# A Study on the Anchoring Effect: Definition, Applications and Optimization

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**Abstract.** Behavioral economics is a branch of economics that shows the irrational decisions made by people due to the presence of bias and heuristics. This essay delves into a predominant bias, the anchoring effect, and mainly discussed its applications in real world examples. The first application discussed is about the anchoring effect in judicial decision makings, where judges are affected by the anchors so they make irrational sentencing decisions; secondly, anchors can significantly influence consumers' purchasing decisions because of the anchors businesses deliberately used, for example, pricing and advertising; lastly, the anchoring effect on property price listings is analyzed, where people often perceive higher values for the high-anchored houses. Through the research, it can be concluded that the anchoring effect is ubiquitous among all kings of people, and even irrelevant anchors can surprisingly influence experts' final decision makings. What people can do to either mitigate or effectively take advantage of this bias were also presented in this essay.

**Keywords:** Anchoring effect, Heuristics, Judicial decisions, Marketing, Property.

## 1. Introduction

Behavioral economics uses variants of traditional economic assumptions, often with a psychological motivation, to explain and predict behavior, and to provide policy prescriptions [1], integrating insights from psychology and economic theory. People do not always make rational decisions due to the presence of heuristics, the concept introduced by Herbert Simon in the 1950s and enhanced by Tversky and Kahneman [2]. Heuristics are mental shortcuts that allow people to make fast decisions based on their past experiences [2], and heuristics are commonly used in making decisions, for example, financial decisions, investment decisions, and even the most of the choices that individuals have to make in everyday life. However, heuristics may sometimes lead to cognitive bias, hence resulting in irrational human behaviors.

The cognitive bias that is discussed in this essay is the anchoring effect. The definition, importance and more importantly, its applications are discussed and analyzed in this essay. The anchoring effect is used in a variety of domains, including negotiations, financial market, investment decisions, stock purchasing, and many other areas. In this essay, three applications are listed, including the anchoring effect in judicial decision makings, in marketing and on property pricing decisions. Experiments conducted by past researchers are presented to verify the effects of anchoring in certain fields. Mechanisms behind certain behaviors are investigated, and what people can do is examined, depending on what groups they belong to.

## 2. The Anchoring Effect and Why it Matters

"In many situations, people make estimates by starting from an initial value that is adjusted to yield the final answer. The initial value, or starting point, may be suggested by the formulation of the problem, or it may be the result of a partial computation. In either case, adjustments are typically insufficient. That is, different starting points yield different estimates, which are biased toward the initial values." This is the definition of anchoring given by Kahneman and Tversky, the discoverers of anchoring effect. People tend to stick to the initial information they have seen and adjust their final judgements based on this value. However, they do not adjust enough, which leads to decision-making deviation.

Anchoring effect, especially for numerical anchoring, has been considered one of the most robust psychological phenomena in judgment and decision-making [3]. By understanding the anchoring effect and how it works, people might be less influenced by the anchors and thus make more radical decisions as an “economic man”.

# 3. The Impact of Anchors in the Court

## 3.1. An Experiment on the Impact of Anchors in the Court

In deciding sentencing decisions, legal professionals may face a lot of kinds of anchors, for example, the expected sentencing by both defendants and plaintiffs, media, and even completely irrelevant figures exposed to judges. it is shown that 63.6% of the judgements by the professionals are influenced by anchors [4], showing the considerable influence of anchoring effects in courts.

Birte Englich, Thomas Mussweiler, and Fritz Strack conducted an experiment to find out the influence of anchors in the court [5]. 42 experienced legal professionals, were divided into groups and were asked a question for the time period of sentence, with high and low anchor, directly by journalists. The participants were then asked to make their sentencing decision. As a result, groups with high anchor showed substantially higher sentence decisions with 33.38 months, while the low-anchored group gave the average sentence decision at 25.43 months. This experiment shows that even the irrelevant anchors can affect the decision made by professionals that higher anchor leads to about 8 months longer sentence decided, proving that anchors, even though irrelevant, are inveterate that even the professionals are unable to escape. People pay too much attention on and are more influenced by the initial value they are given, while do not adjust enough to make rational choice, leading to ineffective decision making.

## 3.2. Theoretical Analysis

Anchoring effect in the court can be explained by the concept of selective accessibility. A study which focused specifically on the selective accessibility effect recruited 57 legal experts [5]. Participants were asked to throw a pair of dice to determine the sentencing demand and then to classify materials into incriminating and exculpatory arguments. As a result, incriminating arguments were identified faster by participants with higher sentencing demand, which acted as higher anchors. Consequently, people tend to focus more on incriminating arguments which support high sentencing when they are exposed to high anchors. The anchor leads to people paying attention on decisions that are in line with it, thus affecting the final decision making, leading to stricter sentencing decisions, in this case. In addition, as judicial decisions are often complicated without the presence of “correct answers” for the judgement, judges tend to rely on some simple anchors as a clue to give the final judgement quickly.

## 3.3. Behavior Optimization

As judges may give different sentencing decisions on the same crime due to the presence of anchoring effects, the fairness and justice of the court will be questioned, leading to dissatisfaction among the public. Thus, reducing or mitigating the anchoring effect is necessary. Judges need to pay attention to potential anchors and avoid being exposed to the anchors by, for example, not contacting with journalists. An alternative solution is that judges can explain their decisions as accountability can effectively reduce the anchoring effect, shown in an experiment conducted by Yuval Feldman, Amos Schurr and Doron Teichman [6]. Lastly, judges should examine every facts available and relevant to the crimes, avoiding the extreme influence of a single anchor on their judicial decisions. They should also listen and take into account all information and plea provided by both sides, ensuring not being influenced by a single side and giving the unfair judgement.

# 4. Anchoring Effect in Marketing

## 4.1. Pricing

### 4.1.1. High Price as an Anchor

Firms and businesses often use pricing method to increase sales. Take Williams-Sonoma bread maker as an example. They used a bread maker with the price of $429 as an anchor to increase the sales of bread makers with price $275 [7]. The bread makers with much higher prices have only relatively slightly larger size. The effect is quite considerable that the sales of the $275 machine nearly doubled than before, when the anchor was not introduced. Thus, the anchor plays an important role in pricing because consumers can have a product to compared with, which increases the attraction and cost-effectiveness of the alternative products.

Another example is about the difference in pricing between the same product. Firstly, individuals can often see discounts of a product, where the initial price is also listed near the discounted price. This is based on the anchoring effect that the initial price acts as an anchor, which increases the consumers' perception of the value of the discounted price, hence increasing the sales. The second example is a real case in 2010, when the first iPad was introduces to the public. Media and the mass were guessing and rumoring about the price of the iPad before its announcement for at least $999 per iPad [8]. This acted as an anchor because it was unveiled that the actual price was $499, which was far below the public's expectation. Then, customers were attracted by the perceived good value of iPad, which increased the sales dramatically. Though the price was still high, customers considered the initial value they have seen as their expected value of the product, thus were more willing to buy products, with the presence of high-price anchor.

### 4.1.2. Decoy Pricing

Though decoy effect is a cognitive bias that is different from anchoring, many consumers generally use decoys as anchor points to make decisions on which of the items or combinations of items they are going to buy. In an experiment which took place in a restaurant [9], customers were exposed to two special menu items, one with decoy, while the other did not. As a result, more people chose a low-priced offer without decoy, while another group had 71.4% of people choosing high-priced offer, due to the presence of decoy. In this case, the least popular choice, or the decoy, acted as an anchor that gave consumers an initial impression and perception about the value of products, thus would more likely to purchase products with higher perceived value and lucrativeness.

## 4.2. Limiting Quantities of Products Bought

Anchoring effect is widely used in advertisements by businesses. In 2014, KFC intended to increase the sales of KFC French Fries with price and quality of the items unchanged. By advertising slogans with "A DEAL SO GOOD YOU CAN ONLY BUY FOUR", sales of chips increased by 56% [10]. To explain, the "four" packs of French fries act as an anchor to give consumers the initial amount they expect to purchase, and they then adjust according to the anchor to purchase. In other words, the anchor of "four packs" nudges them to consider to buy more than they intended to. For instance, those who are not going to buy initially may choose to buy 1 pack, while those who want to buy 1 or 2 packs may consider to buy more. In addition, this anchor can influence consumers' perception for the quality and value of French fries, and gave them a sense of scarcity, leading to them being attracted from buying the French fries.

In conclusion, businesses and firms can increase sales by, for example, giving a high price to another product as an anchor, or advertising on an anchor that nudges consumers' buying quantities, hence increasing firms' profit.

### 4.3. Optimization

The paragraphs above discuss how sellers can take advantage of anchoring effect to increase sales. As for buyers, they should try to reduce the effect placed on them in order to maximize the utility. Firstly, they should search and compare the prices for identical or similar products to see whether the prices set are reasonable. By being exposed to more than one anchors, they can avoid being influenced by a single anchor largely and better understand the real intrinsic value of the products, and hence mitigating the anchoring effect. Secondly, consumers should be more aware of the presence of anchors. they should firstly give themselves an expected price level for the products they want to buy before looking at any of the prices or other irrelevant digits given. Then, by comparing the listed price with their expected value, they will be more price sensitive and hence reduce the anchoring effect. They should also correctly identify the anchors by knowing the knowledges of how anchoring in behavioral economics can influence their final decisions.

## 5. Anchoring Effect on Property Pricing Decisions

### 5.1. Case Study

The anchor set for properties can significantly influence people’s perceived value for the house. In a study which was set in the real world rather than in a laboratory, participants [11], including amateurs and experts, were equally divided into four groups and were exposed to four different listing prices for the same property. The listing prices are the anchors in this experiment, and two of them are higher than the actual selling price of this house, while the other two are lower. They were provided with ten identical pages of related information, and the only difference is the listing price. They were then asked to evaluate the value of the house. The result was shown in the table below that both amateurs and experts were impacted by the anchor, and hence giving the value of the property that is similar with the listing price given. Though the experts were more susceptible to decision bias and denied using the listing price to consider the value, they were still affected by the anchors, meaning the anchoring effect was wide-spread and influencing everyone, even without notice.

### 5.2. Theoretical Analysis

The result of the study can be explained by adjustment insufficiency [12]. Though participants have sufficient information and knowledges, they do not adjust enough from the anchor given, thus give values higher than real values.

### 5.3. Behavior Optimization

The study shows the reasonableness for applying the anchoring effect for sellers setting the price of the real estate. The sellers can set a high price for the properties they are willing to sell. This can give buyers a reference price. They may not adjust enough around the anchored price, and thus making the bargain more profitable for sellers because buyers charge a higher price in the presence of anchors. In addition, sellers can give a more precise initial price to increase the effectiveness of anchoring. For instance, when providing an initial listing price for a house of $255,500 is more likely to attract customers with price $256,000 or $255,000[13], because higher precision is seemingly more reliable and trusted by buyers. However, sellers have to be aware of not giving a very unreasonable anchor, which set an extremely high initial price, as this will lead to impasses and buyers’ suspicion about the price, resulting in the ineffectiveness of the anchoring [14].

As for buyers, what they should do is to be aware of the anchoring and try to mitigate the effect. Firstly, they should be given a reminder that they have a choice [15], which may mitigate the effect of anchoring bias because they may think more about the potential price that they can negotiate, rather than being manipulated by the initial price given. Secondly, they should not be over-reliant on experts. According to the experiment, the experts are also affected by the anchors. Buyers should consult the experts to adopt some of their advices while thinking independently for the accuracy and reliability of their suggestions. Thirdly, they should make more preparations. By searching for the price of another house with similar features [13], they can get more anchors, counteracting the influence of a single anchor. As a result, buyers can purchase the house with a more reasonable price by not being anchored.

## 6. Conclusion

This essay mainly discussed how the anchoring effect can be applied into various areas and ways to either mitigate or benefit from this bias. In judges' judicial decision makings, judges tend to be influenced by even irrelevant anchors due to selective availability, and make sentencing period longer if they are exposed to high anchors, and vice versa. In marketing, businesses take advantage of the anchoring effect by, for example, set a high price for another product or the initial price of the product they want to sell as an anchor in order to increase the sales of the targeting products. In real estate price listings, people, no matter experts or not, often overestimate the real value of the houses after being exposed to high anchors, meaning the sellers of the properties can use the effect to raise the selling price. It is found that anchoring effect takes place in almost everywhere, and is influencing everyone in the world, even with anchors that are irrelevant. In the future, sellers can further use the anchoring effect to maximizing profits, while buyers and judges that represent the groups that are influenced negatively by the anchors can take differentiated actions that are suitable to be used in the domain to mitigate the anchoring effect.

This paper, however, does not give details about how to effectively deal with the anchoring effect by carrying out experiments. Thus, the future research should focus on whether some particular actions, for example, accountability by judges, can effectively mitigate the harmful effects of anchors in the court, and the mechanisms behind it, which are not found yet.

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