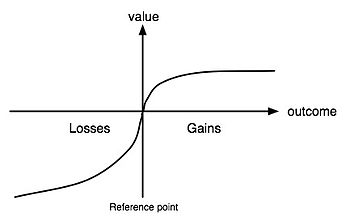
* Refers to a situation involving conflicting attitudes, beliefs or behaviours. This produces a feeling of discomfort leading to an alteration in one of the attitudes beliefs or behaviours to reduce the discomfort and restore balances etc
* Festinger’s 1957 cognitive dissonance theory suggests that we have an inner drive to hold all our attitudes and beliefs in harmony and avoid disharmony or dissonance
* Principle of cognitive consistency – starts from the idea that we seek consistency in our beliefs and attitudes in any situation where cognitions are inconsistent
* Cognitive Dissonance theory – states that a powerful motive to maintain cognitive consistency can give rise to irrational and sometimes maladaptive behaviour
* According to Festinger, We hold many cognitions about the world and ourselves, when they clash, a discrepancy is evoked, resulting in a state of tension known as cognitive dissonance. As the experience of dissonance is unpleasant, we are motivated to reduce or eliminate it, and achieve consonance
* Cult example
  + Studies a cult which though a big flood was coming, never came
  + Committed members had given up their homes and jobs for it
  + Fringe members were more inclined to recognise that they had made fools of themselves and “put it down to experience”
  + Committed members were more likely to re interpret the evidence to show that they were right all along – the earth was not destroyed because of the faithfulness of the cult member
* Dissonance can be reduced in 1 of 3 ways
* 1. – change one or more of the attitudes, behaviour, beliefs so as to make the relationship between the two elements a consonant one. Frequently presents problems for people as it is often difficult for people to change well learned behavioural responses –e.g. giving up smoking
* 2 – Acquire information that outweighs the dissonant beliefs. For example thinking smoking causes cancer will cause dissonance if a person smokes. However new info such as “research has not proved definitely that smoking causes cancer” may reduce dissonance
* 3 – Reduce the importance of the cognitions. A person can convince themselves that it is better to “live for today” than to “save for tomorrow”. In other words he tells himself that a short life filled with smoking and sensual pleasures is better than a long life devoid of such joys. In a way he would be decreasing the importance of the dissonant cognition (smoking is bad for one’s health)
* If a voluntary experience has cost a lot of effort turns out badly, dissonance is reduced by redefining the experience as interesting. This justifies the effort made
* Notice that dissonance theory does not state that these modes of dissonance will actually work, only that individuals who are in a state of dissonance will take steps to reduce the extent of their dissonance.
* Various factors that have been identified which may be important in attitude change: forced compliance behaviour, decision making, and effort.
* For example, when people smoke (behaviour) and they know that smoking causes cancer (Cognition)
* Example “the fox and the grapes” – fable by Aesop.
  + A fox sees some high hanging grapes and wishes to eat them
  + Fox is unable to think of a way to reach them
  + Decides that the grapes are probably not worth eating, with the justification the grapes are probably not ripe or that they are sour (hence common phrase “sour grapes”)
  + The moral is “any fool can despise what he cannot get”
  + Example follows a pattern: one desires something, finds it unattainable, and reduces one’s dissonance by criticising it – pattern called adaptive preference formation
* Jewish tailor example – used to be called a Jew by the children
  + Started paying them
  + Reduced payment every day and they left happy
  + Then offered them only a penny – wasn’t much incentive
  + Said they could take it or leave it, kids protested – they said they refused to call him a Jew for only a penny
  + When the tailor announced that he was happy to be called a Jew, and when he changed the gang’s motivation from anti-Semitism to monetary reward, he made it inconsistent or dissonance-arousing for the gang to please him without financial compensation. Without a sufficiently large payment, the kids could no longer justify behaving at variance with their attitudes, which were, of course, to upset the tailor, not to make him happy
* Example – the one hour of boring work
  + People had to perform a series of boring tasks
  + Were paid 1 or 20 to tell the next participant it was interesting
  + Most people agreed
  + The participants who were paid only 1 rated the tedious task as more fun and enjoyable than the participants who were paid 20 to lie
  + Being paid only 1 is not sufficient incentive for lying and so those experienced dissonance
  + They could only overcome the dissonance by coming to believe that the tasks really were interesting and enjoyable
  + Being paid 20 provides a reason for turning pegs and therefore is no dissonance

**Framing**

* An example of a cognitive bias, in which people react to a particular choice in different ways depending on how it is presented e.g. as a gain or a loss
* People tend to avoid risk when a positive frame is presented but seek risks when a negative behaviour is presented
* Prospect theory shows that a loss is more significant than the equivalent gain, that a sure gain (certainty effect) if favoured over a probabilistic gain and that a probabilistic loss is preferred over a definite loss
* Once of the dangers of framing effects is that people are often provided with options within the context of only one of the two frames
* E.g. political opinion polls that are framed to encourage a response beneficial to the org that has commissioned the pole
* Frame: positive
  + Option A: saves 200 lives
  + Option B: 33% chance of saving all 600, 66% chance of saving no one
* Frame: negative
  + Option A: 400 will die
  + Option B: 33% chance no one will die, 66% chance all 600 die
* Treatment A chosen by 72% of participants when positively framed
* Treatment B chosen 22% of time when negatively framed
* 93% of PHD student registered early when a penalty fee for late registration was emphasised, with only 67% doing so when this was presented as a discount for early registration
* More people will support an economic policy if the employment rate is emphasised that when the unemployment rate is emphasised
* In drug addiction, is it a “law and order” problem or a “public health” issue?
* At home, wife and husband fight over how to frame their personal issues. He says out late and didn’t call. Is he “insensitive” and “inconsiderate” or is she “anxious” and “controlling”?
* A 95% effective condom appears more effective than one with 5% failure rate
* People prefer to take a 5% raise when inflation is 12% than take a 7% cut when inflation is 0
* Considering two packages beef, more people will pick the one labelled 80% lean than the other one labelled 20% fat
* The question “how do you feel about obama’s policies” may get a very different answer distribution than the question “compared to the rule of Satan, how do you feel about obama’s policies”
* Real numbers tend to have a much stronger impact on people
* Instead of saying 90%, say 9 out of 10 were happy
* When you must present negative information, give a percent instead of a number. 1% doesn’t sound as bad as 1 in 100 defects
* When buying to emphasise how small a costs it – break it down to daily amounts, 90 cent a day is cheaper than 200 a year
* Sometimes beneficial to aggregate costs – a 400 euro machine is cheaper than 800 spent in a coffee shop in a year
* Pricing – more effective to have 490 cost plus 10 shipping that 500 altogether, an effective way to shift attention from one type of component price of TV to another – the great deal on shipping
* Framing can affect our mental state, glass half full or half empty? Did you break up or did she dump you?
* Euphemisms frames that serve to soothe, distract or reduce conflict – putting a dog to sleep
* WW1 – shell shock – battle fatigue – post traumatic stress disorder
* Framing cannot be avoided. There’s always a point of view and it biases the view by emphasising or including certain aspects of the situation or experience while omitting or devaluing others
* Awareness shifts you from automatic pilot to manual, putting you in control

**Prospect Theory**

* Behavioural economic theory that describes the way people choose between probabilistic events that involve risk, where the probability of outcomes are known
* Value rather than utility
* Theory states that people make decisions based on the potential value of losses and gains rather than the final outcomes, and that people evaluate these losses and gains using certain heuristics
* Model is descriptive – it tries to model real life choices – rather than optimal decisions as normative models do.
* Extended on by kahneman as a psychologically more accurate description of decision making, compared to the expected utility theory
* Theory describes the decision processes in two stages
  + During editing, outcomes of a decision are ordered according to a certain heuristic. In particular, people decide which outcomes they consider equivalent, set a reference point and then consider lesser outcomes as losses and greater ones as gains. The editing phase aims to alleviate any framing effects. It also aims to resolve isolation effects stemming from individuals’ propensity to often isolate consecutive probabilities instead of treating them together. The editing process can be viewed as composed of coding, combination, segregation, cancellation, simplification and detection of dominance.
  + In the subsequent evaluation phase, people behave as if they would compute a value (utility), based on the potential outcomes and their respective probabilities, and then choose the alternative having a higher utility.
* Losses hurt more than gains feel good (loss aversion). This differs from expected utility theory, in which a rational agent is indifferent to the reference point. In expected utility theory, the individual only cares about absolute wealth, not relative wealth in any given situation.
* Captures idea that people tend to overreact to small probability events but underreact to large probabilities.
* Leads to
  + The endowment effect – people ascribe more value to things merely because they own them
  + Preference depending on framing
  + Psychological accounting – attempts to describe the process whereby people code, categorise and evaluate economic outcomes.
* Decision based on weights rather than probabilities
* Regret is a major factor in poor investment decision
* People are reluctant to take a loss – fail to bail out when they should
* An important implication of prospect theory is that the way economic agents subjectively frame an outcome or transaction in their mind affects the utility they expect or receive.
* According to prospect theory, losses have more emotional impact than an equivalent amount of gains. For example, in a traditional way of thinking, the amount of utility gained from receiving 50 should be equal to a situation in which you gained 100 but then lost 50. In both situations the end result is a net gain of 50. However, despite the fact that you still end up with a 50 gain in either case, most people view a single gain of 50 more favourable than gaining 100 and then losing 50
* Example
  + People don’t want to put their money in savings account because they feel the tax applied is too much and will end up losing money
* also explains the disposition effect, which is the tendency for investors to hold on to losing stocks for too long and sell winning stock too soon. The most logical course of action would be to hold on to winning stock in order to further gains and to sell losing stocks in order to prevent escalating losses.



**Context Dependency**

* Context dependent memory refers to the phenomenon of how much easier it is to retrieve certain memories when the “context” or circumstance around the memory are the same for both the original encoding and retrieval
* Practical example – if you lost your keys, go through the steps from your house to work and re enact is to try and find your keys.
* Argued that decision making is fundamentally context – dependent
* Framework – the major assumption is that every form of decision making happens in some cognitive context and this context plays the main causal role in people’s behaviour
* Halo effect – an observer’s overall impression of a person, company, brand, or product influences the observer’s feelings and thoughts about that entity’s character or properties
* Primacy effect – when given a list of information and later asked to recall that information, items at the beginning (primacy) are more likely to be recalled than the items in the middle
* Recency effect – same as primacy effect basically
* The debater’s dilemma

**The representativeness heuristic**

* The representativeness heuristic is used when making judgments about the probability of an event under uncertainty
* Heuristics described as – judgmental shortcuts that generally get us where we need to go, and quickly but at the cost of occasionally sending us off course.
* Heuristics are useful because they use effort reduction and simplification in decision making
* Representativeness as “the degree to which an event is similar in essential characteristics to its parent population, and reflects the salient features of the process by which it is generated.
* When people rely on representativeness to make judgments, they are likely to judge wrongly because the fact that something is more representative does not actually make it more likely
* Described as assessing similarity of objects and organising them based around the category prototype (e.g. like goes with like, and causes and effects should resemble each other)
* The problem is that people overestimate its ability to accurately predict the likelihood of an event – thus it can result in neglect of relevant base rates and other cognitive biases
* Tend to look for traits an individual may have that correspond with previously formed stereotypes.
* “the plant is categorised as belonging to the species that its principle features most nearly resemble”
* Offers a good first cut approximation, drawing our attention to the best options.
* Similarity
* When judging the representatives of a new stimulus/event, people usually pay attention to the degree of similarity between the event and a standard process.
  + Medical beliefs – ulcer caused by stress, actually caused by bacteria
  + Patients encouraged to eat organ meat that corresponds to their medical disorder
* Randomness
* Irregularity and local representativeness affect judgments of randomness. Things that do not appear to have any logical sequence are regarded as representative of randomness and thus more likely to occur
  + For example thththth as a series of coin tosses would not be considered representative of randomly generated coin tosses as it is too well ordered
* Local representativeness is an assumption wherein people rely on the law of small numbers, whereby small samples are perceived to represent their population to the same extent as large samples
* Taxicab problem
  + Another study by kahneman
  + A cab was involved in a hit and run accident at night. Two cab companies operate in the city. 85% of cabs in the city are green, 15% are blue
  + Witness identified cab as blue, witness correctly identified each one of the two colours 80% of the time and failed 20% of the time
  + Probability that the cab involved in the accident was blue rather than green knowing that this witness identified it as blue.
  + Most subject gave probabilities of over 50% that the cab was blue rather than green
  + 41% chance that the cab identified as blue is actually blue – bayes theorem

**Biases emanation from the representativeness heuristic**

**Bias 3: insensitivity to base rates**

* Down syndrome example, probability.
* Tend to ignore the base rate – the overall prevalence of DS
* Causes people to ignore background info relevant to the problem
* Tendency is even strong when the specific info is vivid and compelling
* Example of lawyer and engineer group, 70, 30 and 30 70, all people said engineer no matter the group size
* Participants do use base rate data correctly when no other info is provided. People understand the relevance of base rate info but tend to disregard such data when individuating data are also available.

**Bias 4: Insensitivity to sample size**

* Cognitive bias that occurs when people judge the probability of obtaining a sample statistic without respect to the sample size
* Variation is more likely in smaller samples, but people may not expect this, Sample size rarely part of our intuition
* People intuitively judge samples as having similar properties to their population without taking other considerations into effect
* Example of hospital and male birth rates
* People have basic idea of how unusual it is to have 60 percent of a random event occurring in a specific direction
* When responding to problems dealing with sampling, people often use the representativeness heuristic

**Bias 5: Misconceptions of Chance**

* The mistaken belief that, if something happens more frequently than normal during some period, it will happen less frequently in the future
* Triggers our inappropriate tendency to assume that random and non-random events will balance out.
* The gamblers fallacy
* “Chance is commonly viewed as a self-correcting process in which a deviation in one direction induces a deviation in the opposite direction to restore equilibrium. In fact, deviations are not corrected as a chance process unfolds, they are merely diluted”
* Streaks are part of our conception of chance in athletic competition.
* We don’t think of a string of four in a row shots as a situation where he missed his fifth shot. As a result we have a misconception of connectedness, when in fact chance is actually in effect
* Leads people to see patterns where there are none.

**Bias 6: Regression to the mean**

* Example of batting averages
* Basic principles of statistics tell us that any extreme performance is likely to regress to the mean over time.
* The flaw if failing to account for natural fluctuations
* People are most likely to take action when variance is at its peak- then after results become more normal they believe that their action was the cause of the change when in fact it was not causal
* Gifted children frequently have less successful sibling. Short parents tend to have taller children
* Individuals typically assume that future outcomes will be directly predictable from past outcomes. Thus we tend to naively develop predictions based on the assumption of perfect correlation with past data.

**Bias 7: The conjunction fallacy**

* Lisa teacher example, the and rule
* People make judgments according to the degree to which a specific description corresponds to a broader category within their minds.
* Probability – the subset cannot be more likely than a larger set that completely includes the subset.
* Predicts that a conjunction will be judged more probably than a single component descriptor when the conjunction appears more representative than the component descriptor.
* Probability theory dictates that the probability of being both a bank teller and feminisit (conjunction of two sets) must be less than or equal to the probability of bein either a feminist or a bank teller
* A conjunction cannot be more probabile than one of its consituents.

**Applications**

* People more likely to buy more cans of something if they are “limited” to 10 per customer etc