

Interpret and categorize cognitive biases: Theoretical model

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Abstract

Many researchers have addressed the topic of cognitive biases via theorizing, research, and experimentation and have categorized many of them and this list is expanding so long as they're essential in research and evaluation. till the remember of these biases reached greater than one hundred seventy-five biases, which careworn their expertise, type, and the dissolution of similarities and overlaps among them. The examine seeks in a studies attempt to offer new theoretical information and interpretation of cognitive biases as they fall inside the cognitive process. we depend on our sensory structures to provide essential records about our surroundings. We use these statistics to have interact with our environment and communicate with others so that we can stay adequately, maintain social relationships, and keep away from probably risky conditions. And even though sensory facts is essential to our survival, there are so many records available at any given time that we'd be confused if we had to attend to all of it. with the aid of counting on cognitive schemes or shortcuts, we will make many quick and powerful selections every day. those abbreviations allow us to make "accurate enough" judgments that are frequently real. but, we are liable to expect cognitive biases.

I have written many lists that attempt to rely on cognitive biases, and their number may reach extra than a hundred seventy-five (decision-making biases, social biases, reminiscence errors, and many others.). In those lists, you locate many duplicates and plenty of similar biases in content material with special names. This topic has received significance and looks at since the generation of Greek philosophy, as Aristotle became the primary to systematically arrange mistakes of reasoning in a list, as the ability to refute an opponent's argument is one of the methods to win the talk. He recognized 13 inference mistakes, which he knew as a logical fallacy. The importance of the current research lies in the theoretical aspect that provides a brand new understanding of cognitive biases, which allows to categories those biases and as a result address them in applied research in a greater know-how and interpretation approach that removes the anomaly in the method of overlap between those biases.

additionally, this understanding and classification is greater beneficial and is simpler to apply in the cognitive psychology branch incorporated with pc programming in studies that inspire cognitive psychology theories in programming and algorithms for interaction applications of robots in line with records processing systems.

Keywords: Cognitive biases, logical fallacies, perception, Make a decision.

making biases, social biases, memory errors, etc.). In these lists, you find many duplicates and many similar biases in content with different names. This topic has gained importance and study since the era of Greek philosophy, as Aristotle was the first to systematically arrange errors of reasoning in a list, as the ability to refute an opponent's argument is one of the ways to win the debate. He identified thirteen inference errors, which he called a logical fallacy.

These logical fallacies for Aristotle are ambiguity, ambiguity, casualty, confiscation of the required and affirmation of necessity, cause and error, multiple questions, and a set of summoning arguments; Such as the argument using an adversary, the argument using authority, the argument using compassion, and the argument using ignorance of something.

He divided it into two main types:

1. Linguistic fallacies, which are called verbal fallacies, and are a mistake in how the discussion is presented.
2. Non-linguistic fallacies, which are called physical fallacies, and it is a material error in what the person is talking about.

Richard Hotelli (1826) divided the fallacies into two groups:

1. Physical fallacies: They are not logical errors because the inference in them relates to the introduction, they include:
 - The fallacy of ignoring what is required.
 - The fallacy of confiscation of the requested.
 - The fallacy of the suspected cause.

Introduction

Many researchers have addressed the subject of cognitive biases thru theorizing, research, and experimentation and feature categorized a lot of them and this list is expanding as long as they are crucial in studies and evaluation. till the variety of these biases reached greater than one hundred seventy-five biases, which confused their information, category, and the dissolution of similarities and overlaps between them. what is its dating to belief, and does it have a basis in philosophy after philosophy has offered many logical fallacies that overlap with many cognitive biases. that is what triggered the researcher to are seeking in research try to offer a new theoretical understanding and interpretation of cognitive biases as falling inside the cognitive system.

we depend on our sensory systems to offer important statistics about our surroundings. We use these statistics to engage with our environment and speak with others so that we will stay properly, hold social relationships, and keep away from probably dangerous conditions. And even though sensory information is crucial to our survival, there are so many statistics to be had at any given time that we would be confused if we had to attend to all of it. In truth, we are aware of most effective a fragment of the sensory statistics our sensory systems soak up at any given time.

By relying on cognitive schemes or shortcuts, we can make many quick and effective decisions every day. These abbreviations allow us to make "good enough" judgments that are often true. However, we are vulnerable to expected cognitive biases.

I have written many lists that try to count cognitive biases, and their number may reach more than 175 (decision-

4. The logical fallacy is another aspect of calling logical biases.

Introduction to cognitive bias

Most traditional views of human perception are in favour of the assumption that people tend to be idealistic when making choices and judgments. According to these sayings, which were widespread in many cognitive sciences, especially psychology, people act in a rational manner close to idealism. People who can solve simple problems, as well as complex cognitive problems, seek in every cognitive processing to maximize the rewards they can get from their interactions with the environment. In general, this represents a rational factor that would weigh the potential costs and benefits of this treatment and arrive at a suitable and appropriate option for the individual and this involves taking into consideration all relevant information to solve the problem involved in the treatment while excluding any unrelated information that could contaminate the judgment, or the decision.²

However, this traditional view has been challenged and rebuked in past decades, in light of evidence coming from experimental psychology and related fields. Thus, a growing set of cognitive experiences suggest that people's judgments and decisions are often far from rational: they are influenced by factors that appear unrelated or may fail to arrive at decisions and judgments that are appropriate and appropriate for the individual.

Deviations from the rational rule usually occur systematically: as people constantly fail to reach adequate and appropriate results for them in the same type of problem, and with the same mistake, this also appears to mean that

2. Logical fallacies: are the discussions in which the inference is not related to the introduction. He divided it into two groups:

- Purely logical
- Semi-logical, the quasi-logical group includes all remaining Aristotelian fallacies.

Dan Ariely (2010) says the author of *Predictably Irrational: Our irrational behaviours are neither random nor meaningless - they are systematic and predictable*. We all make the same types of mistakes over and over again, due to the basic wires of our brains.¹

The importance of the current research lies in the theoretical aspect that provides a new understanding of cognitive biases, which helps to classify these biases and thus deal with them in applied research in a more understanding and interpretation method that removes the ambiguity in the process of overlap between these biases. Also, this understanding and classification is more beneficial and is easier to apply in the cognitive psychology branch integrated with computer programming in studies that inspire cognitive psychology theories in programming and algorithms for interaction programs of robots according to information processing systems.

Research hypotheses

1. We can know and explain cognitive biases through the inputs and outputs of the cognitive process.
2. We can classify cognitive biases through the three stages of the cognitive process.
3. Epistemology in philosophy is the philosophical basis for perception and customary biases.

question that comes to my mind is whether these biases can be classified in a way that is based on internal mechanisms in the work of our minds, and what is the process of dealing with the problems of the outside world. It is the process of perception, this refers to the search for a classification of cognitive biases and their understanding through the stages of the perception process. The conclusion that I am trying to uncover in this research is that three types of cognitive biases are divided according to the stages of perception, selection, organization and interpretation and that there is complementarity and interaction between these patterns, so the bias that occurs at a stage can be supplemented by another bias at a later stage to appear as another form of bias, which is. In fact, interaction and integration of more than a cognitive bias.

The concept of cognitive bias

The Nobel Prize-winning academic researchers, Amos Tversky and Daniel Kahneman 1970 (authors of *Fast and Slow Thinking*) show that when the same information is presented to us differently (for example, once it is positively framed, and once it is negatively framed) Our decisions will also differ. These two scientists studied the following question: How do we know that cognitive biases underlie human understanding and effective communication?

Kahneman, D. (2003) explains cognitive biases in their condition to the limited processing capacity of the human mind, for example, the human memory does not have an infinite capacity, so when we deduce or make a decision, we cannot arbitrarily place any large amount of information in the memory. Even if all of this information is relevant to the problem, instead, we are forced to focus on a

people are not rational in making decisions and making judgments,³ hence the need for a theory capable of explaining this model of irrational, consistent judgments and decisions or cognitive biases.

Buster Benson (2016) says: I took four weeks to try to understand an initial list of 175 biases and add them all to a spreadsheet in an attempt to understand them in greater depth, seeking to come up with a simpler and clearer organizational structure to suspend these biases. Then I took another path to remove the duplications, pooling similar biases (such as the effect of the curious and the effect of humour) or complementary biases (such as the optimism and pessimism bias). The list drops down to about 20 unique biased mindset strategies that we use for very specific reasons. I made several different attempts to try to group these twenty or so at a higher level, and eventually landed down in grouping them according to the general mental problem that they were trying to address. Every cognitive bias is present for a reason - primarily to save time or energy on our brains. If you look at them through the problem they're trying to solve, it becomes a lot easier to understand why they exist, how helpful they are, and the trade-offs (and the resulting mental errors) that they make. Buster Benson concludes that there are four types of problems, for each of which we use a pattern of cognitive biases to address:

1. Information overload.
2. lack of meaning.
3. the need to act fast.
4. how to know what needs to be remembered for later.

Buster Benson's attempt was wonderful and inspiring when I read it, as he divided cognitive biases based on the problem in the external world, but the

the first system is fast, intuitive, inference-based, automatic, and frugal, while the second system is slow, greedy for information resources, rational, and oriented toward the optimal solution. People perform many daily tasks within the first system: when the task is easy, when we need a quick solution, or when an approximate (non-optimal) solution is good enough. However, some task requirements can activate the second system.

Forms of cognitive bias include errors in statistical judgment, social attribution, and memory, such biases significantly skew the reliability of anecdotal and legal evidence. It is believed that it occurs through the three stages of perceptual processes (selection, organization, and interpretation) of the distortion process of inference. It may be a bias in the process of selecting external stimuli, or it may be deviations in the process of organizing information for stimuli entering the perceptual system, and there may be deviations in the process of interpreting information and the function of meanings that do not match the origin of the stimuli, and they may be complex deviations, that is, they have deviated in more than A stage of cognitive processing.

Cognitive biases in the cognitive process

In our interaction with the external, physical world, there is a constant need to process the information coming from this world to understand it and to be safe and sound. And since we can feel the outside world through hearing, seeing, smelling, touching and tasting, this means that we sense this world and remain aware of what is happening around it, and this is the perception that our sensory systems allow. While sensory receptors are constantly collecting information from the

specific set of information available and within the limits of our ability, which we cannot address more than these limits. As for the more complex problems, the ideal solution is a distant matter, and we can only reach it with limited rational limits.⁴ That is, take the best decision after considering a limited amount of information. This could be a good explanation for many instances of cognitive bias. Kahneman et al. (1982) A framework for understanding cognitive biases is the Kahneman and Tversky Research Program on Inference. The rationale for this approach is as follows:

- **First**, making rational choices is not always possible or even desirable for several reasons:
 - A. It takes time to collect and install evidence effortlessly to solve the problem.
 - B. It also needs to invest a lot of knowledge resources that can be used for other purposes.
 - C. It is often the case that approximation to the best possible solution to the problem (i.e. what is good enough) while continuing to process to obtain the optimal solution is very expensive and does not bear fruit. So minds or shortcuts, they conclude quickly and frugally. The inference process here represents a simple rule that does not aim to understand the problem in all its complexities or reach an optimal solution, but rather produces a "good enough" solution quickly and with minimal effort, but it can also lead to systematic errors.

According to Kahneman's theory of the dual system of human perception, the mind possesses two modes of operation:

individuals, we may focus on a familiar sensory stimulus or something new. When we are at a certain thing in our environment - be it a smell, a sound, or something else entirely - that becomes the chosen stimulus, which is the first stage in the process of perception. In which we convert environmental stimuli into inputs to the cognitive processing process. In daily life, we are exposed to a torrent of information through a large variety of stimuli that abound in any situation in daily life that must be addressed in a moment and make judgments and decisions about it: the words we hear, listen, look there, what is this smell, the colours, the temperature of the room, for example, A few. These are countless stimuli coming to our sensory organs simultaneously and waiting to be processed. However, we cannot be aware of all the information around us, and these are the limits of perception available to humans. Thus, we see only a portion of the information available in the environment through a selective process. And this is what Singer, M (1987) has pointed out. "We experience everything in the world not as it is - but only as the world comes to us from our sensory receptors." ⁶

When we are amid many competing stimuli, we pay attention to those stimuli that we know or are interested in through the selective process of perception. This process is a process of cognitive bias that falls within the pattern of choice biases, which we can understand in two forms. The first is a useful bias for making quick decisions that cannot be postponed, and the second is choice biases that make us overlook the stimuli and information that was present in the situation and are more important to us in subsequent cognitive treatments. Within this pattern, we can

environment, it is the way we ultimately interpret this information that influences how we interact with the world. ⁵

The researcher's definition of cognitive bias

Here I present the definition that I think is the most appropriate for the concept of cognitive bias, which I will try to prove in this paper. A cognitive bias refers to a systematic system (that is, it is not random and, therefore, predictable) of deviations in the processing of information entering the cognitive process that confuses the inference logic in it and a defect occurs in the processing algorithm that results in what we call the logical fallacy, which leads to distortions in the output of the treatment Perception represented by judgments or decisions that a person adopts. Categories of cognitive biases are classified according to the stages of the cognitive process. From this definition of cognitive biases, we believe that it is another aspect of calling logical fallacies that we know as follows:

A logical fallacy is a systematic deviation in the processing of information entering into the perceptual process, which hinders the process of sound logical reasoning, which leads to distortions in the output. Cognitive biases are classified into three types according to the stages of the perception process, and from here we will display the patterns of biases according to the stage of perception in which these biases occur.

First, selection biases

The world around us is filled with countless stimuli that we may encounter, but our brains do not have the resources to take care of everything. Thus the first step to realization is what should and should not be paid attention to. Depending on the environment, and depending on us as

characterized by a certain intensity and are homogeneous that do not attract attention to it, so the variation or fluctuation in the intensity of the stimulus works to attract attention.

3. Novelty, modernity and weirdness in stimuli: familiar stimuli do not attract attention to them because the individual has become accustomed to them, while new or unfamiliar stimuli soon occupy the focus of the individual's attention.

The second factor, Motivational state biases

The sensation is a physical, physical process, while perception is a mental-psychological process. Often the choice is influenced by a person's motivations or motivations to behave in a certain way. The presence of urgent impulses that need to be satisfied often distract a person from many other stimuli and stimuli. This is a prejudice, as a person chooses a stimulant or stimulus and leaves another based on a psychological motive or psychological need. Let's take an example that illustrates the idea: When you walk to the kitchen and smell the smell of cinnamon apple pies (students), the sensation is the smell receptors and the perception is that you go to the kitchen to eat.

Psychological needs and motivations have a great influence on the cognitive bias process, as we found in the need for food

The smell of cooking food attracts the attention of a hungry person, while a satiated person may not be interested in these details. Long-term urges also affect the stimuli that get our attention. For example, an art historian who has spent many years studying visual art may be more inclined to pay attention to the

include several cognitive biases that we call selection biases. It can be enumerated and classified according to the causative factors.

Factors causing selection biases

The first factor, biases of the physical factors

One of the most obvious factors that affect the bias in selecting a stimulus are the physical factors, specifically what is related to the feelings that transmit information to us, whether they are accurate or confused and distorted, as well as the comparison between stimuli for inclusion in the treatment process, we consider it a selection bias. Time There was a strong light shining in your eyes and your friend next to you was talking to you about his problems with his brother, and the weather was very cold winter. Also, the time factor affects the receipt of sensory alerts, whether it is at the time of waking up from sleep, midday or the end of the night, some people are more alert "In the early morning, unlike others who go about their lives at night, the general health of a person also affects the bias in the selection of stimuli.

Many external factors affect the selection process, the most important of which are:

1. The physical properties of the stimulus or situation, such as colour, shape, size, intensity, and location about the background on which the stimulus is located, movement, change, organization and arrangement. Bright colours attract more attention than dark, loud sounds are more attention-grabbing than faint sounds and intense scents are more interesting than ordinary smells.
2. Variation in the intensity of the stimulus: the stimuli that are

making process because they can contaminate the results.⁷ This could explain many instances of choice bias when emotions or emotions are involved. In the cognitive processing process, the decision-making process deviates from the rational context and outside the laws of possibility and utility theory. This is what we hear in our daily life, such as the words (I will turn green and everything and on me and my enemies). When you are in a state of anger, you do not realize many of the stimuli in the situation that may calm you down. You respond to what fuels your anger with a cognitive bias affecting the input of the perceptual process. Also, when you are in a state of joy, you do not pay attention or may overlook mistakes that others may make.

Factor five, Selective Focus Bias: The phenomenon of being able to selectively focus on a specific stimulus while filtering out a host of other stimuli, is a test bias.

Imagine that you are at a party full of music, chatter and noise, and you are engaging in an interesting conversation with a friend, you are biased to selectively choose a conversation alarm and delete all background noise information and if someone interrupts you to ask about the song that just finished playing, you probably will not be able to answer this question.⁸

Although our perceptions are based on sensations, not all sensations lead to perception. Often we are not aware that stimuli remain relatively constant over long periods. This is known as sensory adaptation. Imagine entering a small seminar hall with an old mechanical clock, when you first enter the room, you can hear the clock ticking; When you start to engage in a conversation with your roommates or listen to a lecturer

detailed carvings on the exterior of a building; whereas a building engineer will pay attention to the column structure that supports the building.

Factor Three, Beliefs and Attitudes Explain why we may be attentive in the form of a selective selection bias for some stimuli but not others. It mainly appears that the culture, attitudes, tendencies and beliefs of the individual have a great impact on the mechanism of his choice of various stimuli and how he interacts with the external world topics.

Cognitive bias occurs here when the bias in choosing a stimulus without another because it is consistent with a person's specific belief or trend, which directs the choice from the situation to a specific stimulus.

Let's take an example of this: If you travel to one of the European countries and in a city that combines the beauty of buildings, a beautiful park and a basin for dancing water jets, and you enter the place, you hear the sound of the call to prayer coming from a nearby mosque that you do not see and the smell of rice food and value sauce, you will find yourself looking for the place from which it comes Azan sound. It's the selection bias of stimuli that influence your beliefs and attitudes.

The fourth factor, Mood: the emotional state and mood often affect the choice of certain stimuli without others, or distracting the choice from a stimulus, it was safe for you to pay attention to it and treat it. Kahan et al. 2012 indicate that emotion and emotion are a possible cause of some cognitive biases. In a normal situation, decision-making is understood as a formal, rational consistency consistent with the laws of possibility and utility theory and accordingly emotions are excluded from the rational decision-

society or in an organization that makes him deal with stimuli and stimuli, especially related to the social relationship in a selective manner that indicates a clear selection bias in choosing and processing stimuli and leaving other stimuli.

The seventh factor, selection bias according to life experience: The shared experiences of people in a particular cultural context can have clear effects on perception. For example, Marshall Segall, et al (1963) published the results of a multinational study in which they showed that individuals from city-dweller cultures were significantly more supportive of responses to a specific type of visual illusion than responses provided by tropical forest dwellers in Africa, and vice versa. Right. One such illusion that city dwellers were likely to experience is the Müller-Lyer (Fig. 1): The lines look at different lengths but are the same length.

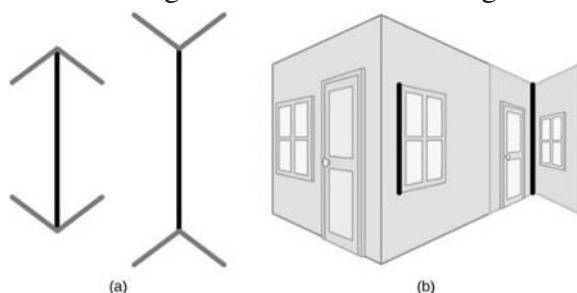


Figure 1. In the Müller - Lyer illusion, the lines appear of different lengths even though they are identical. (A) Arrows at the ends of a line may make the line to the right appear longer, even though the lines are of the same length. (B) When applied to a hologram, the line on the right may appear longer again even though both black lines are of the same length.

These perceptual differences were consistent with differences in the types of environmental features in which people live regularly in a particular cultural

presenting a presentation on a topic, you find that you are listening to the voice of the lecturer and are no longer familiar with the tick even though the clock is still ticking, and that information still affects the sensory receptors of the auditory system ⁹. You are showing selection bias and no longer entering clock sound into the perceptual processing process.

In another example, he illustrates one of the most interesting demonstrations on selection bias. In a famous study by Daniel Simons and Christopher Shapres (1999). In this study, participants viewed a video clip of people wearing black and white basketball. Participants were asked to count the number of times the team had passed the white ball. During the video, a person in a black gorilla costume walks between the two teams. Do you think someone would notice the gorilla, right? Almost half of the people who watched the video did not notice the gorilla at all, even though it was visible for nine seconds. Because the participants were tightly focused on the number of times the white team passed the ball, they perfectly tuned other visual information. Inattention blindness means that something completely visual is not noticed due to a lack of attention. In a similar experiment, researchers tested unintended blindness by asking participants to watch images moving across a computer screen. They were directed to focus on white or black things, ignoring the other colour. When a red cross passed across the screen, about a third of people did not notice it. That is, selective focus, perceptual adjustment, and unintended blindness are all forms of choice biases in cognitive processing processes.

The sixth factor, social status: the person's real or perceived position in

distinctive traits.¹² After selecting information from the outside world, we need to organize it in some way by finding some patterns that are meaningful and easy to process. This organizational stage is accomplished by placing things or people into categories, which is why it is also called classification by some researchers. Once we choose to pay attention to a stimulus in the environment (consciously or unconsciously), the choice triggers a chain reaction in our brain. This nerve process begins with the activation of sensory receptors (touch, taste, smell, sight, and hearing). The receptors convert the input energy into nerve activity, which is transmitted to our brains, where we construct a mental representation of a stimulus (or, in most cases, multiple related stimuli) called perception. An ambiguous stimulus can be translated into multiple concepts, which are randomly tested, one by one, in what is called "metastable perception".¹³

Metastable perception is the automatic alternation between two or more perceptual states that occurs when sensory information is ambiguous. Polymorphic phenomena allow the separation of the neural activity related to conscious perception from that associated with sensory stimulation, and thus it has been widely used to study the neural correlates of consciousness.¹⁴ This ambiguity in sensory information and the alternation process between more than one cognitive state creates regulatory biases in treatment preferences and classification. For any category more applicable to the characteristics of the stimulus.

Factors for regulation biases

The first factor: the laws of Gestalt theory of grouping are a set of principles in psychology that explain how humans

context. People from western cities, for example, have a perceptual context for straight-line buildings, which is what Segall et al. (1966) called the carpentered world. In contrast, people from tropical forest dwellers' cultures in Africa have a point of view. An eccentric view, whose villages consist of round huts arranged in circles, are less prone to this illusion.¹⁰ It is not just the vision that is affected by cultural factors. Research has shown that the ability to recognize a scent and assess its attractiveness and intensity varies across cultures. The selection bias here is based on the living system and the culture system that determines the choice of a system for dealing with the environment and not previous experiences as some researchers in this field believed. I believe that the culture or living system needs to be researched and studied in more depth because it will present useful ideas.

The seventh factor: basic or distinctive aspects of an individual's personality may create stimulus selection biases. Like children described as excited, seekers are more likely to show taste preferences for intense sour flavours.¹¹ Likewise, individuals with positive attitudes toward low-fat foods are more likely to rate foods classified as low-fat as tasting better than people with less positive attitudes. Towards these products.

Second, Organization biases

In the second stage of perceptual processing, the physical and social objects and events we encounter have shape, colour, texture, size, etc. For example, when he asks about what a human is, some people may describe him from the perspective of skin colour, others from the perspective of race or nationality. The range of potential contrast between types of people, their actions, and their

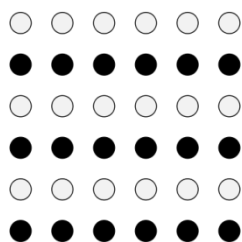
process a greater number of smaller stimuli. Because of this, people tend to see groups of dots on a page rather than seeing a large number of individual dots. The brain brings items together instead of processing large numbers of smaller stimuli, allowing us to understand and visualize information more quickly.¹⁶



Because of the law of affinity, people tend to see groups of dots on a page rather than seeing large numbers of individual dots.

Law of Similarity

This law states that people will perceive similar items that will be perceived to be grouped. This allows us to distinguish between adjacent and overlapping objects based on their visual texture and similarity.



Because of the law of similarity, people tend to see this as six groups of black and white dots rather than 36 individual dots.

Law of the Earth Form

The visual field can be separated into two different areas: shapes (prominent objects) and ground (objects receding into

naturally perceive stimuli as patterns and organized things. Regulatory biases can be understood through our understanding of these laws.

Gestalt laws of grouping. Gestalt laws of grouping are a set of principles in psychology first proposed by Gestalt psychologists to explain how humans naturally perceive stimuli as patterns and organized things. Gestalt psychology attempts to understand the laws of our ability to acquire and maintain meaningful perceptions in a seemingly chaotic world. The basic principle of Gestalt psychology is that the mind forms a universal unit with self-organizing tendencies. The Gestalt effect is the ability of our brain to generate complete meanings. We can understand the theory's rules regarding the visual recognition of global shapes, but the application of these concepts and rules in understanding and interpreting organization biases appears very practical and effective, instead of seeing the forms of cognitive biases in a specific issue and counting them as mere groups of Sparse, simple and irrelevant cognitive processing processes, we find that according to the Gestalt theory, our brain organizes and combines the elements whenever possible instead of keeping them as separate elements and forms the overall meaning that should be with a treatment that can only be a cognitive bias based on organization biases. Some of these grouping laws include the laws of proximity, similarity, and closure, and the law of base number.¹⁵

The law of proximity

This law assumes that when we feel a group of things, we are going to process things that are physically close to each other. This allows the items to be grouped into larger groups and reduces the need to

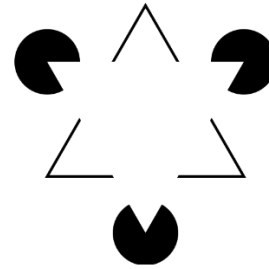
Factor Three, Our tendency to group stimuli helps us regulate our emotions quickly and efficiently, but it can also lead to false perceptions.

The fourth factor, Perceptual diagrams help us to organize people's impressions based on appearance, social roles, interaction, or other traits. Hence, we find that stereotypes are biases of information organized so that it is easy to recognize, recall, predict and respond to information. Stereotypes are classes of things or people who help simplify and organize information so that the information is easier to recognize, recall, predict, and interact with. Among the stereotypes, things or people differ from each other as much as possible. Within stereotypes, things or people are as similar to each other as possible.¹⁸

While our tendency to group stimuli helps us quickly and efficiently regulate our emotions, it can also lead to perceptions of being misleading. Stereotypes become dangerous when they no longer reflect reality, or when certain characteristics are attributed to entire groups. It can contribute to prejudice, discriminatory behaviour and suppression. We call psychological classification systems the perceptual scheme that we use to organize our impressions of people (appearance, social roles, interactions, habits, etc.).¹⁹

We develop perceptual charts to organize people's impressions based on their appearance, social roles, interaction, or other characteristics; Then these diagrams influence how we perceive other things in the world. These charts are inferences or shortcuts that save time and effort on the account. For example, you may have a perceptual scheme that the

the background. Many optical illusions play on this perceptual direction. "



In the Kanisza Triangle Illusion, the Law of Shape and Earth causes most people to perceive a white triangle in the foreground, making the black shapes recede into the background.

Lockdown Act

The Closing Law demonstrates that our visualization will complement unfinished elements, such as the lines of the circle and square in the figure below.



The circuit and square line are operated according to the closure law

The second factor, The human brain is built in a standard way, with different regions processing different types of sensory information. A special part of our brain known as the fusiform face area (FFA) is dedicated to identifying people, organizing them, and classifying them according to the biases that regulate their distinctive features from an individual's point of view. This unit was developed in response to our need as humans to get to know people and organize them into different classes to help us survive.¹⁷

characteristics of things, this means that thinking took the form of generalization.

5. **Concretization:** Abstraction requires a reverse mental process, which is the transition from abstraction and generalization to sensory reality, which is an important condition for a correct understanding of reality.
6. **Analysis:** It is the rational process by which a complex total phenomenon is deciphered into its constituent elements, that is, to its partial components.
7. **Synthesis:** the reversal of the analysis process, since the synthesis is a mental process by re-unifying the complex phenomenon from its elements that were identified in the analysis process.
8. **Reasoning:** Reasoning inference is based on deducing the validity of a certain judgment from the validity of other judgments. Correct reasoning leads to achieving confidence in the necessity and inevitability of the results reached. There are two types of inference:²¹

A.Deduction: It is the inferential process by which we conclude that what is spent on the whole is also spent on the part.

B.Induction: It is the inferential process, by which a general conclusion is reached from the observation of certain partial states.

The fifth factor, characteristics associated with the stimulus or the situation: the individual perception of what is around him from stimuli, situations, people, and phenomena are affected by several external factors (objective) related to

building you go to in class is symmetrical on the outside (sometimes called "symmetry inference" or the tendency to remember things as more consistent than they are). Even if not, setting that assumption saved your mind sometimes. This is both the blessing and the curse of diagrams and inference: they are useful for understanding a complex world, but they can be imprecise. The organizing process by which classes of objects or phenomena are arranged or coordinated in a particular system, according to what exists between these categories of reciprocal relationships, is a series of mental processes that the brain undertakes in the process of searching for meaning:²⁰

1. **Comparison:** It is known as contrast or balance, and is represented in the relationships and correlations between phenomena, things, or events, and the extraction of these phenomena, things, or events in perception and perception of man.
2. **Classification:** It is the process in which objects or phenomena are grouped according to what distinguishes them from common features, and where grouping or categorizing is put into place, and so that it includes specific concepts of phenomena or things.
3. **Abstraction:** For thinking to be realized, it is carried out according to distinguishing the independent properties of things, as it is done in a way that is independent of the things themselves.
4. **Generalization:** Abstraction is related to generalization, on the basis that upon reaching the determination of the abstract



Robin's vase: A robin's vase is a common visual trick used to illustrate differences in perception of stimuli.²³

When confronting a thing or a material event, almost everyone agrees with the objective part of the meaning, but the matter differs when confronting social events, as each person considers a unique situation depending on previous experiences and cultural background, so diversity appears among people in the perception of the same stimulus. Also, people from close cultures will have a repository of similar experiences and knowledge in terms of values and customs, so they may attribute similar meanings to the same motivation, and this means similar perceptions, thus the process of understanding and conveying the exact meaning of verbal and non-verbal behaviours to each other.²⁴

Therefore, treating interpretation to impart meaning to the stimulus has advantages that must be considered because it represents the basis of interpretation biases at this stage of the perception process:²⁵

- Interpretation of stimuli is subjective, which means that individuals can come to different conclusions about the same stimuli.
- Self-interpretation of stimuli is influenced by individual values, needs, beliefs, experiences,

external stimuli, as these factors direct the attention and perception of the individual according to some variables. Affiliation can be formulated intuitively as follows "If A is similar to B (or belongs to group B), then A will function in the same way as B. That is when the model is seen as a representative of the group, then all the features that are typical of the group Attributed to the model. We can give an example of this that this person is intelligent, just because he studies at university or because he wears glasses. This inference could explain why people make certain errors when they use solving Bayesian reasoning problems, such as neglecting the base rate."²²

Third, Interpretation Biases: After we commit to a stimulus, and our brains receive and organize the information, the interpretation or translation stage comes as final processing within the perceptual process. We logically interpret the stimuli using the information we have in categories and then superimpose it on our lives to give it meaning. This means that the interpretation is simply the process of processing the information that we organized in the previous stage to classify it so that the output is the attachment of the meaning of a specific stimulus or stimulus. But different people may give different interpretations of the same stimulus. For example, in the Robin Vase Illusion, some individuals will interpret sensory information as a "vase," while some interpret it as "faces." This represents interpretation biases.

about plane crashes. This inference can explain many common biases, such as the recency bias: the portion of the information that is easily remembered and thus is weighted more than other information, which can lead to serious errors in many areas (for example, judicial).

An individual's hopes and expectations about the stimulus can influence the type of cognitive bias with which they will process the information to interpret it. The reason for the emergence of interpretation biases can be understood by analyzing the associated benefits. Thus, according to the error management theory (Haselton and Nettle 2006), we can understand interpretation biases for the pressures to make important life or death decisions quickly.

For example, it is better to escape when seeing a potential predator than to wait for it to be visible, but possibly too close to view.) These conditions foster the development of decision mechanisms that (a) operate quickly and (b) produce the so-called "least-cost error". In this example, it is better to wrongly conclude that the predator is present in the surrounding environment rather than the surrogate, i.e. wrongly infer that there is no predator. We know this because the two mistakes have very different consequences (it can be a waste of time in the first case and death in the latter.²⁷ Sometimes the least expensive mistake is the least likely. In general, many interpretation biases seem to systematically favour the conclusion that corresponds to the least-cost error, and which is formulated by any of these methods. Selective perception bias refers to the process of classifying and

expectations, self-concept, and other personal factors.

- Self-concept: a multidimensional construct that refers to an individual's perception of "self" about any number of characteristics, such as academics, social roles, gender, ethnic identity, and many others.
- This stage is characterized by our representation and understanding of the stimuli in our environment, as it is a direct representation of what we call each person's views of the world around him.

Cognitive bias factors in the interpretation stage

Cultural values, beliefs, traditions, past life experiences, expectations, social participation, self-concept, obtaining benefits, psychological needs and motives, and other personal influences all have a tremendous influence on cognitive processing trends and thus are active factors in biases of cognitive processing and imparting a unique final form. For each person to interpret stimuli in the environment and the meaning attached to them. Experience plays a major role in the way a person interprets stimuli.²⁶

The age factor is an interpretation bias, since the elderly, for example, look at the world and events and deal with them more expertly compared to "youth and adolescents. Experience so their interpretation bias is different. Availability bias Availability index depends on the ease with which it comes to mental representation. If there's a sure clue, it most likely does incorrectly. A classic example is to overestimate the probability of a plane crashing after watching a movie

influencing how much money participants are willing to pay for a series of items.

Selective retention bias (also known as selective memory) is a similar process by which some information is preserved and stored in memory (and thus available for retrieval) and other information is not (and therefore forgotten).²⁹ This is an interpretation bias outside of conscious perception in which it occurs. Choosing specific information and not others to be used in the subsequent information processing processes to divert the subsequent output according to a desired context for the person. Like someone who maintains a waif that you sinned and does not keep your good deeds with him and he is in every situation, he treats you based on your only fault with him.

Fourth, Cognitive processing scheme: Since perception is subjective, it is affected by the characteristics of the perceptive individual.

Therefore, the chart helps guide accurate perception by organizing and interpreting information based on previous experience and knowledge. Whereas perception refers to how perceptual information is consciously organized, interpreted, and experienced. Two general processes work between sensation and perception:

1. Bottom-up processing, which is a system in which information is processed from sensory input (bottom) as soon as it arrives (top), building perceptions. In other words, if you display a random image on the screen, your eyes detect the features, your brain puts them together, and you see an

interpreting information in a way that favours one class or interpretation over another. Thus, selective perception is generally considered to represent an interpretation bias in information processing. More specifically, information tends to be perceived selectively in ways that are consistent with individual current needs, goals, values, attitudes, and beliefs. This process generally occurs automatically, outside of the perceived conscious awareness.²⁸

An example is the fixation and modification bias which is sometimes considered a special case of heuristic disclosure. Knowing a tentative answer to a question is known to bias other attempts at an answer (these answers become closer to the anchor). For example, imagine you are asked, "In what year did Albert Einstein visit the United States for the first time?" Suppose you don't know the answer, so you must be guessing. (Most people will choose a number like "1950" because it represents the world's period.) Now, imagine if you got two options for an answer and you are asked to be a year representative within one of the following two cities (1200-2000) or (1900-2000). Low and those who gave a range between 1900 to 2000, they answer with higher numbers than the first group. This indicates that the members of each group express an answer on the extent to which they considered (the anchor) their rate of judgment. The effect of anchor or establishment has been extensively studied on consumer behaviour. As well as irrational decisions made by some people, for example, arbitrary numbers (i.e. the last numbers of participants' Social Security numbers) can act as fulcrums for

Look at the figure in the square, if you look at it alone, your brain is involved in the processing from the bottom up. There are two thick vertical lines and three thin horizontal lines. There is no context to give it a specific meaning, so there is no top-down processing. Cognitive bias occurs when choosing this form and not others if it is in the midst of a group of other forms. Now, look at the same shape in two different contexts. Surrounded by string letters, your brain expects the shape to be a letter and completes the sequence. In this context, you see the lines forming the shape of the letter "B". The shape itself is surrounded by numbers, and it now looks like the number "13." When the context is given, your perception is driven by your cognitive expectations. You are now manipulating the shape from top to bottom.³⁰



Cognitive bias in the perception process is your choice of the sequential character pattern the first time and your choice of the sequential number pattern the second time, and the fact that the shape was not a letter or a number. One final example of top-down processing. Look at the following picture.



image of an eagle. What you see depends only on the incoming sensory information. Ascending refers to the method that is built from the smallest pieces of sensory information. Cognitive biases occur here in the process of selecting the stimulus as an input to cognitive processing, so why is this stimulus and not the other present in the situation, then it is a selection bias process.

2. Top-down processing, which refers to the perceptual-driven sensation. It is a system of influence in directing feelings with available knowledge, experiences and ideas, that is, how we direct feelings is affected based on our available knowledge, experiences and ideas. Your brain applies what it knows and what it expects to perceive and fills in the blanks, so to speak. Cognitive biases occur here in the process of influencing and directing sensation from our knowledge, experiences, thoughts, and psychological state. These biases represent the interaction between the three entrances to the perception process as it renews due to the existence of selection biases influenced by biases in interpretation, which creates biases in the organization, to come back and interpret according to this complex treatment. Let's look at a visual example:



presented to them and choose the appropriate evidence, while ignoring the unwanted. The basis of this theory is rooted in the cognitive dissonance theory, which asserts that when individuals encounter contradictory ideas, certain mental defence mechanisms are activated to produce harmony between new ideas and pre-existing beliefs, resulting in a cognitive balance which is defined as a state of The balance between a person's mental representation of the world and their environment. Selective exposure is based on the assumption that one will continue to search for information about an issue even after the individual has taken a stand on it. The position a person takes will be coloured by various factors of that problem which are reinforced during the decision-making process. Have you ever anticipated a really important phone call, and while in the shower, you think you hear the phone ring, only to find out it's not? If so, I tested how stimuli can detect a meaningful stimulus that transforms our ability to distinguish between a real sensory stimulus and background noise. The ability to identify a stimulus when embedded in the background of distraction is called signal detection theory. This may also explain why the mother is awakened by a murmur of her baby but not by other sounds occurring while she is asleep. Signal detection theory has practical applications, such as increasing the accuracy of air traffic control.

In the image above you should see a bunch of nonsensical dots. However, our brain is associated with detecting faces, which, from a biosocial perspective, are among the most important stimuli in the world. And so the floating-point becomes an eye, and from there we build a nose and a mouth, and it determines that the image bears the image of a "face" and tells your mind that this is what it is supposed to see. Again instead of the face, now look at the photo and see a saxophone player wearing a big hat. Some of you may have noticed this from the start. So here, too, a cognitive bias in perception occurred. It is a slick of ink that we try to give meaning and when we do not find a cognitive bias in our mental processes.

An example of this interaction and the overlap between types of treatment biases is:

1. Perceptual expectation biases, which is the willingness to perceive things in a certain way based on expectations and assumptions about the world. The individual often directs his attention to the stimuli associated with his expectations when he expects something to happen, and thus neglects other stimuli. Willingness to perceive things in a certain way.
2. Selective exposure bias is the tendency of individuals to prefer information that reinforces their pre-existing views while avoiding contradictory information. Selective exposure has also been known to be "confirmation bias." According to the historical use of the term, people tend to choose certain aspects of the information

4. Cognitive biases can be observed in decisions and judgments that people make in a wide range of areas and tasks that they perform.

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Controllers must be able to detect aircraft among the various signals (flashes) that appear on the radar screen and track them as they move through the sky. The original work of the researcher developing the signal detection theory focused on improving the sensitivity of air traffic controllers to flying shots.

3. Ambiguity bias: lack of clarity. If the ambiguity increases, the person may have difficulty with the information that is suitable for processing. Here, cognitive bias occurs in more than one stage of cognitive processing. Either the person does not choose the stimulating alarm and move to another, or choose this mysterious alarm and treat it with the bias of organizing and categorizing it in a way that does not suit him, and then bias in its interpretation according to variables that fit the person's characteristics and not the characteristics of the stimulus.

Conclusions

1. Cognitive biases are defined, understood and explained by processing information coming from the senses in the stages of the perception process.
2. Cognitive biases are of three classes according to the stage of information processing (selection, organization, interpretation). The assumptions of cognitive bias in each stage have been inferred and the biases interact across the stages.
3. Logical Fallacies is another verbal expression of the concept of cognitive biases.

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