



1.

### a) Frequency theory

Frequency theory is a theory that estimate probability based on the frequency of an event. A high frequency means that the probability gets higher. For example to consider the chances for a smoker to get lung cancer, the probability gets considered based on how many people that smokes that have lung cancer.

This theory can be used in gambling. Ex say you flip a coin ~~10~~ ten times and get head 7 out of the ten times. On the 11th time it is a 0.7 chance of getting head again according to this theory. But we know that there is still a 0.5 chance of both outcomes no matter what the last flips have turned out to be. Therefore an adjusted version of the frequency theory have been brought to mind, that is frequency based on a long run perspective. In the long run the chance is 0.5 for head and tail.

### 2. Logical theory

Logical theory concerns exchangeable events. This means that an event easily can be replaced with another event. Like frequency theory, logical theory is an objective theory that is known to everybody.

Logical theory can also be used in gambling.





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By this theory we can prove that there is a 0,5 chance for both head and tail when flipping a coin. We know that this is about exchangeable events and that the outcome can turn out to be: HH, HT, TH or TT when flipping twice.

However, this theory is difficult to apply in the real world. Exchangeable events are hard to find.

### 3. Personal theory

Included consideration of both frequency theory and logical theory, personal theory also takes into account a personal aspect of probability. This theory is thus easier to apply to the real world. However, this also gives an uncertain outcome. Ex two doctors can evaluate a patient's health condition differently through their personal theory. ~~Personal theory~~ But in this case, it is unlikely that the doctors will evaluate with a huge difference in their result. Personal theory can be affected by personal experience, education etc. It is also likely that people build up their own heuristics or "rules of thumb" when dealing with certain situations. The human mind is disturbed by different biases - a fluctuation from the normative theory. Both heuristics and biases are a part of the descriptive theory.



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1b) Typical mistakes we do when making probability judgments are that we often don't consider all the relevant facts when calculating the probability. There are often many factors that contribute to a particular outcome and it is important to include all the relevant factors. Related to this comes the fact that we often just use the information that is available and known to us (availability heuristic) and we favor our own opinion and often let it lead us to the outcome.

Another thing is that many people don't know how to consider probability. They don't know the most rational way to do it, and therefore rather base their probability judgments on influences, by other, "what that is more likely to believe" etc.





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- 1C) The "Linda-problem" goes something like this:  
Linda is a 38 year, outspoken women.  
She is active in a feminist group,  
What do you believe her profession is?
- 1) Feminist
  - 2) Banker
  - 3) Banker and a feminist.

The point is that when people are to consider her profession, most people believe she is a feminist (1). But between the two other options, more people believe she is a feminist and a banker than just a banker.

This is the conjunction fallacy, the value of a combination cannot be higher than each factor alone. This is thus a fallacy that many people make. The more information and options people get, the more confused and wrong they can make their conclusions. Many people believe that a combination of ~~a particular~~ ~~events~~ events that causes a particular result are more likely.



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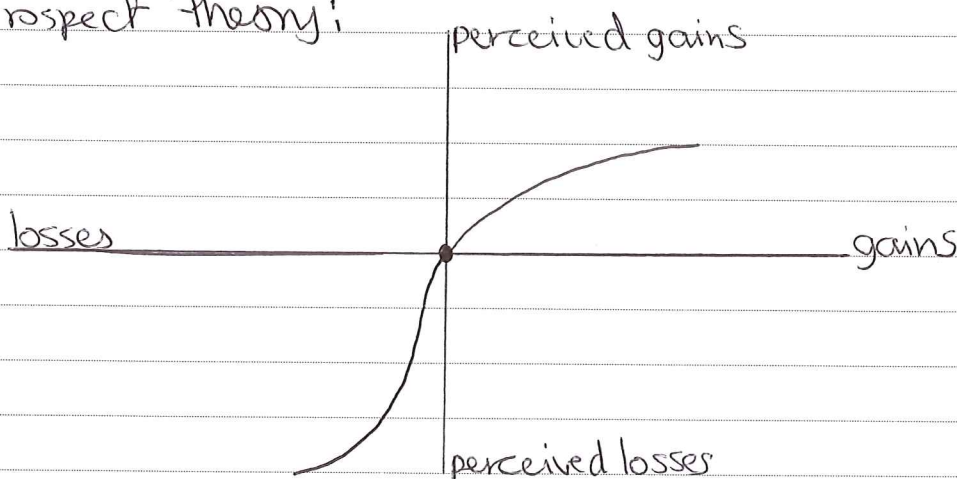
2. Expected utility theory is a Normative theory  
a) of choice under certainty. It says that we should choose the option/outcome with the highest expected utility. Utility is measured from the formula  $EU = \sum p_i \cdot u_i$

where  
EU = expected utility,  $p_i$  = probability of an event  $i$ ,  
 $u_i$  = utility of an event  $i$ .

This is a normative and thus an ideally way of making a choice under uncertainty.

A counterexample is the prospect theory. This is a Descriptive Theory of choice under uncertainty and adjust the former model into real life.

Prospect theory:



Differences from expected utility theory:

1) Consider value rather than utility, Utility can be difficult to measure in real life, Therefore prospect theory rather consider value, in terms of gains and losses.





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2) "Losses loom larger than gains", We see that the ~~loss~~ curve for loss is steeper than that for gain. People are risk averse, and losses and gains have to be considered differently.

3) Framing effect: people value a certain amount higher than a probable amount with equal or higher expected value. That also has to do with the fact that people are risk averse. The opposite is true for losses.

4) People overestimate low probabilities and underestimate high probabilities.

The prospect theory model (the drawing) can be used to explain that people are risk averse, and ~~that people are~~ related to sunk cost, that people ~~are~~ often are unable to forget earlier investments and takes this into account for further actions too (lying on a point on the loss curve). It can also be used to explaining why ~~buyers~~ sellers want customers to integrate loss, but separate gains. That is because from the reference point (in the middle) both the gain and loss curve is very steep. When integrating losses, we see that the curve "evens out" after the steep and just going down the steep once makes it seems better. By separating gains, repeating the gain through the steep curve will make it seem like a good buy.



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2b) An analysis of how we spend money on risk reduction shows that behaviour deviates from the normative theory. This discrepancy can be explained by the perceived differences between risks.

### 1) Voluntary versus involuntary risk

Research shows that we use more money on involuntary risk than voluntary risk. Ex it is prohibited to smoke inside of restaurants, clubs etc. But it is not prohibited to smoke in general. Smoking is a voluntary matter of your own. As long as you don't bother others by it, you are free to do as you like.

### 2) Known versus unknown risks

We spend more money on known risks than on unknown risks.

### 3) Catastrophic versus individual risks

Catastrophic ~~cases~~ makes impression on us. Ex "Flodbølgen" in Thailand made all the people in the world engaged to help. It touches us, and also takes a lot of space in the media, which makes us focus more on this than on "smaller individual cases". The fact that the amount of people suffering from flodbølgen in Thailand compared to individual cases is also a probable relevant factor. This. A lot more people suffered in Thailand.





#### 4) Individual versus ~~stat~~ statistical risks

We are willing to give more money to individual than to statistical risks. For example, we know statistically that there are many poor people dying of hunger and diseases in Africa. But that is "something that everybody knows", and it is just like a common fact. But if the poor conditions can be related to a child, ex through "Plan Norge" you can become a buddy of a little child that you get to see and know, then you are likely to give more money. It seems like the fact that you can know for a fact that your help will save that child makes it worth it. If you contribute in a collect, you know that your part is very small and that it don't will make such a huge difference.

#### 5) Natural versus artificial risks

People tend to believe in the nature. Everything that the nature produces is pure, healthy and good for us, many think. Therefore we are willing to pay more for natural products than artificial products, even though the artificial products are made to contain the same "preservatives" as natural. Ex in a restaurant many people buy natural water from a bottle rather than asking for tap water from the sink.





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## b) Omission versus commission

Omission is the same as default and means not to take/do an action. Commission means to make action. Research shows that it costs us more to do an action than to not do anything. When we actually do something and involve ourselves, we get more emotionally attached and care much more about the outcome.

"Salespeople" know how to take advantage of the fact that it costs us more to act than to not act. Ex a "phonesalesman" can call you and ask if you want 3 free magazines in the mail the next 3 months. Of course you say yes. But if you don't take contact with the magazine within these 3 months, they will keep on sending the magazine to you with a bill attached to it. Lazy people will not do anything about this because it "requires too much of them" and they therefore rather just pay the bills.



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3 a) A compensatory decision strategy is that you have more than one criteria, in which you can compensate one for another if you want to. A non-compensatory decision strategy is thus when you only have one criteria on your decision strategy. This contributes to making the decision process easier.

One such strategy is "elimination by aspects". This means that you rank the different attributes that you have. For example when buying a sofa you can have attributes like price, quality, color and size. By elimination by aspects you put the most important attribute to you first and put most weight on that one. Similar you rank the other attributes after importance for you.

A second type of this strategy I will explain here: A market serves two different kinds of beer, X and Y. X is better on both quality and price, but still some people choose to buy Y instead of X. Then a new beer enters the market, Z. X is better than Z on both quality and price, but Z is better than Y on price. When this new beer enters the market, the effect is that even more people will buy X. It is difficult to understand this, but it seems like people now have one more reason to buy X, which will make more people do it.





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3b) Status quo are the state you are in now. Most people don't like changes and keep their reference point (default point) close to their heart. Research shows that willingness to accept (WTA) is much higher in value than willingness to pay (WTP). For example people are more willing to pay for a poor and hungry child in Africa than to accept that the child can move in to your house.

This is important to be aware of when measuring utility, because this makes it much harder to measure, WTA and WTP have different reference points and have to be valued differently.



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3C) RECAP help customers to be more aware of how the market works in terms of prices etc. The regulation helps people and give people information about different prices so that they can buy ~~most~~ as cheap and efficiently as possible. A type of RECAP is the tv-show in Norway called "N2 helper deg" which tests different products so that people learn more about the products they want to buy and also which one that is best to buy.

This makes markets more efficient to. The customers get more demanding as they learn to know what they want and how they want it. This puts pressure on the market to be more efficient. This strains the market and gives room for the best producers and suppliers.





4, a) A utilitarian approach to moral decisions means that you consider different moral decisions based on their utility, and chooses the one that will gain most utility for most people.

It is an approach that wants to make the world a better place for everybody. It wants to make people happy, satisfied and feel safe. Further, it considers the future, not the past. However, it is not really applicable to make moral decisions in real life. For example consider 3 patients in the hospital in need of organs to survive. According to the utilitarian approach it would make sense to sacrifice one fourth person to make the 3 others survive, this is because this decision would be best for most people. If we ~~it~~ were to start applying this rule, no people would come to the hospitals unless they were deadly sick.

This approach do not take care of minority groups in the society, just because they are a minority, and will not serve the wealth for most people. This shows that utilitarianism mismatch with altruism (care about the sake of others more than yourself).



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4b) Act utilitarianism is a short-term view on moral decisions that are in the moment and do not think of further consequences. For example in the dilemma whether sacrificing a 4th person for the sake of 3 sick persons, the act utilitarian approach would definitely do it. Right here, right now, this is considered as the best thing to do.

Rule utilitarianism has a more long-term view and ~~also~~ take into consideration effects from acting. In moral decisions they consider, "if we do something, can we make this a rule?". In our dilemma this makes the 4th person live. If we would have to kill somebody everytime somebody gets sick, this would be a very bad rule. Rule utilitarianism is thus a more well considered approach.