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Revisiting the Anchoring Effect: Summary and Outlook

Jie Ding[1,a,*]

[1]*Binzhou University, No.5 Huanghe Road, Binzhou, 256600,China*
a. dingjie940209@gmail.com
**corresponding author*

Abstract: The practical application of anchoring effect has been paid much attention in the commercial field. Research in recent decades has shown that the effects of anchoring are very powerful. In different contexts, it can be manifested through a wide range of decision-making tasks in different groups. There are many forms of "anchoring" that influence people's thinking and judgment, such as casual comments from friends, numbers on TV, and fixed opinions about people's skin color, appearance, and clothing may affect your thinking and judgment on a certain issue before you realize it. One of the most common types of "anchoring" in business decisions is based on past events and trends that lead to poor decisions. This paper discusses the anchoring effect in many different fields and tasks under the influence of anchoring, and how the anchoring effect is related, developed, and further influenced. This paper also focuses on the judicial decision and consumer price negotiation to explore the influence of anchoring effect. Finally, we look at the effects of anchoring from these two perspectives.

Keywords: anchoring, decision-making, negotiation, judicial sentencing decisions

1. Introduction

The role of anchoring effect has been verified in the study of judgment and decision problems in many fields, from everyday phenomena, for example, the impact of promotional advertising on consumers' purchase quantity decisions to risk assessment problems such as estimating changes in stock market indexes; From general knowledge problems, gambling estimation problems, judicial sentencing problems, auction price evaluation problems, consumer price negotiation problems, game evaluation problems, software evaluation problems, many studies have followed and developed the research framework of Tversky and Kahneman, and extended the research to field experiments and real situations. It is proved from different angles that the anchoring effect is a universal, active and difficult to eliminate judgment bias.

Behavioral economics is a doctrine built on judgment heuristics, called mental shortcuts, that most people form by instinctively relying on rules of thumb [1]. While using rules of thumb reduces many of our cognitive limitations, on the other hand, it can also lead to serious systemic errors, resulting in bias and errors in decision-making, which can have serious implications. [2].

The concept of heuristics was first put forward by Simon [3], who proposed a behavioral model that emphasized "limited" rationality, and he believed that decision making is a dynamic outcome reached through a process of adjustment to external circumstances and internal factors. This model is also known as the heuristic cognitive model.

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Anchoring heuristic is a common phenomenon that exists in daily life, and it is often used in human's judgment of daily things. Slovic proposed the concept of decision anchoring, which became the earliest discussion on decision anchoring [4], who elaborated on the description of the reversal of preferences in Chapman and Johnson [5].

Tversky and Kahneman provided an early explanation of the anchor-adjustment heuristic [2]. They believe that due to people's inadequate adjustment. As a result, judgments based on initial values or parameters do not give a final evaluation. In other words, if a person is at a higher anchor point, then he needs to pay attention to downward adjustment, and conversely, if a person is at a lower anchor point, then he needs to make upward adjustment.

However, Mussweiler and Strack argue that adjustment alone cannot account for the effects of anchoring effects [6]. Strack and Mussweiler argue that the adjustment process can explain the anchoring effect only if the given anchor point is more extreme than the boundary value of the range of reasonable answers [7]. In addition, Mussweiler and Englich has proved that people can assimilate to fixed values, a response that is often unconscious. [8], meaning that the adjustment process may not occur in anchoring.

Psychological explanation of the anchoring effect. Russo further analyzed and discussed three different types of anchoring effect in the literature. The first analysis shows that due to the uncertainty of quantity, the first reasonable value exists in the anchor search and the distribution of uncertain values, resulting in a final estimate that is skewed towards the anchor point [9]. Recall preference exists in people's past experience, and this preference is uncertain, but this mechanism is feasible. Increase the likelihood of system reliability issues related, where the points of anchoring are taken as suggestions about the correct answer provided by the context [10].

From a psychophysics perspective, Sherif et al. give a specific definition of anchoring effect [11], i.e. When the stimulus judgment exists on a continuum, two points located at the head and end are used for comparison with other stimuli.

The anchoring effect is seen as an unconscious operation, so even if people are warned, they cannot avoid it.

2. Types and Research Paradigms of Anchoring Effect

2.1. Semantic Priming Paradigm

Sperber et al. are interested in more automatic types of semantic priming. In their experiments, subjects were asked to identify stimuli (labeling pictures or reading words) as quickly as possible. The stimuli are presented in pairs (the target follows priming), but there is no mention of the underlying relationship between the stimuli. Under these conditions, semantic priming effects can be inferred from the reduced in response time to the target in the correlated pairs.

For example, in the study of Jacowitz & Kahneman, D. [9], subjects were asked to consider the comparative judgment question "The length of the Mississippi River," and then they were asked whether it was longer or shorter than 5,000 meters.

2.2. Numerical Priming

Wilson et al. used the method of digital priming paradigm to conduct some experiments to discuss and study the influence of anchoring effect. For example, they demonstrated the anchoring effect of mere numerical representation by giving the experimental group an ID number, telling them it was random (it was actually between 1928 and 1935), while the control group received no ID number, and then asking them to estimate to estimate how many doctors appeared on a list in a local phone book. It is called the base anchoring effect. He further suggests that anchoring is a general

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psychological process that is more likely to occur in natural situations than in classical anchoring experiments.

2.3. Anchoring Effects of Self-Generated Anchors and Experimental Anchors

Self-generated anchoring refers to the intrinsic anchor values spontaneously generated by the subject when making judgments under uncertain situations. The experimenter - provided anchoring refers to the external anchor value provided by the experimenters, i.e., classic anchor in anchoring.

The study addresses many different debates about the anchoring effect, and, among these theories, which one is correct. In this debate, they discussed and came up with two types of anchors, self-generated anchors and experimental anchors, in which the experimental anchors are mainly the result of a series of external experiments [12].

Epley & Gilovich, T. proposed the classification of self-generated anchoring and experimental anchoring [12], introduced the self-generated anchoring value is introduced into the anchoring effect study, and verified the "inadequate adjustment" heuristic by manipulating the experimental situation of self-generated anchoring and experimenter-provided anchoring. In their study, participants were asked to estimate the year in which George Washington became president and account for the type of self- production. For some participants, although they may not know the specific answer to the question, they may associate a lower or higher anchor point that they may know (e.g., the date of the American Revolution began in 1775), and then they will adjust up or down in this range (e.g., 1777, 1778, etc.) to arrive at the answer. What's more, the anchor point (1775) is determined by the participants' thinking and is self-generated, and Epley and Gilovich argue that people will generate self-generated anchors in this way, and then adjust the anchor point. They also took the range of values considered reasonable by the subjects when estimating the target value as an important variable in the experimental analysis, it not only reveals the process of the subject's judgment adjustment, but also gives its scope, and thus obtaining evidence of the "insufficient adjustment" heuristic psychological mechanism.

The results show that whether the subjects are asked to compare or not, as long as there is an "anchor", there will be an anchoring effect.

3. Theoretical Explanation of Anchoring Effect

Recent decades of research on behavioral decision-making have shown that people can construct different judgments according to their needs, and these judgments are often influenced by different constructed environments. The application of anchor-adjustment heuristic reflects this effect [2][5], which has become a focus of research and discussion. In this heuristic, an initial value is started, and the decision maker adjusts it as needed to arrive at the final answer. In this process, it has been observed that there is a systematic bias whereby decision-makers tend to arrive at a judgment that is biased towards the initial anchor point, and then adjust up and down to arrive at an answer based on that judgment.

Psychological studies on the "anchor-adjustment" theory show that :(a) the value estimation is deeply affected by the anchor point selected in an arbitrary way; (b) the value estimation will not adjust the reference point sufficiently, let alone the real value of the estimated object [14]. Insufficient adjustment to the estimation bias of anchor points is the source of decision bias. Tversky and Kahneman conducted a series of experiments to test their hypothesis. Using the United Nations as a reference point, they asked participants to estimate the proportion of African countries [2]. Subjects rotate the "wheel of fortune" to obtain a number between 1 and 100. For the subjects, they first need to judge whether the obtained number is above or below the correct result, and then give their estimate. After a second random-generated estimate, it is estimated that the share of African countries is higher

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than the estimate after taking into account the 10% anchor point. Moreover, this anchoring of the estimated object was not reduced when an accuracy reward was offered.

Determining that anchoring and adjustment must lead to the occurrence of judgment bias has become the research focus of Tversky & Kahneman [2]. In context, however, the effect proved to be powerful, for example, in Mussweiler & Strack's assessment of car prices and in real estate professionals' assessment of house prices [10][13].

Chapman & Johnson argue that an early part of the anchoring process is crucial: retrieving features of the target from memory [5]. They propose a mechanism, called confirmatory search, in which people focus more on the similarities between targets and reference points than on the reasons for the differences.

The purpose of this paper is to further discuss the nature of anchoring effects, such as whether random numbers in memory have an effect on irrelevant judgments. Although the theory of anchoring and adjustment has been studied for many years, the study of the starting conditions in the anchoring process remains to be solved.

In a current study, we predicted that knowledgeable people are less affected by the anchoring effect because they can find answers directly from memory. In the study on anchoring effect, there is sufficient evidence to confirm this judgment, that is, the smaller the anchoring effect, the higher the certainty [5].

The anchoring effect occurs in the real world and is a powerful judgment bias in our daily life. Anchoring effects are prevalent in a wide variety of judgments, such as estimates of the average temperature of Antarctica [6], general knowledge problems [2][9], Evaluation of automobile prices [13], evaluation of real estate prices [10], and price estimation [13][15], Judicial sentencing decisions [16], Consumer price judgments [17], Expert proficiency and criminal sentencing [16][18]. The previously considered anchor values eventually assimilate one's final judgment step by step.

Not only does the anchoring effect have an effect in many situations, but its effect is also very powerful. First, anchoring occurs even when anchor values clearly do not provide information for critical estimates, for example, because they are chosen at random [2]. Moreover, even incredibly extreme values can produce this effect [5][7]. For example, in the study of Strack, F. and Mussweiler, T. [7], they estimated the age of Mahatma Gandhi and gave a rather high anchoring value, which was eventually found to be unreasonable.

3.1. Selective Accessibility Model

Mussweiler & Strack used the selective accessibility model to evaluate the price of a car [13]. The experiment used decision heuristic---anchoring and adjustment. In their study, 33 mechanics and 16 dealers evaluated a 10-year-old car, and 60 people in total participated in the evaluation. They were told the experts' prices for the car, the low and high anchoring values set by the experiment, as well as information and prices related to the car, and asked to give their own estimates of the car. Half of the participants were given low anchoring values and the other half were given high anchoring values. Before they gave their estimate, only some of the participants went on to be asked why the anchoring value was inappropriate, and finally they were asked to give their estimate. The experiment shows that the size of the anchored price information has a significant impact on the valuation of both mechanics and dealers.

The basic assumption of the selective accessibility model about the anchoring effect is that it is, in essence, a knowledge-based accessibility effect, and therefore anchoring is essentially a semantic effect. At the same time, the model combines social cognitive theory with the hypothesis consistency principle and semantic priming principle to analyze and explain the anchoring effect. The study shows that the model also uses comparative judgment, thus increasing the anchor consistency. [6-7].

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Northcraft & Neale studied the valuation of housing prices in the real estate market [10]. Their research demonstrates the effect of anchoring on market pricing decisions. In their study, hobbyists and property experts were asked to assess the value of a property. Before they made their assessment, they were given relevant information about the housing and real estate market. The results show that the evaluation size of real estate price has an impact on both outsiders and experts. In particular, outsiders are more influenced because they are more influenced by the anchor information and more dependent on the anchor information given.

3.2. Application 1

Anchoring is a kind of common and impact on human judgment and strong effect, it is a steady influence of all kinds of natural environment of numerical evaluation. As criminal sentences are often associated with numerical quantities (i.e., imprisonment or fines), anchoring may also have an impact on this problem area. Moreover, this bias may even affect professional fields, such as experienced judges. From this perspective, we find that there are differences in the anchoring effect in sentencing: that is, the judge affects the sentencing result by using different anchor points, so that the judge makes different sentencing decisions, and the final sentence may be different.

In this application, we discuss and study how judgment anchoring affects judicial sentencing decisions.

Enough, B., and Mussweiler, T. focused on discussing and studying the application of anchoring effect in court. As a typical case, anchoring effect has a strong impact on judicial sentencing [16]. The application of anchoring effect in numerical judgment has been proved in many fields. In addition, we found that judicial decisions are also affected by the anchoring effect. The anchoring effect in the court can be used as a sentencing figure to make a difference in sentencing.

In their study, 19 German trial judges, 15 men and 4 women, participated in the experiment as participants, and they did so by means of random assignment. Under different experimental conditions, the distribution of men and women was even. Participants received the same case material describing the alleged rape case, as well as the relevant paragraphs in the criminal law. We set the prosecutor's sentencing requirement at 2 months under low anchor conditions and 34 months under high anchor conditions.

In their study, participants were first told separately that the prosecutor was seeking a sentence of 2-34 months for the defendant. They were then asked to indicate whether they agreed with the sentencing outcome, whether the sentence was low or high, and finally they were asked to give their assessment of the sentence they thought was correct. In addition, they were asked to indicate how certain they were about this sentence, on a scale of 1 to 9. Finally, they were asked how true they thought the case was, again in numbers. For the final sentencing decision, a shorter sentence in the first case is considered reasonable if the judge is influenced by the sentencing request made by the prosecutor.

The data suggest that sentencing decisions are heavily controlled by prosecutors' requests. In fact, the final verdict was 10 months apart. These results, in line with previous research results, show that sentencing decisions exist in daily life, and the final verdict is often closer to what people suggest or require [19-20].

The results show that the evaluation of the initial sentence requirements seriously affects the final decision of the judge produces different differences. Therefore, for the decision, given the prosecutors claim to the sentencing will directly affect the result. Research has shown that the sentencing needs of prosecutors can influence the final decision of judges in a case.

Thus, another logical question is: Can the anchoring effect of the prosecutor's request be detected and corrected by defense counsel in time? This answer may be influenced by relevant factors, but the final answer is no, that is, the defense counsel will not correct the sentencing decision. According to

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a recent study by Englich et al., sentencing requests by prosecutors influence not only the sentencing of judges, but also the recommendations of defense attorneys. More specifically, their findings suggest that the defense attorneys did not oppose the prosecutors' initial request, but instead delayed their own sentencing recommendations.

In their study, participants received the same case material describing the alleged rape case, along with the relevant paragraphs in the criminal law. In previous studies (e.g., Under low anchoring conditions, the prosecutor's sentencing requirement is 12 months, and under high anchoring conditions, the prosecutor's sentencing requirement is 34 months. Defense lawyers' sentencing requests for the proposed rape ranged from an acquittal to 30 months in prison. On top of that, when asked about their own sentencing recommendations, defense attorneys suggested that if they faced the prosecutor's high demands, the defendants would receive a higher sentence than if they had previously faced the prosecutor's low demands.

The judge's decision in the rape case gave sentences ranging from six months to 48 months. The sentencing requirements manipulated by the prosecutor, together with the bias requirements of the first part, have a clear influence on the judge's decision. Like the defense's counterclaim, the judge's sentencing decision was assimilated to the prosecutor's initial request. Further research and analysis show that this sentencing bias is largely generated by defense lawyers' counterclaims [8]. It is the demands of biased defense attorneys that most forcefully because the final sentencing outcome will be influenced by the prosecutor's request.

At the same time, even experts with professional knowledge and rich experience cannot prevent the emergence of such sentencing bias. In this case, some of the participants were professionals with experience in criminal cases. The results show that both experienced criminal law experts and amateurs are affected by the prosecutor's request. In short, expertise did not reduce prosecutors' sentencing requirements or judges' sentencing decisions.

There is a clear difference between professionals and non-professionals whether they have legal knowledge and whether they have extensive experience is that the experts are more confident in their judgments. It turns out, however, that the certainty judges experience has absolutely nothing to do with their sensitivity to bias. We did not find a link between certainty and bias. In other words, experts do not feel that their decisions are influenced by bias.

3.3. Application 2

In Application 2, we will focus on discussing and examining the influence of anchoring induced bias in negotiations, especially for us as consumers in price negotiations.

According to Kristensen, H., & Garling, T. [14], a total of 96 students participated in the experiment. In their study, participants were asked to rate the value of an apartment. Before they could evaluate the apartment, they received all the basic information about the apartment and the same relevant market information, and then they were asked to give their own estimate. People set an anchor point in advance, and the anchor point is chosen at an arbitrary price. Therefore, the anchor point should not be affected by the predetermined price [2][9], because there is no logical relationship between it and the negotiation.

From the experimental results, we can find that the lower the anchor point, the buyer's given price will be relatively lower, and vice versa, the higher the anchor point, the higher the buyer's price. As expected, participants set a given price, the anchor point, at any unrelated point and adjust it, showing that the point is usually far away from the anchor point.

It is worth pointing out that there is no connection between the anchor points, that is, there is no correlation between the anchor points. Although participants were randomly assigned to different groups, they received the same apartment and market information. Over the course of the experiment,

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participants found that the reserve price they gave varied with the level of the anchor point, and there were also differences between the prices.

4. Conclusion

Anchoring robustness for it spread a layer of mystery, particularly in influence on psychological research, however, selective accessibility model shows that there are many ways to reduce the degree of anchor deviation, for example, instead of considering seems to have been proved to be reasonable approach. From this point of view, we find that it counteracts the creation of bias, namely selective accessibility. It is also effective advice for improving human judgment.

The findings summarized in this paper make it clear that decisions about whether established court procedures favor defendants and are consistent with defendants' decisions should not consist of answers based on expertise or memory. Instead, people need to conduct systematic study and research, we should not only grab the attention of professional legal professionals, strengthen the persuasive results of the research, but also focus on the conscious and unconscious conclusions that happen to the protagonists. In short, through the study of human psychological mechanisms, the relevant information obtained, and the conclusion drawn are likely to help us further enhance and determine the fairness of court decisions.

The experiments presented in this paper add to the pervasive literature on anchoring. When it comes to general discussion, and the applications discussed above in bargaining and marketing. The correlation between anchoring in bargaining tasks and individual tasks adds to the emerging literature on anchoring as a consistent, individual-specific susceptibility.

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