



Psychological Mechanism of Anchoring Effect from the Perspective of Attitude Change Theory and Metacognition

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ABSTRACT

The integration of two explanatory mechanisms of insufficient adjustment and selective accessibility has become a research hotspot in recent years as a result of in-depth research on the psychological mechanism of the anchoring effect. Attitude change theory and metacognition model provide a new perspective for the study of the psychological mechanism of the anchoring effect. Researchers presented the division of high elaborative anchoring and low elaborative anchoring effect based on the Elaboration likelihood model (ELM) and explained the psychological processing process and linkage between them. The study of the extreme anchor, self-generated anchor, and external-provided anchor also deepens the explanatory connotation. This paper reviews the development of the anchoring compound mechanism and dual anchoring effect based on the perspective of ELM model and attitude change theory and proposed that future research should further explore anchoring processing and examine its effect in the light of the real social situations.

Keywords: Anchoring effect, Attitude change theory, Metacognition

1. INTRODUCTION

In the past two decades, the explanation of the psychological mechanism of the anchoring effect has been explored from the perspectives of bounded rationality, the social cognition theory and dual-process theory, and a voluminous number of models or views of the psychological mechanism have been proposed and tested. This paper illustrated three developmental stages of the anchoring effect, among which the early and most representative views are the insufficient adjustment mechanism proposed by Tversky and Kahneman [1] and the selective accessibility model proposed by Strack and Mussweiler [2].

In recent years, with the in-depth research on the psychological mechanism of the anchoring effect, the problem of the relationship between the two mechanisms has attracted the attention of researchers, and some of them have tried to integrate the two mechanisms from different perspectives, among which attitude change theory and metacognitive theory have provided new perspectives for the research on the psychological mechanism of anchoring effect. In the next stage, researchers detach anchoring from the traditional experimental setting and focus on the real world.

Anchoring effect as a decision-making heuristic strategy and mechanism has been validated in studies in the fields of price judgment, organizational management, and product recommendation systems. Researchers made every endeavour to fill the research gap and provide a viable alternative solution.

2. LITERATURE REVIEW

2.1 Definition of the Anchoring effect

The term “anchoring effect” was first introduced by Tversky and Kahneman and has been used to describe the phenomenon that people’s response is affected by any value as the possible answer to the question [1]. They argued that this effect could explain existing bias in decision-making. Furnham & Boodescribed this phenomenon in which people confronted with numerical estimation tasks in uncertain problem situations are frequently influenced by previously presented numerical information, resulting in judgment and decision outcomes biased toward the initial information, i.e., the anchor, and judgment bias [3]. Anchoring effects have been found to have a broad and difficult to erase influence on people's decision-making processes in

studies ranging from general knowledge problems to negotiating negotiations. Although the anchoring effect can have a favorable effect when people are doing difficult decision-making tasks, a huge body of research has shown that it can have a negative impact on people's decisions in many circumstances [4].

2.2 Definition of the Anchoring effect

2.2.1. The First Stage

In the decades of theory development, numerous scholars have conducted extensive research. Epley and Gilovich identified three phases of anchoring research [5]. The first phase concentrated on determining if anchoring was an explicit bias in judgment and tried to explain this heuristic on the ground of JDM (judgment and decision-making) theory. Two explanation mechanisms were proposed from the perspective of bounded rationality and the context effect of social cognition.

2.2.1.1. Insufficient Adjustment Model

The first view was put forward by Tversky and Kahneman, who demonstrated the anchoring effect generated from insufficient adjustment processes based on the initial value [1]. Jacowitz and Kahneman further expounded this proposition: Uncertainty about the target value stimulates an adjustment of the anchor to the first plausible value, resulting in value skewness because the insufficient adjustment heuristic tends to terminate around acceptable boundaries [6]. Epley et al distinguished the external-provided anchor (EPA) which is provided by the experiment or the other external resources, and the self-generated anchor (SGA) which is generated by the decision-makers [7]. They further stated that this mechanism mainly explains the occurrence of SGA: Decision-makers realize initially the gap between the target and anchor, therefore, they wouldn't consider the anchor as the target value and then simplify the complicated evaluation and adjust until they satiate. Furthermore, for people with a high cognitive load and low cognitive need beget the adjustment process terminates prematurely. However, after they precluded the cognitive factors, the heuristic bias still existed which might evince that people are more likely to make prudent mistakes rather than an impulsive one.

2.2.1.2. Selective Accessibility Model

The second view was first illuminated by Strack & Mussweiler: they proposed the selective accessibility model based on the context effect, which is connected with semantic priming and hypothesis-consistent testing the final value would tilt to the anchor when people are confronted with the anchor - consistent background knowledge [2]. The comparison between the decision objective and anchor changes the accessibility of target-

related information. The temporary representation of the anchor will be constructed in short-term memory, then people will retrieve the consistent memory from the information subsets. Mussweiler and Strack proposed this model for explaining EPA (compared with the SGA) related decision research, for instance, the EPA could be regarded as obscure hints and further arouse the pertinent clue albeit the anchor value is unreasonable, especially under the uncertainty [8].

2.2.1.3. Types of Anchors and other Interpretation Mechanisms

Anchoring value is an important feature to distinguish different anchoring effect research paradigms. Based on the high and low anchoring values, they can be classified as high and low anchors, Mussweiler and Strack demonstrated that high anchors produced a stronger effect than low anchors (within the range of the plausible values) maybe because of the affinity [8]. From the source of anchoring values, they can be classified as SGA and EPA. From the credibility of anchoring values, they can be classified as credible and implausible anchors, which would generate varying intensity effects. People would pay considerable attention to a credible system, and they may be convinced by its numerical cues. From the selective accessibility and the semantic perspective, anchors can be classified as informative and irrelevant ones. For instance, an anchor might not necessarily be relevant for a specific user's intent or context, depending on the context of use. People retrieve consistent information and further result more significant anchoring effect. These papers highlight the mechanisms and applications of SGA and EPA, and attempt to distinguish whether their interactions are symbiotic or antagonistic.

Besides, Russo also summarized and provided explanations of the other two possible mechanisms: (1) Numerical priming effect — the final estimate would be influenced by the anchor if it can prompt related notions. (2) Conversational inference — the subjects would compare the target value with the anchor consciously by inferring the gist of the experiment. This research phase seems to be mature, therefore, this review will focus on the second and third phases [1] [9].

2.2.2. The Second Phase — Psychology Dual-Process based on Attitude Change Theory and Metacognition Interpretation

Its second phase is primarily based on the previous two main mechanisms and attempts to integrate them. During this process, theories of attitude change can provide a relatively more systematic and complete view.

2.2.2.1. Metacognition Interpretation Model — ELM Model

Different kinds of anchors have corresponding mechanisms under the Elaboration likelihood model (ELM), one of the main interpretation models of metacognition. The early ELM concentrates on the amount of elaboration during attitude change. Specific persuasion information would precipitate the attitude change process through the peripheral route (non-thoughtful process) and the central route (thoughtful process). Individual involvement level is considered the cardinal factor affecting route selection: the central route would be activated when individuals are motivated to contemplate the information and put more effort into fine assessment. In contrast, individuals' attitude relies on external cues, and lack of intensive evaluation, the peripheral route will start [10].

Wegener et.al made specific division of high/low elaboration anchoring [11]. Decision-makers would high elaborate the anchor value with a low cognitive load and further create metacognition, for instance, people would generate higher attitude certainty (one of the attributes of metacognition) and greater attitudinal persistence of the final estimates. The high-elaboration anchoring is comparable with the central route and activates the selective accessibility mechanism: the anchor value would be perceived as an important persuasive argument. Conversely, decision-makers would regard anchors as a simple clue and start insufficient adjusting under the low-elaboration anchoring, which is relatively unstable and volatile [12].

2.2.2.2. Explanation of Extreme Anchor Based on the Attitude theory

Under the traditional view, researchers considered the implausible/extreme anchor can be generated from the different mechanisms. From the insufficient adjustment mechanism perspective, people would stop assessing their target value around the initial estimates until reaching their objective acceptable boundaries. Under the theory of attitude change, Wegener and Petty proposed a new explanation of implausible/extreme anchor compared with the traditional paradigm [11]. They demonstrated that the anchoring effect presented an inverted U shape from the extreme low anchor to plausible anchor to extreme high anchor. The anchoring effect from extreme low anchor to plausible anchor and then to extreme high anchor has an inverted u-shaped change, i.e., the degree of anchoring effect increases as the credibility of the anchor value grows, and the degree of anchoring effect becomes smaller when the credibility of the anchor value further decreases. When people are confronted with extreme anchor values, they may have counterarguments or simply ignore the anchor values because they perceive their unreasonableness. However, when confronted with plausible anchor values, people

tend to consider them as close to the true value of the judgment problem, thus producing a greater anchoring effect. The psychological mechanism of the anchoring effect under the traditional view considers single. In contrast, from the perspective of attitude change, the anchor value will have different effects on people's judgment decision-making process according to the credibility of the anchor value, which is why there is an inverted U-shaped change in the anchoring effect caused by the change in the extremity of the anchor value. Petrocelli & Tormala also stated the antecedent attitude certainty: decision-makers are always memory-based and retrieve it from repeated expression and past direct or indirect experience [12]. In this case, people have higher resistance to the implausible anchor which is perceived as persuasive attack.

2.2.2.3. Integrated Mechanism of SGA and EPA

In this phase, researchers realized the previous explanation mechanisms of EPA and SGA were still separated. Simmons et.al, demonstrated both SGA and EPA generated insufficient adjustment and occurs in two directions [13]. People may consider their estimates are too close to the anchor value and adjust them far, or they may think that their estimates are too far from the anchor value and adjust them closer. When the estimated value is considered too close to the anchor value, that is, the initial adjustment is considered insufficient, and the reinforcement of the accuracy motivation will increase the distance between the estimated value and the anchor value. The initial adjustment is considered excessive when the estimate is considered too far from the anchor. The reinforcement of motivation reduces the distance between the estimated value and the anchor value. To this end, the adjustment heuristic should not only focus on predicting the accuracy of motivation to increase or decrease the anchoring effect but should further focus on the motivational effects of under-adjusted or over-adjusted belief thoughts. Accurate certainty can increase the distance between the anchor and estimate only when there is confidence in the direction of adjustment. Furthermore, Simmons et.al, manipulated the implausible anchors, adjustment direction, and accuracy motivation and stated that there was a synergistic or competitive relationship between two main explanation mechanisms: the anchor value would first activate the selective accessibility through sensitizing the verified information, then decision-makers may be influenced by the certainty of adjustment directions and change the distance between the anchor value and target value [13].

2.2.2.4. Metacognition Interpretation of SGA and EPA

Dowd et.al [14] observed the degree of similarity between the SGA and EPA influence the final responses which provide the evidence for the metacognitive account of the anchoring heuristic. SGA is an important

reference point for the availability and accuracy of EPA, therefore, the higher degree of similarity between the two anchors, the more confidence people will have. Petrocelli and Tormala also stated that the consensus would spur the certainty of judgment and the degree of similarity was a signal of consensus. Also, the credibility of EPA can adjust the anchoring effect. People would first activate the SGA, then consider the influence of the degree of the similarities, keep sensitive to the source of EPA, finally integrate them, and make the final estimates [12]. This is a metacognitive process.

They not only indicated the extent to which people incorporated the EPA in their final response (about their SGA), also how the EPA was weighted to in experiment. Participants gave the EPA greater weight when it came from a highly reliable source rather than a low-credible one. The degree of SGA–EPA Similarity impacted the weight given to the EPA in the final response when Source Credibility was high. The degree of SGA–EPA Similarity influenced the weight given to the EPA in the final response. This data pattern implies that there is an assimilation impact [15]. Participants may pay more attention on source credibility than SGA–EPA similarity, and it was appropriate to assimilate their final responses to the EPA when source credibility was high (regardless of SGA–EPA similarity). This does not rule out the possibility that participants were aware of the ramifications of high SGA–EPA Similarity after consulting a reliable source. Focusing on similarities between two stimuli has an assimilation effect, as Damisch, Mussweiler, and Plessner discovered, and attention to high SGA–EPA Similarity would seem especially reassuring when the EPA originates from a highly reliable source [16]. Evidence of metacognitive account is provided by the fact that greater confidence was expressed in final responses in the context of high SGA–EPA Similarity/high Source Credibility compared to low SGA–EPA Similarity/high Source Credibility.

2.2.3 . The Third Phase — How to Eliminate the Negative Effect of Anchoring

The third research phase detaches anchoring from the traditional experimental setting and focuses on the real world. The anchoring effect has been verified in studies of judgment and decision-making in a wide range of fields, many studies follow and develop the research framework of Tversky and Kahneman, expand the research to field experiments and real situations, and prove that the anchoring effect is a persuasive and difficult to eliminate judgment bias from different perspectives.

2.2.3.1.Recommender System

Recommender systems are salient decision auxiliary tools in e-commerce websites that aim to provide

selection advice for clients, helping businesses to better service and boost sales.

Netflix used to adopt the Five Star Rating System to collect customer preference scores of experienced items as input for subsequent predicted system ratings, which suggest an expectation and serve as recommendations. Following consumer evaluations (after consumption), a feedback loop is completed. It can be found that precise delivery and accurate prediction play an important role in this whole procedure. Adomavicius et al. observed that the amount of the rating drift1 is proportional to the amount of the recommendation disturbance [17]. They further demonstrated that this shift is generated by a selective accessibility mechanism. The recommendations that consumers receive are anchor-consistent with the background information. Therefore, the temporary representation of the anchor will be constructed in short-term memory. Consumers may postulate that the anchor is the target value and customers would retrieve the anchor from the memory when they decide to rate.

However, the existence of anchoring would beget a distorted view and lead to lower effectiveness. In 2017, Netflix changed the system to the combination of thumb up or down and percent match, which might impair the negative effect of anchoring and increase predictability at the same time.

2.2.3.2.Pricing Strategy

Also, the negative effect of anchoring in pricing strategy might diminish the profitability of enterprises. In 2009, iTunes adopted the variable pricing strategy that allows the music labels to raise best-selling songs from \$0.99 to \$1.29. However, this scheme dented the sales growth by 4% compared with the last quarter. Nasiry and Popescu stated that the impact of the low iTunes price anchor on customer behaviour might be underestimated by Apple in the long term [18]. In this case, customers form a low-price expectation/reference price in a repeated purchase market, contaminating their willingness to pay, and thereby influencing profitability.

2.2.3.3. Performance Rating

Moreover, supervisory ratings have always been a prevalent way of assessing the performance of the employee and making important decisions (e.g., merit pay and payoffs), however, they have been regarded as biased indices to some extent. Some researchers proposed that both irrelevant anchors and informative anchors influence the rates performance judgment. For example, the past performance information or judgment from other resources (i.e., peer-ratings and self-ratings) are relatively inconsistent with each other. Besides, Thorsteinson et al. stated that the ratees faced numerous information which may contain large amounts of irrelevant numbers and could be regarded as anchor [19]

s. For instance, the ratees may anchor on the values shown in an example rating form, which could serve as a decision tool in evaluating the performance of juniors. Moreover, the juniors might seek to influence supervisors' ratings by exaggerating self-ratings. However, a few studies focus on how the mechanism works in this type of anchor and how to eliminate the adverse effect.

3. CONCLUSION

This paper reviews the development of the anchoring effect based on the insufficient adjustment process and selective accessibility mechanism and from the perspective of the ELM model and attitude change theory. In recent years, the research focuses have gradually changed from the single explanatory model to the compounding mechanism, while advancing from a single anchoring effect to a dual anchoring effect such as EPA and SGA. After reviewing the previous studies, the current view of the anchoring effect warrants further research.

3.1 Types of Anchor

Up to now, the understanding of the types of anchors is still preliminary relative to the complexity of the anchoring effect. Most of literature focuses on the SGA and EPA or the other numerical anchors, however, such irrelevant anchors and informative anchors which play an important role in performance judgment warrant further exploring, which may impetus for the development of research.

3.2 The Positive Significance of Anchoring

The anchoring effect is a form of intuitive thinking in decision making, which can be used wisely to save much time and psychological resources and facilitate people to make timely response decisions in urgent and complex environments. However, anchoring always seems to be a negative impact that would distort the rating views, decrease business profit, and manipulate performance ratings unconsciously through different mechanisms and different kinds of anchors. People may utilize the anchoring in turn, which might enable these systems to be more sophisticated and precise in the future. Findings on how to effectively reduce anchoring bias are still relatively poor, and deeper research is needed on this issue. Also, the positive implications of exploring and using the anchoring effect have not received much attention. It's valuable to construct the positive forecasting judgment related theories and further explore the effectiveness and premise of anchoring effect.

3.3 Metacognition Processing of Anchoring

Previous studies explore how the ELM model (one of the metacognition interpretations models) interprets the

anchoring effect the metacognition processing of SGA and EPA. Research may further utilize the models of metacognition. For example, investigating whether the benefits observed in the anchoring effect are augmented in persons with a high need for cognition, settings of high cognitive elaboration, or high EPA-argument quality. Greater metacognitive processing might be expected.

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