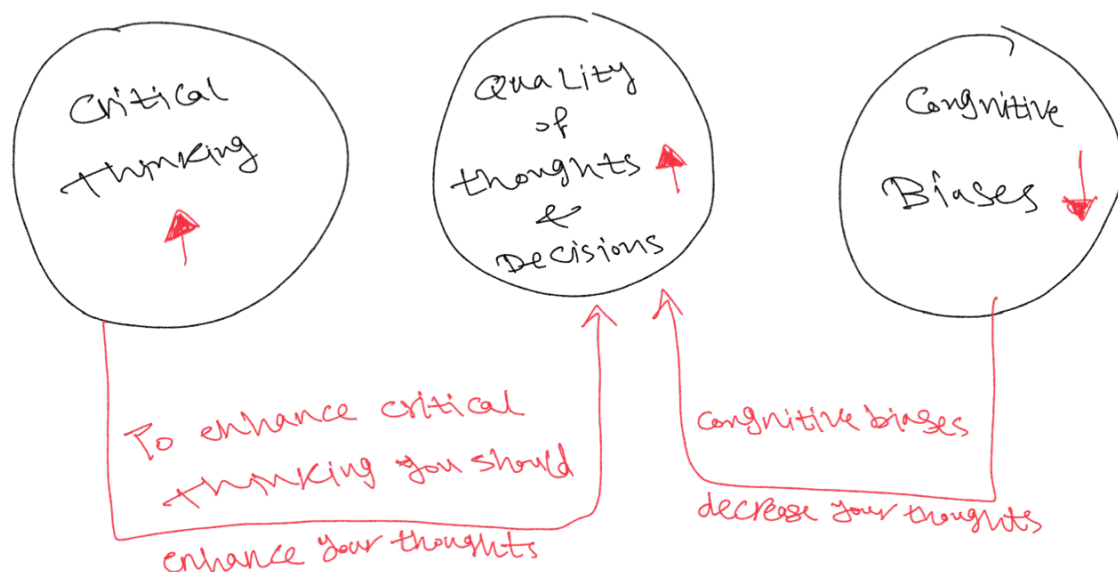


Critical Thinking

Course Link: <https://www.udemy.com/course/upgrade-your-mindware/>

What are Cognitive Biases?

- Features of ordinary human psychology that make us prone the errors in how we form beliefs and make decisions. As judged by some accepted standard of "**Good Reasoning**" we can't detect bias simply by inspecting our conscious beliefs and reasoning. A central aim of critical thinking is to improve the quality of our beliefs, judgements and decision. Cognitive biases, by definition, lower the quality of our beliefs, judgments and decisions.



[How we ought to reason >> **GAP (BIAS)** >> How we actually reason]

The Mindware Theory:

- The theory is that everything that we associate with the properties and activities of minds, thinking, feeling, perceiving, believing, desiring, imagining, reasoning and so on, all these things are best understood as a kind of information processing activity carried out by our physical brains and bodies.
- **Mindware** is whatever people can learn that helps them to solve problems, make decisions, understand difficult concepts, and perform other intellectually demanding tasks better.
- **Mindware** is software for the mind and the programs you run in your mind that enable you to do useful things with data stored in your memory.
- **Mindware** is like kitchenware, the equipment of the mind, the pots and pans, measuring spoons and spatulas, egg beaters and corkscrews that enable people to cook up something compelling out of the information at their disposal.
- **Mindware** is whatever knowledge, understanding, and attitudes you have that support you making the best use of your mind.

[Mindware = Software of Brain/Body]

[Mindware = Tools for Smart Thinking]

Why Cognitive Biases Training? [3 Categories of Reasons]

- Minimize Negative Outcomes
- Improve Performance
- Promote Social Justice

Examples of Discrimination and Social Injustice:

- Boys associate with **Math**, but Girls associate with **Reading**.
- Using Student ID instead of his name in the exam because the exam result may be affected badly depending on how the student's name looks good.
- Perform the orchestra exam in a blind exam without showing who plays the song, because the exam result may be affected badly depending on the player gender.

Confirmation Bias:

The Tendency to focus on information in a way that confirms one's prior beliefs and expectations.

3 Different Ways for Confirmation Bias:

- Biased Memory
- Biased Search for Information
- Biased Interpretation of Information

Biased Memory:

Studies show "**CORRELATION**" between full moons and frequency or type of emergency room in hospitals. (**ILLUSORY CORRELATIONS**).

Biased Search for Information:

Showing a preference for asking questions that confirm our expectations over questions that would disconfirm expectations.

Example: The man is interviewing the woman and wants information about the number written on a card that she's holding in her lap. Let's assume that the man believes that the number is a three. He can ask a question like whether the number is even or odd, and she can only answer yes or no. It turns out that if we think the number might be a three, an odd number, we're much more likely to ask the interviewee whether the number on the card is odd than ask whether it's even. This is important because either question would yield the exact same information. If you asked if it's odd, she'll say yes, and you know it's odd. If you asked if it's even, she'll say no, and again, you'll know it's odd. It's the same information either way. Yet we're more likely to ask the question that confirms our expectations if the answer is yes than the question that would disconfirm our expectations if the answer is no. This is a bias having to do with how we search for information.

Framing Effects for Biased Search for Information:

Drawing different conclusions from the same information depending on how that information is presented.

Example: The question, "Are you happy with your social life?" gets more yes answers than the question, "Are you unhappy with your social life?" gets no answers. If we assume that being happy implies that you're not unhappy, then you might predict that people would treat those as equivalent statements, but they don't. You're more likely to answer yes to the first than no to the

second. That's a cognitive bias. Now, exactly why people do this is an interesting question, but the point here is that the way a question is framed can elicit a biased response. This framing effect is itself one of the most heavily studied cognitive biases.

Example: Many people will strongly prefer one medical treatment over another, even though statistically they have identical outcomes simply based on whether the outcomes are framed in terms of survival rates or mortality rates. People strongly prefer a treatment that they're told has a **75%** survival rate over five years over a treatment that they're told has a **25%** mortality rate over five years, even though those describe exactly the same outcomes. After five years, three quarters of the patients are still alive and a quarter have died. So, we respond to information very differently depending on how the information is framed.

How Questions can manipulate Memory in Biased Search for Information?

How the words used to ask a question can influence not only our likelihood of answering yes or no, but even our memories of events that we're asked about.

Example: Subjects are asked to watch a video of a car accident at an intersection. Then afterward, they're asked questions about what they saw in the video. One of the questions is, "About how fast were the cars going when they contacted each other?" And they're asked to write down an answer. But for some subjects, they didn't use the word contacted. Instead, they used a different word, like hit or bumped or crashed. So some of them were asked about how fast were the cars going when they contacted each other? And some were asked about how fast were the cars going when they hit each other or bumped each other, or collided into each other or smashed each other? And then they're asked to write down a number for how fast they thought the cars were going. The estimated speeds that the subjects wrote down were systematically higher depending on the forcefulness of the verb used to describe the contact. These are the averages, 31 miles per hour for contacted versus 41 miles per hour for smashed. So here's a case where one's memory of an event can be manipulated by the choice of words used to solicit an answer. Subjects were interviewed a week after watching the video. One of the questions asked was, "Do you recall seeing broken glass at the accident site?" Now, in the original video, there was no broken glass, so the correct answer is no. But almost a third of the participants who were given the smashed condition said they had seen broken glass at the accident scene in the video. Now some fraction of all the subjects said they saw glass, but that fraction increased with the force of the contact verb that was used, reaching its peak at 32% for those who were initially asked to estimate how fast the cars were going when they smashed into one another. These kinds of results, of course, have important implications for evaluating eyewitness testimony reports. We now know that the reliability of eyewitness testimony is affected by a host of biases, this being just one of them.

Biased Interpretation of Information:

Even if two individuals have the same information, the way they interpret it can be biased.

Example: A short video clip which circulated around the internet a while ago. We're told that it was shot from a cell phone from a person located somewhere in Russia. It looks like some kind of giant spider creature climbing up an apartment building. But it's too big to be a normal spider and it seems like it only has four legs and spiders have more than four legs. When the audiences see this clip, there are two kinds of responses. There's the open-minded person who was totally creeped out and admits that they might be seeing something real. If they were told it was an alien spider creature that had escaped from a government facility. The other type of response is more skeptical. They assume it's a hoax of some kind, maybe done with special effects. So we have two different interpretations of the same information. Now, these interpretations reflect different background beliefs on the part of the interpreters. The first person, might already be predisposed to believe in government conspiracies, and this video fits easily within that network of beliefs. On first exposure, he takes it very seriously. He interprets it as potential evidence that would confirm his prior belief that the government is hiding the existence of aliens. The second person on the

other hand, is much more wary of videos like this. His background as a scientist and a skeptic disposes him to be cautious of this video. His first reaction is to assume it's probably a hoax of some kind and hold out for evidence that would prove otherwise.

- **“Extraordinary Claims require Extraordinary Evidence”**. To take this as an authentic video of a real creature climbing that building, that's an extraordinary claim. Those who hold strong beliefs about an issue, will tend to accept confirming evidence at face value but be highly critical of disconfirming evidence. This is a bias, an asymmetry in the standard being employed for what is to count as good reasons to believe something. For confirming evidence, we set the standard lower, for a disconfirming evidence that conflicts with our expectations, we set the standard higher. This is one reason why reasonable and well-informed people can have very different reactions to the same argument. One person finds the argument persuasive and well defended, the other person finds it full of unjustified assumptions and weak inferences.

Pattern Seeking:

The tendency to see patterns and correlations which may not exist. The tendency to look for a causal story to explain the patterns we see.

Example: Our faces communicate a huge amount of information about our mental states, and we're physiologically wired to be sensitive to even tiny differences in facial arrangements. But our facial detection heuristics, the rules of thumb that our brains use to recognize and classify facial expressions, can be triggered by lots of things that aren't human faces. We see faces in a tree bark. We see faces in wall sockets, and coffee foam, and faucets, and all sorts of things. Basically anything where eyes and a mouth might go. We see them in sliced peppers. We'll see horrifying faces in the dried leaves of a flower or mischievous faces in an onion. In all these cases, remember, we're not looking at human face but the face recognition software running in our brains, which evolved as an adaptation for extracting information from human faces relevant to survival. This is being automatically triggered by cues that are present in the mentioned examples. That's why we see faces in these mentioned examples, why they seem to be expressing emotions, or signaling some inter-mental state, even when we know we're looking at an inanimate object. This is a kind of cognitive error. It's a cognitive illusion.

Example: Almost everyone is attracted to fatty foods and sweet foods. This is hard to deny. A hardwired attraction to fats and sweets would be adaptive in environments where food was a lot more scarce. And where it would make sense to eat as much of it as we could, when these foods were available. It would be adaptive, for example in the environment of ancestral humans on the African Savannah who lived by hunting and foraging. But this hardwired attraction for fats and sweets, which is still there in our brains, is no longer adaptive in a world where fatty and sugary foods are accessible all the time. The result is a behavioral disposition that is dysfunctional, rather than adaptive, and which arises because of a mismatch between the Stone Age environment, in which an evolved targeted shortcut is adaptive and useful, and a very different modern environments, we may currently find ourselves in.

- Our brains use cognitive shortcuts called "**Heuristics**" to make quick judgments and decisions. These shortcuts are useful and reliable in many environments and contexts.
- The reason why we need fast recognition of facial expressions, is that an expression can carry information that may need to be acted upon very quickly. If I'm having a conversation with you, and I say something that upsets you, your facial expression can signal that fact to me. And if I pick it up quickly, I can respond to it quickly. If I have to go through a long process of deliberation to figure out what you're thinking, the moment is passed, and I lose the benefit of responding appropriately in the moment. To get the benefits of speed, our brains employ automatic responses that are triggered by simple cues, or rules, or heuristics, and that bypass our conscious reasoning centers that operate much more slowly. But in other environments and contexts these shortcuts can lead to error.
- Whenever possible, our brains impose structure and meaning on the information it's trying to process. We receive information from various sources, and we automatically try to impose an interpretation on that information that is meaningful to us. Our brains don't like interpretive

ambiguity, so if information is incomplete or ambiguous, our brains try to fill in the gaps and construct a meaningful model or representation of what's going on.

Example: When we see faces in clouds and tree bark, that's a visual example of this phenomenon, where the stimulus is a visual image of some kind, and our brains take this ambiguous stimulus and impose an interpretation on it that adds more content to the representation than is present in the image itself, and the result is that we see not just an arrangement of shapes and colors, but a face.

Example: When you play lyrics normally forwards you can hear well, but you can't hear these lyrics when you play this backwards. Pattern seeking is a very general phenomenon which can occur at the level of immediate perception or at the highest levels of abstract thought, and everywhere in between. The cases we've been looking at with seeing faces and images or messages in audio recordings are operating at the level of immediate perception.

- **"Pareidolia"** is the experience of perceiving meaningful patterns or structures in ambiguous sensory information, where the meaning is imposed by our brains onto sensory information that is itself meaningless or at least doesn't actually contain the meaning that we're experiencing. With images, that's visual pareidolia. With the backwards lyrics, that's audio pareidolia. Our brains look for opportunities to impose a meaningful interpretation on it. They do this by positing an interpretation and filling the gaps in the information to create a richer, more fleshed-out representation of the world in accordance with that interpretation. In the case of faces, our hard-wiring for **"Facial Recognition"** does the interpreting for us. In the case of audio recordings, it's the **"Suggested Lyrics"** that provide the interpretation that our brains then use to construct a meaningful representation, which then becomes the content of our perceptual experience, what we're directly aware of when we're looking at something or listening to something.

[Sensory Information (Incomplete) + Cognitive Processing (Interpretation) = Meaningful Perceptual Experience (What we are directly aware of)]

Anchoring Effect:

The tendency to base a judgment on the first piece of information you're exposed to.

Example: Here's a cool jacket. If you estimate the true dollar value of the jacket. What's the jacket really worth? Now the main piece of information you have is the sticker price, which is \$300. So, you see the jacket, you see the price, and you're asked to estimate what the jacket is really worth in dollars. Now, most of us understand that retail prices are inflated cause stores need to earn profit. So, most of us will assume that the sticker price is high, and that the true value of the jacket is something less than \$300. Maybe it's 200, maybe it's 250, who knows? But that's the thought process, right? Now, let's consider the same question, but imagine that in your first encounter with this jacket the sticker price was this. Retail is \$600 but it's been discounted down to 300. So, this is what you see. Now, when asked to estimate the true value of the jacket, what's your thought process? Well, it's the same as before, but now your first exposure is to a higher price. So, your estimate is gonna be anchored to this higher price. You figure it's not worth \$600, so you revise downward, but how far down? Well, when you perform this experiment, these are the typical answers you get. For the \$300 price tag, people anchor to 300 and revise downwards, heading somewhere between 200 and 300, usually. For the \$600 price tag, discounted to 300, people anchor to the 600 and revised downwards, ending somewhere between 500 and 600. So, this is the **"Anchoring Effect"**. In this case to estimate what the jacket is really worth, you're given a piece of information, a **"Number"**, and your brain uses this number to simplify the task. Anchor to the number you're given and then make adjustments using whatever background knowledge you have that's relevant to the situation. Sometimes you'll adjust upwards, sometimes downwards, depending on the context and the question asked. And notice how powerful this effect is in terms of manipulating your willingness to pay for this jacket. Even though the actual purchase price is the same for both jackets, the perceived value of the jacket is much higher when the price is anchored high, and your willingness to pay is much higher, maybe twice as high. You perceive the discounted jacket as a great deal. You don't perceive the regularly priced jacket the

same way. This way of manipulating consumer beliefs about the value of a product is very common, and it's used all the time in business and marketing.

- The shortcut "**Heuristic**" that your brain is following is called "**Anchor and Adjust**".
- Anchor your estimate to the first piece of information you're exposed to, and then adjust your estimate upward or downward from there.

Example: Think of the jacket example but this time with no price tag, no context, and you're asked to estimate how much the jacket is worth. That would be a very frustrating task, wouldn't it? What if you took off the label so you couldn't tell what brand or designer it was. I wouldn't have a clue how to price this jacket. That's one of the reasons why we hunt for information. We look for the price tag, we look for the labels. We look to see what the neighboring jackets are worth. We're thinking about what store we're in. Is it a high end store or low end store? Anything to help put some constraints on this task, to simplify it. It's perfectly reasonable to look for these kinds of proxy or comparative indicators of value to help us answer this question. This is just an example but it illustrates the general point about why "**Anchor and Adjust**" is actually an adaptive cognitive strategy. Why our brains would've evolved to take advantage of it. In a wide range of circumstances, looking around for relevant nearby information does help you simplify the task, and does give relevant information that can help you make quick, reliable judgements. But like all of these shortcuts, they can lead to error when your mind defaults to the shortcut automatically, even in situations where more thoughtful deliberation might be necessary to give you better results. In the case of shopping for jackets the stakes may not seem that high. You can still imagine a more rational approach to shopping especially if you're consciously aware of how discounting can manipulate your intuitive judgment of the value of an item.

- The information does NOT have to be "**RELEVANT**" to the question being asked for our brains to anchor to it.

Example: When you look at the price tag on a jacket, and are asked to estimate the true dollar value of the jacket, at least the information you're given is relevant to the question. But it turns out that anchoring can happen even when the information given is completely irrelevant to the cognitive task at hand. Our brains will still anchor to it, without us even realizing it. Here's a real example of this effect. The study was done with a group of German judges. These are experienced, working judges. They're given a short description of a hypothetical shoplifting case, with a female accused of shoplifting. Given the details of the case, the judges are asked whether they would convict this person. And if so, how many months of prison time they would give the shoplifter? So that's the cognitive task that they've been given. But before they can write down their answers, the judges are asked to roll two dice right in front of them and to note the total value of the dice roll. Then they can write down their answers to this question.

Some of the judges got dice that are guaranteed to yield a total of three, and others got dice that are guaranteed to yield a total of nine. So a low number and a high number. Some see a three, others see a nine, and then they're asked to answer how many months in prison they would sentence this hypothetical shoplifter. On average, the judges who rolled a nine said they would sentence the shoplifter to eight months in prison. Those who rolled a three said they would sentence her to five months on average. That's an average difference of three months between the two groups. That is a very powerful effect, and a horrifying result if you're worried about arbitrary factors that can influence judicial decisions. So what's going on here? The "**Anchor and Adjust**" shortcut is being activated. But in this case, the anchor is completely "**Irrelevant**" to the content of the question being asked. It still has the positive effect of simplifying a complex task, but in this case, it doesn't result in a more reliable judgment. It skews the judgment in an arbitrary way, unconnected to anything resembling a good reason, and that's clearly an error. And remember, these judges had no idea that their answers were being affected by the dice roll. This was all happening unconsciously, outside of their control. And this is how cognitive biases typically operate.

- Cognitive biases can be used, and are used, to intentionally manipulate the opinions and behavior of the public.

Example: Let's say you're a media advisor to a government, that has just conducted a major military strike on a foreign country, and there were civilian casualties resulting from the strike. Now, if the number of civilians killed is high, then that's bad for the government. It'll be harder to maintain public support for this action. So let's say our intelligence indicates, "That the number of casualties is in the thousands." This is not a good number. It's gonna be hard to sell this action if that's the number that everyone reads in the news the next day. So as an advisor to this government, what do you recommend? If all you cared about was furthering the government's interests, you would say, "Mr. President," or whoever's in charge, "We need to issue a statement before the press gets a hold of this. In this statement, we need to say, 'The number of estimated casualties resulting from the strike is low maybe 100 or 200 at the most.'" Now, why would you advise this? Because you know about the anchoring effect. You know that the public's estimate of the real number of casualties is gonna be anchored to the first number they're exposed to. And if that number is low, they'll estimate low. And even if data eventually comes out with numbers that are higher, the public's estimates will still be lower than they would be if we didn't get in there first, and feed them that low number. That's what you would do if all you cared about was manipulating public opinion. Now, this is a hypothetical example, but decisions like these are made every day, under the advice of professionals who are experts in the psychological literature. These are powerful tools, and people need to understand that they're being used in all sorts of ways, throughout the media environment to influence our judgments and our behavior.

Hindsight Bias:

The Tendency, after an event has occurred, to judge the event as having been predictable.

Example: Imagine that our prediction task is to estimate the likelihood that a civil war will break out in a particular country between 1980 and 1985. So we're given background information on the political climate within the country as of 1980. On the basis of that information, we have to estimate the probability of a civil war breaking out. So the question is, given what was known in 1980 what is the probability of a civil war breaking out before 1985? Let's say that the subject says that there's a 40% chance of a civil war breaking out given the information available in 1980. That's their answer to the prediction task. And let's say we sample a large number of people, and maybe this is the average answer we get. Less than 50%, so not a very confident prediction. It's important to note that at this point, we're asking people to answer this question without knowing the outcome. Even though you're answering these questions now, the experiment is set up so that you don't know whether a civil war actually broke out before 1985 in this particular country. It could be a hypothetical country and a hypothetical scenario. It doesn't have to be a real event. We can still ask the question. Now for a different group, we use the exact same setup. The only difference is that we tell the subjects up front whether the outcome occurred or not. So these people are told that say, a civil war did break out before 1985, but they still have to answer the question. And the question is, given what was known in 1980, how likely was it that a civil war would break out? This is the condition of predicting in hindsight. Now, let me ask you, should it make any difference to your answer, whether you know the outcome or not. It's hard to see why should, since what we're asking about is the predictability of an event given the information available at the time in 1980. But when you run this experiment, these are the typical results. On average subjects will estimate that probability of a civil war breaking out as much higher when they know the outcome beforehand. In other words, people tend to be much more confident that a particular event was predictable in hindsight than they would be if they didn't know the outcome of the event. Remember, whether the event occurred or not should be irrelevant to the question, but our minds don't work that way.

- Knowing the outcome of the event inflates our judgment of the predictability of that event. Why do we do this? Well, one of the principles we've discovered about how our minds work is that when an event is easy to imagine in our heads, when an image of the event is easily brought to mind in a vivid way, than we are disposed to think of events like that as more probable, more frequent, more likely to occur. It's a kind of shortcut or heuristic that our brains use. And in the literature it's called the "**Availability Heuristic**". So one mechanism to explain what's going on

is that if we think we know the outcome, then that outcome becomes more easily accessible to our imagination. And through the availability heuristic, we attach a higher probability to it. But whatever the mechanism, this bias can lead to error with real consequences.

- Hindsight bias can dramatically increase our willingness to assign responsibility and blame for historical events. And the effect is even stronger if the event is particularly tragic like a terrorist attack or the collapse of the stock market or the death of a patient due to a misdiagnosis. It makes us more confident in making accusations of you should have known, you're negligent. So that's something to consider.

Example: In 2009, the medieval mountain town of L'Aquila in Italy was struck by an earthquake, which killed more than 300 people and left thousands homeless. Several days beforehand, a group of scientists, including some of the country's most respected seismologists met in the town after a series of small tremors were recorded in the region over several months. They were part of a risk assessment committee and their job was to assess the likelihood of a larger earthquake and the risk to the town. Well, the group issued a memo just days before the earthquake stating that it was improbable that there would be a major quake. Well, of course, you couldn't rule out that possibility. Before the memo was circulated, however, a public official, the Deputy Head of Italy's Civil Protection Department spoke to a reporter, made a series of reassuring statements downplaying the risk of a major earthquake, and even suggesting that the tremors would actually reduce the probability of a larger earthquake by dissipating energy that would otherwise have built up in the ground. Well, after the quake hit, relatives of many of the deceased said that these public reassurances had persuaded them that they were in no danger when otherwise they might have left. So in a rather stunning development, six of the scientists and the public official who made those statements to a reporter were put on trial for manslaughter, for underestimating the risks of an earthquake and for making quote, "**Misleadingly Reassuring Statements**" that prompted at least 29 people who wanted to leave the town to stay instead. In 2012, after a 13-month trial, all of the defendants were found guilty and sentenced to six years each in prison and were required to pay millions of dollars in damages. The scientific community around the world was watching this trial very carefully and the verdict stunned them. It was roundly condemned by scientists who likened it to a medieval witch hunt with its vision of an angry public blaming scientist for failing to predict events that are inherently unpredictable. Now whatever else you might think about this case, I raise it because it's the perfect example of a situation where it's absolutely guaranteed that hindsight bias will be operating, especially with this vivid negative outcome present in our minds. Hindsight bias will inflate people's intuitions about the predictability of the quake and their eagerness to assign blame and responsibility for the consequences. Now just an update. In 2014, an Italian appeals court overturned the manslaughter convictions of the scientists and reduced the sentence of the public official who made those reassuring statements to a reporter. The court affirmed that the risk assessment that the scientists conducted was consistent with reasonable scientific practice and current understanding of the science of earthquake prediction and there was no negligence involved. But while the court's opinion was being read, some of the families of the deceased were heard shouting, "Shame." So emotions were obviously still heated.

What is Debiasing?:

A debiasing strategy is any strategy that is designed to avoid or reduce the negative effects of cognitive biases. There are 2 categories of debiasing strategy: "**Decision Maker & Environment**".

Debiasing Decision Maker:

The first debiasing strategy is modifying the "**Decision Maker**", When you modify the decision-maker, you're making changes to the person or groups of people. This usually involves some combination of training in cognitive biases, cultivating different thinking strategies, learning to apply simple rules of thumb, and instruction and other tools that can aid in decision-making. Consciousness-raising is an important part of debiasing. If you're not aware of your vulnerability to bias, it's hard to see how any of these other strategies are gonna be helpful. We'll look at some thinking strategies later on.

How to modify Decision Maker?:

- Learn to recognize circumstances where bias is likely to distort your judgment.
- Cultivate the habit of not accepting your intuitions at face value.
- Assume they're likely to be biased and look for alternative ways of making a judgment that rely on more objective sources of information.

Debiasing the Environment:

The second debiasing strategy, is modifying the “**Environment**” within which decisions are made. Can we alter environmental or behavioral settings or modify the choice options where decisions are made, so that people are just naturally disposed to make better choices in that environment? There is a huge interest in this because in some ways it's the most attractive approach to debiasing if it works. It doesn't require self-reflection, or discipline, or learning new skills on the part of the decider, it takes human beings as the flawed biased beings that we are, and engineers an environment that exploits these features of human nature to generate positive outcomes.

Example: Copenhagen is a city in Denmark, that had a problem with littering. In spite of the fact that 90% of Danes surveyed say, "They're concerned about littering, 30% of the population admitted to occasionally leaving their trash on the streets or in parks." So in 2011, Pelle Hansen and his students came up with a litter-reducing strategy, which they tested in the streets of Copenhagen. They placed green footprints on the ground in heavily trafficked areas, which led to different trash bins, and that's it, that's all they did. The result, a 46% reduction in littering. People walking the streets with trash in their hands just followed the footsteps to the nearest trash bin. This is an example of intentionally modifying the environmental context in which a decision is made, that resulted in behavior that is more aligned, more consistent with the professed beliefs and values of the people whose behavior has been affected, and that's a positive outcome by any measure. Now, why does this work? Well, two factors. One, under normal conditions, it can be hard to identify a trash bin in the middle of a crowded street. It's inconvenient to scan and search for one, the footprint and the color coating reduces the cognitive effort it takes to find one. And second, this strategy exploits social norms. We want to look like we're following the rules in a social context. It's harder to avoid those norms when the social norms for not littering are flagged in such a public way. When you modify the environment in a way that improves the quality of decision-making, but doesn't eliminate choice options, that's what's known in the literature as a “**Nudge**”. The term was made popular by the 2008 book, “**Nudge**” subtitled: “**Improving Decisions about Health, and Happiness**”.

Five Reasons why Businesses may resist Debiasing:

1. **The word “bias” has negative connotations. (Associations with bigotry, prejudice, irrationality, ..):** Most of us hear the term used in context where someone is being accused of bigotry or chauvinism or some other kind of irrational prejudice that implies something negative about the person's character. We naturally wanna distance ourselves from these associations and so we wanna distance ourselves from the term bias. For some people, it's hard to shake these associations even when you go outta your way to convince them that they're not using the term this way. Some consulting firms have chosen to avoid using the term bias at all, when approaching businesses for these reasons. They'll talk about helping to improve decision making but won't frame it in terms of strategies for counteracting the effects of cognitive biases, even though that's exactly what they're doing.
2. **People in positions of authority and leadership don't wanna be told or have others in their organizations come to believe that their judgment is prone to bias and error:** Think about how the employment hierarchy is structured in most organizations. People at the bottom have lower paying jobs and pay increases as you go up the hierarchy. Jobs, higher up the hierarchy require a broader set of decision making and judgment skills because people in those positions are responsible for more of the organization's activities below them. There's a presumption that higher pay is justified because what you're paying for is a higher quality of expertise and judgment. Expertise grounded in superior experience or background knowledge

or aptitude that makes the person's judgment more reliable, more trustworthy, and less prone to bias and error. So the message about the universality of cognitive biases that we're all systematically prone to errors in judgment is more threatening to people higher up the administrative hierarchy, to people with positions of authority and leadership than people lower on the hierarchy because those people occupy positions where their higher pay and authority is predicated on a belief in the superiority of their judgment.

3. People don't wanna relinquish control of a decision process.

4. People don't understand how debiasing strategies can actually benefit them in their organization.

5. People may question whether debiasing strategies are worth the effort to implement.

- Many business consultants who work in this field say that efforts to implement debiasing strategies in business, corporate and government environments are often met with resistance.
- **"bias bias"**, or **"bias blind spot"**, and it's a real cognitive bias. It turns out that we're biased against the view that our own judgements are biased.

Example: People believe they're less prone, less vulnerable to bias than other people. Like if you survey 1,000 people and asked them, "If they think they're more or less biased or just as biased as the average person?" 800 to 900 of that 1,000 will say that, "They're less biased than the average person." Which, of course, is statistically impossible. And maybe only one or two people in 1,000, will say, "They're more biased than the average person."

Example: It reports on studies of bias blind spot in physicians, whether they believe that their medical decisions about what drugs to prescribe for patients, are influenced by the free gifts they receive from pharmaceutical companies, who are lobbying for doctors to prescribe their drugs. When physicians receive gifts from pharmaceutical companies, they may claim that their gifts do not affect their decisions about what medicine to prescribe because they have no memory of the gifts biasing in their prescriptions. However, if you ask them whether a gift might unconsciously bias the decisions of other physicians, most will agree that other physicians are unconsciously biased by the gifts, while continuing to believe that their own decisions are not. This disparity is the bias blind spot, and occurs for everyone, for many different types of judgments and decisions.

- There are several reasons why we might be prone to this bias. One plausible reason is that we think we can detect the presence of bias in our thoughts just by introspecting them, mentally surveying our own beliefs. If we don't find any sign of bias, we can conclude that it's not there. We don't have the same kind of introspective access to other people's minds. I can only judge your actions based on your behavior and what you say I can't see inside your head. This asymmetry in how we access our own thoughts versus how we infer the thoughts of others based on behavior is one of the reasons why we view ourselves as less prone to bias than others. So this biased blind spot can be a source of resistance to debiasing. This is why it's important to make people aware of it and to reiterate the central message, which is that everyone is equally vulnerable to cognitive biases. We need to convince people to assume that their own judgments are just as vulnerable to biases as everyone else's, and ignore, or at least, critically manage the strong intuition that they themselves are not biased.

Debiasing Strategies:

- **Widening Narrow Thinking:** All of the cognitive biases that we've looked at have the effect of narrowing the range of options or interpretations or types of information that are considered in some belief forming or decision making process. Confirmation bias compels us to focus on information that reinforces our beliefs and expectations, rather than consider the full range of information that might be available. Anchoring draws our attention to a piece of information and compels us to make a judgment that is anchored in the vicinity of that information rather than consider a wider range of options. The errors arise when our narrowed vision, as it were, isn't directed at the right target or misses information that really is relevant to the task at hand. So one way of thinking about de-biasing strategies for avoiding these errors is that they force us to widen our thinking and our attention.

- **Consider the Opposite:** Let's say you're facing a decision task or a judgment task, and you settle on an initial answer. To implement this strategy, you ask yourself, "What are some reasons that my initial judgment might be wrong?" And then you start listing reasons. If I think this product will sell, what are some reasons why it doesn't sell? If I think this college would be a good choice, what are some reasons why it might not be a good choice? If I think I can meet this deadline, what are some reasons why I might fail to meet this deadline? If I think these two variables are correlated, what are some reasons why they might not be correlated? And that's it. This exercise works by forcing you to consciously visualize different outcomes or different scenarios than what you naturally expect or anticipate or hope for. And that alone can counteract the narrowing effect of cognitive biases. Experiments have been done that show that simple consider the opposite strategies can reduce confirmation bias, anchoring effects and hindsight bias. Here's a pro tip. When your brainstorming reasons why the opposite might occur, don't try to rack up as many as possible. Anywhere between 2 and 10 reasons have been shown to be effective, but beyond 10, the de-biasing effect is reduced. Why? Because it becomes increasingly harder to imagine alternative reasons why your assumptions may be false. And our brains treat this increased cognitive effort as a signal that our assumptions are not false, because if they were false, why would it be so hard to come up with reasons, right? So, the effect is strongest when you keep your options below 10. My suggestion is that you consider no more than five, the number of digits on your hand. It's easy to remember and that'll keep you out of the danger zone.
- **Make People Accountable:** Accountability is giving people the expectation that they would later have to explain their decision to others. If you go into a situation knowing that you're gonna have to give an account of why you made the decisions you did, that forces you into whole new mindset. You start anticipating the criticisms that others might give. It forces you to anticipate the flaws, or objections to your arguments and consider responses to those objections. Now, I should say that this strategy works best when the person or group to whom you're going to be accountable isn't one where you feel pressure to conform. You need to be wary of situations where you might be under an incentive to tell people what they want to hear. If there's a party line that you are expected to tow, or you feel like you wanna impress someone, and you're worried about saying something stupid that's not a good environment for this strategy. Ideally, accountability works best if you don't know the preferences of the audience to whom you're going to have to justify your decision or your argument. That way, even if you feel pressured to give the people what they want, your reasoning won't be biased in that direction because you don't know what they want. You could approximate this situation by for example, arranging meetings where you assemble a diverse set of one or two person audiences, and the presenter is matched up randomly with one of those audiences.

Example: If you know Andrea is a risk taker, and Bob is a risk avoided, and you know you're gonna have to justify your decision to either Andrea or Bob, but you don't know which, then you can't bias your reasoning toward one or the other. You need to consider how your reasoning would look to both audiences, and that helps to broaden the range of considerations that you pay attention to.

- **Premortem Analysis:** If a project or a decision goes poorly, in many organizations there'll be a lessons learned session that looks at what went wrong and why the project failed. Like a medical postmortem where a patient dies on the operating table and a team meets afterward to review what happened, assess the decisions that were made, and submit recommendations for preventing cases like this from happening in the future. Businesses do postmortems of projects all the time. But the debiasing strategy that we're talking about is a Premortem. The Premortem strategy asks, why don't we ask these kinds of questions up front? In a Premortem exercise, you're asked to imagine that your project has failed and then consider the reasons why it might have failed before it ever gets to that stage. Here's the kind of prompt that a project manager might deliver to his or her team to elicit the right kind of responses. He told his team that the project has failed. Now everybody take two minutes and write down all the reasons why you think the project failed. So everyone in the room independently writes down every reason they can think of for the failure especially the kinds of things that they wouldn't ordinarily mention as potential problems for fear of stepping on toes or offending someone. Now, what you do with this information is important too. There are better and worse ways of using these kinds of lists, but you get the idea. You can think of a Premortem analysis as a special case of considered the opposite. It's particularly effective for combating the effects of groupthink. "**Groupthink**" is a

cognitive bias that appears in social settings. It's a phenomenon that occurs within a group of people where the desire for harmony or conformity in the group results in irrational or dysfunctional decision-making. When groupthink is operating, members of the group try to minimize conflict and reach a consensus decision without critically evaluating alternative viewpoints and often by actively suppressing dissenting viewpoints and by isolating themselves from outside influences. Premortem exercise is designed to elicit views that the group hasn't yet considered or is avoiding, it can be a powerful tool for combating this kind of bias.

- **The Value of Checklists:** The value of using checklists is simple, but very effective at avoiding certain kinds of errors. It helps to distinguish two different kinds of errors. On the one hand, there are errors of **"Ignorance"**. These are mistakes we make because we don't know enough information or we don't know how to do something. For example, I might try to make a pie, but if I don't know the proper ingredients or how to make it, I'm probably gonna make a lot of mistakes at a sheer ignorance. On the other hand, there are errors of **"Ineptitude"**. These are mistakes that we make because we don't make proper use of what we know. So if I have a pie recipe in front of me, I know enough to make the pie. But, if I skip a step in the recipe or misread an instruction or do things in the wrong order, that's a mistake of ineptitude. I'm an incompetent pie maker, not an ignorant pie maker. It turns out that a lot of failures in the modern world are due to mistakes of this kind, where we know the solution to a problem, but we're just not good at applying that solution in a consistent or reliable way. These are the kinds of mistakes that checklists are designed to avoid. When you think about it, a recipe is like a checklist. So that in theory anyone following the recipe should get a good result at the end. Checklists are standard in the aviation industry. The pre-flight checklist is a ritual that every pilot and co-pilot uses to make sure that they have all the information necessary to make good aeronautical decisions, including whether to take off or not. In medicine, they're used to ensure that clinical guidelines or protocols are followed. Here's the beginning of a surgical safety checklist that has to be performed before a patient is administered anesthesia. It includes things like inspecting and reviewing the equipment, the medications and the patient's anesthetic risk, whether the patient's consent has been obtained and so on, and it requires a verbal or written confirmation along the way. for example, it says, anesthesia safety check complete, yes. The anesthesiologist confirms his or her agreement by stating yes. These kinds of checklists have revolutionized the safety practices in many industries and have saved literally hundreds of thousands of lives. If you work in an area where you see frequent mistakes in applying procedures or guidelines that are already worked out, you might consider implementing a checklist policy. Making a checklist can also be a useful exercise for coming up with a standardized procedure if you don't have one already. Thinking about how one could turn a procedure into a checklist can help to clarify steps and fill in gaps that you might otherwise miss.
- **Group Decision Making:** There's no doubt that groups can improve the quality of judgments and decisions but there are some risks involved too. Here's one way that group interactions can be a resource for de-biasing. **"They can facilitate Error Checking"**. We all have the experience of staring at something for so long that we can't see it with fresh eyes anymore. And someone looks over your shoulder and points out a glaring error. **"Groups can exploit Complimentary Expertise when it's Present"**. I'm a good writer but you are a better marketer or a strategist. Bill has experience working with large organizations but Sarah has experience working in urban communities. Groups allow us to exploit these kinds of complimentary expertise in pursuit of our shared goal but they also allow us to anticipate problems that we otherwise might not see because only someone with that experience could see the problem for what it is. **"Groups can increase the Sample Size of the Experience Base that is informing a Decision"**. Small samples can be a source of error because they might not be representative of a larger data set. With three people you're more likely to have a lot of shared experience just by statistical accident. With 10 or 15 people, you're more likely to get a more diverse experience base just by the numbers alone. So groups can be very effective at broadening our thinking. However, groups can introduce new cognitive biases of their own. Like ingroup bias, groupthink, anchoring on the judgment of others, et cetera. And these can negatively impact the decision making process. So if you don't handle things right group work can actually lower the quality of your reasoning.

Debiasing Strategies associated with Groups:

- Groups can introduce their own cognitive biases that can negatively impact the decision making process. We already talked about groupthink, where people feel a compulsion to promote consensus and harmony within the group and to shoot down or censor opposing viewpoints. There's also the phenomena of telling the group leadership what they want to hear, which we mentioned on accountability as a debiasing strategy. And there are group anchoring effects, like when you start asking for opinions and you move around the group, subsequent opinions can be anchored to the first opinions expressed. And all of these have the effect of narrowing the range of ideas and options that are considered. There are two approaches to group decision making that can help to neutralize these potentially harmful group biases. One focuses on **"The Value of Diversity"**, and the other focuses on a **"Technique for Effective Brainstorming"**.
- We will talk about **"Diversity"** first. Effective debiasing requires that groups be sufficiently diverse to bring real alternatives to the table. Not just diversity of expertise, but social diversity as well, gender diversity, racial diversity, age diversity, and so on. Social diversity has a documented positive effect on creative problem solving and innovation. Socially diverse groups are more innovative than homogeneous groups. Workplaces tend to be much more homogeneous than people realize. Now, we need to ask why does this work? It seems obvious that a group of people with diverse individual expertise would be better than a homogeneous group at solving complex non-routine problems. It turns out that simply interacting with individuals who are different, **"Forces Group Members to prepare better"**, to **"Anticipate Alternative Viewpoints"** and to **"Expect that reaching Consensus will take some Effort"**.
- **Costs of Social Diversity:**
 - Discomfort
 - Rougher Interactions
 - Lack of Trust
 - Greater Perceived Interpersonal Conflict
 - Less Cohesion
 - More Concern about Disrespect
- So in these senses, the work experience in a socially diverse environment can be less attractive than in a more homogeneous environment, especially if it's not managed well. But the bottom line is that when businesses compete on innovation and complex problem solving, the more socially diverse workforces have a documented advantage. So take your pick.

[If you wanna feel comfortable at work, hire people like yourself. If you wanna win, hire people who are different from you].

- **Brainstorming** can certainly be an effective tool for broadening our thinking, but there are better and worse ways to do this if generating lots of new and diverse ideas is really our goal. Here's a typical setup. You call the team together, get the whiteboard markers ready and open up the floor to ideas. People offer their suggestions. Someone writes them down. You bounce things back and forth, edit and revise what you have. And eventually you settle on some list of ideas or a course of action. Seems like it would be a good method of generating more and better ideas than just one person working alone but in fact, this is not a good way to do it. This might be a good method of building consensus around a plan, but it's not a good way of generating genuinely new and different ideas or looking at a problem from a new point of view, which is what you need for effective debiasing. Remember, the debiasing strategies that we've been looking at are supposed to widen our thinking. This kind of group consensus building is vulnerable to all the forms of social bias and group thinking. If our goal is really to widen the range of options and ideas that are on the table, we need a different way to brainstorm. Here's a much better way to do it. You give everyone a chance to write down their own list of new ideas or proposals individually without talking with others or knowing what anyone else is writing. So everyone generates a list of 10 ideas say independent of one another. Having each person work independently is important, because this is key to minimizing the conformity effects of social biasing and groups. It also matters how you bring these ideas together. It may not be a good idea to have everyone read out their own list of ideas in order, which is another common practice. Why, because once again, you've got an opportunity for group biasing to influence what people say and how people respond. You also might not want it known who list belongs to whom. If you anonymize the lists, this can screen off potentially prejudicial judgements. One way to do this then is to post each person's list around the room with no

names attached. Everyone gets a chance to peruse the lists on their own and the group comes together to have an open discussion about each one in turn. So with this approach, you end up with a larger number of ideas and a more diverse set of ideas than in the traditional brainstorming approach. This method is explicitly designed to generate a wider range of new ideas, new points of view, new objections. It's not a consensus building exercise.