What causes poor decisions?

- Mistakes in the decision process
- Bounded rationality
- Suboptimization

Bounded rationality

Bounded rationality is a concept that recognizes that people have limitations in their ability to process information and make decisions. These limitations include cognitive limitations (such as limited attention and memory), information constraints (such as incomplete or imperfect information), and environmental factors (such as time and resource constraints). Because of these limitations, people are not able to fully analyze and evaluate all available options when making decisions. Instead, they rely on heuristics or shortcuts to simplify the decision-making process. These heuristics can be helpful in some situations, but they can also lead to biases and errors in judgment.

For example, people may use the availability heuristic, which involves making decisions based on the information that is most easily available to them. This can lead to biases if the available information is not representative of the overall situation.

Similarly, people may use the confirmation bias, which involves seeking out information that confirms their existing beliefs and ignoring information that contradicts them. This can lead to errors in judgment and prevent people from considering all available options.

Bounded rationality also suggests that people may not always choose the option that is objectively best in terms of the expected outcome. Instead, they may choose an option that is "good enough" given the constraints they face. This can lead to suboptimal outcomes, but it may be necessary in situations where time and resources are limited.

Overall, bounded rationality is an important concept in understanding how people make decisions and how their decision-making processes are influenced by cognitive, informational, and environmental factors.

Suboptimization

Suboptimization is a concept that refers to the situation where an individual, group, or organization focuses on optimizing one part of a system or process at the expense of other parts. In other words, suboptimization occurs when an entity prioritizes the optimization of a subsystem or component rather than the overall system.

Suboptimization can lead to inefficient or ineffective outcomes because it fails to consider the interdependent nature of systems and processes. When a subsystem or component is optimized without considering its impact on the rest of the system, it can create unintended consequences or conflicts with other parts of the system.

For example, in a manufacturing plant, suboptimization might occur if the production department focuses solely on maximizing output without considering the impact on quality

control, maintenance, or other departments. This can lead to an increase in defective products or equipment breakdowns, which can ultimately reduce overall efficiency and profitability. Suboptimization can also occur in decision-making processes when decision-makers prioritize one objective over others without considering the trade-offs or implications of their decisions on other objectives or stakeholders. This can result in suboptimal outcomes that fail to meet the needs or interests of all stakeholders.

Overall, suboptimization is a concept that highlights the importance of considering the interdependence of systems and processes when making decisions or optimizing performance. It suggests that optimizing one part of a system at the expense of others can lead to inefficient or ineffective outcomes.

Decision theory

Certainty

- Rare exist
- Choose the best available

Decision-making rules used in decision theory under uncertainty

Criterion	Description	Benefit	Drawback	others
Maximin	• select the option minimizes the potential loss or regret among a set of alternatives. • decision-maker assumes that the worst possible outcome will occur, and chooses the option that minimizes the potential losses.	• Useful in risk-averse situations where minimizing potential losses is the top priority	• Can result in overly cautious decision-making and does not consider potential gains	also known as the pessimistic criterion
Maximax	• Selects the option that maximizes the maximum possible outcome among a set of alternatives • Choose the option with the highest possible outcome	• Useful in risk-seeking situations where maximizing potential gains is the top priority	• Does not take into account potential downside risks or the likelihood of achieving the maximum outcome • Assumes the best possible scenario will occur	also known as the optimist criterion
Hurwitz	• used to select the best option among a set of alternatives by	• Balances potential risks and benefits while taking	• Assumes decision-maker has a fixed level of risk aversion	

	calculating the regret associated with each decision option • choosing the option that minimizes the maximum possible regret. • focuses on minimizing the potential worst-case outcome, while still taking into account the potential benefits of each option.	into account potential worst-case scenarios • useful in situations where the decision-maker is risk-averse, meaning that they are more concerned with avoiding potential losses than with maximizing potential gains. • useful when the decision-maker lacks complete information about the potential outcomes of each option.	• Does not consider the likelihood of outcomes • Can be overly cautious • Can be complex to calculate	
Laplace	• Selects the option with the highest expected outcome • assuming all outcomes are equally likely and assigning equal probabilities to each outcome	• Useful when the decision-maker lacks complete information about the probabilities of each outcome	• May not be appropriate when the probabilities of different outcomes are known or when the decision-maker has preferences for certain outcomes	
Minimax regret	• Selects the option that minimizes the maximum possible regret, which is the difference between the best possible outcome and the outcome that was actually achieved	• Balances potential risks and benefits while focusing on minimizing potential regret	• Assumes the decision-maker has knowledge of potential outcomes and regrets and may not always result in the optimal outcome	

Minimax regret is similar to the Hurwitz criterion, but it also takes into account the potential regret associated with each option. It focuses on minimizing the maximum regret, rather than maximizing potential gains or minimizing potential losses.