Thinking, Fast and Slow Book Summary, by Daniel Kahneman

by Allen Cheng


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1-Page Summary of Thinking, Fast and Slow

Overview

When you're in a better mood, the part of your mind that is analytical and rational relaxes. That gives control to the more intuitive and creative side of your brain, which also makes you more creative. There are two main characters in our minds: System 1 (impulsive, automatic) and System 2 (thoughtful, deliberate). They play off each other as they make decisions about how we think and act.

The first system in our brain is the one that operates automatically and suddenly. It responds to loud and unexpected sounds by shifting attention toward them. This system exists because it helps us survive, since we can react quickly to danger when we hear an unexpected sound. The second system is what we use for conscious activities such as decision-making, reasoning and beliefs. We focus on a task like finding someone in a crowd or recalling characteristics of people around us so we can find that person easily without being distracted by other people in the crowd who might be similar to her. If you maintain your focus on this task, you'll eventually spot the person you're looking for within minutes if she's there at all; but if you lose focus due to distractions, it will take longer than just maintaining your focus from the beginning of your search.

The relationship between these two systems determines how we behave.

Big Idea #1: The brain is lazy. It's always looking for shortcuts to save effort, and sometimes that leads to errors in thinking.
To see how these two systems work, try solving the following problem: A bat and ball cost $1.10. The bat costs one dollar more than the ball. How much does the ball cost? Most people think that it's ten cents ($0.10), but they're wrong! Take a second to do the math now.

Did you notice your mistake? The correct answer is $0.05, but you answered too quickly and relied on your intuition because it was a simple problem.

Usually, when we face a problem that is too hard for us to solve on our own, System 2 steps in and helps us solve it. However, in the bat-and-ball problem, System 1 misjudges the difficulty of the task and thinks it can handle it by itself.

The bat and ball problem is a good example of how our mind uses the least amount of energy possible to get things done. Our minds are lazy, so when we use them, we try to do as little work as possible. If it can solve something just by using System 1 thinking, it will avoid using System 2 at all cost.

It's unfortunate that people are lazy and don't use System 2. It's an important aspect of our intelligence, as it helps us focus on things and practice self-control. This leads to higher scores in IQ tests. The bat-and-ball problem is a good example of this; by using System 2 we could have avoided making this error.

We can become more intelligent by using System 2.

**Big Idea #2: The human mind is like a computer. It works on autopilot most of the time, and we're not always in control of it.**

When we see a word, our mind associates it with other words. For example, if you first look at the word "EAT," then you would probably complete the fragment "SO_P" as "SOUP." This is known as priming.

We are more easily influenced by concepts that relate to one another. If we see the word "shower" instead of "eat", we will think about soap and showering. This can be seen in a study where people who were primed with words associated with aging, such as Florida and wrinkle, walked slower than usual.

Unconsciously, we are all influenced by the world around us. We act and think in ways that are affected by our environment without realizing it. This is called priming. It shows that although we like to believe we're always in control of what we do or say, sometimes it's not true.

For example, Kathleen Vohs' research shows that being exposed to images of money primes individualistic actions. People who are primed with the idea of money act more independently and less willing to depend on others. This could mean that living in a society filled with triggers that prime people to think about money will nudge their behavior away from altruism.

Priming is a societal element that influences the choices, judgment and behavior of an individual. It also reflects back into society as a whole and affects it in many ways.

**Big Idea #3: We make judgments quickly, even when we don't have enough information to make a rational decision.**
Imagine you meet someone named Ben at a party, and you find him easy to talk to. Later, someone asks if you know anybody who might want to contribute to their charity. You think of Ben because he was easy to talk with. Therefore, we often like one aspect of a person's character and assume that we would like everything else about them as well.

Our minds are inclined to simplify things without sufficient information, which can lead to judgment errors. This is called the halo effect: you think Ben is approachable because of his friendly demeanor, but it's too early in your relationship for that conclusion. You're also prone to confirmation bias—you accept what others tell you and ignore evidence challenging those ideas.

If we ask the question, “Is James friendly?” studies have shown that our minds will automatically tell us yes. This is the halo effect in action because it doesn't matter what else you know about him; he's been labeled as friendly and so your mind will confirm this idea. The same thing happens with confirmation bias; when a person has an idea or belief they want to be true, they find ways to prove themselves right even if it means ignoring evidence that contradicts them.

These phenomena also happen without our conscious knowledge and affect our decisions.

**Big Idea #4: The mind makes quick decisions based on shortcuts.**

It's often necessary to make quick judgments in life. To help us do this, our minds have developed shortcuts that allow us to quickly understand our surroundings. These shortcuts are called heuristics, and they're usually very helpful. The problem is that we tend to overuse them, which can lead us to mistakes. Let's take a look at two of these heuristics: the substitution heuristic and the availability heuristic.

The substitution heuristics is when we answer an easier question than the one that was actually posed. For example, if someone asks, "How will this woman be as sheriff?" then we might substitute it with a simpler question like, "Would she make a good sheriff?"

This heuristic means that instead of researching the candidate's background and policies, we merely ask ourselves whether they match our mental image of a good sheriff. If not, we reject them without looking at their qualifications or experience.

Then there is the availability heuristic. This means that you overestimate the probability of something if it's easy to remember or you hear about it often.

A study found that 80 percent of people considered accidental death a more likely fate than death by stroke. This is because we hear about accidental deaths in the media more often, and they are easier to remember; therefore, we react inappropriately to these dangers.

**Big Idea #5: We don't understand numbers and statistics very well. We make mistakes about them, which leads to wrong conclusions.**

One way to predict the likelihood of an event is to remember its base rate. This means making a statistical estimate about how often something happens. For example, if 20% of taxis are yellow and 80% are red,
we can predict that a cab ordered in this situation will be yellow since it has a higher chance than red for occurring.

We should remember the base rate when making predictions. For example, if five red cabs go by in a row, we might expect to see a yellow one next time. However, it is still 80% likely that the next cab will be red. We focus on what we expect rather than what is most likely and therefore make mistakes with our predictions.

Base-rate neglect is a common mistake that's related to the wider problem of working with statistics. We also have trouble remembering that everything regresses to the mean, which means all situations eventually return to their average status.

If a football player averages five goals per month and scores ten in September, her coach will be happy. However, if she then only averages about five goals per month for the rest of the year, her coach might criticize her for not keeping up that "hot streak." This would be unfair because it's just regression to the mean!

**Big Idea #6: There are many ways to remember something, but it is often easier to recall things from the past than in the present.**

Our brains remember experiences in different ways. We have two memory apparatuses, and they both work differently.

There is the experiencing self, which asks how you feel in the present moment. It gives an accurate account of what occurred because your feelings during an experience are always reliable. Then there is the remembering self, which asks how it was on the whole after everything has happened. The remembering self isn't as accurate because it registers memories after a situation has finished; therefore, its memory can be faulty.

The experiencing self isn't nearly as important as the remembering self. With duration neglect, we run through something but don't pay much attention to how long it actually takes. We also overemphasize things at the end of an experience.

To demonstrate the power of our remembering self, let's look at an experiment that compared how well people remembered a colonoscopy. In one group, patients had long and painful procedures, while those in another group had shorter procedures with increasing levels of pain.

You'd think that patients who had the longer procedures would be unhappier, but they weren't. The ones who had shorter procedures with more painful endings were unhappier than those whose procedure was equally long but less painful. This is an example of duration neglect and the peak-end rule; our memories are faulty because we don't remember everything about something that happened to us.

**Big Idea #7: Mind over matter: how focusing on something can alter your thoughts and behaviors.**
Our minds use different amounts of energy depending on the task. When there's no need to mobilize attention and little energy is needed, we are in a state of cognitive ease. Yet when our minds must mobilize attention, they use more energy and enter a state of cognitive strain. These changes in the brain's energy levels have dramatic effects on how we behave. In a state of cognitive ease, the intuitive System 1 is in charge of our minds, making us happier but also more likely to make mistakes.

When we're stressed, our mind works harder and is more attentive. It's like when you're driving and your mind is on the road; in that situation, you are less likely to be distracted by other things. Our brains work faster during stressful situations as well.

We can consciously influence the amount of energy our mind uses to get in the right frame of mind for certain tasks. For example, if we want a message to be persuasive, we can promote cognitive ease. We do this by exposing ourselves to repetitive information that becomes more memorable and therefore more persuasive.

On the other hand, cognitive strain helps us solve statistical problems. We can increase our energy levels and attention by exposing ourselves to confusing information in order to comprehend it better.

**Big Idea #8: Taking chances is important because of the way we perceive probabilities.**

The way we judge ideas and approach problems is heavily determined by the way they are expressed to us. If you change a few details, our minds will take a different approach than if you didn't change anything.

Risk assessment can be seen through a great example in how we do it.

Even though we can calculate the probability of something occurring, people don't always approach it in the same way. For example, a person may think about an event differently if they hear that there's a 90% chance of rain compared to hearing that there's a 10% chance of rain.

For example, people think that rare events are more likely to happen if they're expressed in terms of frequency rather than as a statistical probability. In what's known as the Mr. Jones experiment, two groups were told that patients like Mr. Jones committed acts of violence 10% of the time or 1 out of every 10 times. Both groups denied his discharge twice as much when it was stated in terms of frequency rather than probability.

Our attention is also distracted by the vivid mental images that influence our decisions. Take these two statements: "This drug protects children from disease X but has a 0.001 percent chance of permanent disfigurement" versus "One of 100,000 children who take this drug will be permanently disfigured." Even though both statements are equal, the latter statement brings to mind a disfigured child and is much more influential, which makes us less likely to administer the drug.

**Big Idea #9: We don't make decisions based on logic alone.**
How do individuals make choices? Economists once believed that we made decisions based on rational arguments. They argued that we all follow utility theory, which states that when making a decision, we look at the facts and choose the option with the best outcome for us.

For example, a utility theory would say that if you like oranges more than kiwis, then you’ll take a 10% chance of winning an orange over a 10% chance of winning a kiwi.

It seems obvious that the most influential economists in this field are from Chicago. They argued that individuals act rationally, and they named these people Econs. Rationality is important when it comes to utility theory as well as how much money we value things by weighing their utility.

Two people, John and Jenny, have $5 million each. According to the theory of utility, they should be equally happy with their financial situation.

But what if we complicate things a bit? Let's say that they both start with $5 million, but John starts with $1 million and Jenny starts with $9 million. Would you still think that John is just as happy as Jenny?

Utility is not the only thing that determines how much value we place on something. We can have irrational values for things, so there are other factors at work in our decision-making processes.

Big Idea #10: We often make decisions based on gut feelings, rather than logical reasons.

Utility theory might not work. Prospect theory, by the author, is an alternative to utility theory.

Psychologist Daniel Kahneman shows that we don't always make rational decisions. For example, imagine you have $1,000 and must choose between receiving a definite $500 or taking a 50% chance to win another $1,000. Now imagine you have $2,000 and must choose between losing a sure amount of money ($500) or taking a 50% chance on losing another thousand dollars ($1000).

If we were to make rational choices, then the two options would be equally appealing. However, this is not always the case. In one scenario most people choose to take a sure bet while in another scenario most people opt for a riskier choice.

Prospect theory helps us understand why we don't always act rationally. It highlights two reasons for this, both of which are related to our loss aversion - the fact that we fear losses more than we value gains. The first reason is that we value things based on reference points. Starting with $1,000 or $2,000 in the two scenarios changes whether we're willing to gamble because the starting point affects how much something is worth to us. In scenario 1, the reference point is $1,000 and in scenario 2 it's $2,000; therefore ending up at $1,500 feels like a win in one case but a distasteful loss in another even though it's objectively neither of those things. Even though our reasoning here is clearly irrational (we know what something’s actual objective value is), understanding value as much by our starting point as by its current state makes sense given how people think about money and other resources they possess rather than have access to.
Secondly, we are influenced by the diminishing sensitivity principle. It works like this: when something is perceived to be worth less than it was before, then there is a greater loss in value. For example, going from $1,000 to $900 doesn't feel as bad as going from $200 to $100 even though both amounts are equal. Similarly with our example here of losing money; the first drop feels worse than the second one because there's more lost in value.

Big Idea #11: The mind creates a picture of the world that is not always accurate. These images lead to overconfidence and mistakes.

We use cognitive coherence in order to understand situations. This is when we construct a complete picture of an idea or concept in our minds. For example, we have many different images for the weather, such as a bright summer day with hot sun bathing us in heat.

We rely on mental images when making decisions. For example, if we want to know what clothes to wear in summer, we base our decisions on our image of that season's weather. The problem is that even when available statistics and data disagree with our mental pictures, we still let the images guide us. In summer, the weather forecaster might predict relatively cool weather but you might still go out in shorts and a T-shirt because your mental image of summer tells you to wear those things. You may then end up shivering outside!

People are very overconfident in their mental images. This can lead to bad predictions, so we should use reference class forecasting instead of our general mental image. Reference class forecasting is the comparison of your current situation with a specific historical example that happened before. In addition, you can set up a long-term risk policy for when things go wrong or right with your forecast. With this strategy, you'll be able to rely on evidence and make better predictions about the future weather conditions by bringing along an extra sweater just to be safe.

Full Summary of Thinking, Fast and Slow

Overall Summary

Daniel Kahneman starts by describing the two cognitive systems that make up our brains. System 1 is automatic, intuitive and involuntary. It's used for simple math problems, reading sentences and recognizing objects as belonging to a category. System 2 requires effort and attention, but we tend to be lazy and rely on System 1 instead of using it properly, which leads us to making errors because of the biases in System 1.

Daniel Kahneman discusses System 1's biases. The most obvious one is that people tend to believe things they hear because it's easier for them to process. However, this doesn't mean the information is accurate or true; another bias of System 1 is that it can cause people to like (or dislike) everything about a person, place or thing without giving any thought as to why they feel that way. Another example is substituting an easy question for a difficult one in order to avoid thinking too much about something and therefore coming up with the wrong answer.

The second section of the book focuses on bias in calculations. Our brains are not good at statistics, so we
don’t realize that small samples can be more extreme than large ones. This leads us to make decisions based on insufficient data. We also tend to construct stories about statistical information even if there is no true cause for it.

We tend to overestimate the frequency of things that come to mind easily. For example, if you ask someone how many people die from cancer in a year, and then ask them how old Gandhi was when he died (which is an easy question), they will probably overestimate his age at death because it's easier for them to think about him dying than other people dying. It also works with divorce rates: If you want to estimate the rate of divorced people over 60 years old, but can only remember one person who is divorced and over 60 years old, your estimation will be inaccurate because you're basing your answer on just one person.

We underestimate statistics. For example, if we are told that a person is a computer science student and he fits the stereotype of one (Tom W), then we will think there's a high probability that he actually belongs to this group. On the other hand, if someone fits the stereotype of being feminist (Linda) but she is not necessarily one, people will say that she's more likely to be a bank teller than just any old bank teller.

When we try to predict the future, we often overestimate talent, stupidity and intention and underestimate luck. For example, if a golfer has a good first day in a tournament he is statistically more likely to have worse second day. We also tend to think that our predictions about the past are better than they actually were.

Kahneman then goes on to talk about how people are overconfident in their abilities and ideas. For example, he says that when he and a peer were observing soldiers for officer training, they would often make bad predictions based on gut feelings instead of using statistics or numerical records. He also talks about how we should rely more on checklists, statistics and numerical records than subjective feelings because it can lead to great progress such as the Apgar tests which have greatly reduced infant mortality rates.

Daniel Kahneman debunks the idea that financial analysts and newscasters are good at predicting future events. He works with Gary Klein to figure out when intuition can be trusted, and they find that these people have a lot of experience in their specific field. To become an expert, you need to have enough experience in your field so that you understand the patterns behind what is happening. Firefighters and chess masters are examples of those who fit this description well.

Daniel Kahneman, a Nobel Prize winner in economics, explains that we are overconfident about our abilities. We assume that the best case scenario will happen to us and that we will be better than other people at starting businesses or designing curricula.

Kahneman then goes to talk about the theory he developed with Amos Tversky, called prospect theory. He first introduces Daniel Bernoulli’s utility theory and explains how money has different values based on a person’s reference point. For example, if someone had $1 million yesterday and another had $9 million, they will not be equally happy with their current wealth of $4 million because their reference points are very different.

Prospect theory is different from utility theory because it considers losses and gains in the context of a
reference point. It also shows that people have diminishing sensitivity to differences in wealth, and they fear losing more than they desire to gain. Loss aversion applies to goods as well—people value things more when they own them because it's painful to lose something you already have.

In economic theory, people are rational and will weigh the outcomes of a decision based on their probability. However, prospect theory demonstrates that sometimes people do not weigh outcomes strictly by probability. For example, in a scenario in which there is 95% chance to win $10,000 (and 5% chance of winning nothing), people overweight the probability that they may not win the money. They become risk averse and take whatever they can get even if it's less than what they could have gotten had they played for more money with only 5% chance of losing it all. If there is a 5% chance of winning $10,000 (and 95% chance to lose everything), people overweight the probability that they'll win big money and hope for a large gain (this explains why lottery tickets sell so well).

Prospect theory is the reason we overestimate rare events and also become risk-averse in certain situations. Our loss aversion explains why we hesitate to cut our losses, even though not all gambles are bad.

Sometimes people make irrational decisions. For example, if you were to ask someone to donate money for the cause of helping farmers get check-ups that prevent skin cancer or a fund where dolphins are helped (with no mention of anything else), that person would generally give more money to the farmer's fund than the dolphin's because humans are valued more than animals in general.

Framing a problem can affect how we perceive it. For example, if you have 90% chance of surviving an operation, then you're more likely to undergo surgery than if the odds are 10%. The reason why is that people don't realize they're being influenced by the framing.

The author also did studies about happiness. He found that we have an experiencing self and a remembering self, and the latter is more influential on our actions than the former. For example, how something ends matters more to us than what happens throughout the experience. We also tend to focus on how pleasurable or painful something was rather than its duration. This leads us to evaluate our lives based on global memories rather than day-to-day experiences.

Daniel Kahneman concludes by saying that we need to understand our biases so we can recognize situations in which they might cause us to make mistakes. In other words, if we know what our weaknesses are, it'll be easier for us to avoid them.

**Part 1, Chapter 1**

Daniel Kahneman starts by describing the two different ways we process information. He first presents an image of a woman who looks angry, with her eyebrows furrowed and mouth agape. We automatically assume she's angry because of how she looks. That is an example of System 1 processing, which is fast and automatic. Next he tells us to solve 17 x 24 on paper (or in our heads). This requires effort and attention, so it's slow and deliberate thinking using System 2 processing.

Kahneman then lists some examples of System 1 and System 2 processing: System 1 detects distance,
orients to sounds, allows us to drive a car on an empty road, automatically answers $2 + 2 = ?$, reads words, and understands simple sentences. The author also says that many of these mental actions are completely involuntary.

System 1 is responsible for all automatic actions, such as driving a car or walking. These things come naturally and are not disrupted if attention is drawn away from them.

Kahneman says that we can only pay attention to one thing at a time, so we have to choose between driving and doing math problems.

Daniel Kahneman explains that we can be blind to what is obvious. He gives an example of a study in which people count the passes made by one team while ignoring another. People get so focused on counting, they ignore a woman dressed as a gorilla who walks across the court, thumps her chest and moves away.

When System 1 encounters a problem, it calls on System 2 to help. For example, when you multiply $17 \times 24$, your first reaction is to use the calculator and then check your answer. Similarly, if you see something unexpected (such as a gorilla wearing a basketball uniform), it surprises you because you didn't expect that image. As such, System 2 kicks in and tries to make sense of the surprising stimulus by asking questions like "Why does he have that outfit?" or "What's going on here?". It also works to maintain self-control so that we don't do things we want but shouldn't do (like punch someone who just insulted us).

The division of labor between System 1 and System 2 is efficient. If you're accustomed to a situation, your brain can handle it automatically with minimal effort. However, this system has biases that may make you misjudge situations or people. For example, if someone's name is printed in all capital letters, your brain assumes they are either angry at you or shouting at you (even though there could be other reasons why their name would appear like that). Furthermore, the automatic system cannot be turned off once it kicks in; for instance, if someone says something about a topic we have an opinion on (e.g., politics), our mind will immediately start thinking about what we think without us even knowing it!

In the book, "Thinking Fast and Slow", Kahneman reveals that we are more likely to notice words if they are in upper or lower case rather than saying whether they're in upper or lower case. We also tend to focus on objects that appear to our left or right instead of reading what is printed there. This is because System 1 has a tendency to read words automatically while System 2 must be called upon for tasks that conflict with those impulses.

Kahneman then introduces the Müller-Lyer illusion. It is a figure with two lines that are equal in length, but one appears longer than the other. This happens because of how we perceive things around us.

The Müller-Lyer illusion is an example of a visual illusion, but there are cognitive illusions as well. As a graduate student, Kahneman attended courses on psychotherapy. One professor said that the students might meet a patient who will share his past treatment mistakes with them and feel like they (the students) can help him despite their sympathy and intuition. But he warns them not to get involved because this patient is likely a psychopath.

Kahneman, a Nobel Prize winner in economics, said that we should try to avoid mistakes when possible.
We can do this by recognizing situations where mistakes are likely to happen and avoiding them. He explains that it's difficult for people to constantly question their own thinking, but they can learn how to recognize situations where mistakes are likely and try harder not to make those mistakes.

**Part 1, Chapter 2**

In chapter 2, Kahneman suggests an exercise to try. It involves writing out four-digit numbers and then saying them aloud while keeping a steady beat in your head. For example, if the number is 5294, you should say that number aloud and then add one to each digit as you repeat it (5295). Most people have trouble with this exercise.

In a study by Kahneman and Jackson Beatty, they found that participants' eyes dilate more when performing math problems which are harder to solve. The participant's eyes dilated less in solving difficult math problems than simpler ones. They also discovered that people don't try hard in casual conversation because the process is easier for them.

The Add-3 exercise reveals that we cannot expend more energy on a mental task than what's necessary. We do not need as much energy to remember four digits, because the brain will always use the least amount of energy possible and not any more.

Additionally, as a person becomes more skilled in an activity, the amount of energy needed to complete it decreases. The same is true with talent. Individuals who are highly intelligent require less effort to solve problems than those who aren't as smart.

Kahneman then explains the concept of mental load, which means that more effort is required to maintain several ideas that require separate actions or in which information has to be combined. An example of this would be choosing between two restaurants on a date night. Time pressure is another driver of mental load and thinking when you have only 3 seconds to answer a question can cause people to put in more effort than they usually do.

When we switch between tasks, it takes time to get into the right frame of mind. For example, if someone is asked to count all instances of the letter f on a page, they would have difficulty doing so because they wouldn't be used to focusing on that task. However, with practice and focus they could become good at counting things like commas or letters f.

In the end, we spend most of our time trying to avoid mental overload. We either break things down into smaller steps or take notes with a pencil and paper rather than try to hold everything in our head at once.

**Part 1, Chapter 3**

Kahneman says that System 2 is fast. We don't use much mental energy to consider random thoughts or observe what's going on around us. We make many small decisions and absorb pieces of information without much effort.

Normally, it's easy to walk and think at the same time. However, if we're asked to compute 23 x 78 while
walking or are walking very fast, we'll have to stop. Also, when thinking is difficult because of the subject matter (like a book on advanced physics), maintaining that cognitive effort can be hard. Sometimes people can maintain high levels of mental activity for long periods without having to exert willpower due to being in what psychologist Mihaly Csikszentmihalyi calls flow.

It has been proven that self-control and cognitive effort are both forms of mental work. When people have to remember a lot of information for a short amount of time, they tend to make bad decisions about food choices. They will choose foods that are easier to consume mentally instead of healthier options like fruit salads.

Psychologist Roy Baumeister discovered that if you have to force yourself to do something, your self-control is reduced for the next challenge. This is called ego depletion. Or, if you successfully exert self-control in one task, you don't feel like making an effort in another.

Baumeister's group showed that the idea of mental energy is not a metaphor. The nervous system consumes more glucose than other parts of the body, and people who were given lemonade with sugar before participating in a focusing task did not show the same ego depletion as those who were given lemonade with Splenda. A disturbing effect of ego depletion was recently reported by judges in Israel, who spent days reviewing applications for parole. When they are ego depleted, they fall back on denying parole requests rather than considering them more carefully.

The main function of System 2 is to monitor the actions suggested by System 1. It’s like a bat and ball, which costs $1.10 total. The bat costs one dollar more than the ball does, but we can’t say that it costs 10 cents because that’s not true. We often have these biases in our thinking; they cause us to make mistakes when solving problems. This is called an “anchoring effect” because it anchors your thoughts on certain numbers or ideas before you even start working on a problem.

Many people get the math problem wrong, even though it would take only a few seconds to correct their mistake. The reason is that they’re not motivated enough to do so. People who avoid incorrect answers are more alert and active in their thinking than those who don't.

Some researchers have tried to discover the connection between cognitive aptitude and self-control. A famous experiment involved four year olds who were given a choice between one small reward (one Oreo) or two larger rewards if they could wait 15 minutes.

About half of the children wait for two cookies. Ten or fifteen years later, a large gap has opened up between those who can resist and those who cannot. Resisters are less likely to take drugs and have higher intelligence scores than non-resisters.

This test shows that some people are better at using System 2, and others are better at using System 1. Keith Stanovich believes that a person's ability to use either system is related to how intelligent they are, but not necessarily the same thing.

Part 1, Chapter 4
Kahneman then explains how we form associations. He gives the example of "bananas" and "vomit." When you see those two words together, your mind may recall unpleasant memories or other things that make you not want to eat bananas. The association happens quickly because our System 1 tries to understand everything it sees as best it can.

The brain is constantly building associations of ideas. It links causes to effects, things to properties, and things to categories. The mind does not go through a sequence of ideas one at a time but instead one idea activates many others. Psychologists have found that exposure to a word causes immediate changes in the ability to retrieve related words; if you've recently seen or heard EAT, for example, you will be more likely to complete SO_P as SOUP rather than SOAP. This tendency is called priming because EAT primes SOUP and WASH primes SOAP (and also food-related ideas).

A study of NYU students revealed that word association can cause people to behave in a certain way. The experiment involved unscrambling sentences with words associated with the elderly, and then walking down a hall. Students who had those words walked more slowly than other students.

This study also worked in reverse. In another study, students were asked to walk around a room for five minutes at a very slow pace. After this experience, the participants were quicker to recognize words related to old age than other students who walked normally. Also, people who are made to smile by holding a pencil between their lips find things funnier than those who are made to frown—even though they don’t realize that they're being influenced in such a way. People who shake their heads while listening to something will be less likely to accept it than people who nod their heads while listening.

Studies have shown that priming effects are powerful. In a study of voting patterns, it was found that support for propositions increased when the polling stations were in schools than when they were at nearby locations. The difference between parents and other voters was surprising because it overshadowed the difference in voting between those groups.

In an experiment, students who were primed with money behaved differently than those who weren’t. They acted more selfishly and less helpful when someone asked for help. When a pencil was dropped on the floor, they picked up fewer pencils than people who weren’t primed with money. The results are true of everyone and can be reproduced in other experiments as well.

Kahneman ends by describing an experiment that was conducted in a kitchen. A poster with flowers and eyes above the price list was placed there. When there were eyes instead of flowers, people contributed three times as much money to the honesty box. This shows how our unconscious mind can affect us without us even knowing it’s happening.

**Part 1, Chapter 5**

Daniel Kahneman explains that when we're conscious, our brains are busy doing a lot of calculations. We're constantly checking to make sure that things aren't going wrong and if they are, figuring out what to do about it. When something is easy for us to process (like clear fonts or colors) then we don't have to use much energy thinking about it.
Kahneman writes about a phenomenon that's known as the illusion of memory. He mentions three names: David Stenbill, Monica Bigoutski, and Shana Tirana. After a few days, if we're shown a long list of celebrities’ names that includes these three people, we'll be likely to identify them as minor celebrities based on our ability to recall having seen their name before. This happens because our knowledge of someone being a minor celebrity creates an illusion of memory in which we think we have remembered seeing their name before when it was really just from the list.

We often make judgments based on whether information is easily retrievable. Kahneman describes how he retook a driving test after moving to a new state. For some questions, which there seemed to be no good answer for, he simply relied on cognitive ease.

Messages are easier to believe if they're clearer. This is because of font contrast, letter size and paper quality. Also, adages with rhymes are more likely to be taken as truth. All these things make it easier for people to understand the message being conveyed.

Kahneman shows how cognitive ease can distort our processing. A study revealed that when participants see the bat-and-ball problem in a normal font, 90% of them get it wrong. When they see the same question in a less legible font, only 35% of them get it wrong. Cognitive strain mobilizes System 2 and is more likely to reject the intuitive answer.

In other examples, people were more relaxed when they saw objects that were easy to see. In another experiment, participants had a favorable reaction to words that were easier to pronounce. Familiarity also has an effect; in one study, people associated foreign words with good meanings if the words appeared frequently.

The author believes that the exposure effect has a long evolutionary history. In other words, organisms react cautiously to new stimuli because they could represent danger, whereas familiar things are thought of favorably once we have learned that they do not cause anything bad to happen. Our brains sense cognitive ease even before we're conscious of it if people are shown three words (like dive, light and rocket). If people get into a good mood by being exposed to something positive or funny, their ability to recognize if the words are linked increases from 50% accuracy in a neutral state of mind up to 80% when in a good mood. The reason for this is because our bodies give us signals when something is dangerous and it's all right for us let our guard down when we feel safe.

If participants in an experiment are told that their emotions are being influenced by pleasant music, they do not have the same accuracy in connecting words as those who aren't. This shows that people's emotional response to the presentation of words is actually what influences their judgment of coherence.

Part 1, Chapter 6

System 1 is the part of our mind that helps us make sense of what we see. It's like a model or map that helps us understand the world around us. When something unusual happens, it takes time for System 1 to figure out how to react because it doesn't know what's going on at first. Once System 1 gets used to an event though, it can predict when and where similar events will happen in the future after seeing them once before.
Kahneman asks how many animals of each kind did Moses take into the ark. The question is wrong because it's based on a biblical context, and Moses makes sense in that context.

When we hear something that doesn't sound right, our brains detect it very quickly. For example, if someone said "Earth revolves around the sun every year", or a male voice says "I am pregnant" or an upper-class person says "I have a large tattoo on my back," these statements would be detected as not sounding right because they violate the patterns and norms that System 1 has constructed over time.

Kahneman writes, “Fred’s parents arrived late for the party. Fred was angry.” He points out that we know why Fred was angry because his parents were late and not because of something else like the caterers being expected soon. Anger is linked to a lack of punctuality as an effect and possible cause in our minds. We see causality everywhere including videos of triangles where one triangle appears to bully another triangle but it could just be a coincidence or there might be other explanations for what's happening in those videos. Kahneman explains that using causality to explain situations that require statistical reasoning is a recurrent theme throughout this book on decision making and biases.

Part 1, Chapter 7

System 1 allows us to use intuition to draw conclusions. Kahneman describes a shape that can either look like the letter “B” or the number “13” depending on the context, as well as a sentence about money and rivers that changes our perception of an earlier sentence about banks.

Psychologist Daniel Gilbert argues that when trying to understand a statement, one must first attempt to believe it. If it is false, then you will be able to quickly determine whether or not it's true. Even if the statement makes no sense at all (e.g., "whitefish eat candy"), once you try to believe that statement and realize that whitefish don't eat candy, then you'll know immediately whether or not the statement is true. However, if your mind is otherwise occupied with something else (e.g., holding digits in your brain), then statements like these will seem believable until proven otherwise.

This concept contributes to a general confirmation bias. We look for confirming evidence when answering questions, and this is contrary to the rules of science which advise us to try disprove hypotheses.

The halo effect is a tendency to like everything about someone, even things that you may not have observed. This is one way that System 1 simplifies the world around us.

In a party, you might meet someone named Joan. She is easy to talk to and pleasant. If she's suggested as a possible donor for charity, we retrieve good feelings about her (which are unfounded) and think that she is likely to be generous. Now that we believe this assumption, we like her even more than before!

Another psychologist, Solomon Asch, presented descriptions of two people and asked for comments about their personality. The descriptions included the exact same words in a different order. People are much more likely to have a positive view of Alan because his traits were listed first, but they had negative views toward Ben's traits because those were listed first.
Kahneman describes how he used to be biased by someone's first essay score when grading exams, but that changed after he started grading them blind. He found it more difficult to give a coherent score (because the essay grades varied wildly), but his new system was less biased.

A way to avoid the halo effect is by using estimates from many people. This can be done by giving everyone a jar of pennies and asking them to guess how many there are, then averaging their guesses. The only caveat is that they cannot discuss the number with each other or let others affect their decisions in any way. Organizations should take this into account when making decisions: open discussions often lead to groupthink where early and assertive members dominate the discussion.

Kahneman then presents the principle, called "What You See Is All There Is," which states that if we are given some information and have to make a judgment based on it, we will tend to stop gathering more information once we get what seems like enough. For example, if you tell me someone is strong and intelligent, I'll assume he's also good at leading people even though you might go on to say that this person is also corrupt or cruel.

In an experiment, people were presented with a legal scenario. Some people heard the defense's argument, others heard the prosecution's argument and some heard both sides of the story. Even though they knew what was going on, those who only saw one side became more confident in their judgments than those who had seen both sides of the story.

The WYSIATI effect means that we often fail to account for the possibility that evidence critical to our judgment is missing. It also suggests that how well people can explain their observations influences their confidence in those observations.

WYSIATI is also known as the "framing effect". It accounts for how people react differently to a statement like, "90% of patients survive one month after surgery," versus something like, "10% of patients die within one month of surgery."

Kahneman also talks about “base-rate neglect.” He uses a fictional character named Steve to explain it. Steve is described as someone who likes order and structure, but most people will say he's more likely to be a librarian than a farmer even though there are twenty male farmers for every male librarian in the United States. This is because we can only see what we know, not what the numbers say.

**Part 1, Chapter 8**

We have a system in our brains that constantly monitors everything happening around us and inside of us. It's called System 1, and it helps us make quick decisions about people without thinking too much about them. We are biologically programmed to quickly assess how dominant a person is, as well as whether they're trustworthy or not.

This principle has some influence on today's politics. Todorov showed his students pictures of politicians and asked them to rate those politicians based on attributes like trustworthiness and competence. The candidates whose faces were rated higher for competence won in about 70% of the races for senator, congressman, and governor. People judge competence by the same two factors: strength and
trustworthiness. Competent-looking faces have a strong chin with a slight smile.

The study of political scientists found that people have a natural tendency to prefer others who are similar to themselves. This is true even if they don't know much about the person or issue at hand. In addition, voters tend to be more influenced by what they see on television than other forms of media, like radio and newspapers. However, this doesn't apply equally across all demographics: those who understand politics better and watch less TV are less likely to be swayed by politicians' speeches. Our brains use System 1 for simple tasks like recognizing patterns in language and visual stimuli; however, it's not as useful when we're trying to solve complex problems like figuring out how tall buildings are or adding up numbers quickly.

In an experiment, participants were asked about their willingness to pay for nets to cover oil ponds in order to save migratory birds from drowning. The number of birds made little difference: instead people reacted to the image of a drowning bird they conjured.

Daniel Kahneman introduces another aptitude of System 1: matching across diverse dimensions. He does so through a fictional character named Julie, who was precocious with her reading skills as she was four years old. Later on, he asks the question, “How tall is a man who is as tall as Julie?” The person will most likely choose 6 feet or 7 feet; numbers that match other people in our culture. However, later on we will realize this method of predicting heights to be flawed because people come in different shapes and sizes.

Kahneman writes about these flaws and goes into more detail about them throughout his book Thinking Fast and Slow.

Humans constantly compute, and often do so without us even realizing it. We can be slowed down because of the computer-like thought processes we use to think through a problem, which Kahneman calls the “mental shotgun.” In one experiment asking people to identify words that rhyme quickly, they are much quicker at identifying "vote" and "note" as rhymes than "vote" and "goat," once again proving this system's usefulness.

In one study, people were asked to make a decision quickly if something was true. Some examples of statements: "Some roads are snakes," "some jobs are snakes," and "some jobs are jails." The second example is more obviously false because the other two contain metaphors that could be interpreted as true. This shows that when we're trying to focus on one thing, our brain sometimes does another thing by mistake.

**Part 1, Chapter 9**

The normal state of our minds is to have intuitive feelings about almost everything. When we face difficult questions, we substitute them with easier ones that are more easily answered.

Kahneman presents a set of difficult questions and the easier questions we often substitute for them. “How much would you contribute to save an endangered species?” is replaced with “How much emotion do I feel when I think of dying dolphins?” “How happy are you with your life these days?” is replaced with “What is my mood right now?”
The mental shotgun is a quick way to answer questions. It also involves System 1, which allows us to compare different things and find the best match. This technique can be used on problems that require more than one step to solve, such as figuring out how much money we should donate when considering our feelings about dolphins and the amount of money we have in our bank account. Kahneman includes an image that makes it look like two people are very different sizes, but they're actually the same size. When answering questions about this picture, System 1 uses cues from 3-D vision to determine that one person is tall and another is short.

In a survey of German students, researchers found that they were happy with their lives even though the number of dates they had in a month was uncorrelated. However, when asked about their happiness and then the number of dates later on in the survey, there was a huge correlation between those two questions. Students who do this are like the people in the visual illusion. They don't want to spend time figuring out what they should be doing, so they substitute it with something simpler. This is an example of WYSIATI (What You See Is All There Is). The present state of mind looms large when people evaluate happiness.

When emotions are involved, people have preconceived notions. If they don't agree with a new policy, their System 2 uses previously held beliefs to refute it. This happens often without the person realizing it and is further exacerbated by confirmation bias. People look for information that supports the way they feel about things rather than considering all the available evidence fairly and objectively.

Kahneman summarizes the features of System 1 introduced in Part 1: it generates impressions, operates automatically, creates patterns of ideas, infers causes from evidence, exaggerates consistency (the halo effect), focuses on existing evidence (WYSIATI), matches intensities across scales (e.g., size to loudness), and computes more than intended.

**Part 2, Chapter 10**

A study of kidney cancer diagnosis rates across the United States reveals that rural counties in the Midwest have lower rates of diagnoses than other regions. Rural counties in the Midwest also have higher diagnosis rates, but they are still lower than those of non-rural areas. The reason for this is not due to location or any other factor related to environment; rather, it's because small populations tend to be associated with more disease and death (including kidney cancer).

System 1 is not effective at understanding probabilities. It tends to overreact when observing extreme results, even though those outcomes are statistically more likely to happen. For example, a sample of four marbles will yield an extreme result (all red or all white) 12.5% of the time, whereas a sample of seven marbles will yield that same result only 1.56% of the time.

The fact that small samples are more likely to have extreme results than large samples is a purely statistical one. There's no causal explanation for this phenomenon, but it makes sense because we know that the results of larger samples are more trustworthy than smaller ones.

In the 1970s, Daniel Kahneman and Amos Tversky conducted research on whether people are good intuitive statisticians. This is important in psychology because it helps researchers choose a sample size
that can prove their hypothesis, while minimizing risk of error.

Kahneman had read a study that said psychologists often chose sample sizes that exposed them to a 50% risk of failing to confirm their hypotheses. He and Tversky did the same thing, so they developed a questionnaire about research situations and asked researchers what sample size they would use in those situations. It turned out that many people made the same mistakes Kahneman had made.

Psychologist Daniel Kahneman then presents a statement: “In a telephone poll of 300 seniors, 60% support the president.” The summary of this poll is “elderly support president.” We don't always react differently to different sample sizes; we usually believe smaller sample sizes because they seem more reliable and coherent than larger ones.

Our tendency to favor causes over randomness can lead us to make mistakes. For example, we tend to think that a sequence of babies with the same gender is more likely than one with mixed genders, even though it's equally likely. We expect regularity from random processes and don't realize how often they occur in nature.

Kahneman soon realized that the same principle applied to his work. When the Yom Kippur War broke out in Israel, Kahneman was working for the Israeli Air Force. At first, it seemed like things were going quite badly for Israel because of poor performance by Egyptian ground-to-air missiles. However, an inquiry found no operational differences between two squadrons that flew from the same base and had different outcomes; therefore, luck must have played a role in those results.

The illusion of causality is when we believe that there's a specific cause for an event. People think that the best basketball players are "hot," or that certain people are better at making deals than others. However, these things aren't always true. For example, some schools have good results because they're small, but this isn't necessarily true across all schools and situations.

We pay more attention to content than the credibility of a source. Therefore, statistics create many observations that require causal explanations but do not have them. Many facts are simply due to chance.

**Part 2, Chapter 11**

Daniel Kahneman and Amos Tversky once rigged a wheel of fortune that only had numbers from 0 to 10. They asked people two questions: “Is the percentage of African nations among UN members larger or smaller than you just wrote?” and “What is your best guess of the percentage of African nations in the UN?”

When people complete a task, they tend to use the first number given to them as an anchor for their subsequent estimates. In one experiment, participants were asked how many African nations are members of the United Nations. The median estimate was 45% after seeing that 65 countries belonged to it; when they saw 10 out of 193 countries, their median estimate jumped up to 25%.

Kahneman describes an example that shows the anchoring effect. If people are asked how old Gandhi was when he died, they'll give a higher estimate than if they're asked about his age at 35. Any number people
are given to solve estimation problems will induce this effect.

Tversky believed that people often started from an anchor, which would influence their final answer. For example, when asked the question "when did George Washington become president?" most people will start with 1789 and adjust accordingly. The adjustment stops when they are no longer sure what to do next, as in "What was George Washington's presidency like?" Some anchors come to mind more easily than others; for instance, if you were asked about the boiling point of water at the top of Mount Everest (which is impossible), it would be difficult to arrive at a number because there are so many factors that go into determining how hot something can get.

A study found that people who are doing another task at the same time will adjust less (stay closer to the anchor), which implies that System 2 is involved.

Kahneman believed that anchoring is produced by priming. In the Gandhi example, if the anchoring number is 144 years old at age of death, people do not adjust down from that number because they are primed by an image of an ancient person and believe that Gandhi was very old when he died.

Another experiment conducted by German psychologists demonstrated this aspect of anchoring. People were asked to estimate the mean temperature in Germany, and those who saw higher temperatures had an easier time recognizing summer words, while those who saw lower temperatures had an easier time with winter words.

Anchoring effects have been observed in real estate. For example, if a seller is asking for $500,000 for their home and the buyer says he'll give them $400,000, the seller will usually counter-offer with $450,000 because it's higher than what they were expecting. If you're selling your house and you say that you want to get at least $400,000 for it but someone offers you less than that amount, then you should accept his offer because it's better than nothing. However, we can't rely on anchoring all of the time. It only works when there are no other sources of information available to us.

Our minds are very suggestible, and we can be influenced by things around us. For example, if a supermarket puts up signs that say "Limit of 12 per person" or "no limit", people will take twice as many cans of soup even though they don't realize it. Many people believe that they aren't affected in the same way because their subjective experience doesn't show any change.

The anchoring effect can be combated by mobilizing the brain's System 2. For example, people should focus on what their opponent would accept rather than being drawn up to the initial offer that the opponent provided.

Part 2, Chapter 12

Kahneman and Tversky spent 1971-72 at the Oregon Research Institute studying a cognitive bias called “availability heuristic.” This heuristic describes how people think about the frequency of an event. They often judge frequency by how easily instances come to mind.

Kahneman and Tversky determined that people will immediately think of a lot more words that begin
with the letter “T” than those beginning with “X.” They also found that vivid examples, like celebrity divorces, plane crashes in the news, and personal experiences will affect how often we think something happens.

The availability heuristic is a psychological phenomenon that explains why we overestimate our own contributions to group activities. In one study, people were asked to estimate the percentage of housework they do in their marriages. The estimates usually added up to more than 100%. Another experiment was conducted by German psychologists who wanted to see how people's impressions of frequency are affected by requirements to come up with specific examples of that category. The results showed that those who had listed twelve instances rated themselves as less assertive than those who listed six instances, even though both groups actually did the same amount of work (or not).

We often think of people who are good at communicating their ideas as being more assertive. However, this isn't always the case, and it's due to a cognitive bias called the fluency heuristic. When asked to recall instances in which they were assertive, people consider how many examples they can come up with instead of just going by how easy or difficult it was for them to retrieve those examples. This is why we sometimes see that less confident people will be more assertive when asked about particular topics than confident people because they have difficulty retrieving instances in which they were not assertive (the fluency heuristic).

If a person is in the middle of another task, happy or feeling like they are powerful, then ease of retrieval will affect their decision making.

**Part 2, Chapter 13**

An economist observed that the availability heuristic explains why people buy insurance after disasters, but they stop buying it over time. The reason is because people are concerned about a disaster; however, this concern fades and they don't think about it as much anymore. Also, when designing protective actions for disasters, engineers usually design them to be adequate enough to handle the worst disaster that's been experienced so far. However, there may be worse ones out there and we're not aware of them yet.

A study by Paul Slovic asked participants to consider pairs of causes of death. The results showed that estimates were warped by media coverage, which is biased toward novelty and poignancy (for example, deaths from accidents are judged to be far more likely than deaths from diabetes). Causes of death that yield frightening and visceral images were particularly overestimated.

Paul Slovic found that people frequently use their feelings to help them make decisions about new technologies. When asked how they feel about a technology, people will answer based on the thoughts they have of it. The more positive these thoughts are, the more likely people will act positively towards it. For example, when faced with a new technology like GMO (Genetically Modified Organisms), if someone thinks positively of GMOs because he is familiar with modern farming practices and believes in scientific advancement then he would be much more inclined to support them than if his thought process was negative.

After a survey, people were given information about the benefits of new technologies. They found that
when they read about the benefits of those technologies, their opinions changed regarding their risks even though they had no evidence to support the risks. Slovic also says that expert judgment should not be accepted without question when it conflicts with everyday people's opinions on risk—that risk is subjective and based more in emotion than logic or statistics.

However, another scholar believes that the US government sets poor priorities and does not reflect public pressure. He argues that risk can be calculated by lives and dollars cost.

Sunstein's research focuses on two examples that are still debated. Love Canal was a community in Niagara Falls, New York, where toxic waste was buried underground during the 1940s and '50s. It wasn't discovered until 1979 when it began to leak into the local environment after heavy rains caused flooding. The incident became one of the most famous cases related to environmental pollution and prompted an overhaul of federal laws regarding hazardous-waste disposal. However, scientists believed that some aspects of this case were overstated in order to make it more compelling for media coverage; they also argued that there were other issues which deserved greater attention than Love Canal—such as nuclear power or pesticides—which could have saved many more lives if funded properly. Alar is another example Sunstein discusses about how small risks from a chemical sprayed on apples became hugely overstated by environmentalists who wanted stricter regulations on its use; however, science showed there really weren't any serious health concerns with using Alar.

The Alar scare shows how we perceive risks. We either ignore them or overreact to them. This availability cascade, in which events given prominent media attention garner a large overreaction, explains why terrorism is so potent even though it kills few people each week compared to traffic accidents.

Daniel Kahneman writes that he agrees with the notion of availability cascades, but also understands why people might overreact to certain things. He argues that even though fear is painful, it can alert people about risks and dangers in their environment. Therefore, policy makers should consider a combination of expert knowledge and public emotions when making risk policies.

**Part 2, Chapter 14**

Daniel Kahneman then presents a fictional scenario about a student named Tom. He asks us to rank the likelihood of him studying in nine different fields (e.g., business, medicine, humanities, etc.). If people are given only this fact, they will rank the fields based on their relative frequencies. But if we know more about Tom (i.e., that he likes sci-fi and isn't very sympathetic), our rankings change drastically because descriptions like these are much more representative of certain categories (computer science and engineering).

People are more likely to ignore base rates and instead focus on the similarity between Tom W. and a computer scientist, rather than calculating probability. This is because people think about how similar they are to a stereotype (computer scientists) versus thinking about the actual probability of something happening.

There are certain rules that apply when trying to determine if someone is a computer scientist. For
example, you can use Bayesian statistics and the base rate combined with representativeness (if 3% of
graduate students are enrolled in computer science and Tom W has characteristics similar to those of
other computer scientists, then it's more likely he'll be a computer scientist). However, even if we assume
all this information is true about Tom W., the probability that he's actually a computer scientist would still
only be 11%.

Kahneman writes that we should anchor probabilities on a plausible base rate, and question how much
evidence presented to us should affect our answers.

Part 2, Chapter 15

Kahneman introduces a puzzle about Linda, who is outspoken and very bright. She majored in philosophy
and is concerned with social justice. People will say that it's more likely that she's an activist bank teller
than a regular one, even though this violates the laws of probability because every bank teller is by
default a bank teller.

This is a cognitive bias, or illusion. It is called the conjunction fallacy because people are more likely to
believe that two events are linked when they can explain them with one story rather than separate stories.
People will often ignore statistics and go for the most coherent explanation even if it's less likely to be true.

Daniel Kahneman shows why plausibility is so pernicious. He gives an example of a question that makes
us believe one thing over another, even though they are equally likely.

A study was conducted in which people were shown two sets of dinnerware. Set A contained 8 cups and 8
saucers, while Set B had no cups or saucers. On average, people chose to buy Set A ($32) over Set B
($30).

When people are shown a choice between Set A and Set B, they will usually choose the former because
it's cheaper. However, when there is no comparison available (i.e., just one set of items is presented), then
people will pay more for the second set even though both sets contain identical items. This happens
because everyone wants to avoid broken dinnerware at all costs.

However, if the question is changed from percentages to numbers, these kinds of fallacy are much less
likely. In this example, 100 men had a thorough medical survey that included questions about age and
heart attacks. If people were asked how many of those surveyed were over age 55 or have had one or
more heart attacks, they would be unlikely to commit crude fallacies because changing the information
(numbers rather than percentages) reduces error.

Part 2, Chapter 16

Cab drivers in New York City are involved in accidents at night. Most of the time, these are green cabs
(85%) and blue cabs (15%). Witnesses identify the cab as blue 80% of the time. But people tend to ignore
that information and instead focus on how often witnesses correctly identify colors when they're called
upon to do so. According to Bayes' Theorem, which provides a mathematical formula for calculating
probabilities, we should assume that only 41% of the time is it actually a blue cab.

However, if the first sentence had said that green cabs are involved in 85% of accidents, people give more weight to that information because they assume that green cab drivers must be reckless. The information is literally the same, but people prefer base rates with a causal connection. The causal version of the cab problem creates a stereotype that green cab drivers are dangerous. Kahneman admits that social stereotypes can be harmful, but he says we need them to make sense of our world and create categories and norms—like horses, refrigerators, and police officers. Stereotyping in this case makes people more accurate by assuming a cause for why so many accidents happen with green cabs.

Social psychologists conducted an experiment to see how many of their students would help someone who was having a seizure. Only four out of fifteen responded with the correct answer.

Nisbett and Borgida conducted an experiment to prove that people often make assumptions based on a small amount of information. They showed their students videos of two people who seemed nice, normal, and decent. These students thought the two individuals would help someone in need because they appeared to be good people. However, only 27% of the time was this true.

For a psychologist, it's disappointing that the results of this experiment didn't change their beliefs about people's behavior. However, another group of students were shown only two interviews (without knowing the full results) and told those individuals did not help the choking person. The Nesbitt and Borgia then asked them to guess what the global results would be like. They guessed accurately.

In an experiment, people were asked to think about their beliefs on helping. It was found that when they were surprised by a statistical fact, or the behavior of others in general, they didn't change their beliefs. However, when they were surprised by individual cases (their own behavior), then they immediately made the generalization and inferred that it is more difficult than what they thought before.

**Part 2, Chapter 17**

Daniel Kahneman describes a situation in which an instructor for the Israeli Air Force was trying to teach flight cadets how to fly better. The instructor used punishment instead of reward, and he found that when he praised the cadets’ execution, they did worse on their next attempt. However, screaming into the cadet's ear after a bad maneuver led them to improve their performance on their next try.

Kahneman writes that success is the result of talent and luck. He uses a golf tournament to illustrate this idea. A golfer who scores above average on day 1 can be assumed to be both more talented and lucky; a golfer who scores below average on day 1 is both less talented and unlucky. On the second day, the first-day high scorer will probably continue his success because he won't lose any more luck than he already has, but his success rate may not be as good as it was on the first day because there's no way for him to regain lost luck. The low scorer from Day 1 will likely improve because his streak of bad luck isn't likely to continue—he'll either score well or poorly again based purely on chance rather than past performance.

Regression to the mean is a pattern of statistical analysis that shows extreme scores tend to be followed by lower scores. This happens because an extremely high score suggests a very lucky day, and therefore
we expect it will eventually regress toward the average. The same effect can be observed when looking at day 2 and then day 1, which should help convince people that regression does not have a causal explanation.

Regression effects are everywhere, and people often misattribute causes to explain them. Kahneman points out that commentators have a tendency to attribute cause-and-effect relationships in what is actually just random chance. He uses an example of Olympic ski jumpers who perform two jumps. If they do better on the first jump than expected, commentators say that they will do worse on their second because they're feeling pressure; if the first jump is worse than expected, then commentators say that the athletes have nothing left to lose and will therefore do better on their second jump. The commentator has identified a principle of luck and assigned it a causal story.

Kahneman says that regression between two variables can be measured by a “correlation coefficient.” It is a measure of the weight each variable shares with the other. For example, height and weight have some factors in common in adult men (.41 correlation) but income and phone number are unrelated.

Correlation and regression are different ways of looking at the same concept. If there is imperfect correlation between two scores, then it's possible to find a relationship that may be due to chance or some other factor. For example, highly intelligent women tend to marry men who are less intelligent than they are. This statement can be explained in terms of causality as well as by pointing out that there will inevitably be less-than-perfect correlations between spouses' intelligence scores.

Daniel Kahneman is a psychologist who studies biases in thinking. One of his experiments involved children who were depressed and the effect that an energy drink had on them. The headline he made up would be true even if there was no energy drink, because the children would get better over time anyway.

A final example comes from a question in Max Bazerman’s Judgment in Managerial Decision Making. It's about sales forecasting for a department store chain. The stores are similar, but they differ due to location, competition and random factors. Overall sales are expected to increase by 10% across the board, so we have to account for regression and add slightly more to the underperforming stores (add less than 10%), and slightly less for the overperforming stores (add more than 10%).

Part 2, Chapter 18

There are many situations in which people make predictions. Economists predict unemployment rates, the military predicts casualties, and producers predict audiences. Some of these predictions rely on precise calculations while others rely on intuition and System 1 thinking. The latter can lead to mistakes because they stem from heuristics.

Daniel Kahneman introduces Julie, a current senior at a state university who read fluently when she was four years old. He asks us to make an educated guess about her GPA. System 1 makes several quick calculations and creates causal links between what we know of her reading ability and how well she's likely doing in school right now.

Kahneman then describes another study he and Tversky conducted. They asked people to imagine a
fresher who was intelligent, self-confident, well-read, hardworking, inquisitive and got good grades in high school. Then they asked them what percentage of freshmen would impress them more than this student. People said that the top 15% of freshmen would impress them more than this hypothetical student but not the top 3%. When they then asked other participants how many students out of 100 get better grades than this hypothetical student got in high school their answers stayed the same even though it's impossible to predict someone's GPA from five adjectives about him or her.

When we're asked to make a decision about something, it can be difficult to know what's right. In the case of Julie, Kahneman writes that we have to do several calculations first before deciding for sure. First, estimate our initial impression (the base rate). Then figure out how well this matches with our intuition (our insight into the situation). Next are two more steps: estimating the correlation between reading precocity and GPA based on some evidence presented in the story and then moving 30% of the way from an average GPA toward this particular student's GPA if there is a correlation. This approach takes into account our initial impressions but corrects them by taking other factors into consideration as well.

Kahneman writes that the biases we find in predictions that are expressed on a scale (like Julie's GPA) are similar to the biases observed in judging probabilities of outcomes. In each case, it is important to start with the baseline and aim for an intermediate number between those responses.

It's not easy to correct intuitive predictions. In fact, it requires a lot of effort and thought. It may even mean that you won't be able to predict extreme cases or outcomes in the future. However, there are important exceptions: for example, venture capitalists need to make investments with high returns while avoiding losses; they have an incentive to invest in high-risk ventures if they're very promising. Their goal is different from people who work in more mundane jobs—they don't want their careers jeopardized by missing out on opportunities for success because of risk aversion.

Kahneman presents a situation in which two candidates are being considered for the job. One candidate has no track record but is impressive in interviews, while the other candidate's research record is good but not as strong. The first candidate is more likely to regress toward the mean and be less successful, making the second candidate appear stronger.

**Part 3, Chapter 19**

Trader-philosopher-statistician Nassim Taleb introduced the notion of a narrative fallacy, which is when we look at the past to understand what will happen in the future. We don't realize that there's luck involved in life and focus on specific events instead of things that didn't happen.

A compelling narrative is like Google's story. Two students create a superior way of searching for information on the internet, and they start their own company. Within a few years, it becomes one of the most valuable stocks in America. Each decision made by these students was an excellent choice that contributed to its success.

This story only covers a few of the events that led to Facebook's success, because there were many other factors. One event could have changed everything—for example, if someone else had come up with the idea for Facebook first or if they hadn't been able to get funding. However, those things didn't happen and
the founders had a lot of good luck along the way.

Many people think they knew the 2008 financial crisis would happen, but Kahneman explains that they could not have known it. They only thought it would happen and were proven correct. We understand the past less than we believe we do.

When an unexpected event occurs, we adjust our view of the world to accommodate the surprise so that it makes sense. We have a hard time reconstructing past states of knowledge or beliefs because we are biased towards believing that our new state is how things have always been.

In 1972, Baruch Fischhoff conducted a survey that asked people to predict the outcome of President Nixon's meeting with Mao Zedong. People were assigned probabilities for different outcomes and then questioned again after the event had occurred. They exaggerated what they thought was the probability of an event occurring.

When making decisions, we tend to judge the quality of our decision-making process by whether or not it led to a good outcome. We also tend to blame people for bad outcomes even if they made good decisions that just didn't work out in the end. This is called hindsight bias and outcome bias. It usually leads us into being risk averse but can reward irresponsible behavior as well because sometimes risky gambles do pay off.

In his book, Kahneman discusses a study that looks at the correlation between the quality of a CEO and the success of their firm. A generous estimate finds that there is only 30% overlap in factors shared by both CEOs and firms. This means that given two CEOs and two firms, the stronger CEO would lead the stronger firm about 60% of time—only 10% better than random guessing.

The Halo Effect is a phenomenon that occurs when people attribute the success or failure of a company to its CEO. The book shows that even though we know this isn't true, we still think it's true and look at CEOs differently depending on whether their companies are successful or not.

Many books have been written about how to be a good manager and get the best results. However, this ignores the fact that some companies are more successful than others simply because they're lucky. The illusion of understanding can give people false hope for future success when it's really just luck.

**Part 3, Chapter 20**

Decades ago, Kahneman watched soldiers in the Israeli Army as they completed a group exercise. He and a colleague took note of who tried to lead, who was rebuffed, who seemed to be stubborn, arrogant, patient, persistent and so on. After several hours he evaluated who should get officer training based on their observations.

It is now known that Kahneman and his colleague were not able to predict the future accurately with their heuristics. Still, they did not change their minds about what was expected from soldiers. This concept of having an illusion of confidence in one's predictions despite evidence against it is called "the illusion of validity."
In 1984, Kahneman and Tversky visited a Wall Street firm. They were struck by the stock market and began to wonder what motivates some people to buy stocks while others sell them. This led them to realize that trading stocks seemed like an illusion of skill, with each participant believing they knew more than others.

A student of Daniel Kahneman's named Terry Odean began studying the trading records of individual investors over seven years. He found that, on average, after one year the stocks they sold did better than those they bought by 3.2 percentage points.

A study by Odean implies that the majority of investors would have been better off if they had done nothing. The average investor who traded often earned worse returns than those who did not trade as frequently. Men traded more often than women, and thus women achieved better investment results than men.

Investors often like to sell stocks that have gone up a lot since they were bought and hold on to the losers. However, recent winners tend to do better than recent losers in the short run, so individuals are selling the wrong stocks. Most investors don't beat the market consistently year after year because most of them roll dice instead of playing poker. The differences in skill among these investors can't be found by Kahneman's research.

Executives at these firms think that they reward luck as if it were skill. Kahneman presented his findings to them, but their behavior didn't change. The statistics clashed with their personal impressions from experience. They bought into the potent psychological illusion that people who pick stocks are exercising high-level skills and that they're among the few who can do what others can't.

Kahneman then discusses the pundits who make forecasts in business and politics. They are often wrong, but they tend to overestimate their ability to forecast. Kahneman uses an example of Hitler's gender as an illustration that large historical events are determined by luck as well.

Psychologist Philip Tetlock interviewed 284 experts who predicted the future and asked them to rate three possibilities. They all performed worse than if they had just assigned equal probabilities to those three outcomes, or "worse than a dart-throwing monkey," according to Kahneman.

The more you know, the better your forecasts will be. However, experts are often wrong because they overestimate their knowledge and become overconfident in their ability to predict. Experts also have excuses for why they were wrong that make them less reliable.

Tetlock uses terminology from Isaiah Berlin’s essay on Tolstoy: “The Hedgehog and the Fox.” Hedgehogs have one coherent theory about the world and are confident in their forecasts, which makes them good for television. On the other hand, foxes recognize that reality emerges from many different agents and forces, including luck.

Kahneman says that there are two main points in this chapter. The first is that we can't predict the future, and the second is that our confidence isn't always accurate.
Part 3, Chapter 21

Psychologist Paul Meehl analyzed 20 studies to show that predictions made by trained professionals are not as accurate as statistical formulas. In one example, his formula was more successful at predicting the grades of college freshmen than 11 professional counselors were. He found a similar result with parolees, pilots in training and criminals returning to crime.

A book written by Paul Meehl was very controversial. Many studies were conducted to prove him wrong, but most of them ended up proving his point that algorithms are more accurate than humans in predicting the future.

Meehl suggests that experts and algorithms make predictions differently. Experts use complex combinations of features to make their predictions, while algorithms focus on simple ones. People often feel that they can overrule the formula because they have additional information; however, this is only true in a few cases—for example, if you know someone broke his leg today then you would disregard an algorithm's prediction about whether he will go to the movies tonight. Broken legs are both rare and decisive enough to alter predictions based on them alone; therefore, it makes sense for people not to rely too heavily on formulas when making decisions under uncertainty.

Humans are inconsistent and can't be relied on to give the same answers. They're also unreliable, as they can contradict themselves. This is a problem because people often ask for second opinions from radiologists, who might give different answers than their colleagues did in the first place. However, formulas don't suffer from these problems; when you plug the right numbers into them, they always come up with the same answer.

Kahneman also discusses the idea that some formulas don't require any statistical research. Psychologist Robin Dawes provides an example of this kind of formula: marital stability is predicted by frequency of lovemaking minus frequency of quarrels. Positive numbers signify good results, and it can compete with expert judgment.

Virginia Apgar created a scoring system to standardize the way doctors determine which babies need help after birth. She did this because she realized that newborns who aren't breathing normally are at risk for brain damage or death, and doctors didn’t have consistent standards for determining which babies were in trouble. Her system has been credited with reducing infant mortality, and it is still used every day by every doctor in every delivery room.

Some psychologists were hostile to Meehl's ideas because they thought their intuitions and judgments were good. However, the tasks that require long-term predictions are difficult to know the boundaries of their skill. Additionally, it is hard for them to sympathize with robots over humans.

When people make mistakes in the most important decisions, they often prefer to blame algorithms. This is because human error seems more acceptable than an algorithm that makes a mistake. However, algorithms play a bigger role in our lives now—like calculating credit limits and how much teams should pay for players.
In 1955, Daniel Kahneman wanted to improve the army's interview process. He felt that it was not effective in predicting who would succeed and fail because of the halo effect. So he decided to separate traits into specific categories rather than evaluate them as a whole.

Interviewers were upset when they were told to stop using their intuition and ask factual questions. However, Kahneman compromised by telling them to give the interviewees a global score on a scale of 1-5. This new method was an improvement over the old one, even though it still relied heavily on intuitive judgment.

**Part 3, Chapter 22**

Kahneman then writes about his collaboration with Gary Klein, a colleague who disagreed with him about the value of using algorithms to replace human judgment. Kahneman invited Klein to join in an effort to discover when one can trust experienced professionals who claim they have prediction abilities.

Daniel Kahneman's view of intuition was formed by observing the illusion of validity with his own work and Meehl's work. He stated that firefighting teams can quickly choose a course of action based on their experience, without having to generate other options. This method is called recognition-primed decision model (RPD). It also applies to chess players who have learned patterns in which they can intuit the best move quickly, without having to generate other moves first.

Kahneman believes that this kind of intuition is really recognition of information stored in memory.

Some intuitions are stored in memory quickly, while others take a long time to develop. A bad experience can be remembered for a long time. However, it takes years of practice to become an expert at something like chess.

Learning to play chess can be compared to learning how to read. In first grade, students are taught the alphabet and how to parse syllables. However, adults who have learned how to read can comprehend entire clauses at a time. Learning chess is harder than reading because there are more pieces in the "alphabet" of chess and longer words, but eventually you will learn how to interpret situations quickly just like an expert reader does.

Kahneman and Klein realized that they had different experts in mind. Kahneman worked with financial traders and political scientists, while Klein worked with firefighters and nurses. They agreed that there are many pseudo-experts who don't know what they don't know.

Daniel Kahneman, a psychologist, says that experts are those who have the opportunity to practice something over and over again. They also have an environment that is predictable so they can learn how to predict it correctly. Bridge players, poker players, nurses, physicians and firefighters all satisfy these conditions because their environments are predictable and they have opportunities to practice what they do. But political scientists make long-term forecasts about things that aren't predictable or valid cues for predicting them.

Statistical algorithms are better than humans at predicting the future, but even they can't predict it
perfectly. Statisticians have found that people do not use good predictive cues consistently and accurately. If a strong predictive cue exists, then people will usually find it. Therefore, professionals should stop blaming themselves when they fail to forecast the unpredictable future correctly. However, professionals should blame themselves for thinking that their profession is possible in the first place if it's impossible to achieve perfection under such circumstances.

There are a few conditions that one must meet to become an expert. Those conditions include receiving immediate and unambiguous feedback as well as sufficient opportunity to practice. Chess is good for these factors, but some surgeries may not be suitable for becoming experts in them because surgeons can't receive immediate feedback or enough practice on certain procedures. Psychotherapists get good feedback from patients during the sessions, but they don't get much chance to try out long-term treatments because it takes years before they know if their techniques were successful and there's often ambiguity with results after that time period has passed.

The authors found that most of the time, people are able to distinguish good ideas from bad ones. When a person is in a regular environment and has learned how things work in it, they can easily tell which ideas will be effective and which won't.

**Part 3, Chapter 23**

A few years after Kahneman started working with Tversky, he convinced some officials in the Israeli Ministry of Education to create a textbook on decision making and judgment. After about a year, they had written several chapters and created sample lessons. They estimated that it would take 1.5-2.5 years for them to finish the book.

Then, Kahneman asked Seymour Fox if he could think of other teams who had developed curricula. He realized that many teams did not finish the project and those who did took around seven to ten years. Until Kahneman prompted him, Seymour's estimate was in line with everyone else’s.

Fox and Kahneman worked on the project for eight years. After that time, they were no longer living in Israel or working together. The Ministry of Education was not interested in their textbook anymore and it was never used.

Kahneman learned three lessons from this incident. The first is the distinction between two methods of forecasting: the inside view and the outside view. The inside view uses what we've already done to predict how long it will take us to finish a project, but that method can be flawed because we are likely to underestimate how much work remains and overestimate our progress.

Seymour was able to use the outside view by looking at similar cases. He then estimated a base rate, which gave a better idea of what could happen—and showed that his group's inside-view forecasts were not even close.

Seymour Kahneman and his team realized that people are very confident about their decisions, even when they're wrong. They also found that people don't need a lot of information to make important decisions. And the participants in the study believed they would do better than others who had tried and failed
before them.

The third lesson is that they should have given up the project. This is similar to a psychological experiment where students were taught about general cases and did not alter their assessments of individual people they met.

Kahneman and Tversky discovered a phenomenon called the planning fallacy, which is when people have an unrealistically optimistic plan for how long something will take to complete. They also found that it was better to consult statistics from similar cases than rely on one's own optimism. This can be seen in government projects, business plans, and home renovations.

Daniel Kahneman and Amos Tversky found that the outside view is a good way to overcome the planning fallacy. Organizations should reward planners for precise execution, not overly optimistic plans.

Kahneman realizes that the team made a planning fallacy. He also acknowledges his own responsibility because he did not have an accurate baseline prediction to begin with. If they had, they would not have started the project in the first place. Because of this, it's hard for him to give up at that point in time. In future projects, Kahneman hopes to use an outside view as a baseline prediction so that he can better assess how much time and effort is needed for a project before starting work on it.

**Part 3, Chapter 24**

Overconfidence is a type of bias that people have. They view themselves as more capable than they truly are and believe that their goals are easier to achieve than they really are. Such overconfidence leads them to take bigger risks, which can lead to failure in the end.

Small businesses often don't survive for more than five years, but the owners of these businesses are optimistic about their chances. They believe that they have a 60% chance of success and think that 7 out of 10 times is a pretty good chance to succeed. Still, optimism can be costly: inventions with D or E grades from the Inventor's Assistance Program rarely work out. Even after hearing this information, 47% continued working on their projects even though there was no hope for them to succeed and they lost money on them.

Years ago, a couple had a motel. They bought it for cheap because the previous owners weren't successful in making it profitable. The couple didn't explain why they expected to succeed where others failed.

Cognitive biases play a big role in optimism. We focus on our goal and neglect the base rate of success, which exposes us to the planning fallacy. We focus on our own qualities and neglect others' skills when we're making plans for ourselves. We focus on skill rather than luck when we're thinking about how likely something is to happen, even though skill has little to do with it.

In his book, Kahneman asks readers to consider two questions. The first is: "Are you a good driver?" Most people say yes because they're confident in their driving skills. However, when asked if they are better than average as drivers, most people have a hard time answering that question and substitute the first answer for the second one. This happens when someone is asked about something difficult or
challenging that he/she does well at; he/she will usually rate himself/herself lower than average at it instead of saying "I'm above average."

People are also prone to overestimate their own influence, rather than considering the actions of others. This is why many movies open on a given weekend: they focus on their own abilities instead of competition from other movies.

The CFOs of large corporations were asked to estimate the returns on the Standard & Poor's index over the next year. They also provided two other estimates, one that they were 90% sure would be too low and another that they were 90% sure would be too high. The range between these two values is known as an 80% confidence interval. In reality, their estimates were far too conservative: about 67% of outcomes fell outside of this range (more than 3 times higher than expected). This demonstrates that CFOs are grossly overconfident in their predictions.

Kahneman acknowledges that he gave the wrong number because his prediction would have been laughed at if he had given a more accurate 80% range. He also says this is true in other fields like medicine, where high confidence (even if it's unwarranted) earns the trust of clients.

Overconfidence is a difficult trait to manage. However, it may be possible for organizations to do so by using a process called the premortem. In this scenario, you imagine that your decision was implemented and resulted in a disaster one year later. You spend five minutes writing about what went wrong with the plan. The premortem reduces groupthink and legitimizes doubts of plans supported by overconfident people. It also encourages supporters of a plan to search for potential pitfalls that they might not have considered earlier on in the process.

Part 4, Chapter 25

Economists think of people as being rational, selfish and stable. Psychologists think of people as not completely rational, not completely selfish and anything but stable. Behavioral economist Richard Thaler calls these two ideas Econs (Economist's view) and Humans (Psychologist's view).

After discovering that people often made choices differently than the expected utility theory predicted, Tversky proposed to Kahneman that they study decision making and discover what rules governed their choices. The most popular theory was expected utility theory, which came from logic instead of psychology.

In the 1950s, researchers focused on Econs. However, Tversky and Kahneman wanted to study Humans' decision-making processes. They completed a paper in 1979 that was based on utility theory but explained why people made irrational decisions when choosing between gambles. This paper became their most significant work ever done.

In 1738, Daniel Bernoulli conducted an experiment to show that the psychological value of money is more important than its actual value. He argued that a gift worth 10 ducats has the same utility to someone who already has 100 ducats as a gift worth 20 ducats does for someone with 200 ducats. Therefore, people don't assess gambles based on their expected values (80% chance to win $100 and 20%
chance to win $10) but rather by their psychological values (the risk of losing). As such, most people will take the sure thing over a gamble even if it means getting less money overall.

Bernoulli created a table that showed how much utility people gain from different amounts of money. People prefer certain things to gambles, so they're more likely to choose something with a higher number than something with a lower number.

In an essay, Bernoulli explains why poor people buy insurance and why rich people sell it. Poor people are less able to afford the loss of money than richer ones so they pay a premium to transfer that risk to someone else.

Bernoulli's theory is incomplete. It does not take into account the recent change in wealth, and it assumes that people are equally happy at any point in time if they have a fixed amount of money.

Bernoulli's theory has its flaws. In this example, Anthony and Betty have different preferences for the gamble versus the sure thing. Anthony prefers to take the sure thing because he wants to double his wealth without risk (risk = probability of losing). Betty prefers to take a gamble because she doesn't want to lose half her current wealth with certainty.

Daniel Kahneman is interested in the fact that a theory existed for so long despite some obvious counterexamples. He calls this phenomenon "theory-induced blindness" because once people accept a theory, they tend to ignore its flaws.

**Part 4, Chapter 26**

Kahneman discovered the flaws in Bernoulli's theory because he wondered if people evaluated gambles by tiny differences in wealth. Likewise, Tversky quickly realized that another economist had proposed utilities were attached to changes of wealth rather than states of wealth.

Utility theory is used to determine the value of a good or service. It assumes that all goods and services are measurable by money, which means it can’t be applied to non-monetary values. This flaw was discovered when Kahneman and Tversky were conducting experiments about people's preferences for winning versus losing different amounts of money. They realized that they had different preferences depending on whether they were discussing gains or losses, even though both scenarios involved monetary outcomes.

Daniel Kahneman asks readers to consider two scenarios: 1) Get $900 for sure OR 90% chance to get $1,000; 2) Lose $900 for sure OR 90% chance to lose $1,000. Most people choose the first option in scenario one and the second option in scenario two. In scenario two, it's very aversive to lose money so people are willing to take more risks. Bernoulli's theory did not have any way of handling this phenomenon.

Daniel Kahneman, a Nobel Prize winner in economics, discusses two problems. The first involves choosing between getting an additional $1,000 with a 50% chance or receiving $500 for sure. In the second problem, people are asked to choose between losing $1,000 with a 50% chance or losing $500 for
sure. Kahneman's theory is that people should be risk-averse in the first scenario and risk-seeking in the second because both scenarios end up with the same final state of wealth (zero). However, his findings revealed that most people were actually risk-averse in both situations and preferred taking certain amounts over gambles.

Daniel Kahneman and Amos Tversky found that people evaluate gains and losses relative to a neutral reference point. In other words, if they gain $100, the difference between winning $900 or losing $100 is greater than the difference between winning $1,000 or losing $200. They also found that people are more sensitive to their losses than their gains.

There are many situations in life where we're faced with a choice between two options. One option has the potential to lose us money, while the other has the potential to gain us money. A simple example is this: if you flip a coin and it comes up tails, you'll lose $100. If it comes up heads, you'll win $150. For most people, they're more afraid of losing that $100 than they are hopeful about gaining that extra $50; therefore, for them to take the gamble (e.g., flipping a coin), there needs to be an opportunity for approximately twice as much money ($200) on the line before they'd feel comfortable taking that risk.

Kahneman points out that Bernoulli's theory is flawed. Rabin proved this in 2000, stating that most people would reject the first gamble because they believe it's not worth taking a 50% chance to lose $100 and only a 50% chance at winning $200. However, they'd also turn down the second gamble because it has them taking a 50% chance of losing $200 and winning $20,000—which is obviously better than the first one since you have more chances to win. In other words, utility theory doesn't work with Humans as much as we think it does.

Kahneman admits that utility theory is useful in introductory economics classes. The basic concepts of economics are not easy, and psychology makes them more complicated.

Prospect theory also has flaws. Consider three gambles: A) One chance in a million to win $1 million. B) 90% chance to win $12 and 10% chance to win nothing. C) 90% chance to win $1 million and 10% chance to win nothing. The first two options have the same value because you're unlikely to lose anything, but winning nothing is possible in both cases, so it's worth zero points on the scale that prospect theory uses for evaluating risky choices (the difference between expected value and payoff). However, losing something valuable when you could have won it is an intensely disappointing outcome; therefore, this third option should be evaluated differently than the others—it should be counted as -10 points instead of 0 points since it's much worse than either of them!

Two theories commonly used in economics, prospect theory and utility theory, did not account for choices of risk against sure things. In this case problem #6 puts you at a 90 percent probability of winning $1 million, while problem 7 gives you only a 50/50 shot but guarantees the payout at $150,000 if you lose the toss-up coin flip. Problem number six has much more to gain than seven because with 75 percent certainty we are guaranteed that our choice was correct. Two main theorists decided it might be important to consider risk versus currency situations correctly and they adjusted their models based on what people perceived as actual value rather than monetary output.

Part 4, Chapter 27
Chapter 27 begins with a figure that shows the relationship between leisure days/year and income. The curve of the graph illustrates the points where people are indifferent to having more money or more leisure time. However, it does not indicate their current income or how much leisure they currently have.

The reference point is a key factor in determining people's preferences. For example, Albert and Ben are identical twins who have the same tastes and start out with identical jobs. When the firm offers them new positions, they both receive raises of $10,000 or extra paid vacation days each month. After some time passes and they're offered the chance to switch jobs (and perks), prospects theory says that they will definitely want to stay where they are because their added benefits have become accustomed to them.

Behavioral economics started out in the 1970s when Richard Thaler, who was a graduate student at the time, pointed out irrational behavior of his professors. One of them, Professor R., believed in economic theory but he also loved wine and bought bottles for less than $35. Yet he refused to sell one bottle for $100 or less.

Economic theory suggests that if you own something, it should have no effect on your willingness to sell it. But in practice, people value things more when they own them. This is called the endowment effect and was discovered by Professor Richard Thaler of Cornell University. He found several examples of this phenomenon and realized that loss aversion could be used to explain why people overvalue what they already own.

Tversky and Kahneman spent a year at Stanford while Thaler was there. During that time, they became friends and explored the endowment effect. They realized that the concept wasn't universal because people don't act like this when shopping for shoes; in fact, you can even sell more shoes by lowering your prices if you advertise them as "sale items." The difference between how we value something we plan to consume (like wine) versus something we plan to use (like a pair of shoes) is that the former is held for "use" whereas the latter is held for exchange.

Daniel Kahneman, Richard Thaler and a local economist named Jack Knetsch designed an experiment that would demonstrate the difference between goods for use and those for exchange. They found that in markets where people had to buy or sell coffee mugs (goods for use), the average price of buying was nearly double the average selling price. The number of trades was also less than in markets with goods for exchange.

In the real estate market, we can see that Econs will pay attention to the current value of a home and not what it was worth in the past. However, Humans are different because they set their prices based on how much money they paid for their homes. When housing markets crash, these owners have trouble selling their homes at all or for as much as they want.

Experienced traders are less likely to feel the pain of giving up something. That's because they understand that it's not really about the item itself, but rather how much they want it compared with other things.

Poor people don't experience the endowment effect because they are always giving things up. The cost of something is always a loss for them, so buying something doesn't bring any additional pain.
Part 4, Chapter 28

Loss aversion has a biological and psychological root in which negativity dominates positivity. The brain's priority is to notice bad news, so we are drawn to the frightened eye over the calmer one. Bad impressions and stereotypes form more quickly than good ones, even if they're symbolic threats like war or crime.

When people set a goal, they tend to be less motivated when they fall short of it. For example, golfers are more likely to succeed if their goal is to achieve par than if they aim for birdie (one stroke under par). This difference in motivation between falling short and exceeding the goal has been shown to have implications on earnings. Tiger Woods would earn an additional $1 million per year by setting his goals at achieving par instead of trying for birdie.

Loss aversion makes it difficult to negotiate and renegotiate contracts. It causes people to be more upset about losing something than happy about gaining something of equal value. Therefore, it's hard for both parties to reach an agreement because one person is always going to feel like they're getting the worse end of the deal.

Thaler, Knetsch, and Kahneman designed a survey to see how people reacted to price hikes in the hardware store. In the survey, they described a situation where the store raised prices on snow shovels after an unexpected storm hit. While this is technically allowed by economics rules of supply and demand, 82% of consumers still thought it was unfair for them to do so.

In another example, people viewed it as unfair if a small shop that had only one employee cut their wage from $9 to $7 an hour. However, they did not consider it unfair if the current employee left and the shop hired a new worker at $7 an hour. People understand that firms want to maintain their profit margins but also believe that certain employees deserve wages based on seniority or experience. Firms who violate these rules will lose both productivity and sales.

Loss aversion and entitlements extend to justice. Merchants whose goods are lost in transit will be compensated for their losses, but not for the profits they could have made from those goods.

Part 4, Chapter 29

People often assign weights to different outcomes when they're uncertain about the future. They evaluate how much they believe a certain outcome will occur, and these weights are correlated with the probabilities of those outcomes. Usually people assign these weights automatically and unconsciously, but this theory doesn't reflect reality because it's too simple. There are four examples of probability changes: 1) From 0 to 5%, 2) From 5 to 10%, 3) From 60 to 65%, 4) From 95 to 100%. In each case, one’s chances of receiving $1 million improves by 5%, but everyone agrees that option 1 and option 4 are psychologically more affecting than options 2 or 3.

The impact of a small change is disproportionately large. For example, the difference between 5% and 95% is huge. Similarly, the difference between 0 and 100% is also very big. The downside of an almost certain outcome can be quite scary—for instance, if you're almost sure to fail at something, it may not
seem worth trying because failure will be devastating. People tend to avoid this risk by being overly cautious or conservative in their decisions.

The author states that people are more likely to take risks when there is a sliver of hope. So, if one has a 95% chance of losing $500,000 and a 5% chance of winning $520,000, they're more likely to take the risk than if they had 100% certainty of losing $500,000. This violates logic because it doesn't make sense for someone to choose an option with less potential winnings over another option with higher potential winnings but lower odds. The author introduces this problem in 1952 and called it the Allais paradox. It's explained by the certainty principle which says that people want either guaranteed outcomes or better odds; not both at once.

Table 4 (page 315) shows that people overweight unlikely events, and underweight likely ones. This occurs because the fear of losing something that's almost guaranteed weighs more than the slight hope of gaining something incredible.

When it comes to probabilities, we tend not to be sensitive about low or high numbers. If the probability is greater than 99%, there's a tendency to ignore the number; however, if it's less than 1%, people tend to overweight that risk. Additionally, people are almost completely insensitive to variations of risk among small probabilities. The difference between .0001% and .0005% is barely noticeable, even though they translate into 300 cases versus 50 cases in the United States yearly.

People tend to worry disproportionately about threats. For example, a $10 insect spray causes 15 inhalation poisonings and 15 child poisonings per 10,000 bottles of it. Parents are willing to pay an additional $2.38 to reduce the risks by two-thirds, and an additional $8.09 to eliminate them completely.

The fourfold pattern is described as follows: in terms of gains, there's a 95% chance to win and people tend to be risk averse. With a 5% chance to win, there's hope for large gain and people are more likely to take risks (this explains why lotteries are so popular).

In terms of losses, people who have a 5% chance to lose will be risk-averse. They will accept unfavorable settlements. People who have a 95% chance to lose will be hopeful and reject favorable settlements in the hopes of avoiding their losses. This leads them to make desperate gambles in which they hope for the best but expect the worst.

Daniel Kahneman of Princeton University then looked at the fourfold pattern in a court case. The plaintiff with good chances will try to settle because they are afraid it'll go badly for them, even though that's unlikely. The defendant with bad chances should fight and take what he can get, because there is a definite loss from settling if you're not going to win anyway. Therefore, the stronger hand is held by the defendant in this situation.

Kahneman contrasts this case with a frivolous suit, in which the plaintiff has no chance of winning but files anyway. They're aggressive and want to win, even if it's not likely. For the defendant, they want to avoid the small risk of a very bad outcome and settle quickly. Therefore, the plaintiff holds more power in this situation because they are more desperate for money than their opponent is for peace.

It's easy to empathize with the plaintiffs and defendants who don't have a better hand. However, in the
long run, this strategy can be costly. If New York City faces 200 frivolous lawsuits each year with a 5% chance of costing it $1 million if they settle for $100k per case or by litigating all 200 cases and losing 10 times, they'll lose only $10 million total. Therefore, paying more to avoid a small risk of losing big is costly over time.

Part 4, Chapter 30

Daniel Kahneman visited Israel several times and noted that there were numerous bombings on buses during the time he was there. He said that people who rode the bus felt like they were in danger because of all those incidents. However, he pointed out that the probability of being killed by a terrorist attack was very low, but this did not matter to most people—they still avoided riding buses as much as possible. Emotion and vividness influence availability, which influences judgment of probability.

When people are asked to assess the probability of a rare event occurring, they tend to overestimate it. This is because when we're presented with an alternative (e.g., team A or B), we tend to overweight our estimate for the first alternative that's mentioned (e.g., team A).

Prospect theory and utility theory are different because utility theory says that decision weights and probabilities are the same, but prospect theory says they're not. Psychologists at the University of Chicago found that people's decision weights were even less correlated with probability when the outcomes involved emotions (such as meeting your favorite movie star or getting a painful shock).

People are more likely to choose something if they can imagine it vividly, even though the math doesn't make sense. For example, people would rather have a chance at winning one prize out of 10 than eight prizes out of 100 because the first option seems less risky.

There are many ways to communicate risks. A vaccine that has a 0.001% chance of permanent disability seems much safer than one that says "One in 100,000 vaccinated children will be permanently disabled." People have a hard time translating percentages and fractions, so the different ways of framing create opportunities for people's opinions to be manipulated.

In the book "Thinking, Fast and Slow", Kahneman gives an example that refutes part of prospect theory. Instead of receiving descriptions for gambles, people are given two buttons: one with a higher probability to win but less money; another with a lower probability to win more money. The expected value is about the same for each button (in other words, if you press either button 10 times, you'll have won $10 or $1 ten times), but one option is riskier than another (for example, pressing the first button will result in winning $5 five times while pressing the second will result in winning $50 once). When participants press a button many times and experience its consequences (i.e., they learn which outcome occurs when they press each button), overweighting the rare event never happens and underweighting does happen often. A possible explanation for this effect is that people rarely experience rare events such as getting only 5 out of 10 tries correct on something like a quiz show where there's only 1 chance to get it right.

For comparison, Kahneman gives an example of two different people from whom a person may want advice. Adele is consistent and helpful, but not exceptional. Brian is not quite as friendly or helpful most of the time, but on some occasions he has been extremely generous. People generally prefer Adele
because they don't overweight rare events.

In this case, we are still making a choice based on probabilities. We are aware of the 1% chance that we'll fail to win $1,000 and therefore choose the safer option (99% chance) to ensure that we get at least something.

**Part 4, Chapter 31**

Daniel Kahneman asks his readers to picture two concurrent decisions. In the first, choose between A) a sure gain of $240 or B) a 25% chance to gain $1,000 and 75% chance to gain nothing. The second decision is similar but involves choosing C) a sure loss of $750 or D) a 75% chance to lose $1,000 and 25% chance to lose nothing. Most people prefer choices A and D over B and C because they believe that it's better not risk losing money than taking risks for potential gains. However, if you consider both decisions together instead of separately, then you'll find that choice B plus choice C is actually preferable when compared with choice A plus choice D because the former has greater expected value (EV).

There are two ways to look at a problem. The first is to consider it as two separate decisions, and the second is to consider it as one decision with four options. In every case, you should take into account all of your options when making a decision because humans naturally narrow-frame problems.

Paul Samuelson, an economist, wanted to know if his friend would take a gamble that was worth $200 or lose $100. His friend said he wouldn't do it because the odds of winning were 1/2,300 and losing money is never good. However, if he bundled 100 of those gambles together into one big bundle and offered them to him again, then he'd accept. This shows how people tend to view things differently depending on how they're framed.

The combination of loss aversion and narrow framing is costly, but individuals can avoid it with discipline. Experienced financial traders shield themselves from the pain of losses by broad framing. Broad framing will also help you make consistent decisions that are financially advantageous in the long run.

A risk policy is similar to the outside view in that it helps alleviate two biases: the planning fallacy and loss aversion.

Daniel Kahneman concludes the chapter by telling a story about Richard Thaler, who asked 25 managers to consider taking a risky option that would either lose or double their capital. None of them wanted to take this risk. The CEO then asked all of the managers to take the risk and count on statistical aggregation (the odds) to mitigate it.

**Part 4, Chapter 32**

The main motivators for money are not always economic. For example, a sports fan might travel 40 miles to see his favorite team play. If he paid for the ticket himself, he'll be willing to brave a blizzard in order to go to the game; otherwise, if someone else gave him that free ticket and it's snowing outside, there's no point in going because he already got what he wanted (the free ticket).
It's a common mistake for investors to buy and hold losing stocks because they don't want to admit that their decision was wrong. They continue investing in the stock hoping it will eventually make money. It's important for investors to analyze each investment independently, not based on how much they've invested in it already. The sunk-cost fallacy is one of the most expensive mistakes an investor can make, as it causes them to invest more money into something that isn't working out.

Fear of regret is a strong motivator for people's decisions. That fear can be triggered by the availability of alternatives to reality. For example, consider this scenario: Mr. Brown rarely picks up hitchhikers and has never been robbed before; yesterday he picked up a hitchhiker who robbed him. Mr. Smith frequently picks up hitchhikers and was recently robbed; yesterday he picked up another hitchhiker but wasn't robbed again. Most people would believe that Mr. Brown will experience more regret than Mr. Robert Smith, while only 23% think that he will receive the most criticism from others in his community for picking up a robber on the road.

People have similar intuitions about regret. When a person owns stock in company A and learns that he would've been better off by $1,200 if he had switched to company B instead, 92% of people believe that the man feels more regret than a man who owned stock in company B but then switched to company A. Situations outside the norm will garner more regret, particularly when someone takes action (as opposed to inaction).

Fear of regret can cause people to make the conventional choice even when it's not necessarily the best one. In a case where someone is sick and their doctor has them try an unconventional treatment, they might be afraid to do so because they're worried about what could happen if that treatment doesn't work out. They would feel bad about having chosen an unusual treatment in the first place, as well as getting blamed for making such a poor decision or being sued by their patient.

People become more risk averse when they feel responsible for the outcome. In this scenario, you are exposed to a disease that leads to death within days. There is a vaccine available that can help prevent the disease but it's only effective before symptoms appear. People will pay some amount of money for it but not much because it doesn't offer complete protection and there is still some risk involved in getting it.

People are usually willing to take risks. They're only unwilling when they think about the regret that may come from their choices, even if the risk is small. In this example, parents were asked whether they would buy a bug spray with 15% of bottles containing insects or one with 16%. Most people said no because of potential regret for saving a little money on something so important as keeping their children safe from bugs.

We spend a lot of time thinking about the regrets that we'll have, but we can prevent them by remembering that we considered the possibility of regret before making decisions. We should consider the possible consequences when making decisions and if we do, then there's no way to say "I almost made a better choice".

**Part 4, Chapter 33**

In a different scenario, Kahneman presents another puzzle. A man was shot and lost his arm in an armed...
robbery. The victim's regular store or a different one he rarely visited should not make any difference in the compensation amount, because location shouldn't be a factor.

When people are offered two options, they believe that the option in which their regular store is not mentioned is better than when it's included. They do this because they think of it as more poignant and see only one option at a time. The reason for this is that most choices we make don't involve multiple options and therefore, we're used to seeing only one choice at a time.

The economic experiment was conducted to test the idea of people making different decisions in different situations. In this case, participants were asked to choose between two bets: A or B. Bet A: 11/36 chance of winning $160; 25/36 chance of losing $15. Bet B: 35/36 chance of winning $40; 1/36 chance of losing $10. The first group chose bet B (35/36). However, when they were told that they had to sell their bet for a price, they set a higher price on bet A (11/36) than on bet B (35/36). Thus, it appears that individual choice can depend on context and not be rational every time.

Evaluation is dependent on context. This can be seen in the following example: John is 6 years old. He's 5 feet tall. Jim is 16 years old and he's 5 feet 1 inches tall. People will agree that John is tall, but they'll disagree about whether or not Jim is because of the different contexts involved (John being a child and Jim being an adult). Kahneman then asks people to imagine that they've been asked to contribute money for dolphins, which are creatures that most people like/love/enjoy etc.. The way you translate your feelings towards dolphins onto the scale of how much you normally give away depends on what kind of person you are (e.g., if you're really into animals, then this donation will seem small compared to other donations).

In one instance, people may be asked to donate money for the medical needs of farm workers. This is because they have a higher rate of skin cancer than other groups and need help paying for their treatment. People will decide how much money they want to give based on how urgent they think this issue is compared with others. In general, dolphins draw in more donations than humans do, but taken together these issues are represented differently because people feel that animals deserve more aid than human beings do.

Reversals can also be found in the justice system. In a study, people had to decide whether or not they would award damages to two parties. The first case was about a child whose pajamas caught fire and suffered moderate burns because the company that made them didn't make them resistant to fires. The second case involved an unscrupulous bank that cost another bank $10 million dollars due to its dealings. When asked individually, the participants awarded higher damages for the burn victim than for the business victim by $3 million dollars on average versus only $1 million when asked jointly (Faber & O'Guinn, 1988).

In another study, psychologists compared different punishments that can be imposed by government agencies. Different punishment systems make sense for individual agencies but become nonsensical when viewed from a distance. For example, the maximum fine imposed on companies for safety violations is capped at $7,000 while a violation of the Wild Bird Conservation Act may result in a fine as high as $25,000.
Part 4, Chapter 34

Daniel Kahneman demonstrates how different ways of describing the same thing can evoke different feelings. This is a problem because people are often more willing to pay for something that sounds like it will cost them money rather than give them money, even though they're essentially paying the same amount of money in both instances. The reason why this happens is because losses make us feel worse than gains make us feel good.

Kahneman and Tversky applied this concept to gambles by asking some participants if they would accept a gamble that offered a 10% chance to win $95 and 90% chance to lose $5, while others were asked if they would be willing to pay $5 for a lottery with an equal probability of winning or losing $100. These two problems are identical but most people respond differently when presented with the first scenario versus the second one. Losses always seem much worse than gains seem good no matter what their amounts may be.

In a recent article by Richard Thaler, he describes another example of this phenomenon. The credit card lobby pushed against gas stations that charged more if people paid with a credit card. However, their fallback position was to request that the vendors call it a “cash discount” rather than a “credit surcharge” because people will more readily forgo something they perceive as free (a discount) than pay extra money (a surcharge).

In a study conducted by British psychologists, participants are given £50 and then asked to choose between a sure outcome of £20 or gamble. The odds are 2/5 that they will keep the entire amount. When framed as KEEP £20, subjects more often chose the sure thing. When it is LOSE £30, subjects were more likely to gamble.

In this experiment, people's brain activity is monitored. When they choose the more frequent option (in either frame), a region associated with emotional arousal is active. In other words, when they do what comes naturally, their brains are aroused by that choice. However, if they make a less natural choice for some reason (i.e., to avoid conflict or self-control), another part of the brain becomes active—a region associated with conflict and self-control.

An experiment that Tversky carried out is an example of how framing can affect decision making. In the experiment, two outcomes for surgery are described to physicians as a 90% survival rate and a 10% mortality in the first month. When recommending surgery, more people chose it when presented with outcome A than outcome B. Kahneman and Tversky also explored this phenomenon by describing another scenario: The U.S. is preparing for an outbreak of an unusual Asian disease that will kill 600 people if nothing is done about it; however, there's a program (A) to combat the disease that has a 20% chance of saving 200 lives and 80% chance of saving no lives at all or (B) not doing anything which results in 100% death rate from this disease within one year. Most people choose program A because they believe it has better odds than B even though both options have exactly the same outcomes—200 saved or none saved at all—and are therefore equally likely to occur given those probabilities.

Now consider the following two situations. In situation A, 400 people will die if program A is adopted. If program B is adopted instead, there's a 33% chance that nobody will die and a 67% chance that 600
people will die. Now let's look at situation B', which is exactly like situation A' except for one thing: in situation B', we're told how many people are going to die under each of the programs being considered (i.e., 400 vs 600). Most people choose to adopt program B when presented with this information even though it means letting 200 more people die than they would have if they had simply chosen not to adopt any program.

When people are faced with a dilemma, they have to decide between two choices. One choice will save lives and the other choice will result in death for all who choose it. People know that saving lives is good, but certain death is bad. However, System 2 does not always come up with an answer on its own. Our moral intuitions rely more on descriptions than substance when we make difficult decisions like these.

Some framing devices can be more useful than others. In this passage, Kahneman presents two scenarios about a woman who loses money. He asks the reader to interpret the scenario and answer questions based on their answers. The author advises that people should not consider sunk costs when making decisions because they are irrelevant in most cases.

An example of the wrong way to frame a problem is when we look at two drivers, Adam and Beth. Adam drives a car with 12 miles per gallon (mpg) and switches to one that gets 14 mpg. Beth drives a car with 30 mpg and upgrades to one that gets 40 mpg. People tend to think that Beth saves more gas than Adam, but if they both drive 10,000 miles in their cars, Adam will save 119 gallons of gas compared to 83 for Beth. The original framing was bad because it's not based on how much fuel you use; instead it's based on how far you go before refueling. Cass Sunstein helped change policy by recommending that fuel economy information be presented in terms of gallons-per-mile instead of miles per gallon.

Framing is important when it comes to organ donation. A study was conducted that found that the percentage of people who choose to become donors in different countries varies widely, even though the choice itself is the same. This happens because some countries require you to check a box if you don't want to be an organ donor; other countries require you to check a box if you do want to be an organ donor. The difference between those two situations is very small, but it makes all the difference in whether or not people decide they're going to donate their organs after death.

**Part 5, Chapter 35**

Daniel Kahneman provides two definitions of utility. One is the enjoyability of outcomes as people live them, and the other is the desirability of a choice. These two concepts will coincide if people want what they enjoy and enjoy what they choose for themselves.

A study by Kahneman asks people to choose between two options. In the first, they might have to endure 20 injections but receive a reward of $50 each time. In the second option, they would only have to suffer 6 injections and get paid $10 per injection. Most people would choose the second option because it gives them less pain for a greater gain overall, even though their total gain is still equal in both scenarios.

In this chapter, Kahneman describes two patients who underwent a colonoscopy. One patient had the procedure done with anesthesia and his pain peaked at level 8 on a scale of 10. The other patient didn't have anesthesia and his pain lasted 24 minutes but only reached level 8 as well.
Most people perceive a medical procedure to be more painful than it is when the duration of the procedure is longer. Patients who received a lower intensity of pain over time rated their experience was worse, even if they had similar amounts of peak and end pain. This demonstrates that how long something lasts isn't as important as what happens at its worst moment, or how intense the end was.

It's difficult to differentiate between the experiencing self and the remembering self. Kahneman shares an example of a person who said that a record scratch at the end ruined his experience, despite knowing that it was not possible for him to fix something in the past.

The remembering self is more important than the experiencing self. In an experiment, people were exposed to two experiences: first, 60 seconds of putting their hand in a cold-water bath; second, 60 seconds of putting their hand in a cold-water bath followed by thirty additional seconds with slightly less cold water. People preferred to repeat the second experience rather than the first because they remembered it better due to peak-end rule.

Kahneman explains that the brain is hardwired to focus on intensity rather than duration when it comes to pain and pleasure. This feature of memory is part of System 1, which isn't necessarily rational.

**Part 5, Chapter 36**

Daniel Kahneman relates to the peak-end rule by telling his own experience. He saw an opera, and at the end of it, he was very sad because his favorite character died. However, if she had lived for a year longer, he would have been less upset than when her last ten minutes were cut short.

In a study, people were asked to imagine two versions of Jen's life. In one version, she was extremely happy throughout her life and died instantly in a car accident at age 30. In the other version, she lived for 5 more years but those last few years weren't as happy as the first part of her life. The participants rated her total happiness equally when she was 30 or 60 even though they thought that adding slightly less pleasant years would make little difference.

A study found that people choose to repeat experiences by memory, not experience. For example, if you had no pictures or videos of a vacation and could only remember the trip, it would affect your decision on whether or not to go again. Many people choose to return to places where they've been happy in order to maximize their pleasure; others say that they wouldn't bother going at all.

According to cognitive psychologist Daniel Kahneman, you'll scream and beg for the surgery to stop. However, if you're promised a drug that will erase your memory of the episode, most people would be indifferent about their own pain and treat themselves like a stranger who is suffering.

**Part 5, Chapter 37**

Daniel Kahneman talked about how his interest in the study of well-being began with a question that was directed at people's remembering selves. This question asked, “All things considered, how satisfied are you with your life these days?” However, he proposed that we should focus on the well-being of our experiencing selves instead.
Daniel Kahneman and a team of psychologists developed an experimental method to measure well-being. They asked women in their study to relive the previous day, answering questions about each episode of the day and rating different feelings on a scale.

A study found that long episodes of happiness count more than shorter ones. It also found that even though there are many ups and downs in a given day, most moments can be classified as either positive or negative. American women spend 19% of their time in an unpleasant state compared to 16% for French women and 14% for Danish women.

The study found that people experience more emotional pain on weekdays than they do on weekends. The U-index, which measures the amount of time spent in a negative state, is higher by about 6% during the workweek.

Kahneman's research indicates that our emotional state is largely determined by what we focus on. If you are in love, and thinking about your loved one, you will be happy even while stuck in traffic. To get pleasure from eating, focus on the food rather than how much weight it may add to your body. These observations imply that although we cannot change our disposition (the way we are), we can spend more time focused on things that make us feel good about ourselves and others around us.

People who are happier tend to evaluate their lives as better. Education doesn't make people happier, but it does improve their life evaluation. Children have a negative impact on happiness, but not so much on life satisfaction. Religion positively impacts happiness and life satisfaction. Money makes you feel richer, which improves your life evaluation; however it doesn't change how happy you feel day-to-day.

**Part 5, Chapter 38**

Kahneman provides a graph of happiness levels before and after marriage. Happiness increases until the year of marriage, then declines steadily over time. This is usually met with nervous laughter because it appears that there is a steep decline in happiness after getting married.

When we look at the graph, it appears that there is no relationship between a person's satisfaction with their life and their income. However, when we consider that people who are thinking about marriage will think of it more often than those who aren't, then the data shows us how likely someone will be to think of marriage when asked about his or her life.

People's happiness is not dependent on their circumstances, because happiness and life satisfaction are heritable traits. Some people who appear to be very fortunate are actually quite unhappy, while others have much less but experience more happiness. Therefore, in order to achieve true happiness, one should focus on the goals that they set for themselves rather than what other people think will make them happy.

Daniel Kahneman discusses two concepts that are related to happiness. The first concept is about how much pleasure we get from our cars when they're on our minds versus how much pleasure we get from them when they aren't. Most of the time, we don't think about our cars even though we may be driving them, so most of the time there's less pleasure involved in those instances than there would be if we were thinking about it all the time. The second concept he talks about has to do with what people focus on and
whether or not their attention is directed toward something positive or negative at any given moment in
time.

People believe that California is a happy place because of the climate, but Californians are unlikely to
think about the weather when asked how happy they are. However, people who recently moved there may
be thinking about it more often. Over time, we withdraw our attention from new situations as they
become familiar. The main exceptions are chronic pain and exposure to loud noise—which attract our
attention—and severe depression—which doesn't attract our attention at all.

In a study conducted by an undergraduate student, the student found that people who were told about
paraplegics in a bad mood estimated their percentage of time in a bad mood higher. The students also
found that personal acquaintance made no difference to those results if the accident had happened very
recently. However, when it was one year ago, personal acquaintance made people estimate their
percentages lower than those who did not personally know someone with paraplegia—they understood that
most people recover from these accidents and have better days over time.

Psychologists Daniel Gilbert and Timothy Wilson coined the term miswanting to describe bad choices
that arise from errors of forecasting. For example, people often make poor decisions about buying cars
because they overestimate the long-term benefits of owning a car. However, this is not true for social
gatherings like poker or book clubs; people are more realistic in their forecasts when it comes to these
groups because they know how much time will be required to participate in them on a weekly basis.

**Conclusions**

Kahneman ends the book with a discussion of how people think about their own happiness and well-
being. He wonders whether we should measure our welfare based on how much we're actually suffering
or what our overall level of happiness is, as measured by surveys.

Kahneman then argues that the definition of rationality as being consistent and coherent excludes people
from the definition of rationality. Humans are not irrational, but they need help to make accurate
judgments and better decisions. In a nation of Econs, government should keep out of the way, but
Humans require more guidance.

One author came up with a new way to help people make good decisions. He called it "libertarian
paternalism", which has the support of both liberals and conservatives. An example is the 401(k) plan,
where you automatically join unless you specifically opt out of it. Another example would be automatic
enrollment in a savings program that increases your contribution when you get a raise at work. Those
programs have helped millions of employees improve their future prospects by saving more for retirement

Paragraph 1: Thesis Statement (what I will talk about) Paragraph 2: Supporting point #1 Paragraph 3:
Supporting point #2 Paragraph 4: Supporting point #3 Conclusion : Summarize my topic and what I want
readers to take away from reading this essay

Sunstein introduced more ways to apply the libertarian paternalism. For example, a new label on food
will be introduced that replaces the Food Pyramid with a Food Plate. This will help people make healthier
choices and improve their health, which is an important part of living longer. Another way to introduce this idea would be by adding both "90% fat-free" and "10% fat" under one heading or another. Other examples include gas mileage labels that tell you how much money you'll save by using less gas, as well as dietary guidelines based on what's healthy instead of how many servings we should have per day or week (for example).

Organizations are better than individuals at avoiding errors and making decisions. They can enforce the use of checklists, reference-class forecasting, and premortems to make these decisions more effective.

The author suggests that it's important to understand the different heuristics in order to avoid their errors. These labels remind us of our potential biases and what can be done about them.