04/07/16

DECISIONS: COGNITIVE BIAS: OVER CONFIDENCE EFFECT

- A well established bias in which a persons subjective confidence in her judgement is reliably greater than the objective accuracy of those judgements, especially when confidence is relatively high
- Defined in 3 distinct ways:
  - Overestimation of one's actual performance
  - Overplacement of one's performance relative to others
  - Overprecision - excessive certainty regarding the accuracy of one's beliefs

- Commonly studied by asking people how confident they are of specific beliefs or answers they provide
- The data shows that confidence systematically exceeds accuracy, implying people are more sure that they are correct than they deserve to be
- Key finding is that confidence exceeds accuracy to any of the subjects is answering hard questions about an uncertain topic

Overestimation

- The certainty one feels in their own ability etc.
  - → Illusion of control: the tendency for people to behave as if they might have some control when in fact they have none
  - → Planning fallacy: tendency to overestimate their work rate or to underestimate how long it will take to complete
  - → Confirmation bias: wishful thinking effect in which people overestimate the likelihood of an event because of it's desirability, or relatively rare

Overprecision

- → ~~Ego~~
- Excessive confidence that one knows the truth
  - → Confidence intervals: People asked to create confidence intervals : systematically too narrow

Overplacement

- Suggests if your performance compared to others
- People believe themselves to be better than others: "better than average"
  - → Better than average effect: Study found 93% of drivers rate themself
    a) better than the median
    "all children above average in car skill"
  - This effect is limited to "easy" tasks in which success is common or in which people feel competent.

Overconfidence has been called the most "pervasive and potentially catastrophic" of all cognitive biases in which humans fall victim

01/05/16

177.4

DECISIONS - The Representativeness Heuristic

- Used when making judgments about the probability of an event under uncertainty.
- Heuristic - judgmental shortcuts that generally get us where we need to go and quickly, but at the cost of occasionally leading us off course
- Heuristics are useful because they use effort reduction and simplification in decision making
- Representativeness - the degree to which an event is similar in essential characteristics to its parent population
- 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
- 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 rate 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 quick first cut approximation, drawing attention to our best options

- Similarity
- When judging the representativeness of a new stimulus/event, people usually pay attention to the degree of similarity between the event and a standard prototype
  - Patients encouraged to eat organ meat that corresponds to their medical disorder
  - Medical beliefs - illness caused by sin, actually caused by bacteria

- Randomness
- Irregularity and local representativeness affect judgements of randomness. Things that do not have any logical sequence are regarded as representative of randomness and thus more likely to occur
  - For example tttthhhh as a series of coin tosses would not be considered real representative of randomly ordered tosses as it is too well ordered

03/05/

- Local representativeness is an attempt when people rely on the law of small numbers whereby small samples are viewed to represent their population to the same extent as large samples
- Taxi cab problem - Kahneman 85/15 - Chose than 30/70 chose or correctly identify. Overall 41% chose that cab involved as the is actually blue-based

Insensitivity to base rates
- Tend to ignore the base rate, such as prevalence of DI
- 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 70/30, 30/70 base rates given, all people said engineer no matter the group size
- Participants do use base rates 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 is also available

Insensitivity to Sample Size
- Cognitive bias that occurs when people judge the probability of obtaining a sample statistic without regard to the sample size
- Variation is more likely in smaller sample, but people may not expect this - Sample size is rarely part of our intuition
- People intuitively judge sample [illegible] as having similar properties to their population without taking other considerations into effect
- Example of hospital and more births
- People have basic idea of how unusual it is to have 60% of a random event occur in a specific direction
- When responding to problems dealing with sampling, people often use representativeness heuristic

Misconception of chance
- The mistaken belief that, if something happens more frequently than normal during some period, it will happen less frequently in the future

03/05/16 DECISIONS: COGNITIVE BIAS: REPRESENTATIVE HEURISTIC 7

- Triggers our inappropriate tendency to assume that random and non-random events will balance out
- The gambler's 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 our of misconception of chance in athletic competition
- We don't think of a string of four in a row shots as a fluke when he missed his fifth shot AS a result we have a misconception of correctedness when in fact chance is actually in effect
- Leads people to see patterns where there are none

Regression to the mean

- Example of batting averages
- Basic principal of statistics tell us that any extreme performance is likely to regress to be more average
- The flaw in failing to take into account natural fluctuations
- People are more likely to take action when variance is at it's peak - can often result become more normal they believe their action has to cause of the change when it fact it is not causal
- Gifted children frequently have less successful siblings. Short people 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

The conjunction fallacy

- Teacher example
- People make judgements according to the degree to which a specific description corresponds to a broader category within our mind

- Probability - to subset cannot be more likely than a larger set that completely includes the subset
- Predicts that a conjunction will be judged more probable than a single component description when the conjunction appears more representative than the component description

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DECISIONS: CONTEXT DEPENDENCY

- Context dependent memory refers to the phenomenon of how much easier it is to retrieve certain memories when the context/circumstances around the memory are the same for both the original encoding and retrieval
- Practical example - if you put your keys, remote etc keys from your house to work - will usually find them
- Argued that decision making is fundamentally context-dependent
- Major assumption is that every form of decision making happens in some cognitive context and this context plays the most crucial role in people's behaviour

- Give rise to:
- Halo effect - an observer's overall impression of a person, company, brand or product influences the observers 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 items in the middle
- Recency effect - holiday example - retrieval of info - similar to primacy effect

DECISION NASH AXIOMS

N1: Individual Rationality $(\bar{\mu}_s, \bar{\nu}_s) \geq (\mu^*, \nu^*)$ [N6 $(a,b) \geq (c,d)$ $a \geq c$ and $b \geq d$]

N2: Feasibility: $(\bar{\mu}_s, \bar{\nu}_s) \in S$

N3: Pareto Optimality $(\bar{\mu}_s, \bar{\nu}_s)$ is on Pareto boundary i.e. if $(\mu, \nu) \in S$ and $(\mu, \nu) \geq (\bar{\mu}_s, \bar{\nu}_s)$ then $(\mu, \nu) = (\bar{\mu}_s, \bar{\nu}_s)$ known as "pareto optimality" why choose a point if one is a better point which benefits both parties

N4: Invariance of equivalent representations

If we can replace (μ, ν) by some linear transformation $(\alpha\mu + \beta, \gamma\nu + \delta)$ be choosing $(\bar{\mu}, \bar{\nu})$ for old S, we should choose $(\alpha\bar{\mu} + \beta, \gamma\bar{\nu} + \delta)$ for new S.

eg if $F(S, \mu^*, \nu^*) = (\bar{\mu}_s, \bar{\nu}_s)$ then in new representation with feasible region T and status quo μ_T^*, ν_T^* constructed by replacing each (μ, ν) by $(\alpha\mu + \beta, \gamma\nu + \delta)$ then our requirement is $F(T, \alpha\mu_s^* + \beta, \gamma\nu_s^* + \delta) = (\alpha\bar{\mu}_s + \beta, \gamma\bar{\nu}_s + \delta)$

LINEAR only i.e. monetary units should not matter

N5: SYMETRY

Suppose S is Symetric $(\mu, \nu) \in S$ $(\nu, \mu) \in S$ and $\mu_s^* = \nu_s^*$ then $\bar{\mu}_s = \bar{\nu}_s$

e.g only the shape S and the values $\mu^* \nu^*$ affect choice, not external circumstances i.e. put status of bargain $\Rightarrow$ shouldn't take into account how much money I already have.

N6: INDEPENDENCE OF IRRELEVANT ALTERNATIVES

Suppose $F(T, \mu^*, \nu^*) = (\bar{\mu}_T, \bar{\nu}_T)$ (e.g jointly chose most one fish).

Suppose T subset C of S. New negotiation option

Suppose $F(S, \mu^*, \nu^*) = (\bar{\mu}_s, \bar{\nu}_s) \overset{\text{also}}{\in} T$ the $(\bar{\mu}_s, \bar{\nu}_s) = (\bar{\mu}_T, \bar{\nu}_T)$

e.g. other fish with meat or new bargain some chose of region not fish enough

28/04/16 DECISIONS : PROSPECT THEORY

- Behavioural economics theory that describes the way people choose between probabilistic events that involve risk, where the probability of outcomes are unknown
- Value rather than utility
- The theory states that people make decisions based on the potential value of losses and gains 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.
- They can describe decision making in two steps:
  1- 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
  2- 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 situation
- Cognitive idea that people tend to overreact to small probability events but underreact to large probabilities.
- Leads to:
  - endowment effect - people value more what they own than
  - Preference depending on framing
  - Psychological accounting - attempt to decide to place whereby people, ask, consider and evaluate economic outcomes

7/04/16

- Decision based on weights rather than probabilities

- Regret is a major factor in poor investment decisions
- People are reluctant to take a loss - fail to bail out when they should
- An important implication of prospect theory is the way economic agents subjectively frame an outcome/transaction in their mind affects the utility they expect or receive

- According to prospect theory, losses have more emotional impact than an equivalent gain. 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 gain 100 but then lost 50. In both situations, the end result is the same, 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 favourably than gaining 100 and losing 50
- People don't want to put money in savings account because they feel they are losing tax 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 onto winning stock in order to further gains and to sell losing stock in order to prevent escalating losses

Overreaction
- Representativeness
- Context dependency
- Availability

17/04/16 DECISIONS - FRAME - BIASES

Framing

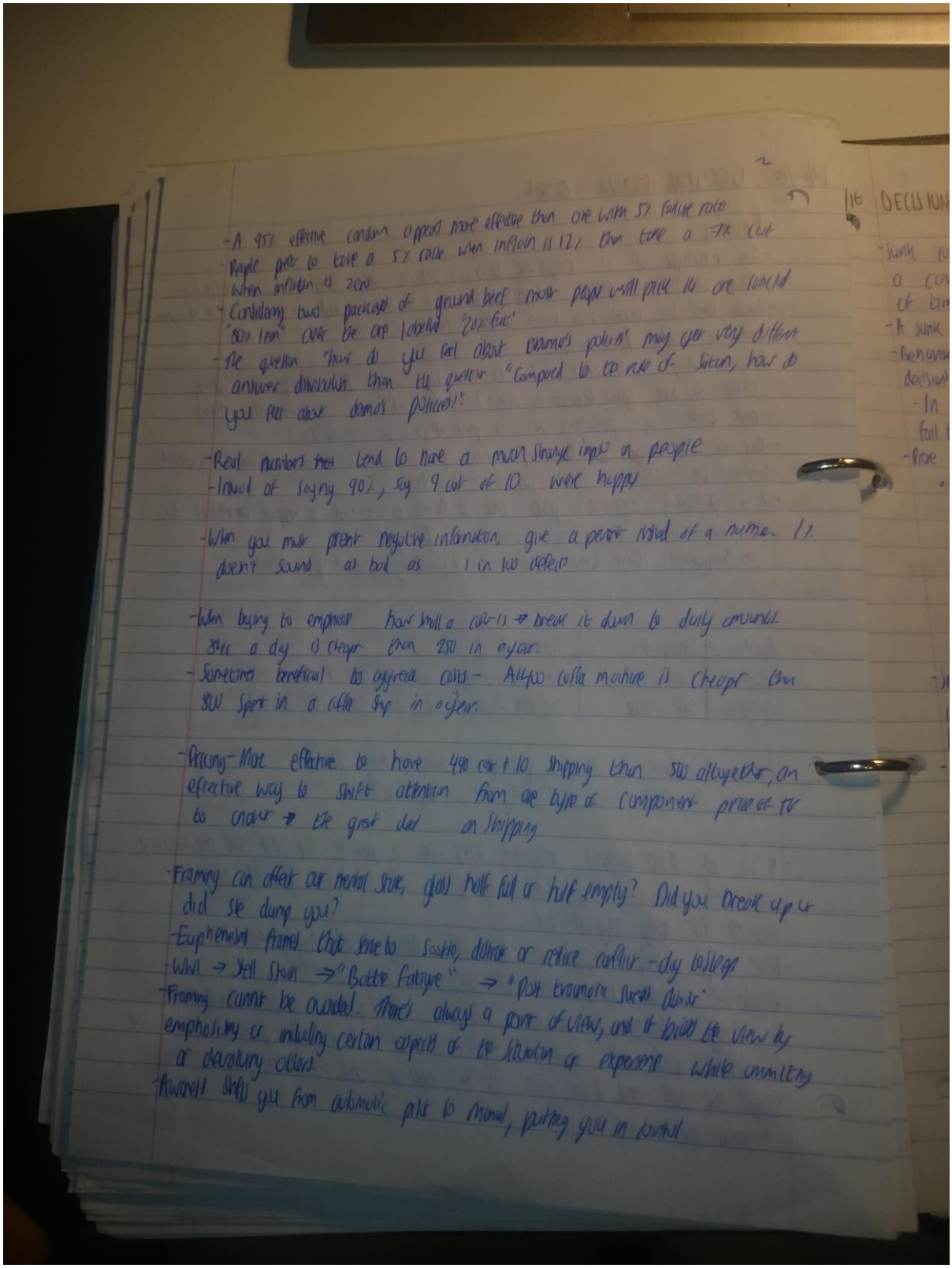
- An example of a cognitive bias, in which people react to a particular choice in different ways depending on how it is presented e.g. as a loss or as a gain
- People tend to avoid risk when a positive frame is presented but seek risks when a negative frame is presented
- Prospect theory shows that a loss is more significant than an equivalent gain, that a sure gain (certainty effect) is favoured over a probabilistic gain and that a probabilistic loss is preferred than a definite loss
- One of the dangers of framing effects is that people are often presented with options within the context of only one of the two frames.
- Eg political opinion polls that are framed to encourage a response beneficial to the organisation that has commissioned the poll.
  → Suggested that this technique is discreditary political polls therefore

Example

Framing	Treatment A	Treatment B
Positive	Save 200 lives	33% chance of saving all 600, 66% chance of saving no one
Negative	400 will die	33% chance no one will die, 66% chance all 600 die

- Treatment A chosen by 72% of participants when positively framed
- Treatment A chosen 22% of time when negatively framed

- 93% of PHD students registered early when a penalty fee for late registration was emphasised, with only 67% doing so when this was framed as a discount for early registration.
- More people will support an economic policy if the employment rate is emphasised than when the unemployment rate is emphasised
- In drug addiction, is it a 'law and order' problem or public health problem?
- At home, wife and husband fight over how to frame their personal issues. If stayed out late and didn't call is he 'irresponsible and inconsiderate' or is she 'anxious and unwilling'?



-A 95% effective condom appears more effective than one with 5% failure rate
-People prefer to have a 5% raise when inflation is 12% than have a 7% cut when inflation is 2%
-Combining two packages of ground beef more people will prefer to one labeled "80% lean" over the one labeled "20% fat"
-The question "how do you feel about Obama's policies" may get very different answer distribution than the question "Compared to the rest of Spain, how do you feel about Obama's policies?"

-Real numbers tend to have a more strong impact on people
-Instead of saying 90%, say 9 out of 10 were happy

-When you must present negative information, give a percentage instead of a number. It doesn't sound as bad as 1 in 100 defects

-When trying to emphasize how small a cost is → break it down to daily amounts. $1 a day is cheaper than $250 in a year.
-Sometimes beneficial to aggregate costs - A $400 coffee machine is cheaper than $80 spent in a coffee shop in a year.

-Pricing - More effective to have $400 cost + $10 shipping than $410 altogether, an effective way to shift attention from one type of component price or fee 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?
-Euphemism framing that serve to soothe, distract or reduce conflict - day to day
-WWI → Shell Shock → "Battle Fatigue" → "Post traumatic Stress Disorder"
-Framing cannot be avoided. There's always a point of view, and it could be view by emphasizing or including certain aspects of the situation or experience while omitting or devaluing others.
-Always shift you from automatic pilot to manual, putting you in control

1/4/16 DECISIONS - SUNK COST

- Sunk cost bias 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
- A sunk cost is a cost that has already been incurred and cannot be recovered
- Behavioral 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 economic deem rational
- Prone to:
  - Overly optimistic probability bias, whereby an increase in the evaluation of one's investment resulting dividends is increased.
    → hate betting example, asked people before and after betting, the odds they have would win on 7-point scale went from 3.48 to 4.81
  - The requisite of personal responsibility - Sunk cost appear to operate chiefly in case who feel personal responsibility for the investments that are to be viewed as sunk cost

- Simple example: buying a ticket for a movie but realize it is shit after 15 min but you People have strong misgivings about "wasting" resources and feel obligated to go to the movie, despite not really wanting two - feel they have passed the point of no return
- Logical form: X has 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
- Example 1: consultant, pro and cons, spent 1000, he advised no but you went anyway, accept the loss is lost.
- Example 2: Ski trip: two bought for 100 and 50, on the same date ⇒ chose which one to go to
  - over half chose the 100 one
  - This is the fallacy at work - the money is gone.
  - The fallacy prevents you from realizing the best choice is to do whatever promises the better experience in the future, not which regard the feelings of loss in the past.
- Example 3: Go to a movie which costs 10. Open your wallet and realize 10 is missing do you go movie?
  - 88%. They would go 12%. would not
  - Second Situation, already bought a ticket for 10. Go up to counter and

realise the ticket is lost: do you buy another ticket?
- 54% said they would not
- Situation is exactly the same but the scenario feels different.
- It seems 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 past cost rather than 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 cost.
- Also known as concorde fallacy
- Related to cognitive dissonance where people think of themselves one way and act in another and try to rationalise

24/06/16 DECISIONS - COGNITIVE DISSONANCE

- Refers to a situation involving conflicting attitudes, beliefs or behaviours that produces a feeling of discomfort leading to an alteration in one of the attitudes or beliefs to reduce the discomfort and restore balance
- 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/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 powerful motive to maintain cognitive consonance 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, Festinger infiltrated a cult and observed
- All believed a flood was coming (aliens) of a year
- Committed members had given up their jobs and house. Flood never came
- Fringe members were more likely to re-interpret 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 their faithfulness of the cult member

- Dissonance can be reduced in 1 of 3 ways
- 1 - Change one or more of the attitudes, behaviours, beliefs, so as to make the relationship between the two elements a consonant one

- For example, people smoke (behaviour) and they know smoking causes cancer (cognition)

Example 2: Fox and the grapes
- Fox saw some high hanging grapes he want to eat - unable to reach them
- Decided that the grapes are probably not worth eating, with the justification the grapes are probably not ripe or they are sour.
- Example follows a pattern: one desires something, finds it unobtainable and reduces one's dissonance by criticising it - person could adopt preference formation

Example 3: Jewish tailor example
- Used to be called a jew by the children - started paying them
- Reduced payment daily until he only offered them a penny
- He said they could take it or leave it, kids protested - said they refused to call him a jew for only one penny
- When the tailor announced that he was happy to be called a jew, and when he changed the gangs motivation from anti-semitism to monetary reward, he made it inconsistent or dissonance arousing for the gang to make him without financial compensation
- Without sufficiently large payments, 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 4: Hour of boring work
- People had to perform an hour of boring work
- Were paid £1 or £20 to tell next participant how interesting it was
- 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, their experienced dissonance
- They could only overcome the dissonance by coming to believe that the tasks were interesting and enjoyable
- Being paid £20 provides a reason for turning pegs and therefore is no dissonance

Dissonance can be reduced in 1 of 3 ways:
1. - Change one or more of the attitudes, behaviour or beliefs so as to make them the relationship between the two elements a consonant one

26/04/16 DECISIONS - COGNITIVE DISSONANCE

-Frequently proven problem 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 will cure cancer will cause dissonance if a person smokes
- However, new info such as "research has shown proven definitively that smoking doesn't cause 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 "live for tomorrow".
- In other words he will consider that a short life filled with smoking and sexual pleasure is better than a long life devoid of such joys.
- In away he would be decreasing the importance of the dissonant cognition (smoking is bad for one's health)

IF a voluntary experience has cost alot of effort turn out badly, dissonance is reduced by redefining the experience as interesting. This justifies the effort made

-Notice that 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.