

THE ANCHORING AND ITS IMPACT TO THE RATIONALITY OF THE DECISION MAKERS

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Abstract

Decision making theory offers a variety of methods and tools to support decision making. These methods and tools are, however, based on the rationality of the decision maker. The prerequisite for most of these methods and tools to be effective is principle called „homo oeconomicus“. Unfortunately, the assumptions of rationality of the decision maker are difficult to fulfill. The decision maker faces various traps and pitfalls at every stage of decision making process. The traps and pitfalls weaken the rationality. The paper describes various traps affecting the rationality of the decision maker such as anchoring trap, status quo, seeking confirming evidence etc. In the second part, the attention is aimed on the anchoring trap and its impacts on the process of decision making. The results of scientific researches focused on anchoring trap are discussed. Own research oriented on the anchoring trap is described. Ways out of these traps are outlined in the next part.

Key words: homo oeconomicus, irrationality, anchoring trap, decision making.

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Introduction

Individuals who directly or indirectly participate in decision-making are the main and mostly the most important component in the process of decision-making. Methods and tools used to support decision making are based on the concept of the **rationality of decision-makers**. The rationality is influenced among others by qualification of decision-maker, his knowledge, experience and analytical skills. Recently, abilities to acquire and process information are especially important. The rationality is influenced by the applied style of decision-making and problem solving as well as risk attitude.

Rationality is the key condition for successful application of the methods and tools of decision-making. **Rational decision-making** maximizes achieving given goals. The goals are set by individuals, groups or whole organizations. Economically rational decision-makers systematically search for the optimal solution to problems and so maximize his utility.

1 Decision maker's rationality

Rational decision maker is called "homo oeconomicus". The term "economic man" was used for the very first time by John Stuart Mill who criticized attitude towards economics at that time; especially not taking account of individuals' needs (Persky, 1995). The concept is based on the presumption of rational behavior of individuals and their ability to make rational decision according to the judgment. Homo oeconomicus maximizes his utility in terms of consumer or economic gain.

The theoretical concept of homo economicus has been criticized for decades. Alternative concepts have been created: homo reciprocans, the theory of economic gains, Kahneman speaks about bounded rationality (Kahneman, *Maps of Bounded Rationality: Psychology for behavioral economics*, 2003).

Presumptions of homo oeconomicus is very difficult to fulfill. Various traps affect the decision makers in almost all of the phases of decision-making process. The traps are center of the criticism of model of rationality (Ariely, *Predictably Irrational: The Hidden Forces That Shape Our Decisions.*, 2008), (Camerer, 1999), (Frank, 1987), (Persky, 1995), (Faber, Petersen, & Schiller, 2002), (Thaler, 2000). Most of the authors belong to behavioral economics¹.

Empirical research proved the influence of systematic flaws to quality of decision-making (Hammond, Keeney, & Raiffa, 1998), (Kahneman, Slovic, & Tversky, *Judgment Under Uncertainty: Heuristics and Biases*, 1982), (Ariely, *Predictably Irrational: The Hidden Forces That Shape Our Decisions.*, 2008), (Gilovich, 1993). The flaws affect decision-makers especially within the phase of problem identification and analysis. The phase requires processing and evaluation of information. First impression or idea can anchor individual's mind so he search only confirming data. Decision based on such skewed and incomplete information lacks quality. This decision than becomes status quo for next actions. Sunk costs are rising. Leaving the alternative is getting much more complicated

2 Anchoring

Anchoring or anchoring trap denotes disproportionate weight put on the first information received. The first information, impressions, ideas anchor subsequent judgments (Hammond, Keeney, & Raiffa, 1998). Anchoring trap has been usually presented on numbers. Individuals are given a number anchor and they are asked to value or guess some information. The

¹ Behavioral economics concern with impacts of social, cognitive and emotional factors on economic decisions of individuals and institutions. Behavioral models join psychology and neoclassical economic theory

number anchor is than the starting point. People stay close to that number in their valuations or guesses. The difference from the anchor is not sufficient. People are not able to deviate from the anchor.

Previous researches investigate influence of anchors on individuals in different situations. Tversky and Kahneman (1974) let respondents spin the wheel of fortune with numbers from 0 to 100. The respondents were asked whether the number of members of United Nations from Africa is greater than or less than the number from wheel of fortune. Even though respondents saw the absolute randomness of setting the number, estimates were significantly related to the number spun on the wheel. (Tversky & Kahneman, 1974)

Ariely, Loewenstein and Prelec (2003) proved effects of anchoring between last two digits of social security number and maximum price willing to be paid for given products such as wine, books, chocolates, keyboard etc. Second important finding from this experiment is the coherent arbitrariness. (Ariely, Loewenstein, & Prelec, "Coherent Arbitrariness": Stable demand curves without stable preferences, 2003)

Three own experiments were performed to find out how the anchoring works (experiment 1), if it is possible to reduce its effects with reminding it (experiment 2) and if the anchor affects more than one answer (experiment 3).

2.1 Experiment 1

Own experiment (Švecová, Habilitation thesis, 2013) to test anchoring has been performed repeatedly on students of University of Economics, Prague as a part of the course Managerial decision-making.

Students were divided into two groups of proximately the same size. The first group was asked to answer question "Do you think that GDP of Democratic Republic of Congo is more or less than 500 USD per capita? And what is your best guess?" Students wrote down answers anonymously and handed the paper to the teacher. The second group answered the same question with one change – the number was 1500 USD.

Results unequivocally showed the effects of the anchoring. Average GDP by the first group was 506 USD (very close to anchor of 500 USD). Average GDP by the second group was 1008 USD. The experiment has been repeated many times with similar results. The number asked in the question has been always something students do not know such as GDP, population or area of less known country.

2.2 Experiment 2

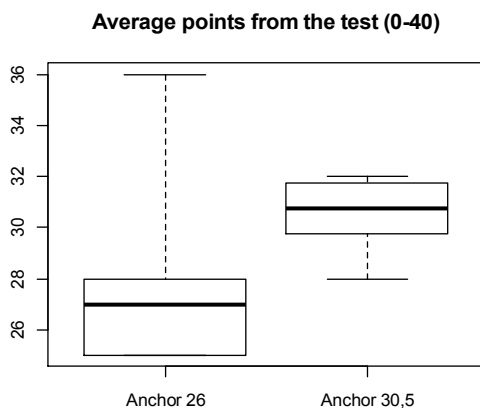
The experiment with students of the course Managerial decision making was repeated at the end of the semester to test if the knowledge of the existence of anchoring lowers down its effects. In the first week of semester students took part in an experiment analogical to the previously described experiment. The anchoring trap was explained to them with other examples and its consequences. At the end of the semester, after thirteen weeks, similar experiment was conducted. To test the effect of knowledge of existence of anchoring, students were reminded of its existence. The test contained three questions from which two were important for the experiment:

1. “We talked about a trap when people disproportionately weight first information received. Do you remember the name of the trap? If so, write it down.”
2. “The average points gained from final test last semester was xx out of 40. What will be the average points gained from final test this semester?”

“XX” was replaced with the number of 26 for one group of students and 30.5 for another. Students were strictly asked to write the response individually without cooperation with others and were guarded. The total number of 26 answers was received. One response sheet was excluded due to unreasonable answer (70 points from the test while the maximum is 40 points as stated in the question). The total number of 25 answers was analyzed.

Boxplots in Figure 1 and characteristics in Table 1 clearly indicate the difference between answers according to the anchors. In the first group – with the anchor of 26 – there is one outlier – the maximum value 36. The second highest estimated average points are 30. Means differ a lot and are very close to anchors – mean 27.54 for the anchor 26 and mean 30.58 for the anchor 30.5. The mean of the first group is again deflected by the outlier.

Fig. 1: Boxplots for estimated test points



Source: Authors' experiment

Tab. 1: Characteristics of estimated test points

	Anchor 26	Anchor 30.5
Minimum	25.00	28.00
1st Quartile	25.00	29.88
Median	27.00	30.75
Mean	27.54	30.58
3rd Quartile	28.00	31.62
Maximum	36.00	32.00

The estimated points gained from the final test were affected by the anchor not only in its absolute value but also in terms of scale. Students with anchor of 26 wrote only the whole numbers while students with the anchor of 30.5 used also decimal numbers (in 33.3 %). The average deviation from the anchor was less than 6%. 75% students changed the anchor less than 5% of the value (the third quartile is 0.0492).

Knowing the anchoring and its effects does not help not being affected by it. Students stayed with their estimates very close to the anchor.

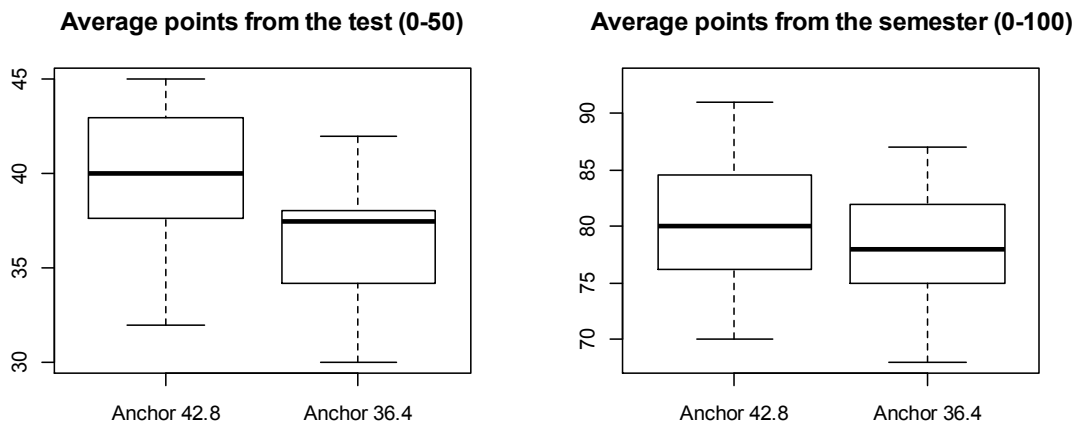
2.3 Experiment 3

Experiment 3 was designed to test the effect of anchor in two questions. Respondents were students of the course Innovation management. Students responded the questions during the final test. The questions were:

1. "Average points gained from the final test in the last semester were xx out of 50. What will be the average points gained from the final test in this semester?"
2. "What is your estimate of average points gained from the whole semester (from 0 to 100)?"

"XX" was replaced with the number of 42.8 for one group and 36.4 for other. The total number of 111 answers was received. Some answers were not included in analysis due to missing answer to one of the questions or due to unreasonable answers; e.g. 36 points (maximum 50) from final test and in total 37 (maximum of 10) from the whole semester. High level of excluded answers may be due to stress from the final test. The final set of 101 answers was analyzed.

Fig. 2: Boxplots for estimated test and semester points



Source: Authors' experiment

The effect of anchoring is clearly visible also in this experiment in answers for the first question. The average estimate points from the finals test was 39.67 by students with anchor 42.8 and 36.58 with anchor 36.4. Boxplots and statistical characteristics are displayed in the Figure 2 and Table 2.

Tab. 2: Characteristics of estimated test and semester points

	Test points Anchor 42.8	Test points Anchor 36.4	Semester points Anchor 42.8	Semester points Anchor 36.4
Minimum	32.00	30.00	70.00	68.0
1st Quartile	38.00	34.20	76.30	75.0
Median	40.00	37.50	80.00	78.0
Mean	39.67	36.58	80.25	77.7
3rd Quartile	43.00	38.00	84.25	82.0
Maximum	45.00	42.00	91.00	87.0

Source: Authors' experiment

Answers for the second question (average points from semester) are different between the two groups of students. The group with the anchor 36.4 estimated less semester points than the group with the anchor 42.8. All the basic characteristics shown in Table 2 are smaller for the second group compared to the first group. But the difference is not as significant as in the answers to the first question.

The correlation between answers for the first and second question is 0.4. It is positive which means that higher test points are connected with higher semester points and also higher anchor. Although Ariely declared relations with correlation coefficient around 0.4 as proved relations (Ariely, Predictably Irrational: The Hidden Forces That Shape Our Decisions., 2008), authors do not consider it as a strong evidence.

The total points gained from the whole semester are the sum of points from partial activities such as seminar thesis, activity etc. The knowledge of gained points from the partial activities could have affected the answer for the second question.

2.4 Anchoring in practice

The anchoring trap can be found in many different ways and situations in the managerial practice (Švecová, Fotr, & Renner, The Influence of Irrationality on the Innovativeness of Variants and the Quality of Decision Making, 2011).

Anchoring strongly affects various estimates of future values of costs, sales or probabilities of risk factors. The anchors in these cases are the previous values. Managers start with the values from a few last years and modify them. The risk factors are usually

underestimated and the historic data are overrated. It is cardinal mistake especially in the turbulent global environment.

Errors in predicting forecasts due to anchoring bias were confirmed by Campbell and Sharpe on the example of monthly economic releases. They are biased toward releases from previous months (Campbell & Sharpe, 2009).

Anchoring trap affects also strategic decisions when the problem is complex, ill-structured and lot of aspects is unknown such as investment in a new information system or implementation of kaizen approach. The first price bid becomes the anchor to which all bids are compared to.

Ignorance especially in the case of prices creates great environment for anchoring trap. It concerns not only brand new technology but also markets with significant price fluctuations. In individuals' minds the previous price is the anchor. Individuals compare prices to the previous ones which can be used in company's pricing strategy. Behavioral economists call it decoy effect. Typical industries where is the decoy effect used effectively are hardware, mobile phones and other electronics

Public contracting is a field where price anchoring plays a big role. The contracting entity has to announce expected price of the contract. It is not a surprise than that the bids do not differ much in their prices.

2.5 Reducing the anchoring trap

Some actions can reduce the effects of anchoring trap such as considering the problem from different points of view and evaluate different aspects of the problem. It is important to create more alternatives to select among before becoming attached to one solution (Švecová, Habilitation thesis, 2013). Searching more information is always a good idea.

Open mind helps open individuals' horizons. Involving other people to the process brings more opinions, more ideas. The first step should be considering the problem individually because others' opinions may become anchor.

In a group meeting with the goal to gather more ideas, manager should not tell his ideas as the first one. Superior's opinion works as an anchor for many subordinates.

In an argument the anchor can be used to affect the opposite side. For one side of an argument, anchor is advantage while for other disadvantage.

Conclusion

Anchoring is one of the traps affecting the rationality of decision makers. Although the theory knows the bounded rationality of decision makers, they are not aware of it themselves sufficiently. Students do not believe in the effect of the anchoring until proven so.

Own experiments confirmed effects of the anchoring. The first experiment concentrated on the anchoring trap itself. Students stayed with their answers very close to the anchors. Experiment 2 was designed to test the effect of knowing the anchoring to reducing its effects. No effect was found. Students estimated the points close to the anchor. The experiment will be repeated in the future due to small sample size. Experiment 3 showed permanency of anchoring effect. The anchor affects also answers to next questions. The results of the experiments are not strong. Other aspects could have affected the results such as stress from the final test, points gained during the semester etc.

The first step in reducing the effects of these traps is to be aware of them. But the awareness itself is not sufficient as proven in the experiment 2. The theoretical knowledge does not help. Students in the experiment did not have the chance to use some other actions to reduce the anchoring trap. Testing the possible actions to reduce the anchoring trap is necessary. More experiments of this topic are needed.

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