Thinking, Fast and Slow Study Guide

Thinking, Fast and Slow by Daniel Kahneman

BOOKRAGS

Contents

Summary

“Thinking Fast and Slow” by Daniel Kahneman is a chronicling of the functions of the two ways of thinking that man has. These two entities are not located in specific or special lobes or parts of the brain. As the title suggested, one is fast and one is slow. The reader learns quickly that fast does not necessarily equate with good and that slow thinking can be the most powerful. For clarity, author Kahneman gives the two ways of thinking names.

System 1 is the fast thinker, the thinker that will jump to conclusions and make snap decisions. It bases its rapid response on a quick query of all the data that is stored in the individual’s memory. System 1 interprets input with the limited data and skills that it has. It may not always come up with a complete or accurate response to a question or event. If System 1 cannot respond to a specific question, it will answer another question that is close in nature to the first question. This response is referred to as heuristic.

System 2 must take over if System 1 is at a lost or the response that it spits out is too unreasonable for System 2 to accept it. Sometimes System 2 is lazy and ignores possible problems with a response but he doesn’t want to put the effort into finding a better response based on new, outside data. System 1 expends virtually no energy conducting its functions. It’s all auto-response and nothing creative or innovative.

System 2 is the boss of the two systems although System 1 rules when System 2 is too lazy to do its job. To find new data and correct the misguided response from System 1 requires a lot of energy on System 2’s part. His unwillingness to do so is what results in misinformation and errors. Even when System 2 overrides a System 1 response, System 1’s answer doesn’t go away. It lingers there as a reminder to System 2 that it could have take the easy way out and elect to use that answer.

The book moves beyond the basics of System 1 and System 2 thinking and on to other ways that man has learned to process information and make decisions. There is a plethora of information that includes detailed descriptions of research, test case studies and experiments conducted by Kahneman and his close associate Amos Tversky and other psychologists, social behaviorists and scientists.

Behavioral patterns of associative coherence, cognitive ease, intuition, loss aversion, regression to measure and theories including the prospect and utility theories are described and discussed in great detail. Elements that impact an individual’s choices and decisions are meticulously discussed and include, among others, the halo effect, priming and the endowment effect.

This book explains how we think, what we think we think, what we don’t know we are thinking, and how we can improve our life through gaining an understanding of our two-pronged thinking mechanism. This book will make you think… and think again.

Chapters 1 - 4

Summary

Psychologists have focused on the two modes of thinking. System 1 is automatic and quick thinking. This form of thinking takes little effort. System 2 is effortful thinking that is associated with subjective choice and concentration.

Most people relate to System 2 thinking – the reasoning self that makes choices and decisions. The thinking that makes us feel in control. However, System 1 is the underlying resource for System 2 thinking. System 1 thinking creates complex patterns of ideas. System 2 is slower and constructs those ideas in to an orderly sequence.

Example of System 1 thinking includes, among others: noting which object is farther away; figuring out the source of a sudden sound; answering 2 + 2; reading words on a billboard; understanding simple words; and, completing a common phrase, “bread and….” These are all examples of automatic thinking that takes no effort. Many are impossible not to respond to.

System 2 thinking requires focus and can be disrupted if attention is diverted. Some examples that falls into System 2 thinking include: Bracing for a starter gun; walking faster than normal; answering 750 x 329; looking for a woman with white hair; filling out a tax form; and, determining the logic of an argument.

System 2 thinking can alter System 1 thinking by “programming the normally automatic functions of attention and memory.” (21) Causing the System 1 function of attention to look for a very specific object – the “white haired” lady listed above, for example – originates from System 2 thinking. Functions of System 2 thinking require one’s total attention. Computing a math problem while making a turn into heavy traffic is something that should not be attempted. Texting a message while driving a car comes to mind. Multi-tasking involves simple functions like talking and driving. However, if the driver encounters any danger on the road, he will stop talking and pay full attention to his driving.

Together, the two modes of thinking create an efficient system. System 1 handles the expected and has good initial reactions to normal occurrences swiftly and appropriately. However, System 1 has biases and has no grasp of logic and statistics. Also, it cannot be turned off. As in any relationship, there is conflict between the two ways of thinking. It is System 1 who wants to tell someone to go to hell; it is System 2 who stops System 1. System 1 is impulsive, while System 2 is self-controlled. System 2 can have evidence of the truthfulness of something that System 1 doesn’t quite believe. System 2 will ostensibly override System 1, but it can’t stop System 1’s impression. Feelings come from System 1 and cannot always be trusted. The validity and relevance of feelings must be determined by System 2. System 2 monitors System 1 reactions and impressions in order to catch biases and errors. An individual cannot live in peace

constantly questioning his thinking. System 1 can usually run things because it is quick and responsive. It is for more complex issues that System 2 must come to the rescue.

System 2 has a natural “speed.” Some mental energy is naturally expended in normal daily activities and observations. But there is no stress or strain. Minor decisions are made effortlessly. It is just like a leisurely stroll. If an individual is walking along and is asked to compute 23 x 78, he will without question stop in his tracks. A difficult task requires one’s full attention. Walking is a diversion; sitting still is more conducive to problem solving.

When System 1 is positive about a response, System 2 is likely to believe arguments that support it even if the arguments are illogical. This is a case of System 2 not monitoring System 1 thinking. More rational System 2 thinking will not accept superficial answers without digging deeper. Students who scored very low on a Cognitive Reflection Test were found to have a weak System 2 supervisory function and are prone to accept the System 1 responses.

Associative activation occurs in System 1 thinking when an unexpected idea triggers a chain reaction of many other ideas. The ideas evoke memories and emotions that result in a diverse yet integrated response referred to as 'associatively coherent'. System 1 makes as much sense as it is capable of when surprised by the unexpected like the phrase, “Bananas vomit.” System 1 does the best with this information with its limited capability. One result System 1 may evoke from the concept is a grimace. It is an example of the association of ideas or associative memory.

Priming is a method psychologists use to increase the understanding of the memory. This methodology has produced evidence that many individuals are not in control of their judgments and choices. When Kahneman describes “priming” studies and their results to audiences, there is widespread disbelief. System 2 thinking tells the individual that he or she is in charge. No one wants to believe that they are so susceptible to outside influence, to priming. System 2 thinking is certain that it is fully aware of the reasoning and logic behind his decisions and actions. System 2 is wrong. The results of the experimentation are accurate. Disbelief by an individual that he is vulnerable to priming is based on subjective experiences based on System 2’s interpretations.

System 2 is largely unaware that System 1 may be in control of the majority of a person’s reactions. Its impulses and impressions form choices and beliefs and tacitly provides an interpretation of events and links them to past memories. It is the source of one’s intuition and the source of the errors in that intuition.

Analysis

Author Daniel Kahneman describes the theory of the two-system thinking process. It is important that he explains the theory in the first part of the book so that the reader will have an understanding of the premise in hopes that he will have a better grasp of subsequent material.

The core of Kahneman's book, "Thinking, Fast and Slow," is the concept of System 1 and System 2 thinking processes. He makes sure to explain that there are not two separate physical chambers in the brain that house the systems. He has given them these titles for easy reference throughout the entirety of the book.

Those who read this book will be enlightened by what a learned psychologist shares about how the human thinking process works. He has also commented that he wants the average person to be opened up to new ideas and vocabulary so that the discussion about decision-making and judgments can be elevated.

Vocabulary

strident, premonition, implausible, computation, cognitive, psychodrama, stimuli, variant, prioritizing, autonomy, illusory, lucidly, incremented, mundane, capacious, aversive, systematic, coherent, effortful, intrinsically, syllogism, algorithmic, imperceptibly, juxtaposition

Chapters 5 - 9

Summary

Conscious thinking contains questions about how one's life or career is going and if there should be a refocus or whether new actions need to be taken. This function is handled by System 1 thinking and is only elevated to Section 2 thinking if extra effort is required. Measuring cognitive ease is a way to respond to those questions. The range of the measurement is between "Easy" and "Strained." Easy means that things are going well; strained indicates that there is a problem that System 2 needs to address. When an individual is in a state of "ease" he is in a good mood. Conversely, a person who is strained is suspicious and more intense and permits limited intuitiveness and creativity.

Familiarity has an element of "pastness" that makes a connection to prior experiences and gives the individual a sense of ease. But it is a false sense; it's an illusion. An individual experiences ease when he can make a connection to something from his past – it's a impression or image of familiarity.

Cognitive strain is experienced when System 2 is engaged in effort. It mobilizes System 2. The search for a solution or reaction switches from the casualness of System 1 to the analytic mode of System 2. Cognitive ease is fostered by familiarity. If the name of a new company is difficult to discuss, it is generally not popular - at least initially. However, if a company places its name – even a difficult name – in front of the public enough it will become familiar and people will experience cognitive ease.

Cognitive ease has a long connection with mood and intuition. Lab experiments were conducted on cognitive east. In one of the test cases, subjects who were told to think happy thoughts did better on the tests. Conversely, unhappy subjects were incapable of intuitive tasks. Unhappiness causes individuals to lose contact with their intuition. Abstract elements like intuition, creativity and gullibility form a cluster. At the other end of the spectrum are sadness, suspicion and increased effort.

The question, "How many animals of each kind did Moses take on the ark?" fools the vast majority of people who read it. Since Moses is connected to the Bible, the rapid fire response of System 1 brings truth to the illusion. Experiments have proven that distortions of an individual's normalcy are detected with great speed. Communication is only possible when there is a shared knowledge of the world and similar vocabularies are used. People will have a similar image of a "large mouse" and a "small elephant." (It was Noah not Moses and the ark.)

System 1 jumps to conclusions. If the conclusions are correct, the speed of response saves time and effort. But when a situation is unfamiliar, jumping to conclusions can have negative consequences. This is the circumstance that is most likely to yield intuitive errors. However, if System 2 intervenes in time, these errors can be

circumvented. In the absence of substance or memories to tap, System 1 will do its best to generate a response.

Exaggerated emotional coherence is also known as the halo effect. If an individual likes another person, he probably likes everything about him – his voice, his looks, his style. The halo effect is generated in System 1 and is the same as common bias which is largely responsible for forming our opinions of events and people. The halo effective increases the importance of first impressions. The solution to the halo effect is the decorrelate error. System 1's talent is making the best story of the material it has. It has no capacity to allow for information it doesn't have. The result of a resolution-seeking System 1 joined with a lazy System 2 is the endorsement of System 1 impressions.

The System 1 solution with a "What you see is what you get," element is teemed with biases including overconfidence, framing effects and base-rate neglect. In total, resolutions arrived at through this scenario are made without complete information.

System 2 both receives and generates questions and searches its memory to find answers. System 1 is constantly making and generating basic assessments which play a role in intuitive judgment. System 1 also supports the substitution of one judgment for another. System 1 has evolved from the fundamental need to survive – the ability to discriminate between friend and foe or a risky situation from a safe one.

Intensity matching is another function of System 1 and refers to the process of comparing with great intensity two divergent things – Julie reads well at four years old. How tall would a man have to be to match Julie's ability to read? System one can carry out many assessments at once. Assessments are on-going and need no catalyst to spark them. System 1 computes more than necessary and is referred to as the mental shotgun.

A remarkable aspect of mental life is that the individual is rarely stumped. He may be stopped momentarily when asked to compute 89 x 326 but he can figure it out. The normal state of mind is filled with intuitive feelings and emotions and judgments and assessments have been made based on them.

Analysis

In this section, Kahneman provides further information about the functioning of two-system thinking. He explains the weaknesses of each system and how they interact. He also explains the various elements that impact thinking such as cognitive strain, cognitive ease, and the halo effects among others.

Dr. Kahneman is presenting information that he feels is vital in acquiring a deeper understanding of a difficult and rather unconventional approach to human behavior. He feels he owes as much detailed information as he can about his premise in order to be convincing. He feels it is important that the readers understand his conclusions and how he arrived at them.

After reading about the two systems of thinking and grasping the concept, the reader may be more aware of the thought processes that are going on. He may start to recognize what role System 1 is playing and the domineering role of System 2. This self-awareness is part of Kahneman's goal in writing this book.

Vocabulary

aphorism, symmetry, reciprocity, triad, ludicrous, incongruity, myriad, propensities, repertoire, homogenous, spurious, collusion, asymmetry, heuristics, fortissimo, pianissimo, discrepant, superfluous, primacy, acquiescent

Chapters 10 - 14

Summary

Understanding an analytical and complex matter requires the discerning talents of System 2. However, System 2 taps the facts and impressions that System 1 has amassed. System 1 is highly adept at automatic and effortless thinking and causally connects events and experiences. System 1 must have comparative data in order to make assessments.

System 1 does not doubt its assessments. It produces stories that are as coherent as possible given the data it has. System 2 can be doubtful, but doubt opens up a can of worms that requires focus and energy. When necessary, System 1 constructs a story with just scraps of input. The result can be an assessment that makes sense. This “causal” intuition can lead to serious mistakes. People are pattern seekers and believe in a coherent world. Like System 1, people see patterns where none exist and generally do not believe in randomness. Basketball players who seem to have a “hot” scoring hand really do not – their performance is random. The “hot hand” is a cognitive illusion. The misunderstanding of randomness has consequences. Following one’s intuition that something is systematic instead of random will cause errors of assessment.

The “anchoring effect” occurs when an individual assigns a value to an unknown quantity before estimating that quantity. Not surprisingly, the quantity estimate is generally close to the value first assigned. They are anchored to their value assignment. The asking price will influence buyers. More value will be assigned to the house when it is listed at a high price. The same house listed at a lower price will not seem as valuable to the buyers. Anchoring is produced by an adjustment process of System 2 and a priming effect on System 1. Anchoring is sometimes due to priming and sometimes to the absence of adjustment.

Anchoring explains why rationing is an effective marketing tactic. A supermarket sold seven cans of soup when a sign read, “Limit 7.” When the supermarket removed the sign, they sold less. This is a case of anchoring blended with rationing that results in a successful marketing ploy. It is advantageous to make a move first like in the negotiation of the sale of a house. Calling on System 2 is a way to defeat anchoring to approach the negotiation with learned practices and finesse. Anchoring can impact both sides of a negotiation. If there is a financial cap on the amount a petitioner can sue a company for – say $1 million, it limits the complainant to just a million even though damages could be more, but it is also an anchor that compels a complainant to sue for $1 million when he may have sued for far less.

Random anchors reveal a lot about the relationship between System 1 and System 2 thinking. Anchor effects are the judgment and choice of System 1 and completed by System 2. System 1 retrieves data from memory to make its assessment. System 2 is vulnerable to System 1 biases. A message will be received in System 1 and treated as

the truth. The direction that the random anchor will lead an individual in is unknown. System 2 may need to combat it.

The study of risk and insurance reveals that availability impacts the purchase of insurance after disasters. After a series of earthquakes in California, the purchase of earthquake insurance rose as did protective measures that people adopted. After a time, the concern wanes and the trend reverses. River flood lines are established with little thought that the river could rise higher. What people hear in the media impacts how they view risk which leans toward the dramatic and hyperbolic. The 2013 Ebola scare that was driven by the media and politicians is a perfect example.

According to research conducted by Paul Slovic, “risk” is something that man has manufactured to prepare for danger and uncertainty. “There is no such thing as “real risk” or “objective risk.” (145) Risk is arbitrary and is defined by the perspective of the individual. Legal scholar Cass Sunstein believes that biased reaction to risk represent erratic and misplaced public policy priorities. Sunstein and collaborator jurist Timur Kuran, named the process that channels biases into policy as the “availability cascade.” In the social contest, “all heuristics are equal but availability is more equal than the others.” The availability cascade is a self-sustaining chain of events which often originates from media reports of a minor incident that snowballs into a major public panic and results in a large-scale government action.

Both Sunstein’s discomfort with the impact of irrational fear on public policy and Slovic’s view that it should not be ignored by policymakers have merit. The government should protect people from real dangers and from fear. Love Canal caused the government unnecessary expenditures but it brought the subject of environmental concerns to the public’s attention.

Judging probability by representativeness are more accurate than guessing. One problem with this mode of assessment is a tendency to predict unlikely events. Base-rate evidence will generally be ignored when information about the matter to be assessed is available. When base rate information is available along with a description both are considered in assessments with more weight given to the description.

When an incorrect intuitive judgment is made, the blame is shared by both System 1 and System 2. System 2 either ignored base rate information or was too lazy to consider it. System 1 based its assessment on sketchy information and was primed with specific hints. When it is suspected that basic information is flawed or misleading, judgments should be made close to the base rate which requires effort from Section 2. To rein in intuition, judgments should be made on the logic of probability based on a plausible base rate and question the available evidence.

Analysis

Dr. Kahneman continues on distinguishing between System 1 and System 2 thinking. In this section, he provides examples that can help the average person in his everyday life.

Since Kahneman is a psychologist by trade, he is naturally and professionally concerned with the welfare of people. He is providing specific information that will enable people to achieve increased self-understanding. He wants people to become equipped with knowledge that will help them live an improved life.

Understanding processes like the “anchoring effect” can help the reader in his daily life. He will gain a better understanding of marketing ploys and how and why they work and to what thinking system they appeal.

The reader will also be better equipped to enter into a negotiation since he will have a deeper appreciation of the process and, if he reads closely, will understand his strengths and weaknesses. He will also learn if he’s a risk-taker or if he’s risk averse.

Vocabulary

ambiguity, manifestation, predilection, salient, bulwark, cascade, entrepreneur, collaborator, propensity, globability, explicitly, stereotype, statistician, subjective, diagnosticity

Chapters 15 - 18

Summary

Kahneman and Tversky created an experiment to produce conclusive evidence of the role of heuristics in judgment and their disconnect from logic. Part of their experiment included the introduction of a conjunction fallacy which is committed when subjects judge the conjunction of two events to be more probable than one event. As in other studies, the substitution of plausibility for probability has negative effects on assessments when based on scenarios. Adding detail to scenarios makes them more persuasive but less likely to be truthful. The presence of bias in human judgment is always a factor.

Causes can override statistics. In the absence of the input of a narrative, the base rate is relied upon. However, if there is a narrative, the base-rate is often given no value and generally ignored. There are two types of base rates. Statistical base rates are facts about the population in which an incident occurred. This base rate has nothing to do with the specific incident – it pertains merely to the environment in which the event happened. Causal base rates change the views of the specifics of an incident. Statistical base rates are typically underweighted and often neglected when specific information is available about an incident. Causal base rates are treated as information about the specific case and are blended in with other pertinent information. Causal base rates are often used as stereotypes.

Although stereotyping has a negative connotation, it is neutral in this usage. System 1 assesses information as normal and typical exemplars. System 1 has impressions of normal forms of various categories of information. Social categories are called stereotypes. People think of categories in terms of stereotypes. Although rejecting stereotypes has benefited society by outlawing such practices as profiling that created more equality, stereotypes are useful in making judgments.

The concept of causal base rates was created by psychologist Icek Ajzen. System 1 can deal with scenarios which contain causally-linked elements but it is weak relative to statistical reasoning. In this approach, causal base rates are used and statistical facts are neglected. Subjects can draw two inferences from causal base rates: an individual's stereotypical trait and an element of the scenario that impacts the individual's role in the results.

The causal interpretation of statistical results has a larger impact on thinking than just non-causal information. However causal statistics do not change strong beliefs gained from personal experience. People learn more when they themselves are surprised versus just hearing surprising facts about others.

Rewards for improved performance work better than punishment for lack of progress. However, sometimes praising performance will result in a worse performance the next

time. This result is known as regression to the mean reflected in random fluctuations in performance. Believing that praise doesn't work and punishment does is attaching a causal interpretation of randomness. Kahneman's favorite equations are: "success = talent + luck and "great success = a little more talent + a lot of luck." (183) The "luck" represents the randomness of performance.

Regression effects are pervasive as are misguided causal scenarios that describe them. The "Sports Illustrated jinx" claims that if an athlete appears on the cover of the magazine, the athlete will perform poorly the next season. To earn the cover, the athlete probably over-performed in the current season and enjoyed some random luck. If he performs poorly the next season, it is just because he didn't have as much random luck.

It is difficult to grasp the concept of regression. Regression to the mean was discovered by Sir Francis Galton in the late nineteenth century. The effects of regression can be found everywhere. It occurs when the correlation between two forms of measure are imperfect. Galton had to struggle with measuring regression between variables that are measured on different scales. Base-rate standards are used to determine the results. It took Galton several years of research to conclude that correlation and regression are not two separate concepts – they are different perspectives of the same scenario.

Regression is difficult to embrace because the human mind is biased toward causal explanations and does not easily adapt to statistics. System 1 will look for a cause when presented with an event. But regression to the mean has an explanation but no cause. Difficulties with regression reside in both System 1 and System 2. It is difficult for System 2 to understand while System 1 searches for a causal interpretation that does not exist. The incorrect causal interpretations of regression are not limited to the general public – researchers have been known to make the same mistakes.

Many predictions are made by everyone from weathermen to economists. Some predictions like those made by engineers are based on calculations and look-up tables. Other predictions are based on intuition and System 1 in two main categories. Some intuitions are based on skill and expertise through experience. Other intuitions are the result of heuristics that substitute easy question for more difficult ones. Professional forecasts are often a blend of analysis and intuition.

The manufacture of extreme predictions and a willingness to predict rare events from scant evidence is a function of System 1 thinking. System 1 will produce overconfident and extreme predictions with a complete lack of regression. It will take System 2 to understand the regression which is different in every case.

Analysis

Kahneman is teaching his readers about heuristics and how they impact decision-making. He also discusses clinical studies that have been conducted on causal base rates and regression to the mean. Although he concedes that these clinical terms and

concepts are difficult to grasp, he wants people exposed to processes that can help people in their daily lives as well as those elements that can bring them harm.

He also discusses predictions and how they are made by everyone from the average person to leaders of corporations and governments. Kahneman is providing as much information as he can to present a rounded view of the many concepts he is presenting.

By studying the processes that Kahneman is presenting, the reader will have a deeper understanding of the predictions he himself makes and how the tricky business of forecasting works.

Vocabulary

homunculus, pernicious, laudable, profiling, astute, efficacy, ubiquitous, oblige, mediocrity, quantitative, analogies

Chapters 19 - 24

Summary

Nassim Taleb, philosopher and statistician, introduces the concept of “narrative fallacy” in his book, “The Black Swan.” The narrative fallacy describes how flawed stories of the past shape present views of the world and expectations for the future. Man creates stories in an attempt to explain and understand the world and the events that occur in it. Man fools himself by manufacturing historical accounts of the past and then believes in them. The stories are simple and coherent. The halo effect contributes to the veracity of the story. An effective story generates an illusion of authenticity.

Many economists and financial analysts now claim they “knew” that the 2008 economic down turn was going to happen. This is a flawed statement. No one “knew” that it would happen; some thought it might happen. The crisis was not knowable. Man understands the past far less than he purports to.

When a surprise or unpredicted event happens, System 1 adjusts the individual’s view of the world. Once a new belief replaces an old one it’s soon difficult to recall exactly what the old belief was. When asked to recall their old views, they generally substitute it with their new beliefs. Research has shown that in highly publicized events such as the O. J. Trial and Bill Clinton’s impeachment, people revised their past views to match the actual outcomes. “I knew O.J. would go free.” “I knew the House would impeach Clinton.”

The misguided predictions are generally the result of substitution and representativeness heuristic and are non-regressive and have an “illusion of validity.” Sales and purchases on Wall Street are built on an “illusion of skill.” After extensive research, Terry Odean, finance professor at UC Berkeley, concluded that professional investors and stock pickers fail the basic test of persistent achievement. The selection of stocks is like rolling the dice. Success is largely due to luck. Educated guesses have no better results on the market than blind uneducated guesses have. Wall Street rewards luck as if it were skill. “Skill illusion” is part of corporate cultures. When confronted with these findings, corporate executives are wont to ignore it for the simple reason that they have been very successful themselves… at least the stories from their System 1’s have convinced them that they were. Even though economic studies demonstrate that the market can’t be beat, many financial managers and executives believe they can because they believe that they have the skill.

When Kahneman was a young Lieutenant with the Israeli army he was tasked with setting up an interview and assessment system for the entire army. He adapted many of the techniques and procedures that Psychologist Paul Meehl had developed. The new system assessed recruits for the fitness and combat readiness among other tasks. The process took more discipline than energy. In the end, everyone was happy with the results.

Intuition cannot override regularites in the environment which are found through practice and successful feedback. Expertise is attained through a combination of skills and series of feedback. Intuitions can be trusted if the specific environment is stable and the individual has learned about its regularities sufficiently.

A planning fallacy describes plans and forecasts that are unrealistic because they are too close to best-case scenarios and could be improved by statistics from similar cases. Poor planning was evident in the cost of building the new Scottish Parliament that began in 1997. It was first estimated to cost up to 40 million pounds but by the time it was completed in 2004, the final cost was 432 million pounds.

The cause of budget overruns in the kitchen renovations is due to the optimism of planners and the practice of contractors of adding on costs as the project goes forward. Planners don't always include all costs in their zeal to get approval. To avoid overruns, planners are advised to study other similar projects that have been completed. An outside view of similar projects all over the world is called reference class forecasting and can be extremely helpful. Planners are rewarded for their successes and penalized for failure to fully anticipate a project's cost. When planning for risky projects, executives are often the victims of planning fallacy. The halo effect comes into play as planners and decision-makers more forward without considering the potential for mistakes and under-estimates. Attaining an outside view via similar completed projects can avoid many budget overruns.

Optimistic people play an important role in everyone's life. They are often inventors, entrepreneurs and political and military leaders. They are talented, lucky, seek challenge and take risks. They are self-confident and admired by others. However, the optimistic mindset causes individuals to not invest enough time and energy to really understand the risk and potential for failure involved. Optimists reject the possibility of failure. Their uplifting demeanor keeps them focused even in the face of obstacles. Their persistence ultimately can be costly. Overconfident leaders can cause damage to their organization.

Cognitive biases in System 1 play a role in entrepreneurial optimism. They focus on goals rather than consulting relevant base rates. They are egocentric in that they rely on their skills and ignore the talents of others. They rely on the causal role of luck and are prone to illusion. They narrow their scope to what they know and neglect what they don't know.

Optimists also believe that they are far superior to others. The impact of high optimism has its pros and cons. The main plus is the resiliency that optimists naturally possess. The optimist is not likely to blame himself for failure but takes credit for successes. However, optimism is a trait of successful people. It keeps a person on task and determined to be successful. Overconfidence is a product of System 1 and cannot be eradicated although it can be tempered. A partial remedy is to conduct premortem review with all involved individuals before a final decision is made.

Analysis

Kahneman introduces the vulnerability of System 1 to flawed stories of the past. He demonstrates how biases can distort the ability for the system to tell a story. He also demonstrates how these narrative fallacies can negatively impact an individual, family or nation. He describes how intuition and false illusions can cloud decision-making.

Since everyone makes decisions – dozens throughout each day – Kahneman is focusing on the reader who can benefit from learning from the practitioner's standpoint what factors impact the average man in the choices he makes.

The reader will benefit from learning the inside information that Kahneman is sharing.

Vocabulary

salient, manifestation, propensity, coherence, paradoxically, prescience, prudent, illusory, preposterous, equivocate, aberration, engendered, recidivism, consequential, envisage, rejoinder, kouros, visceral, resilient, paternalistic

Chapters 25 - 29

Summary

Tversky and Kahneman began a study on decision-making. Tversky had co-authored a textbook called, “Mathematical Psychology” and was an expert on the subject. They wanted to know how people chose between simple gambles and between gambles and sure things. Insight on this question would help in understanding more complex decision-making. Every decision is rife with uncertainty. They were focused on the intuitive choices. Five years into the research, they completed an essay titled, “Prospect Theory: An Analysis of Decision under Risk.” Their goal was to document and explain “systematic violations of the axioms of rationality in choices between gambles.” (280) They developed a theory referred to as prospect theory.

In 1738, Swiss scientist Daniel Bernoulli proposed a new approach to the evaluation of gambles. He observed that most people are averse to risk and will pick a sure thing over a gamble. Bernoulli created psychophysics to explain risk-aversion. Basically, people based their choices on the psychological value of outcomes. The theory is seriously flawed in what it ignores and assumes. He assumed that people are happy because of the utility of their wealth. And he did not allow for difference points of reference. While Bernoulli’s work could explain risk-aversion, it could not explain why people sought risk in the form of gambles.

Tversky and Kahneman decided to develop a theory that would define results as gains and losses not as states of wealth. They worked for years on learning the implications of thinking about outcomes as gains and losses. In the utility theory, the utility of a gain is measured by comparing the utilities of two states of wealth. They focused on the differences between gambles with high and low probabilities of winning. In test cases, they saw that people become risk-taking when they have no good options. They discovered that Bernoulli’s model was missing a reference point variable. The prospect theory is more complex which has three cognitive features that are part of System 1.

There was a blind spot in Bernoulli’s utility theory model that no one spoke about for more than two hundred years. There are flaws as well in the prospect theory and blindness to them. The prospect theory assumes that the reference point has a value of zero. Although it seems plausible, it can lead to some dubious results. The prospect theory does not allow the value of an outcome scenario to change when it is either highly unlikely or very valuable. The disappointment of losing a very valuable result is not factored in. Like the utility theory, the prospect theory does not consider regret. The pain that can be experienced has no equivalency.

Several decision-making models include the regret and disappointment. But these models did not gain steam. Prospect theory became popular with scholars because they appreciated the addition of the reference point and the loss aversion factor.

The endowment effect is defined as a heightened value that a person assigns to his own possession simply because it belongs to him. Inserting the prospect theory into the scenario brings focus to the point where the participant feels comfortable taking an action based on facts – the point would be between the reference point and risk aversion. The reference point and risk aversion would bring logic and perspective to any potential action. Experienced traders and poor people are generally not impacted by the endowment effect.

Fundamentals of the prospect theory are that reference points exist and losses are poised to be larger than gains. The power and accuracy of this model has been proven over and again in the markets. This theory does not include historical data like prior pricing; only the current facts are counted.

The concept of loss aversion was a gift to behavioral economics. It was surprising that loss aversion hadn't already been part of behavioral econ since people commonly evaluate most of the outcomes in their lives against losses and wins. The brains of humans and animals are equipped with survival mechanisms that are sensitive to bad news and threats. This is a function of System 1. Bad information is processed more meticulously than good information. Man is hardwired to distinguish between good and bad at birth. What is good and what is bad change for an individual over his lifetime.

A global evaluation of an expensive purchase, a new in-law or any uncertainty adds a weight to its characteristics. Some elements influence that evaluation more than others and it is a function of System 1. Gas consumption and comfort may receive heavy weighting for a new car. Weights are assigned to the possible outcome scenario of an uncertain situation. The more probable a possible outcome, the more weight it is given. Possibility and certainty are equally powerful relative to loss.

The certainty effect is more striking than the possibility effect if the outcome is a disaster. The certainty effect combined with possibility effects at either end of the probability scale lacks sensitivity to intermediate possibilities. There is danger in assigning too much weight to obscure events that will probably never happen. Fear and worry is reflected in the overweighting threats. One of the fundamental achievements of the prospect theory is the fourfold pattern of preferences.

Analysis

In this section, the author describes his work with colleague and close friend Amos Tversky in their study on decision-making. He explains the research project that took literally years to complete and how they reached the conclusions that they did.

Kahneman also explains the differences between the utility theory and the prospect theory for the layman. It is Kahneman's believes that it will be a benefit for his readers to have an understanding of the thinking and decision-making process from the perspective of a professional behaviorist.

By absorbing this wealth of information readers will be able to spot when they are the victims of a self-imposed endowment effect. And how to spot underweighting and overweighting the probabilities of an outcome. These are all keys to living smarter.

Vocabulary

geneticist, ostensibly, tacitly, extol, theoretical, implicitly, hedonic, heretical, amygdala, schematic, attenuated, status quo, opprobrium, axiomatic, aficionados

Chapters 30 - 34

Summary

Even though Kahneman knew that the chances of a bus being blown up in Israel was minuscule, when he visited the country he would avoid stopping his rental car next to an idling bus. He was ashamed of himself because he knew better, yet fear and worry was in the forefront of his mind. He was assigning a high decision rate to something that had only a scant possibility of occurring. He was driven by a fear in System 1 thinking that associated buses with bombs.

System 2 was well aware that the threat was minimal but its logic and statistical knowledge could not remove the fear captured in System 1. The foregoing scenario is why terrorism is effective. The fear of acts of terror drive people to assign too much decision weight to something that is improbable. At the other end of the spectrum, people who buy lottery tickets assign too much weight to the probability of winning a fortune. Both examples prove the fundamentals of the prospect theory which argue that "highly unlikely events are either ignored or overweighted." (335) When an alternative is unknown, a rare occurrence is more likely to be overestimated.

The concept that vividness and ease of imagining contributes to decision weighting has gained support from many clinicians. Veteran forensic psychologists and psychiatrists understand the importance of assessing risk relative to the discharge of the mentally ill into the public square. Defense attorneys will point out the statistical possibilities that the DNA that proves their client to be guilty was in error. The prosecutor, of course, hopes that the jury believes the preponderance of evidence that the DNA test was accurate.

There is general agreement among researchers that the cause of underweighting certain unusual events is due to the fact that so few people had experienced it. Most people haven't experienced an earthquake and most bankers didn't experience the economic collapse of 2008. At the other end of the spectrum, some rare events receive overhyped attention from the media. The demagoguery can serve a purpose. When there is no hype and thus no overweighting of a rare event, it may be neglected, ill-prepared for and lead to other more serious problems.

Given a set of choices there are limits to human rationalization. All simple choices based on gain and loss can be dissected in multiple ways with multiple inconsistent results. The outcome can be disappointing if an individual seeking gains is overly risk averse and conversely an overly risk-seeking mindset can result in losses.

"Narrow framing" is the consideration of a sequence of two simple decisions considered separately. Using this methodology, market traders are trained to approach each decision as if it were the only one. "Broad framing" is the opposite philosophy – viewing each decision as one of many. Combining the mechanisms of loss aversion and narrow

framing can be costly. One remedy for a trader is to not make constant checks on daily fluctuations. Experiencing the angst of numerous small losses takes the wind out of an eventual large gain.

Experts on risk, advice their clients to always take the highest possible deductible when purchasing insurance and to never take out extended warranties. This advice is based on the low expectations for loss. This advice is a remedy against the overhyped benefit of planning and the excessive caution resulting from loss aversion.

To the very wealthy economic gain is not pursued for the extra cash; rather, the money represents achievement and self-esteem, a fundamentally emotional reward. The sunk-cost fallacy is responsible for keeping people in bad jobs, failed marriages and executives in doomed projects. The acceleration of support for a failing project is a mistake from the point of view of the corporation but not necessarily from that of the executive who is tied to it. If his project is cancelled, his career is tarnished. An executive is sometimes replaced because of ties to a failed project that he refuses to let go of. A new executive may not be more competent but it will put an end to the project.

Regret is an emotion that is sparked by the availability of alternatives to reality. After a plane crash there are always stories about passengers who missed the flight or conversely passengers that hadn't planned on being on the flight. Regret and blame are common emotions when things go badly. Decision-makers are risk-takers; they understand that regret on their part or others are part of the mix when a big decision impacting many others is made.

A preference reversal is a choice made within the parameters of process that it is being decided upon. Preference reversals have a common importance to both psychologists and economists. An element of risk-aversion is part of this decision-making. Rationality generally benefits from broad and comprehensive framing. Joint evaluation is an example of broad assessment. Comparative judgment taps upon the abilities of System 2 avoiding the emotional response of System 1. Relative to the justice system, the expectation then would be that jurors are presented with a comprehensive context to enable them to make appropriate and just decisions. However, that's not generally the case. Jurors are largely prohibited from learning the wisdom of and basis for similar cases from the past. Penalties handed out in court seem to be equitable as the more severe punishments are reserved for more serious breaches of the law.

It is difficult for humans to be rational when logically different statements evoke different emotional responses. If a gas station charges consumers more when using their credit card it is acceptable to them if it is framed within the station's policy of giving customers discounts for using cash. If it were framed simply that the gas station charges customers more when using their credit cards without mention of cash discounts, the station would lose a lot of customers. In different scenarios, System 1 is often primed to immediately lean to one side. If a situation involves the poor, System 1 might be primed to favor the poor in an event without learning the details.

Analysis

Kahneman discusses fear and irrational reaction to events. The author demonstrates that he is not immune to the weaknesses of System 1 thinking. He describes his fear of being near a bus in Israel after a few had been blown up. He confesses that his fear was irrational but understood that the connection between “bombs” and “buses” was deeply imbedded in his System 1 thinking. By not being afraid to show his weakness, Kahneman is encouraging everyone to look at themselves and their fears and biases.

Everyone can relate to emotional reactions to issues and events. Kahneman discusses how emotions such as regret and the fear of blame can impact decision makers.

Many readers of “Thinking, Fast and Slow,” will probably be decision-makers and this information will be of great value to them – and to anyone who makes decisions which includes just about everyone.

Vocabulary

chagrined, hypothesis, vividness, forensic, portfolio, analogous, illusory, tacit, counterfactual

Chapters 35 - 38

Summary

Utility has two distinct definitions. Jeremy Bentham began his “Introduction to the Principles of Morals and Legislation” with these famous words: “Nature has placed mankind under the governance of two sovereign masters – pain and pleasure.” (391) Bentham later apologized for using the term “utility” to his experiences but admitted that he couldn’t think of a better word. Economists have used the word for “wantability” while Kahneman has used the term “decision utility.” He has long been fascinated with the possible difference between experienced utility and decision utility. He and a colleague developed a method of actually measuring the experience of pain. This information will assistant medical professionals in pain management.

It is tricky to distinguish between memories and experiences. For example, a man complained that the long symphony that he listened to was ruined because of a large scratch at the end of the disc due to the loud sound that it produced. He claimed that his entire listening experienced was ruined. But his experience wasn’t ruined. He enjoyed it up to the point of the scratch at the end. What was ruined was the memory of the experience. The confusion of experience and memory is an illustration of cognitive illusion. The memory that is retained is merely a representative part of an experience. Most experiences have peaks and valleys.

In one study, rats were exposed to a series of light signals that were followed soon after by electric shocks. The rats quickly learned to fear the light which was captured by the researchers. The actual pain, the electric shock did not engender fear. Other experiments produced the opposite effect. The electric shock to some areas of the brains of rats produced intense pleasure.

If the decision utility does not correlate with the experienced utility then the decision is flawed. Pain was measured in an experiment where subjects were asked to submerge one hand into ice cold water for a duration of 60 seconds. The ice cold water was painful. If the individual decided to leave his hand in 90 seconds instead of 60, his decision was flawed; the decision does not correlate with the experience. Such decisions lend little support to advocates for the rationality of choice.

Caring for people not only involves how they feel about things or events in their lives but their quality of life. Even when a person has passed away, people care that some new information blemished a perfectly happy life. For example, a man died happy and in love with his life. Others learn later that his wife had a lover. The man was as happy as could be but the news made others pity him. The psychologists Ed Diener studied whether duration neglect and the peak-end rule were dominant in evaluating the lives of people. Diener determined that it is the remembering self that chooses vacations with the hope of repeating good experiences that are in their memories.

Kahneman gathered a group of experts to develop a way to measure the well-being of the “experiencing self.” They conducted their research by experience sampling since no one could keep an accurate log of all their experiences. Since the process was cumbersome and expensive, the team developed a second methodology called Day Reconstruction Method (DRM). Participants were asked to record the previous day in detail. Positive as well as negative feelings were captured in these records. The observations that Kahneman and his team gathered had significance for both the individual and society at large. As a result of the studies success, measures of “experienced well-being” are now routine gathered in the U.S. and many other countries.

An analysis by Ed Diener and other clinicians revealed that people who get married reflect a huge error in “affective forecasting.” On the day of their wedding, a couple is aware of the high rate of divorce. Of course, they do not believe that they will be included in that group. The research confirmed what everyone already knew – five years after the wedding date, there is on the average a consistent decrease in how people rate their life satisfaction. In the DRM studies, there were no overall differences in the well-being experienced by women who lived with a lover and women who did not. There are trade-offs in every lifestyle. Temperament was one of the most important factors in experienced satisfaction.

When attention is focused on any aspect of life, it becomes an important evaluation element. This is referred to as the “focusing illusion.” Most people believe that Californians would have positive memories about the great weather and outdoor activities that they enjoy. However, great weather and outdoor fun does not readily come to the minds of long-time Californians when asked about life satisfaction. People who recently migrated to California will offer more positive memories. Daniel Gilbert and Timothy Wilson coined the word “miswanting” to describe the flawed choices that people make as a result of affective forecasting.

The remembering self makes choices and has stories to tell that have nothing to do with time. This is an example of duration neglect. Focus illusion diverts attention to select memories and avoids what has occurred at other times. While the mind handles data well, it does not display an affinity for time.

The last decade has seen the advance in knowledge about personal happiness. But just like beauty, it is obvious that happiness is also in the eye of the beholder.

Analysis

In this last section, Kahneman focuses on the happiness index of people. He blames the decrease of happiness after marriage on “affective forecasting.” Kahneman provides this information that is supported by data and extensive research because people have unrealistic expectations about what will make them happy.

Kahneman is concerned about the welfare and happiness of people and by providing this information he hopes to give people some tools to help them on their journeys through life. By learning to keep expectations on a realistic level, people may look at their relationships differently.

Readers will benefit from this reality check from the author. His advice seems to be to rely more on experienced utility than on memories because individuals seem to favor recalling good memories and ignoring other experiences.

Vocabulary

hedonic, analogous, integral, masochists, physiological, schematic, frenetic, prototypical, irrelevant

Important People

Daniel Kahneman

Daniel Kahneman is a psychologist, author and expert in behavior economics. He won the Nobel Prize in Economic Science in 2002. Kahneman wrote this book to capture the latest revelations and discoveries in the decision-making process. He also wanted to broaden the discussion that people have about decision-making, judgments and predictions that everyone is confronted with in their lives. He wanted to open people's minds up to things that impact their choices in life, like intuition and bias.

Early in Kahneman's career he spent a year in the University of Michigan's hypnosis studies laboratory. It was there that he discovered the work of psychologist Eckard Hess in pupil dilation research. Kahneman was fascinated with Hess' research which found that there is a physical reaction in expending energy. Hess's study demonstrated that the pupils of the eyes dilate during an expression of energy. As the task becomes more intense, this dilation grows. This research hooked Kahneman, and he and a graduate study devised laboratory tests to confirm Hess' study and advance the research.

Kahneman enjoyed a long-term friendship and relationship with a fellow psychologist, Amos Tryvesty, and conducted many research projects with him. Together they studied availability heuristics which they defined as "the ease with which instances come to mind."

In another research project, Kahneman and Tversky asked participants in two separate control groups to judge the descriptions of eight college freshmen. The questions asked to each control group differed slightly. The objective of the experiment was to compare the judgments that the subjects made when evaluating evidence in one case and when predicting the ultimate outcome in another. The judgments were exactly the same. The participants treated the questions as though they were the same. The study showed that when test subjects are asked for a prediction they actually provide an evaluation of the evidence which produces biased predictions. They ignore the regression to the mean.

Although Kahneman had admired Gary Klein's book, "Sources of Power" in which he describes the intuitive skills developed by professionals, the two psychologists were at odds over Kahneman's prospect theory. Klein rejected focus on the "bias" in the heuristics and biases model. However, they were able to have a gentlemanly - though adversarial - collaboration. Kahneman and Klein both agreed on how intuitive skill is acquired and that the confidence people have in their intuitions does not confirm validity.

Amos Tversky

Daniel Kahneman was inspired by a colleague, Amos Tversky, who he invited to be a guest speaker at a seminar Kahneman was heading in the Department of Psychology at

the University of Jerusalem. The year was 1969; Kahneman was thirty-five and Tversky was thirty-two. At the time, Tversky was considered a rock star in the field of decision research. Many people who knew Tversky well considered him to be the most intelligent person in the world. He had a real charisma that did not go unnoticed on Kahneman. There was never a dull moment when Tversky was around.

During Tversky's visit to Israel, he and Kahneman had a lively discussion about many aspects of their shared pursuits and interests. Tversky turned Kahneman onto the subject of intuitive statistics. The two young psychologists decided to work together and explore the topic together. They learned a lot about themselves and what they considered their own shortcomings and deficiencies in their fields of study. During this early project together, the two men realized that they made a great team.

As a result, Kahneman and Tversky worked together on research and experimentation for many years. They had shared interests and common goals and spent years on a single project involving intuitive thinking. Sadly, Tversky passed away after years of working with Kahneman who dedicated "Thinking, Fast and Slow" to the memory of Amos Tversky.

The premise of a 1970 study that Kahneman and Amos Tversky was that people who had no training in statistics were good "intuitive statisticians." It was Tversky's contention that sample sizes for research studies had been too small. Kahneman and Tversky wrote a joint article, "Belief in the Law of Small Numbers," in which they urged for researchers to be leery of statistical intuitions.

Eckhard Hess

Psychologist Eckhard Hess wrote an article for the Scientific American describing the physical impact of visual stimuli on the human eye. He reported on a pupil-dilating substance known as belladonna that was used for cosmetic purposes. Hess discovered that the pupils are indicators of mental effort. With increasingly difficult math calculations, the pupils become increasingly dilated.

Mihaly Csikszentmihalyi

Psychologist Mihaly Csikszentmihalyi has done more research on "effortless attending" or as he called it, "flow" than any other clinician. Those who have experienced a state of "flow" say they lost their sense of time and of themselves and their problems.

Daniel Gilbert

Psychologist Daniel Gilbert, author of the well-known books, "Stumbling to Happiness" and "How Mental Systems Believe," developed the theory that in order to understand something an individual must approach it with belief. Gilbert claimed that the person can

always “unbelieve” it later. Gilbert traced the believing/unbelieving concept to Baruch Spinoza, a seventeenth century philosopher.

Roy Baumeister

A series of experiments conducted by psychologist Roy Baumeister indicated that all types of voluntary effort whether cognitive, emotional or physical, all draw their energy from the same energy. He and his students who assisted in the research found that exercising one’s will power is physically draining because a person who feels forced to behave in a certain way feels exhausted. It has been dubbed “ego depletion.”

Walter Mischel

Walter Mischel and his students conducted one of the world’s most famous psychological experiments. Four-year-old children were given the choice of one Oreo that they could have immediately or two Oreos if they waited fifteen minutes. The children were observed through a room and about only one-half of the children waiting the fifteen minutes. Fifteen years after the experiment, it was found that those who waited made excellent executives and were generally more intelligent.

Keith Stanovich and Richard West

Keith Stanovich and Richard West were two psychologists who worked as a team and who first referred to the two ways the brain has of thinking as System 1 and System 2 thinking. The language took hold and these labels are widely used in psychology to this day.

David Hume

Scottish philosopher David Hume wrote, “An Enquiry Concerning Human Understanding” which was published in 1748. Hume defined the principles of association as consisting of three main elements: resemblance, contiguity in time and place and causality. Although alterations have been made to Hume’s original premise, his three principles provided a good basis for further study.

Timothy Wilson

Psychologist Timothy Wilson wrote the book, “Strangers to Ourselves.” He was referring to System 1 thinking which provides the impressions that guide one’s beliefs and choices. System 1 is a stranger in that the conscious mind does not delineate between the two systems of thinking and reacting and therefore the power of System 1 can be compared to a powerful “stranger.”

Alex Todorv

Alex Todorv, a colleague of Daniel Kahneman at Princeton, has demonstrated that man is endowed with an innate ability to evaluate another person merely by a glance at his face. This judgment is rapid and includes profound conclusions about the person's honesty, his dominance and threat potential. A strong jaw may indicate dominance and a smile or frown will signal the person's intentions. These judgments are made by System 1 thinking and are part of the natural instinct for survival.

Norbert Schwarz

German researchers led by psychologist Norbert Schwarz conducted a study on how people's impressions of the frequency of a category are impacted by a requirement for them to list a specific number of events. The work of this research team led to a major advance in the understanding of availability heuristics.

Paul Slovic

Psychologist Paul Slovic developed an affect heuristic in which people base their beliefs on their likes and dislikes. One's emotions guide the individual through his political choices, his personal health choices and his feelings on global events and issues such as war and peace and global warming. This is in the realm of System 1 thinking and is deeply imbedded there. New information received by System 2 can alter emotions and beliefs; however, it may be quite a battle.

Paul Meehl

Paul Meehl is considered one of the outstanding scholars and philosophers of the twentieth century. He enjoyed faculty appointments at the University of Minnesota in an unbelievable number of fields including psychology, law, psychiatry, neurology and philosophy. He was a renowned research and clinical psychologist and wrote the celebrated book, "Clinical vs. Statistical Prediction: A Theoretical Analysis and a Review of the Evidence." His book was received with praise and controversy and fostered a flurry of research that is still on-going to this day.

Objects/Places

The Muller-Lyer Illusion

The Muller-Lyer Illusion is a famous representation about how the eye can trick the mind. The illusion consists of two straight lines drawn horizontally on a paper. The top line has short lines, or fins, attached to either end pointing inward; the bottom line has the same length short lines attached at the ends pointing in an outward direction. Most people pick the lower line as being longer than the top line. But it's an optical illusion; the horizontal lines are exactly the same length. Even after measuring the lines and know them to be the same, System 1 thinking will still believe the lower line to be longer. System 2 thinking overrides System 1 thinking and can use this exercise in the future to understand the impact of illusory patterning.

Invisible Gorilla

The book, "The Invisible Gorilla" by Christopher Chabris and Daniel Simons, describes a short film that was presented to various groups of subjects. It featured two basketball teams one wearing black jerseys and the other white jerseys. The students were instructed to count the number of passes that the white team made among its players. Midway through the film, a person wearing a gorilla suit crossed the court, thumped its chest and walked on. Although the gorilla was on the screen nine seconds, only half of the thousands of participants viewing the film actually "saw" the gorilla. Their System 1 thinking was focused on the assigned task – to count the number of passes between players on the white team.

Hedgehog and the Fox

Philip Tetlock, a psychologist at the University of Pennsylvania, used Isaiah Berlin's essay on Tolstoy, "The Hedgehog and the Fox," to describe so-called experts who cannot admit to err and are enraptured by their own brilliance. Hedgehogs all know one big thing and "bristle" when someone disagrees. Hedgehogs are notorious for their inability to admit to being wrong and make excuses when things don't go as they predict.

Foxes think in complexities and don't ascribe to the hedgehog's belief in just one big thing. Foxes believe that reality is a combination of many different elements and energy, the results of which cannot be predicted.

The Love Canal and the Alar Scare

Two examples of overhyped fear are the Love Canal incident in 1979 and the Alar scare of 1989. A toxic waste accident occurred on Love Canal that received intense everyday

coverage ultimately resulting in the expensive relocation of Love Canal residents by the government. When the air cleared, no evidence that the situation presented a real danger to anyone was ever uncovered. The other example is the Alar scare of 1989. Apples were sprayed with Alar to regulate growth and improve their appearance. The scare started with speculation that the chemical caused cancer in tumors in rats and mice. The subject dominated the news culminating in the banning of the chemical by the FDA. It was later proved that the chemical had only a small risk if any. In today's world it is terrorists who benefit from the demagoguery that takes over the public airways for even minor or non-existent terror incidents. The number of people who succumb to terrorism is only a fraction of people killed in traffic accidents.

The Indifference Curve

The "indifference curve" on a graph compares two entities that are equally desirable and share the same utility. Not giving weight to either one is the basis of the name of the comparison, the indifference curve. By not including a reference point, the scientists convince those who observe it to believe that a reference or starting point doesn't matter. That is an unrealistic element of the indifference curve and a case of theory-based blindness. When a union negotiates for a salary increase, both sides are aware of the reference point which is the current salary. Relative to risk aversion, both sides know that they may make concessions that hurt. Risk aversion doesn't guarantee loss; it tells the participants on both sides that it is safer to stay closer to the reference point.

Pupil Dilations

There is unvarnished proof that there is a physical reaction to System 2 thinking. Psychologist Eckhard Hess found that an individual's pupils dilate when doing the multiplication of two-digit numbers. The harder the problem, the more the pupils dilate. Author Daniel Kahneman and an associate Jackson Beatty conducted lab experiments with a subject who was given tasks of varying degrees of difficulty and discovered that the size of the subject's pupil changed accordingly. It was confirmed that a disproportionate amount of energy is expended in System 2 thinking. As time ran out in the experiment there was an increase in the energy expended since the deadline added another factor for System 2 thinking to contend with.

Intuitive Predictions

Kahneman and Tversky devised a process by which a prediction is produced that is only moderately influenced by intuition. Intuitive predictions need correcting because they are biased and not regressive. Corrected predictions eliminate biases. Errors are still made in predictions that are unbiased but there are fewer and they do not favor one outcome over the other. Naturally, it is System 2 that makes corrections to intuitive predictions since it will take effort to assess what needs to be done. This task must be taken seriously and given System 2's complete focus and energy. A rational person

should have no problem developing predictions that are unbiased and moderate. This procedure will force the individual to assess how much he knows about the issue rather than having an emotional or intuitive response that originates in System 1 thinking.

Executive Control

“Executive control” is a term that is used by psychologists to describe the process of adopting a task and then ultimately terminating it. The main regions of the brain serve this function. One of these regions deal with conflict and resolution. The prefrontal area of the brain is associated with intelligence and is involved in this process.

Gilbert Experiment

Psychologist Daniel Gilbert developed a theory of believing and not-believing. It was his belief that in order to understand something, an individual must first be willing to believe it. In other words, the skeptical mind will not listen to a presentation of facts or beliefs. His System 2 thinking will be busy formulating reasons why what he is being told is bogus. Gilbert felt that belief was essential in understanding. Without this understanding it would be impossible to make a judgment as to whether the information was believable. After this initial stage and there is a level of understanding of the subject at hand, the person can then chose to “unbelieve” it.

RAT – The Remote Association Test

In 1960, psychologist Sarnoff Mednick uncovered what he believed to be the essence of creativity. His theory was that creativity is merely associative memory that works extremely well. Mednick developed a test, the Remote Association Test, (RAT) which is still used in studies of creativity. Part of the test was to present series of three ostensibly unrelated words to a subject. Their creativity was measured by the links they were able to make between the words. Later, German psychologists used the RAT in their work with cognitive ease.

Themes

Energy and Thinking

The effort and energy expended for “thinking” was a theme that emerged in “Thinking, Fast and Slow.” It has been determined that more energy is exerted in System 2 thinking. Since System 1 thinking requires no effort it follows that it doesn’t require much, if any, energy. The customized allocation of attention has been created over the ages through the human survival response. System 1 takes over in emergencies because of its ability for quick response and reaction. When an individual is trained in a task, the demand for energy decreases. Highly intelligent or talented people exert less energy to solve problems. More effort is required in order to simultaneously maintain several ideas or tasks that need to be used in conjunction with each other. System 1 thinking doesn’t have the capabilities to keep all these balls in the air. System 1 is expert at discerning simple similarities and differences and can integrate data about one matter. System 2 thinking can create a set of tasks that overrides System 1 responses. This is referred to as executive control by psychologists.

The requirement to maintain a coherent train of thought requires discipline which requires energy. People who expend effort for long periods of time without the need for willpower are said to have “flow.” Artists and athletes experience a high or state of joy when they’re pursuing their chosen activity and expend very little effort. Those who are cognitively engaged with a task are more likely to cave to temptation and make selfish choices. In other words, System 2 can be overloaded and is vulnerable in making impulsive choices. Having to exert will or self-control is exhaustive. One is less likely to maintain self-control when met with the challenge after challenge. This is known as ego depletion. Indications of this depletion include going off one’s diet; binge spending; and doing poorly in cognitive tasks. In addition to the mental exhaustion, a real physical response occurs when one is engaged in a task that requires self-control – one’s blood glucose level actually drops.

Clinical Predictions v. Algorithms

One topic that came to the forefront in “Thinking, Fast and Slow,” was the methodology in forecasting and making predictions. Psychologist Paul Meehl reviewed the result of twenty analyses of whether “clinical predictions based on subjective impressions of trained professionals were more accurate than statistical predictions.” (227) Subsequently, the algorithm Meehl created did indeed turn out to be more accurate than the professionals’ forecasts. The publication of this research caused angst among clinical psychologists and controversy that generated research studies that are on-going to this day.

Meehl found that the predictions of experts were inferior to algorithms because experts are inconsistent and often try to be “too” clever. They think outside the box and combine

complex features in making their assessments. Complexity generally skews results. The experts relied too heavily on System 1 which is rife with biases. Meehl found that to maximize the accuracy of a prediction, final conclusions should be left to the algorithms. It was later concluded that simple equally weighted formulas based on existing data were good predictors. There has always been a moral element to the debate about the benefits of clinical versus statistical predictions. Many felt the statistical predictions were robotic and impersonal while the clinical ones were personal because of the human touch. There has been a deep resistance in some corners to accept statistical predictions but time is softening their image.

Kahneman collaborated with Gary Klein, the leader of an association of scholars and practitioners who do not like psychology. It was an adversarial collaboration. Klein rejected focus on biases and dismissed the model as too concerned with failure. He was skeptical of replacing human judgment with algorithms.

Outcome Bias, Hindsight and the Halo Effect

The impact that decision-making has on others is one of the strong themes that emerge in this work. Hindsight is a difficult prospect for decision makers who provide services for others. Physicians are blamed for errors during surgery – and sued for them. Financial advisors, Little League coaches and police officers are also viewed differently through the advantage of hindsight. There is an outcome bias. When outcomes are bad, people generally look for someone to blame. Since no one “knows” what is going to happen, decisions that seem wise in the present can quickly devolve to poor ones after the fact. The CIA had information in July 2001 that al-Qaeda might be planning an attack on the US. When this fact was discovered, some politicians wanted to blame the CIA or members of the Bush administration for not preventing the 9/11 attack. However, this finger of blame is ridiculous on its face and is a prime example of hindsight.

Politicians and government officials and others become reluctant to take risks because they know full well that if things go wrong, it will be their fault. Just as bias fosters risk aversion, undeserved praise is often awarded to risk takers. Risk takers are often seen as heroes even if they fail. This type of circumstance can be attributed to the halo effect.

Leaders and management policies have an impact on the success of a company. However, their impact is much less than people are led to believe. In his book, “The Halo Effect,” Philip Rosenzweig concludes that stories about leaders exaggerate their impact and that their real impact is actually negligible. The claim in the book, “Built to Last,” by Collins and Porras that good leadership can lead to good results is overstated. When comparing the successes and failures of two companies, it must be remembered that luck plays a role in both outcomes.

Loss Aversion

The topic of loss aversion versus the probability of gains is a theme that emerges throughout, “Thinking, Fast and Slow.” There is more intensity to avoid loss than there is

to achieve gains. An analogy can be made to the game of golf as a measurement of good and bad. Par is the reference point; anything under par is good and anything over par is bad. Striving to avoid loss and achieve gain is found everywhere in life. Negotiators on both sides are aware of how the reference point is important in their successes or failures. When one side is set to suffer a painful loss, the other side wants his opponent to have an equally painful event. Loss aversion generally forces outcomes that are only minor changes from the status quo.

Kahneman and colleagues found that the stigma attached to unfairness restrained profit seeking. In a corporation, the existing wage or price is the reference point and an entitlement. It is considered unfair (by the public at large) for a firm to burden employees with salary cuts or customers with price increases unless there are no other alternatives.

The firm's "entitlement" is to maintain a profit. If a company faces loss, it can transfer that loss to others, i.e., customers or employees. The rules of fairness do not require the company to share savings from lower production costs. Kahneman and his colleagues wrote a research paper on economic fairness on loss aversion and entitlements which is still referenced to this day. Loss aversion and entitlements have application fields other than in economics including in the justice system.

Priming and Truth Illusions

Priming and the truth illusions that it can create is a focus of, "Thinking, Slow and Fast." Advertising companies knew long ago that once the public was "primed" for a product, catch words were sufficient to draw customers in instead of the entire pitch. "Truth illusions" can be used to convince people that an individual is telling the truth. This can be accomplished by reducing the statement to a cognitive string in simple words that is memorable and has engaging elements. But people are not stupid. If the message has no sense all the subterfuge in the world won't convince people that it's true. Those who use truth illusions to prove a dubious thesis relies on the fact that most people are guided by System 1 impressions. Impressing System 1 may prove the truthiness of a subject. People can overcome illusions that dwell in System 1 if System 2 isn't too lazy to act.

Priming if used subtly is an effective tool. Learning that priming with the use of images was as effective as words and concepts was a major step forward in understanding the mechanisms of memory. Although many would reject the assertion, voting does not always reflect values or the endorsement of policies. When a polling place was held at a school in Arizona, support for an educational proposition gained more support than did a nearby polling place that was not in a school. Images of children and classrooms were evoked from the System 1 memories of voters. The voters were primed to vote in favor of the school proposition.

The "Florida effect" is a version of priming. It has two stages the first of which primes System 1 with thoughts and images of the elderly. Stage two was the impact of these

words and images on behavior. Students who were fed this influx of images and words associated with the elderly, were observed actually walking more slowly after they left the classroom.

Styles

Structure

“Thinking, Fast and Slow” by Daniel Kahneman is separated into five main parts. Part I, “Two Systems” explains the premise of the book – that human beings have two systems of thinking that are always active and that have different functions. Part II, “Heuristics and Biases” covers the tactics that each of the thinking systems rely upon in an effort to influence the individual. In Part III, “Overconfidence,” Kahneman delves into the roles that intuition and illusion play in the thinking process and how by impact both System 1 and System 2.

Part IV, “Choices,” describes the processes that people undergo when making decisions and opting for choices. In this section, there is focus on risk aversion and risk takers and how and why some people elect to make safe choices and others are willing to take risks. Part V is a summary about living with two selves which is a reference to the two ways that everyone has of thinking.

Kahneman is a psychologist and expert in behavioral economics. He is, of course, drawn from his own knowledge and experiences in writing this book. However, he heavily depends on the research and studies of other psychologists, economists and behavioral scientists to present a full picture. He makes reference to these sources in his “Acknowledgements” and “Notes” sections. There are many illustrations throughout the book that depict actual testing that was used in control groups as a part of scientific research.

Perspective

“Thinking, Fast and Slow” by Daniel Kahneman is written from the perspective of an expert and practitioner. Along with being a psychologist, he is an expert in the field of behavior economics, winning the Nobel Prize in Economic Science in 2002. Not only does he site numerous behavioral and psychological testing and research in “Thinking, Fast and Slow,” he has often led and been in the thick of many of these projects.

In this work he has not trusted his own knowledge and experience alone; he has called on numerous colleagues and peers to support the assertions that he makes about the two systems of thinking that human beings use to make it through each day and to make it through their lives. He cites many research studies, experiments and the results of the testing of many control groups that help tell the story of human thinking.

Kahneman explains that he was compelled to write this book due to new understanding of judgment and decision-making that has been uncovered over the last several details. He has partnered on many projects with psychologist Amos Tversky who was a scholar in decision research. Kahneman attributes a good measure of his motivation for writing

this book to Tversky who he met in 1969 when Kahneman asked Tversky to be a guest speaker at the University of Jerusalem.

There is no doubt that “Thinking, Fast and Slow” is written from the perspective of an expert in the field who tapped his connections with other experts and scholars in his field and related fields. To the untrained reader at least, Kahneman et al leave no stone unturned on the subject of the two systems of human thinking and how and why we think what we think.

Tone

Not surprisingly, the tone of “Thinking, Fast and Slow” is scholarly and erudite. Author Kahneman goes to great lengths in presenting theories and concepts and is meticulous in the rich detail he provides. Although the topics covered will be above the pay-grade of most readers, Kahneman is able to convey very technical and specialized information in a way that will be largely understandable by most readers – even if some of it has to be read more than once!

A kindness and empathetic tone comes through during Kahneman’s discussions of behavioral research and experimentation. He is a psychologist by trade and along with his obviously compassionate manner, there is the non-judgmental appeal of the scientist who is just reporting the facts. He makes no subjective judgments about the human participants in behavioral testing. He is objective in his conclusions that he presents in an unbiased way.

In the sections that cover behavioral economics, again there is no judgment. He presents the facts and discusses risk-takers and their polar opposite – those who are risk-averse – with the same regard and respect. The term, “gentleman and scholar” comes to mind when reading “Thinking, Fast and Slow.” Kahneman displays an overarching passion for humankind and the goal for better understanding of human thinking with the hope that it will benefit all.

Quotes

This is your System 1 talking. Slow down and let your System 2 take control.
-- Author (Chapter 1 paragraph Page 29)

Importance: The author provides an example that illustrates the function of the two modes of thinking. System 1 is fast and reactionary. System two is plodding and thoughtful.

Highly intelligent individuals need less effort to solve the same problems… A general 'law of least effort' applies to cognitive as well as physical exertion.
-- Author (Chapter 2 paragraph Page 35)

Importance: System 2 thinking requires more energy than System 1 thinking. The author points out that highly intelligent or talented individuals exert less energy to solve problems than the average person because the System 2 function required to solve the problem comes to them much easier due to their high level of intelligence or natural talent.

Unfortunately, she tends to say the first thing that comes into her mind. She probably also has trouble delaying gratification. Weak System 2.
-- Author (Chapter 3 paragraph Page 50)

Importance: The author describes an individual who allows her System 1 reactions and responses to emerge unfiltered. A person with an underperforming, lazy System 2 function permits the impulsive System 1 to have instant gratification.

The consequences of repeated exposures benefit the organism in its relations to the immediate animate and inanimate environment. They allow the organism to distinguish objects and habitats that are safe from those that are not, and they are the most primitive basis of social attachments. Therefore, they form the basis for social organization and cohesion – the basic sources of psychological and social stability.
-- Robert Zajonc (Chapter 5 paragraph Page 69)

Importance: Psychologist Robert Zajonc points out that when a being is familiar with a location or item or another being due to repeated exposure he comes to believe that the item or person is safe simply from "mere exposure" and will experience cognitive ease.

The defendant's lawyers put in a frivolous reference in which they mentioned a ridiculously low amount of damages, and they got the judge anchored on it.
-- Author (Chapter 11 paragraph Page 132 Chapter 11 Author "The defendant's lawyers put in a frivolous reference in which they mentioned a ridiculously low amount of damages, and they got the judge anchored on it." This sample dialog is a prosecutor who is dismayed that the defendant's lawyer got to the judge first and primed him with a low amount of damages that his client should pay. Further, the judge was not only primed, he is anchored into the number. That number has become real to the judge and

he probably won't vary from that amount very much if at all.)

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I don't spend a lot of time taking polls around the world to tell me what I think is the right way to act. I've just got to know how I feel.
-- George W. Bush (Chapter 12 paragraph Page 140)

Importance: This statement by the leader of the free world exemplifies one of the cases in which an individual trusts an assessment based on the fluency of retrieval by System 1. The individual feels powerful and goes with the flow without calling upon the intervention of the more cautious and analytical System 2. (Think Iraq War.)

The lawn is well trimmed, the receptionist looks competent, and the furniture is attractive, but this doesn't mean it is a well-managed company. I hope the board does not go by representatives.
-- Author (Chapter 14 paragraph Page 160)

Importance: This quote captures the dangers of making intuitive judgments based on appearance or representatives. Statistics and other evidence should be used to make more accurate assessments, avoiding intuitive judgments.

She has no evidence for saying that the firm is badly managed. All she knows is that its stock has gone down. This is an outcome bias, part hindsight and part halo effect.
-- Author (Chapter 19 paragraph Page 214)

Importance: The author points out that the woman referred to has no evidence that the company was mismanaged. In fact, when it was doing well she probably didn't think that. In the last sentence, the author lists what compelled the woman to make the comment.

People who are poor think like traders, but the dynamics are quite different. Unlike traders, the poor are not indifferent to the differences between gaining and giving up. Their problem is that all their choices are between losses. Money that is spent on one good is the loss of another good that could have been purchased instead. For the poor, costs are losses.
-- Author (Chapter 27 paragraph Page 309)

Importance: The author explains why poor people, like some traders, are risk averse. They don't have to worry about losing anything because they don't have much to lose.

A single cockroach will completely wreck the appeal of a bowl of cherries, but a cherry will do nothing at all for a bowl of cockroaches.

-- Author (Chapter 28 paragraph Page 312)

Importance: The psychologist Paul Rozin, a purported expert on disgust, makes the observation during the book's discussion about negativity dominance and how the amygdala or "fear center" of the brain reacts to threatening images.

My experience illustrates how terrorism works and why it is so effective: it induces an availability cascade. An extremely vivid image of death and damage, constantly reinforced by media attention and frequent conversations, becomes high accessible, especially if it is associated with a specific situation such as the sight of a bus.
-- Author (Chapter 30 paragraph Page 334)

Importance: Kahneman always rented a car when he was Israel. There had been a series of bus bombings over the years however the threat was miniscule compared to even traffic accidents. But Kahneman's System 1 associated bombs with buses and he therefore avoided riding or parking near a bus. It was an example of assigning too much weight to an event that had little probability of occurring. It is also an explanation of why terrorism is effective.

There are exceptions, of course, in which focusing on an event does not raise its probability: cases in which an erroneous theory makes an event appear impossible even when you think about it, or cases in which an inability to imagine how an outcome might come about leaves you convinced that it will not happen. The bias toward overestimation and overweighting of salient events is not an absolute rule, but it is large and robust.
-- Author (Chapter 30 paragraph Page 343)

Importance: The author captures the strong bias that exists for the overestimation and the overweighting of outcomes in the prediction of events. This bias is often generated from overhyped media coverage that causes a distortion of event or circumstances.

Topics for Discussion

Topic 1

Explain what the author refers to when he asserts that human beings have two ways of thinking. How does he refer to them and what are the two roles that they play?

Topic 2

What is priming and what do psychologists use it for? Name other types of priming that impacts our thinking, choices and decision-making.

Topic 3

What are cognitive ease and cognitive strain? How is energy expended just by thinking? What thinking system uses the most energy and why?

Topic 4

What is the halo effect and how does it impact our thinking and the choices we make? Give three examples of the halo effect.

Topic 5

What is the anchoring effect? How can it be used for a marketing tactic? Explain why both sides of a negotiation can benefit or be hurt by the anchoring effect.

Topic 6

What thinking system is to blame when an incorrect intuitive decision is made? Explain why they are both at fault. What is the importance of base rates in decision making and risk taking?

Topic 7

What is a heuristic? What was the nature of the study of heuristics that Kahneman and Taversky undertook? What impact do heuristics have on a judgment or decision?

Topic 8

What are incorrect predictions usually caused by? What is a narrative fallacy and what benefit do they have to man?

Topic 9

What was Swiss scientist Daniel Bernoulli's theory on risk aversion? What flaw did Kahneman and Tversky find in Bernoulli's theory?

Topic 10

Explain the differences been "narrow framing" and "broad framing." What is the "sunk-cost" fallacy and what outcomes might it cause in personal and professional lives?