

Anchoring and Adjustment Bias and Its Applications

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Abstract: The anchoring bias is one of the most robust and widely researched psychological phenomenon that are constant across many domains of human judgment and decision making. Similarly, the area of personality has also been researched to a high degree of depth, with various of theories and models developed throughout time. With the recent growth in public awareness on personalities, more researches has been done on how personality explains characteristics and actions. Despite the prevalence of anchoring bias and personality, researches have only recently begun to investigate the relationships between the two and how it applies to various scenarios. This paper identifies the knowledge gap of the missing relationship between how personalities would affect real estate agents' appraisal differently when anchoring bias is presented. This paper reviews past studies on both anchoring bias and personality, filling in the gap by using the big five personality model to categorize real estate agents and analyse their unique and common reactions to anchoring bias.

Keywords: anchoring bias, personality, real estate agents

1. Introduction

In a world where individuals are making judgements and estimations constantly, it is vital to understand why sometimes judgments are not always completely rational. Economists began searching for the reasons for inconsistent and inaccurate decisions in the 1950s and began the study of behavioural economics. The modern framework of behavioural economics was developed by Kahneman & Tversky [1] in their groundbreaking work Prospect Theory: An Analysis of Decision under Risk. Behavioural economics challenges the traditional assumption that consumers make consistent and rational decisions. This is done by studies of heuristics and cognitive bias which is an automatic system human have evolved. Heuristics allow complex and time-consuming mental work to be simplified and completed with less mental input. This concept was first developed by Herbert Simon in 1995[2]. Most of the time, heuristics can output reasonable judgments, but sometimes they can lead to systematic bias [1]. These biases include but are not limited to, status quo bias, representativeness and framing. This essay will solely be aiming to draw a link between the relationship between the anchoring bias and its effect on appraisals of real estate with different personalities. The first concept of anchoring bias was developed in the paper named Judgment Under Uncertainty by Tversky and Kahneman [1], named anchoring and adjustment bias. Strack and Later, Mussweiler developed the selective accessibility theory in their work in 1997.

The extent of influence of the anchoring bias on individuals are determined by many factors, to no surprise, personality is one of them. Personality psychology is a field that examines individual

behaviours by analysing individual differences, in doing so it also needs to identify similarities between people. Personality psychology adopts some view on the essence of common human natures in order to understand a person. The view is that people, in the most basic form are biological creatures, social creatures, self-protective and learning creatures, just to name a few [3]. Individual differences that this field of study is personality traits, patterns of thoughts, feelings and behaviours. It explores the unique and enduring aspects of human personality and aims to understand how individuals differ from one another [3]. In order to better analyse and visualise individual differences, scholars developed various of models to categorise and quantise different personalities. The first attempt to categorise personalities can be dated back to 4th century BC in ancient Greek, where they categorised personalities into 4 categories. Through the passing of time, new models were developed and are constantly updated. Different models all hold strength on explaining certain theories. In modern time, the most well-known and academically credited models of personality is Costa and McCrae's version of the Big Five [4].

2. Basic Mechanisms of Anchoring Bias

2.1. Anchoring and Adjustment Bias

The anchoring and adjustment bias was first introduced by Tversky and Kahneman [5] in their revolutionary work judgement under uncertainty. Tversky and Kahneman's theory explains in various situations, individuals will consider a quantitative estimation by beginning from an initial value and adjusting it to what they believe would be an appropriate final answer. This initial value (anchor) may be included in the original problem, the result of a partial computation, or a recall from memory of related data. Regardless of the source of the initial value, a typical outcome is that the adjustment made is insufficient, which is biased towards the initial value, hence given the name anchor. For a better understanding, consider the example used by Daniel Kahneman [2]. Provide an estimation of the value of the following equation in 3 seconds: $1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8$. Generally, one can only solve part of the equation and provide the final answer by adjusting from the partial solution. This adjustment is likely to be inefficient and lead to an underestimation. In Kahneman's [2] work, the medium answer given by participants was 512, where the correct answer is 40320.

2.2. Selective Accessibility

Strack and Mussweiler [6] posted their explanation of anchoring bias called selective accessibility. They explained that the anchor value acts as a reference point for subjects to adjust what they believe is the boundary of the range of possible answers, presuming that the anchor given is more extreme than the boundary that the subject believes. Strack and Mussweiler proposed a limitation to the anchoring and adjustment concept. Their research argued that the adjustment process fails to explain the anchoring effect when the given anchor is within the boundary of the plausible range of answers [6].

2.3. Confirmatory Hypothesis Testing

Until this day, the most widely accepted paradigm anchoring bias is known as confirmatory hypothesis testing. Leading researches were done by Chapman and Johnson, 1999; Mussweiler and Strack 1999, 2001; Strack and Mussweiler, 1997; Wegener et al., 2010 [2]. The theory these researchers have arrived at is that the anchoring effect is the result of the activation of information that is consistent with the anchor presented [2]. The confirmatory search assumes that the anchor given is considered to be a plausible answer by the subject. The subject would then search for ways that the anchor could be the correct answer, thus activating aspects of information that are consistent with the

anchor [2]. In doing so, the subject would develop a judgement that is biased towards the anchor, hence making insufficient adjustments as explained by Tversky and Kahneman [5]. Resulting from the supporting studies mentioned above, it can be argued that confirmatory search and selective accessibility contribute to the fundamental mechanisms that lead to the anchoring bias.

3. Types of the Anchoring Bias

3.1. Internally Generated Anchor

In the scenario that an anchor for a question is generated by the subject, the anchoring bias is powered by the adjustment mechanism. This statement was validated by Epley and Gilovich [7], who began their work on the bases that self-generated anchors are known to be incorrect from the start. Based on this groundwork, the judge has no reason to consider the anchor to be correct, hence, the confirmatory hypothesis testing mechanism is invalid [7]. This leaves the adjustment mechanism to be the driver of the anchoring bias for internally generated anchors.

3.2. Externally Generated Anchor

On the other hand, when the anchor is provided externally, the anchor will hold more validity towards the subject [7]. As such, the subject is then likely to consider the anchor as a plausible answer. This acts in accordance with the confirmatory search and selective accessibility [7]. This hence provides evidence that in the scenario that the anchor is externally generated, the anchoring bias aligns with the confirmatory hypothesis testing model.

3.3. Informational Relevance

Numerous of researches, such as English & Mussweiler [8] came to the conclusion that informational relevant anchors will increase the subject's vulnerability to the anchoring bias. Example of this can be found in the courtroom, when judges sentenced the defendant. Judges sentencing decisions were greatly influenced by the anchoring bias where the anchor was the demands from the prosecutor [8]. This phenomenon can be explained using the selective accessibility mechanism. Anchors that have higher informational relevant are more effective on activating anchor-consistent information [9].

On the other hand, several studies have demonstrated that informational irrelevant anchors also produce the anchoring bias. An example being Tversky and Kahneman [5] where the answer of the subjects was influenced by a wheel of fortune. This experiment along with many other demonstrated that anchors that are irrelevant to the question can also induce the anchoring bias.

3.4. Extremity of Anchors

Researches came to the conclusion that difference between the effect on the anchoring bias for high and low anchors are only valid when the anchors are within the range of plausible answers. Anchors outside the range of plausible values do not increase the anchoring effect [10]. In addition to those results from the study Wegener et al [11] had results which showed that increasing anchor extremity beyond the range of plausible answers led to a decrease in the effect of the anchoring bias. This phenomenon can be explained using the adjustment mechanism, as subjects adjust from the anchor until they reach the boundary of what they believe the plausible answers range from. In the situation where an implausible anchor is encountered, the adjustment mechanism then resembles the selective accessibility model. Judges would adjust the estimate to the boundary of plausible values and test this estimate instead of the original anchor. For this reason, anchors beyond the range of plausible answers would simply lead to more adjustment [2].

Attitudinal approach was developed by Wegener et al. [11], which argued anchors beyond the range of plausible values in fact leads to a decrease in anchoring effect. The argument is that subjects tend to ignore the anchor completely or generate counterarguments towards it, hence, leading to a reduced anchoring effect [11].

4. Fundamentals of Personality

Personality psychologists investigate various factors that shape personality, including genetics, biological factors, social and environmental influences, and personal experiences. Personality is a subject that is easily noticed, however, hard to pin down. To rephrase Allport [12], Personality is the dynamic arrangement within a person of the physical and psychological system. The organisation of these two systems underlies an individual's patterns of actions, thoughts and feelings. Which dynamics are assumed and what systems are proposed to underlie those dynamics varies greatly across different viewpoints [3]. This is because throughout the study of personality, researchers developed multiple theories and methods to categorise and measure personalities. Some of the most well recognised theories are discussed below.

4.1. Psychoanalytic Theory

The first formal theory of personality was developed by Sigmund Freud. The name of this theory is psychoanalytic, still one of the best theories. Freud's psychoanalytic approach emphasizes the role of unconscious processes, early childhood experiences, and the interplay of conscious and unconscious motivations in understanding human behaviours and psychological disorders [13]. There are three components in the psychoanalytic theory the id, ego, and superego [14]. The id is the biological component of personality, it is responsible for instincts and libido. It operates on one's fundamental desires, the pleasure principle. The ego, the rational component of personality, operates in accordance with the reality principle. The superego, the moral side of personality, the internalization of parental and societal values and standards [14]. The ego mediates among the demands of the id, the pressures of reality, and the dictates of the superego. Although theorists criticize the psychoanalytic theory for Freud's deterministic image of human nature, his negative views on woman and the ambiguous definitions of some of his concepts [14]. However, Freud's phenomenal impact on personality theorists is undeniable.

4.2. Social Cognitive Theory

The social cognitive theory of personality was proposed by Albert Bandura. Bandura proposes that individuals' behaviours, emotions, and cognitive processes are influenced not only by their personal characteristics but also by their social interactions and observations [14]. One of the main ideas of the social cognitive theory is named observational learning. This suggests that individuals can acquire new behaviours, personality traits and information by observing others and the consequences of their actions. [15] Moreover, social cognitive theory emphasizes the concept of reciprocal determinism, which acknowledges the bidirectional relationship between personal factors, behaviour, and the environment. [15] This concept states individuals actively influences and are influenced by their surroundings. The theory also underscores the role of self-efficacy, the belief in one's capability to accomplish specific tasks, as a crucial motivational factor that influences behaviour, choices, and persistence in the face of challenges. [15] Expectancy-Value Theory within social cognitive theory emphasizes that behaviour is influenced by individuals' expectations of outcomes and the value they place on those outcomes. [15] Additionally, social cognitive theory highlights the significance of cognitive processes in mediating the relationship between environmental stimuli and behavioural responses, including attention, memory, and problem-solving abilities. Bandura Through fostering

self-regulation, individuals are empowered to set goals, monitor their progress, and adjust their actions to achieve desired outcomes effectively. [14]

4.3. Trait Theory

The trait theory of personality is one of the prominent perspectives in psychology. The theory argues that human personalities can be understood and described in terms of consistent characteristics, named traits. According to the trait theory, traits are relatively stable patterns of thoughts, feelings, and behaviours that differentiate individuals from one another. This means that an individual's action or thought can be predicted by traits to a relative degree. [14] The central theory of trait theory is that the unique traits combination in individuals shapes their unique personalities. Additionally, these combinations of traits influence how people perceive the world, interact with others and respond to situations. [14] One of the main contributors to the development of the trait theory is Gordon Allport. He classified traits into three categories: cardinal traits (dominant traits that shape an individual's life and decisions), central traits (general traits that influence an individual's behaviours in certain situations), and secondary traits (less noticeable traits that only appear in specific contexts). [14] Another prominent trait theorist is Raymond Cattell, who introduced the distinction between surface traits (observable behaviours) and source traits (the fundamental factors influencing behaviours). Trait theory, however, is commonly criticised for its oversimplistic assumption of the complexity of human nature. [16] It limited the possibility that personality can change from social influences or personal developments. The framework of the trait theory is over-restrictive and idealistic. [16]

5. Big Five Personality Model

Models of personality are frameworks developed by researchers in order to quantise personalities for further studies. Over time, numerous models were developed according to different theories of personality. With the use of these models, researchers could predict individual differences in numerous settings: clinical, industrial organisation, counselling and more. [17] In recent years, psychologists came to a general agreement on a comprehensive and robust model of personality named the big five personality model. [18] This model consists of universal personality traits dimension named neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. Each dimension of traits can describe an individual to a high or a low degree.

Neuroticism represents the extent of emotional stability and ability to adjust for an individual. [19] Those who are described to have high neuroticism tend to experience more negative emotions such as hostility, depression, anxiety and more. [20] Those who have a low degree of neuroticism can be presented to be self-confident, emotionally stable and relaxed. [19]

Extraversion describes the level at which people are assertive, energetic, active, enthusiastic, talkative and dominant. [20] Those who have a high score in this dimension are characterised to be cheerful, outgoing and enjoy socialising. [20]. On the other end of the scale are individuals who are reserved, quiet and enjoy being alone. [20]

Openness to experience indicates an individual's degree of intellectual curiosity and temptation to seek new experiences and explore new ideas. Someone with a high extent of openness can be described as creative, imaginative, untraditional and innovative. [19] The other side of the dimension is those who are conventional, unanalytical and narrow in interest. [19]

Agreeableness is a personality dimension that characterizes someone's interpersonal orientation. Individuals said to be high on agreeableness can be seen as trusting, caring, forgiving and preference for positive interpersonal relationships. [20]. Individuals that have low agreeableness are those who are more manipulative, self-centred and ruthless. [20].

Conscientiousness assesses one's level of organisation, persistence, motivation and hard work when achieving a goal. This dimension is the most consistent predictor of job performance across a wide range of work and occupations. [20]. Those who have high conscientiousness normally have better job performance than those with low conscientiousness due to their higher ability to work hard, stay organised and be persistent. [20].

6. General Personalities for Real Estate Agents

Having low neuroticism is crucial for real estate agents as it is a stressful and demanding profession. Low neuroticism will allow them to perform better under pressure, work through challenging situations and make constant rational decisions.

Real estate agents are mostly highly extraversion due to the nature of their job. Their job requires constant interaction with clients, colleagues and others in their industry in order to build and maintain connections and negotiate. For this reason, they are commonly highly sociable and outgoing.

Successful real estate agents need to be open to new experiences. They are required to adapt to the changing market conditions, embrace new innovative marketing strategies and stay up to date with current industry trends.

Real estate agents generally are agreeable, they are friendly and caring. They are skilled at building trusts to assist them navigate complex negotiations to come to a beneficial solution.

Although most research has failed to identify a significant relationship between conscientiousness and the anchoring bias, there have been numerous researchers proving that those with high conscientiousness generally have higher job performance.

As conscientiousness is highly connected to job performance, it is expected that those real estate that perform well consists a high degree of conscientiousness. [21] [22] [23] and more. This result can be applied to the real estate industry. Those agents with high conscientiousness scores would be better at collecting information regarding a property and identifying aspects that determine its value. Additionally, the agent would generally be more responsible with the appraisal. It is safer to say that conscientiousness and anchoring bias in appraisals has a negative relationship than is positive.

7. How These Personalities React to Anchoring Bias

One of the most common anchoring biases that appears in the real estate industry is when the agent is making an appraisal for a real estate. In this scenario, the anchor is externally generated and typically within the range of plausible answers, therefore the subject would undergo confirmatory search. The following section of the paper would identify the relationship between agent's personality and how their appraisals are altered by the anchoring bias. Although their still consists of a relative degree of argument with the relationship between each trait and the anchoring bias, this paper takes the predominant side of the argument for each trait.

More researches have shown that extraversion trait has a negative relationship with the effect of anchoring bias. [24] This indicates that a more outgoing and active real estate agents are less affected by the listing price when appraising for a property.

Several researches have identified that there is a positive relationship between openness to new experiences and the anchoring effect. Meaning the more open the agent is to new experiences, the more they are vulnerable to the anchoring bias. [25] This can be logically explained as those who are open to new experiences are more likely to undergo selective accessibility and confirmatory search on the anchor (listing price) as they are more likely to believe it is true.

Researches such as the Eroglu & Croxton [24] have identified that those with high agreeableness are affected more by the anchoring bias. Those with higher agreeableness are generally people that are more kind, thus those type of real estate agents is less suspectable that the listing price does not

truly reflect the value of the property. As so, their judgement would be more affected by anchoring bias.

8. Conclusion

Personality has been a deeply researched field in psychology and has become more aware by the public in recent years. Anchoring bias is an area that has been even deeper studied, this heuristic is one of the most robust and consistent, which can be found in almost all researches and scenarios. Researchers have been drawing links between the two theories and applying them to different fields. This paper has identified a knowledge gap of the relationship between real estate agent's personality and the effect of anchoring bias to their appraisals. This paper filled the gap by reviewing past studies on anchoring bias and personality, then drawing connections between the two. The findings of this paper can be used as an informal guide to choosing an agent for better appraisal accuracy, it can also be used for agents to gain a better understanding of how their job performance can be improved, specifically their accuracy of appraisals.

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