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Cognitive Biases and Heuristics among Adolescents

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Abstract:

In the process of decision-making our prejudices can make us selective about the information we pay attention to, and the sources we decide to rely on. Errors in cognition can lead us into making quick decisions confidently, only for them to backfire later. This tendency to deviate from logic and rationality in judgment, whereby inferences are drawn in an illogical manner is referred to as cognitive bias. As most of the decisions that determine the course of our lives are taken during our adolescence, remaining cognizant of such common biases and equipping ourselves to guard against them can empower our decision frameworks to make rational and informed decisions leading to better choices in life.

Introduction

Decision-making is all about how we choose, particularly when there is uncertainty. The way people process information can affect their decision-making. When the information necessary to make such decisions is incomplete or imperfect, people tend to be prejudiced in their judgments. These prejudices can influence what information we pay attention to, what we remember about past decisions, and which sources we decide to rely on as we research our options. This bias in processing or error in cognition lets us make a quick decision confidently, founded on supposedly supporting research, only for it to backfire. This tendency to violate rules of logic and probability and make decisions or take action in an unknowingly irrational way is not a sporadic, isolated, or infrequent behavior of few but is quite pervasive, persistent, and surprisingly systematic. This systematic

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pattern of deviation from rationality in judgment, whereby inferences are drawn in an illogical manner is referred to as cognitive bias.

A cognitive bias[i] is a systematic pattern of deviation from norm or rationality, making us irrational in the way we search for, process, evaluate, interpret, judge, use, and remember information, as well as in the way we judge[ii] and make decisions.

A cognitive bias[iii] is a subconscious and automatic process that we unconsciously design to make decision-making quicker and more efficient. This bias results in errors in thinking that lead to misinterpreting information from the world around and affects the rationality and accuracy of decisions and judgments.

Our brains have evolved over two hundred thousand years, it was said. The environment we operate in has become much more complex and the number of decisions we take in a unit of time has also multiplied. The factors to consider while making those decisions have also increased. But the brain still operates in much the same way today. The complex world bombards the human brain with such complex information on a daily basis, that the brain can't get the time every time to methodically, and thoughtfully evaluate the fine details of our everyday tasks, (i.e., the cognitive demands of daily life) making such processing logistically impossible. Hence it resorts to mental shortcuts to make decisions quickly and effectively. Psychologists refer to these efficient problem-solving techniques as heuristics[iv]. Thus, heuristics can be described as general cognitive frameworks humans rely on regularly to quickly reach a solution.

Literature Review

In the late 1950s, Simon opposed the idea of classical rationality, based on the formalization of normative solutions to judgment and decision-making problems through probability theory and statistics, with his principle called bounded rationality[v], which addressed the specific constraints faced by agents in their environments.

Kahneman and Tversky demonstrated[vi] that, in the domains of, judgment and decision-making, human beings rarely behave as if they were trained or intuitive statisticians. Their judgments and decisions deviate in identifiable ways from established economic models. Kahneman and

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Tversky's claimed that these departures from perfect rationality can be anticipated and specified. In other words, errors are identifiable, common, and predictable. The concept of Cognitive Bias[vii] was well explained by Amos Tversky and Daniel Kahneman in their work 'Judgment under Uncertainty: Heuristics and Biases'. Three heuristics employed in making judgment viz. representativeness, availability of instances or scenarios, and adjustment from an anchor were discussed in their paper.

According to Shafir and LeBoeuf, people's decisions can deviate from logic, calculation, and probability in ways that are inadvisable, leading to suboptimal decisions in terms of invested time and effort, given the available information and expected benefits[viii].

Kahneman in his 2011 paper 'Thinking Fast and Slow 'states that certain cognitive biases are quite pervasive, persistent, consistent, and surprisingly systematic. In a variety of circumstances, people tend to use similar heuristics and show the same cognitive biases[ix]

Castro M. et. Al. studied 198 psychology students[x] from three universities in southern Chile to describe the level of representativeness and confirmation bias in Chilean psychology students, in order to know how this phenomenon occurs. This research analyzed and quantified three cognitive biases (the misinformation effect, cognitive dissonance, and confirmation bias) among undergraduate students.

Wolff J. et. Al. studied 7,748 adolescents (50% female) in grades 7-11 to examine[xi] the role of deliberative decision making (the tendency to consider options and consequences before making a decision) and social contextual variables (parenting and friend influences) in alcohol and drug use, risky sex, and delinquency. They found that deliberative decision-making and contextual variables were associated with risk behavior concurrently and a year later.

The importance

When it comes to cognitive biases in other areas like choosing a mobile phone brand or watching a movie the effects are neither consequential nor lasting. But in an adolescent's life, certain decisions are highly impactful and irreversible. A cognitive bias can hold back a student from their full

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potential by impeding their ability to discern between the path to success and the path to failure.

As many life coaches tell us, 'it is not what happens to us, but how we interpret what has happened that decides our response. 'Responding compulsively and not cognitively can be a sure recipe for a debacle. A cognitive bias in the life of a diligent adolescent may not bring a sudden catastrophe but can result in a sequence of decisions that can slowly alter his/her course of life from excellence to mediocrity or mediocrity to failure. Success is factored by the courage to take tough decisions and the character to stay committed to those decisions, long after the heat in which the decision is taken is lost. If these cognitive biases infect an adolescent mind, they will corrupt the courage to make such decisions with pretensions and the character to stay committed with pretexts. Perhaps adolescence is the stage of life where cognitive biases can be most consequential.

Common Cognitive Biases

The following are some of the prevalent biases that occur more frequently than others.

Confirmation Bias:

People tend to accept claims[xii] without any scrutiny or check if they fall within their identity scope i.e confirm their prior beliefs[xiii]. This tendency to interpret new information as confirmation of your pre-existing beliefs and opinions is called confirmation bias. This behavior could promote frequent interactions among people with a similar set of beliefs and can effectively trigger homophily[xiv]. When internal biases instead of being subjected to the test of objective rationality get positive reinforcement from like-minded people around, the comfort to believe in what one believes will grow. This tendency to search for, interpret, favor, and recall information in a way that confirms or supports one's prior beliefs or values can simply blind sight a teenager to see what is glaring at him/her in plain sight. As confirmation biases impact how one gathers information and also influence how we interpret and recall information, it can result in adolescents many a time taking the wrong step.

Bandwagon effect:

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This cognitive bias is perhaps most prevalent among teenagers. Many of us might have at one time or another been intrigued by the frivolous reasons behind school boycotts and student protests. The bandwagon effect may be the reason for this. People can do certain things primarily because other people are doing it, regardless of their own beliefs, which they may ignore or override[xv]. This can cause someone to adopt a certain political ideology because they see that other people in their social circle have adopted the same ideology.

The bandwagon effect refers to the tendency that people have to adopt a certain behavior, style, or attitude simply because everyone else is doing it[xvi]. In the areas like fashion,

music, pop culture, etc, the bandwagon effect can be relatively harmless. But when adopting particular attitudes towards important global or political issues, like participating in an anti-vaccination drive[xvii], bandwagon beliefs can have serious and disastrous consequences.

Humans, being social animals have the evolutionary desire to join groups and work with others towards various goals. This desire can sometimes relegate the discretion and discrimination of an adolescent mind to think independently and take a stance. The peer pressure illusion can simply be their longing for the good opinion of others or just an attempt to fit into an image they portray. The latter can bring the Golem effect into play, especially in schools and colleges where expectations placed on them can become self-fulfilling prophecies.

Focalism :

Also known as the focusing illusion, focalism is the tendency to place too much focus or emphasis on a single factor or piece of information when making judgments or predictions. By focusing too much on the focal event or hypothesis, people tend to neglect other important considerations and end up making inaccurate judgments.

People tend to have unrealistic optimism[xviii] for common positive events and rare negative events but unrealistic pessimism for other common negative and rare positive events[xix]. This tends to nudge people to get into unhealthy romantic associations as they tend to overestimate the impact of losing a

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romantic partner[xx]. With an adolescent's brain plagued with changing hormones, the unrealistic optimism[xxi] makes them underrate the risks they are taking assuming them to be inconsequential. This tends to make them less cautious in life and may easily stray toward harmful or unnecessary distractions.

Base Rate Neglect:

Base rate neglect[xxii] refers to a phenomenon of bias in judgment that results due to ignoring the statistical proportion of base rate information and only focusing on the present case information[xxiii].

Julia Galef succinctly illustrates this through an excellent example. Imagine a shy student on a university campus. What is he more likely to be pursuing, a math Ph.D. or a business major? Many instinctively guess that the student is a math Ph.D. as shyness and introversion are expected to be more common with a math geek than with a business student who is more likely to be an outgoing extrovert. This guess neglected the fact that the number of students taking a business major is approximately 10 times more than those enrolled for a math Ph.D. Neglecting this base rate leads us to guess that a shy student would be more likely to be a Math Ph.D., although the chances that he had enrolled as a business major are much higher.

Anchoring Bias:

We tend to rely too much on the initial information we access when making decisions[xxiv]. This first piece of information that we receive and assimilate can influence how we perceive any supplemental information even if it's received years later[xxv]. While making plans or preparing estimates about something, instead of looking at the available information objectively, we tend to interpret newer information from the previously established reference point which works as an anchor[xxvi]. This anchor skewing our judgment and preventing us from updating our plans or making accurate estimates is called Anchoring Bias.

Anchoring bias seems to be more prevalent in adults than in teenagers. As teenagers are still in the learning phase of their lives, they tend to admit and assimilate new information more easily than adults whose belief systems have become more concretized. Michael Jetter et al. accessed data

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from the US game show Jeopardy, to investigate the anchoring bias among various age groups. They studied kids aged between 10 and 12 years (182 observations), teenagers aged between 13 and 17 years (606 observations), and undergraduate college students (559 observations). They found that college students anchor strongly on the initial clue value.

The area where anchoring bias can really affect people is on social media platforms. When people tend to rely on news of questionable accuracy from these platforms, it can be effectively used to spread conspiracy theories, clickbait, hyper-partisan content, pseudoscience, and fake reports[xxvii].

Dunning Kruger Effect:

This cognitive bias originates from being ignorant of one's own ignorance[xxviii]. In their 1999 paper, D. Dunning and J. Kruger argued that unskilled people are unaware of their incompetence in certain domains and tend to overestimate their abilities in many social and intellectual domains[xxix]. In 4 studies conducted by the authors, it was found that those participants who were scoring in the last quartile on tests of grammar, logic, and humor overestimated their test performance and ability.

The five studies conducted by Joyce Ehrlinger et al. in 2008 further concluded that poor performers lack insight into their shortcomings in real-world settings even when given incentives to be accurate[xxx]. People tend to be overly optimistic while evaluating the quality of their performance on social and intellectual tasks. The incompetence of poor performers deprives them of the skills needed to recognize their deficits, causing them to develop a tendency to grossly overestimate their performances.

The Dunning-Kruger effect can manifest in the skilled too. High performers can tend to underestimate their skills. Those with exposure can compare what they know with what they have yet to learn and belittle their abilities. Alan Muller et al. designed a novel method to study the Dunning-Kruger effect via a test of item recognition with the help of electroencephalography (EEG) recordings[xxxi]. It was found in their study that the participants in the bottom 25th percentile overestimated their percentile, while participants in the top 75th percentile underestimated their percentile, proving the ubiquity of the Dunning-Kruger effect in both the incompetent and the competent. As teenagers and undergrads are still in their learning phase, they are highly susceptible to this bias.

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Attribution Error/ Bias:

Bias in the process of inferring the causes of events or behaviors leads to attribution error. In their 1977 paper discussing the distortions in the attribution process, Lee Ross et al. argued that often due to our perceptual salience, we tend to believe that the other person is what we see most of when we look at them and tend to believe that others are internally motivated and responsible for their behavior[xxxii]. We assume that a person's actions depend on the kind of person he/she is, rather than on the social and environmental forces that influence the person.

In their study, which was published in 2019, Kareem Haggag et al. found that students who were assigned to an early morning (7:30 AM) section of a general education course are approximately 10% less likely to major in that subject, compared to those students who were assigned that same course in any other (later) time slot. The study found that the pattern of results proves attribution bias and was found difficult to reconcile with competing explanations[xxxiii].

Self-Serving Bias:

Attribution error can lead to self-serving bias where people tend to attribute their success to internal factors and attribute failure to external factors[xxxiv]. Thus, people tend to attribute the reasons for the positive or negative outcomes of their behavior in a way that serves their self-interests[xxxv]. Self-serving bias helps people to have a positive self-evaluation and affects to boost their public image. In other words, Self-serving bias helps people to maintain a socially desirable public image which helps them to compensate for their lack of self-esteem.

As East Asian cultures emphasize collectivism and endorse self-criticism and self-reflection, individuals tend to present an image of modesty or humility making them less susceptible to self-serving bias[xxxvi]. But as western cultures emphasize individualism and self, people from these cultures have a strong need for positive self-regard and become prey to self-serving bias, breeding vanity in their lives[xxxvii].

Halo Effect:

The Halo effect is the tendency of letting an initial impression about a person influence our overall thinking about that person. In simpler terms,

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this can also be called the "physical attractiveness stereotype" or the "what is beautiful is 'good' principle". This can lead us to various errors of judgment in our day-to-day life. We can end up drawing incorrect conclusions such as assuming that a good-looking person is smarter or that well-packed or high-priced goods are of superior quality or even that a confident person is a more capable person. If our perception of one quality leads to biased judgments of other qualities of a person or product we call it the halo effect.

In the study published in 2021, Edmund Cannon et al. confirmed the presence of halo effects where answers to one question are contaminated by answers to the other questions during student evaluations of teaching (SETs)[xxxviii]. Teenagers and undergrads are more susceptible to the halo effect because of their greater reliance on appearances and first impressions. From choosing a course of study to a romantic partner their choices can be less than optimal due to the halo effect seeping into their decision frameworks.

Overcoming our Biases

Awareness is the best tool to beat cognitive bias. Knowledge of different biases and their mode of infliction would guard adolescents against falling into the trap of cognitive bias. Awareness of the bias and the probable age it is expected to be an influence (like the Dunning Kruger effect among the students) can make them cognizant and cautious of the biases. Developing a habit of reflecting on the decisions made gives an insight into the attributes that drove one to take those decisions. Irrespective of whether the outcome is positive or negative, examining those attributes can provide insight into the blind spots and biases that have crept into our decision-making framework.

Assimilation of a numeric estimate to a previously considered standard (anchor) can work well against biases. Two studies, conducted by Thomas Mussweiler, Fritz Strack, and Tim Pfeiffer in 2000 found that anchoring could be reduced by applying what they call the 'consider-the-opposite strategy'. The authors[xxxix] applied the Selective Accessibility Model (anchoring is mediated by the selectively increased accessibility of anchor-consistent knowledge) in reverse and hypothesized that increasing the accessibility of anchor-inconsistent knowledge mitigates the effect.

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Generating reasons why an anchor is inappropriate proved to be a successful corrective strategy. They conducted two studies in a real-world setting using experts as participants. The first study proved that listing arguments that are directed against a provided anchor value reduces the effect. The second study found that the effects of anchoring and considering the opposite are additive.

Young people tend to find it difficult to accept that they do not know what they do not know. The psychological discomfort of knowing that they do not know tends to incline them to assume that they know and behave so. In the studies of D. Dunning and J. Kruger, the capacity to distinguish accuracy from error was the reason for such miscalibration leading to bias. Improving the skills of adolescents/ undergraduate students would increase their metacognitive competence and help them recognize the limitations of their abilities.

A Cognitive Reflection Test (CRT) measures cognitive processing ability[xl], particularly the tendency of a person to suppress an incorrect, intuitive answer, a gut feeling, and come to a more deliberate rational answer which has got a greater probability to be correct. Putting students regularly through Cognitive Reflection Tests would not only bring awareness but also build the capacity to distinguish accuracy from error which helps them to recalibrate their decision frameworks.

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