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LINDA: LESS IS MORE

The best-known and most controversial of our experiments involved a fictitious lady called Linda. Amos and I made up the Linda problem to provide conclusive evidence of the role of heuristics in judgment and of their incompatibility with logic. This is how we described Linda:

Linda is thirty-one years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in antinuclear demonstrations.

The audiences who heard this description in the 1980s always laughed because they immediately knew that Linda had attended the University of California at Berkeley, which was famous at the time for its radical, politically engaged students. In one of our experiments we presented participants with a list of eight possible scenarios for Linda. As in the Tom W problem, some ranked the scenarios by representativeness, others by probability. The Linda problem is similar, but with a twist.

Linda is a teacher in elementary school.

Linda works in a bookstore and takes yoga classes.

Linda is active in the feminist movement.

Linda is a psychiatric social worker.

Linda is a member of the League of Women Voters.

Linda is a bank teller.

Linda is an insurance salesperson.

Linda is a bank teller and is active in the feminist movement.

[...]

Now focus on the critical items in the list: Does Linda look more like a bank teller, or more like a bank teller who is active in the feminist movement? Everyone agrees that Linda fits the idea of a “feminist bank teller” better than she fits the stereotype of bank tellers. The stereotypical bank teller is not a feminist activist, and adding that detail to the description makes for a more coherent story.

The twist comes in the judgments of likelihood, because there is a logical relation between the two scenarios. Think in terms of Venn diagrams. The set of feminist bank tellers is wholly included in the set of bank tellers, as every feminist bank teller is a bank teller. Therefore the probability that Linda is a feminist bank teller *must* be lower than the probability of her being a bank teller. When you specify a possible event in greater detail you can only lower its probability. The problem therefore sets up a conflict between the intuition of representativeness and the logic of probability. [...]

Then we took the experiment further, using a within-subject design. We made up the questionnaire as you saw it, with “bank teller” in the sixth position in the first and “feminist bank teller” as the last item. We were convinced that subjects would notice the relation between the two outcomes, and that their rankings would be consistent with logic. [...]

In the language of this book, we had observed a failure of System 2: our participants had a fair opportunity to detect the relevance of the logical rule, since both outcomes were included in the same ranking. They did not take advantage of that opportunity. When we extended the experiment, we found that 89% of the undergraduates in our sample violated the logic of probability. We were convinced that statistically sophisticated respondents would do better, so we administered the same questionnaire to doctoral students in the decision-science program of the Stanford Graduate School of Business, all of whom had taken several advanced courses in probability, statistics, and we were surprised again: 85% of these respondents also rœked “feminist bank teller” as more likely than “bank teller.” [...]

The word fallacy is used, in general, when people fail to apply a logical rule that is obviously relevant. Amos and I introduced the idea of a *conjunction fallacy*, which people commit when they judge a conjunction of two events (here, bank teller and feminist) to be more probable than one of the events (bank teller) in a direct comparison. [...]

The judgments of probability that our respondents offered, in both the Tom W and Linda problems, corresponded precisely to judgments of representativeness (similarity to stereotypes). Representativeness belongs to a cluster of closely related basic assessments that are likely to be generated together. The most representative outcomes combine with the personality description to produce the most coherent stories. The most coherent stories are not necessarily the most probable, but they are *plausible*, and the notions of coherence, plausibility, and probability are easily confused by the unwary. [...]

To appreciate the role of plausibility, consider the following questions:

Which alternative is more probable?

Mark has hair.

Mark has blond hair.

Which alternative is more probable?

Jane is a teacher.

Jane is a teacher and walks to work.

The two questions have the same logical structure as the Linda problem, but they cause no fallacy, because the more detailed outcome is only more detailed—it is not more plausible, or more coherent, or a better story. The evaluation of plausibility and coherence does not suggest an answer to the probability question. In the absence of a competing intuition, logic prevails.

LESS IS MORE, SOMETIMES EVEN IN JOINT EVALUATION

[...]

We found similar violations of logic in many other judgments. Participants in one of these studies were asked to rank four possible outcomes of the next Wimbledon tournament from most to least probable. Bjorn Borg was the dominant tennis player of the day when the study was conducted. These were the outcomes:

1. Borg will win the match.
2. Borg will lose the first set.
3. Borg will lose the first set but win the match.
4. Borg will win the first set but lose the match.

The critical items are B and C. B is the more inclusive event and its probability *must* be higher than that of an event it includes. Contrary to logic, but not to representativeness or plausibility, 72% assigned B a lower probability than C—another instance of less is more in a direct comparison. Here again, the scenario that was judged more probable was unquestionably more plausible, a more coherent fit with all that was known about the best tennis player in the world. [...]

CAUSES TRUMP STATISTICS

[...]

Subjects’ unwillingness to deduce the particular from the general was matched only by their willingness to infer the general from the particular.

This is a profoundly important conclusion. People who are taught surprising statistical facts about human behavior may be impressed to the point of telling their friends about what they have heard, but this does not mean that their understanding of the world has really changed The test of learning psychology is whether your understanding of situations you encounter has changed, not whether you have learned a new fact. There is a deep gap between our thinking about statistics and our thinking about individual cases. Statistical results with a causal interpretation have a stronger effect on our thinking than noncausal information. But even compelling causal statistics will not change long-held beliefs or beliefs rooted in personal experience. On the other hand, surprising individual cases have a powerful impact and are a more effective tool for teaching psychology because the incongruity must be resolved and embedded in a causal story. That is why this book contains questions that are addressed personally to the reader. You are more likely to learn something by finding surprises in your own behavior than by hearing surprising facts about people in general. [...]

REGRESSION TO THE MEAN

I had one of the most satisfying eureka experiences of my career while teaching flight instructors in the Israeli Air Force about the psychology of effective training. I was telling them about an important principle of skill training: rewards for improved performance work better than punishment mistakes. This proposition is supported by much evidence from research on pigeons, rats, humans, and other animals.

When I finished my enthusiastic speech, one of the most seasoned instructors in the group raised his hand and made a short speech of his own. rie began by conceding that rewarding improved performance might be good for the birds, but he denied that it was optimal for flight cadets. This is what he said: “On many occasions I have praised flight cadets for clean execution of some aerobatic maneuver. The next time they try the same maneuver they usually do worse. On the other hand, I have often screamed into a cadet’s earphone for bad execution, and in general he does better on his next try. So please don’t tell us that reward works and punishment does not, because the opposite is the case.”

This was a joyous moment of insight, when I saw in a new light a principle of statistics that I had been teaching for years. The instructor was right—but he was also completely wrong! His observation was astute and correct: occasions on which he praised a performance were likely to be followed by a disappointing performance, and punishments were typically followed by an improvement. But the inference he had drawn about the efficacy of reward and punishment was completely off the mark. What he had observed is known as *regression to the mean*, which in that case was due to random fluctuations in the quality of performance. Naturally, he praised only a cadet whose performance was far better than average. But the cadet vas probably just lucky on that particular attempt and therefore likely to deteriorate regardless of whether or not he was praised. Similarly, the instructor would shout into a cadet’s earphones only when the cadet's performance was unusually bad and therefore likely to improve regardless of what the instructor did. The instructor had attached a causal interpretation to the inevitable fluctuations of a random process. [...]

Furthermore, the instructors were not alone in that predicament. I had stumbled onto a significant fact of the human condition: the feedback to which life exposes us is perverse. Because we tend to be nice to other people when they please us and nasty when they do not, we are statistically punished for being nice and rewarded for being nasty.

TALENT AND LUCK

[...]

Each athlete has two jumps in the event, and the results are combined for the final score. I was startled to hear the sportscaster’s comments while athletes were preparing for their second jump: “Norway had a great first jump; he will be tense, hoping to protect his lead and will probably do worse” or “Sweden had a bad first jump and now he knows he has nothing to lose and will be relaxed, which should help him do better.” The commentator had obviously detected regression to the mean and had invented a causal story for which there was no evidence, the story itself could even be true. Perhaps if we measured the athletes’ pulse before each jump we might find that they are indeed more relaxed after a bad first jump. And perhaps not. The point to remember is that the change from the first to the second jump does not need a causal explanation. It is a mathematically inevitable consequence of the fact that luck played a role in the outcome of the first jump. Not a very satisfactory story—we would all prefer a causal account—but that is all there is.

UNDERSTANDING REGRESSION

[...]

It took Francis Galton several years to figure out that correlation and regression are not two concepts—they are different perspectives on the same concept. The general rule is straightforward but has surprising consequences: whenever the correlation between two scores is imperfect, there will be regression to the mean. To illustrate Galton's insight, take a proposition that most people find quite interesting:

Highly intelligent women tend to marry men who are less intelligent than they are.

You can get a good conversation started at a party by asking for an explanation, and your friends will readily oblige. Even people who have had some exposure to statistics will spontaneously interpret the statement in causal terms. Some may think of highly intelligent women wanting to avoid the competition of equally intelligent men, or being forced to compromise in their choice of spouse because intelligent men do not want to compete with intelligent women. More far-fetched explanations will come up at a good party. Now consider this statement:

The correlation between the intelligence scores of spouses is less than perfect.

This statement is obviously true and not interesting at all. Who would expect the correlation to be perfect? There is nothing to explain. But the statement you found interesting and the statement you found trivial are algebraically equivalent. If the correlation between the intelligence of spouses is less than perfect (and if men and women on average do not differ in intelligence), then it is a mathematical inevitability that highly intelligent women will be married to husbands who are on average less intelligent than they are (and vice versa, of course). The observed regression to the mean cannot be more interesting or more explainable than the imperfect correlation. [...]

When our attention is called to an event, associative memory will look for its cause—more precisely, activation will automatically spread to any cause that is already stored in memory. Causal explanations will be evoked when regression is detected, but they will be wrong because the truth is that regression to the mean has an explanation but does not have a cause. The event that attracts our attention in the golfing tournament is the frequent deterioration of the performance of the golfers who were successful on day 1. The best explanation of it is that those golfers were unusually lucky that day, but this explanation lacks the causal force that our minds prefer. Indeed, we pay people quite well to provide interesting explanations of regression effects. A business commentator who correctly announces that “the business did better this year because it had done poorly last year” is likely to have a short tenure on the air. [...]

Depressed children treated with an energy drink improve significantly over a three-month period.

I made up this newspaper headline, but the fact it reports is true: if you treated a group of depressed children for some time with an energy drink, they would show a clinically significant improvement. It is also the case that depressed children who spend some time standing on their head or hug a cat for twenty minutes a day will also show improvement. Most readers of such headlines will automatically infer that the energy drink or the cat hugging caused an improvement, but this conclusion is completely unjustified. Depressed children are an extreme group, they are more depressed than most other children—and extreme groups regress to the mean over time. The correlation between depression scores on successive occasions of testing is less than perfect, so there will be regression to the mean: depressed children will get somewhat better over time even if they hug no cats and drink no Red Bull. In order to conclude that an energy drink—or any other treatment—is effective, you must compare a group of patients who receive his treatment to a “control group” that receives no treatment (or, better, receives a placebo). The control group is expected to improve by regression alone, and the goal of the experiment is to determine whether the treated patients improve more than regression can explain. [...]

One of my favorite examples of the errors of intuitive prediction is adapted from Max Bazerman’s excellent text *Judgment in Managerial Decision Making*.

You are the sales forecaster for a department store chain. All stores are similar in size and merchandise selection, but their sales differ because of location, competition, and random factors. You are given the results for 2011 and asked to forecast sales for 2012. You have been instructed to accept the overall forecast of economists that sales will increase overall by 10%. How would you complete the following table?

Store 2011 2012

1 $11,000,000 \_\_\_\_\_\_\_\_\_\_\_

2 $23,000,000 \_\_\_\_\_\_\_\_\_\_\_

3 $18,000,000 \_\_\_\_\_\_\_\_\_\_\_

4 $29,000,000 \_\_\_\_\_\_\_\_\_\_\_

Total $81,000,000 $89,100,000

Having read this chapter, you know that the obvious solution of adding 10% to the sales of each store is wrong. You want your forecasts to be regressive, which requires adding more than 10% to the low-performing branches ing less (or even subtracting) to others. [...]

TAMING INTUITIVE PREDICTIONS

[...]

A CORRECTION FOR INTUITIVE PREDICTIONS

Back to Julie, our precocious reader. The correct way to predict her GPA was introduced in the preceding chapter. As I did there for golf on successive days and for weight and piano playing, I write a schematic formula for the factors that determine reading age and college grades:

reading age = shared factors + factors specific to reading age = 100%

GPA = shared factors + factors specific to GPA = 100%

The shared factors involve genetically determined aptitude, the degree to which the family supports academic interests, and anything else that would cause the same people to be precocious readers as children and academically successful as young adults. Of course there are many factors that would affect one of these outcomes and not the other. Julie could have been pushed to read early by overly ambitious parents, she may have had an unhappy love affair that depressed her college grades, she could have had a skiing accident during adolescence that left her slightly impaired, and so on.

Recall that the correlation between two measures—in the present case reading age and GPA—is equal to the proportion of shared factors among their determinants. What is your best guess about that proportion? My most optimistic guess is about 30%. Assuming this estimate, we have all we need to produce an unbiased prediction. Here are the directions for how to get there in four simple steps:

1. Start with an estimate of average GPA.
2. Determine the GPA that matches your impression of the evidence.
3. Estimate the correlation between your evidence and GPA.
4. If the correlation is .30, move 30% of the distance from the average to tie matching GPA.

[...]

This approach to prediction is general. You can apply it whenever you need to predict a quantitative variable, such as GPA, profit from an investment, or the growth of a company. The approach builds on your intuition, but it moderates it, regresses it toward the mean. When you have good reasons to trust the accuracy of your intuitive prediction—a strong correlation between the evidence and the prediction—the adjustment will be small.

Intuitive predictions need to be corrected because they are not regressive and therefore are biased. [...]

They are on average overly optimistic for those who did best on the first day and overly pessimistic for those who had a bad start. The predictions are as extreme as the evidence. Similarly, if you use childhood achievements to predict grades in college without regressing your predictions toward the mean, you will more often than not be disappointed by the academic outcomes of early readers and happily surprised by the grades of those who learned to read relatively late. The corrected intuitive predictions eliminate these biases, so that predictions (both high and low) are about equally likely to over-estimate and to underestimate the true value. You still make errors when your predictions are unbiased, but the errors are smaller and do not favor either high or low outcomes. [...]

A DEFENSE OF EXTREME PREDICTIONS?

[...]

Correcting your intuitive predictions is a task for System 2. Significant effort is required to find the relevant reference category, estimate the baseline prediction, and evaluate the quality of the evidence. [...]

The objections to the principle of moderating intuitive predictions must be taken seriously, because absence of bias is not always what matters most. A preference for unbiased predictions is justified if all errors of prediction are treated alike, regardless of their direction. But there are situations in which one type of error is much worse than another. When a venture capitalist looks for “the next big thing,” the risk of missing the next Google or Facebook is far more important than the risk of making a modest investment in a start-up that ultimately fails. [...]

For a rational person, predictions that are unbiased and moderate should not present a problem. After all, the rational venture capitalist knows that even the most promising start-ups have only a moderate chance of success. She views her job as picking the most promising bets from the bets that are available and does not feel the need to delude herself about the prospects of a start-up in which she plans to invest. Similarly, rational individuals predicting the revenue of a firm will not be bound to a single number—they should consider the range of uncertainty around the most likely outcome. A rational person will invest a large sum in an enterprise that is most likely to fail if the rewards of success are large enough, without deluding herself about the chances of success. However, we are not all rational, and some of us may need the security of distorted estimates to avoid paralysis. If you choose to delude yourself by accepting extreme predictions, however, you will do well to remain aware of your self-indulgence.

Perhaps the most valuable contribution of the corrective procedures I propose is that they will require you to think about how much you know. [...]

OVERCONFIDENCE

THE ILLUSION OF UNDERSTANDING

The trader-philosopher-statistician Nassim Taleb could also be considered a psychologist. In The *Black Swan*, Taleb introduced the notion of a *narrative fallacy* to describe how flawed stories of the past shape our views of the world and our expectations for the future. Narrative fallacies arise inevitably from our continuous attempt to make sense of the world. The explanatory stories that people find compelling are simple; are concrete rather than abstract; assign a larger role to talent, stupidity, and intentions than to luck; and focus on a few striking events that happened rather than on the countless events that failed to happen. Any recent salient event is a candidate to become the kernel of a causal narrative. Taleb suggests that we humans constantly fool ourselves by constructing flimsy accounts of the past and believing they are true. [...]

Of course there was a great deal of skill in the Google story, but luck played a more important role in the actual event than it does in the telling of it. And the more luck was involved, the less there is to be learned.

At work here is that powerful WYSIATI rule. You cannot help dealing with the limited information you have as if it were all there is to know. You build the best possible story from the information available to you, and if it is a good story, you believe it. Paradoxically, it is easier to construct a coherent story when you know little, when there are fewer pieces to fit into the puzzle. Our comforting conviction that the world makes sense rests on a secure foundation: our almost unlimited ability to ignore our ignorance.

Notre liberté de pensée a-t-elle des limites ?

La perception peut-elle s’éduquer ?

Les apparences sont-elles trompeuses ?

Peut-on se fier à l’intuition ?

Toute prise de conscience est-elle libératrice ?

L’expérience peut-elle démontrer quelque chose ?

Les principes de la raison sont-ils issus de l'expérience ?

Peut-on être sûr d'avoir raison ?

Ne fait-on que fuir le réel ?

L’imagination enrichit-elle la connaissance ?

Tout s'en va-t-il avec le temps ?

A quoi peut-on reconnaître la vérité ?

Le doute: Une force ou une faiblesse ?

I have heard of too many people who “knew well before it happened that the 2008 financial crisis was inevitable.” This sentence contains a highly objectionable word, which should be removed from our vocabulary in discussions of major events. The word is, of course, *knew*. Some people thought well in advance that there would be a crisis, but they did not know it. They now say they knew it because the crisis did in fact happen. This is a misuse of an important concept. In everyday language, we apply the word *know* only when what was known is true and can be shown to be true. We can know something only if it is both true and knowable. But the people who thought there would be a crisis (and there are fewer of them than now remember thinking it) could not conclusively show it at the time. Many intelligent and well-informed people were keenly interested in the future of the economy and did not believe a catastrophe was imminent; I infer from this fact that the crisis was not knowable. What is perverse about the use of *know* in this context is not that some individuals get credit for prescience that they do not deserve. It is that the language implies that the world is more knowable than it is. It helps perpetuate a pernicious illusion. [...]

THE SOCIAL COSTS OF HINDSIGHT

[...]

A general limitation of the human mind is its imperfect ability to reconstruct past states of knowledge, or beliefs that have changed. Once you adopt new view of the world (or of any part of it), you immediately lose much of your ability to recall what you used to believe before your mind changed. [...]

Your inability to reconstruct past beliefs will inevitably cause you to underestimate the extent to which you were surprised by past events. [...]

The tendency to revise the history of one's beliefs in light of what actually happened produces a robust cognitive illusion.

Hindsight bias has pernicious effects on the evaluations of decision makers. It leads observers to assess the quality of a decision not by whether the process was sound but by whether its outcome was good or bad. Consider a low-risk surgical intervention in which an unpredictable accident occurred that caused the patient’s death. The jury will be prone to believe, after the fact, that the operation was actually risky and that the doctor who ordered it should have known better. This outcome bias makes it almost impossible to evaluate a decision properly—in terms of the beliefs that were reasonable when the decision was made.

Hindsight is especially unkind to decision makers who act as agents for others—physicians, financial advisers, third-base coaches, CEOs, social workers, diplomats, politicians. We are prone to blame decision makers for good decisions that worked out badly and to give them too little credit for successful moves that appear obvious only after the fact. There is a clear *outcome bias*. When the outcomes are bad, the clients often blame their agents for not seeing the handwriting on the wall—forgetting that it was written in invisible ink that became legible only afterward. [...]

Because adherence to standard operating procedures is difficult to second-guess, decision makers who expect to have their decisions scrutinized with hindsight are driven to bureaucratic solutions—and to an extreme reluctance to take risks. As malpractice litigation became more common, physicians changed their procedures in multiple ways: ordered more tests, referred more cases to specialists, applied conventional treatments even when they were unlikely to help. These actions protected the physicians more than they benefited the patients, creating the potential for conflicts of interest. Increased accountability is a mixed blessing.

Although hindsight and the outcome bias generally foster risk aversion, they also bring undeserved rewards to irresponsible risk seekers, such as a general or an entrepreneur who took a crazy gamble and won. Leaders who have been lucky are never punished for having taken too much risk. Instead, they are believed to have had the flair and foresight to anticipate success, and the sensible people who doubted them are seen in hindsight as mediocre, timid, and weak. A few lucky gambles can crown a reckless leader with a halo of prescience and boldness.

Peut-on croire sans savoir ?

Interprète-t-on à défaut de connaître ?

Connaissons-nous mieux le présent que le passé ?

Que pouvons-nous savoir des autres ?

RECIPES FOR SUCCESS

[...]

Do leaders and management practices influence the outcomes of firms in the market? Of course they do, and the effects have been confirmed by systematic research that objectively assessed the characteristics of CEOs and their decisions, and related them to subsequent outcomes of the firm. In one study, the CEOs were characterized by the strategy of the companies they had led before their current appointment, as well as by management rules and procedures adopted after their appointment. CEOs do influence performance, but the effects are much smaller than a reading of the business press suggests.

Researchers measure the strength of relationships by a correlation coefficient, which varies between 0 and 1. The coefficient was defined earlier (in relation to regression to the mean) by the extent to which two measures are determined by shared factors. A very generous estimate of the correlation between the success of the firm and the quality of its CEO might be as high as .30, indicating 30% overlap. To appreciate the significance of this number. consider the following question:

Suppose you consider many pairs of firms. The two firms in each pair are generally similar, but the CEO of one of them is better than the other. How often will you find that the firm with the stronger CEO is the more successful of the two?

In a well-ordered and predictable world, the correlation would be perfect (1), and the stronger CEO would be found to lead the more successful firm in 100% of the pairs. If the relative success of similar firms was determined entirely by factors that the CEO does not control (call them luck, if you wish), you would find the more successful firm led by the weaker CEO 50% of the time. A correlation of .30 implies that you would find the stronger CEO leading the stronger firm in about 60% of the pairs—an improvement of a mere 10 percentage points over random guessing, hardly grist for the hero worship of CEOs we so often witness.

If you expected this value to be higher—and most of us do—then you would take that as an indication that you are prone to overestimate the predictability of the world you live in. Make no mistake: improving the odds of success from 1:1 to 3:2 is a very significant advantage, both at the racetrack and in business. From the perspective of most business writers, however, a CEO who has so little control over performance would not be particularly impressive even if her firm did well. It is difficult to imagine people lining up at airport bookstores to buy a book that enthusiastically describes the practices of business leaders who, on average, do somewhat better than chance. Consumers have a hunger for a clear message about the determinants of success and failure in business, and they need stories that offer a sense of understanding, however illusory. [...]

Because luck plays a large role, the quality of leadership and management practices cannot be inferred reliably from observations of success. And even if you had perfect foreknowledge that a CEO has brilliant vision and extraordinary competence, you still would be unable to predict how the company will perform with much better accuracy than the flip of a coin. On average, the gap in corporate profitability and stock returns between the outstanding firms and the less successful firms studied in *Built to Last* shrank to almost nothing in the period following the study. The average profitability of the companies identified in the famous *In Search of Excellence* dropped sharply as well within a short time. A study of *Fortune’s* “Most Admired Companies” finds that over a twenty-year period, the firms with le worst ratings went on to earn much higher stock returns than the most admired firms.

You are probably tempted to think of causal explanations for these observations: perhaps the successful firms became complacent, the less successful firms tried harder. But this is the wrong way to think about what happened. The average gap must shrink, because the original gap was due in good part to luck, which contributed both to the success of the top firms and to the lagging performance of the rest. We have already encountered this statistical fact of life: regression to the mean. [...]

Peut-on croire sans savoir ?

Interprète-t-on à défaut de connaître ?

La chance existe t-elle ?

THE ILLUSION OF VALIDITY

[...]

Subjective confidence in a judgment is not a reasoned evaluation of the probability that this judgment is correct. Confidence is a feeling, which reflects the coherence of the information and the cognitive ease of processing it. It is wise to take admissions of uncertainty seriously, but declarations of high confidence mainly tell you that an individual has constructed a coherent story in his mind, not necessarily that the story is true.

Peut-on croire sans savoir ?

Interprète-t-on à défaut de connaître ?

La vérité dépend-elle de nous ?

Peut-on être sûr d'avoir raison ?

THE ILLUSION OF STOCK-PICKING SKILL

[...]

Some years ago I had an unusual opportunity to examine the illusion of financial skill up close. I had been invited to speak to a group of investment advisers in a firm that provided financial advice and other services to very wealthy clients. I asked for some data to prepare my presentation and was granted a small treasure: a spreadsheet summarizing the investment outcomes of some twenty-five anonymous wealth advisers, for each of eight consecutive years. Each advisers score for each year was his (most of them vere men) main determinant of his year-end bonus. It was a simple matter to rank the advisers by their performance in each year and to determine whether there were persistent differences in skill among them and whether the same advisers consistently achieved better returns for their clients year after year.

To answer the question, I computed correlation coefficients between the rankings in each pair of years: year 1 with year 2, year I with year 3, and so on up through year 7 with year 8. That yielded 28 correlation coefficients, one for each pair of years. I knew the theory and was prepared to find weak evidence of persistence of skill. Still, I was surprised to find that the average of the 28 correlations was .01. In other words, zero. The consistent correlations that would indicate differences in skill were not to be found. The results resembled what you would expect from a dice-rolling contest, not a game of skill.

No one in the firm seemed to be aware of the nature of the game that its stock pickers were playing. The advisers themselves felt they were competent professionals doing a serious job, and their superiors agreed. On the evening before the seminar, Richard Thaler and I had dinner with some of the top executives of the firm, the people who decide on the size of bonuses. We asked them to guess the year-to-year correlation in the rankings of individual advisers. They thought they knew what was coming and smiled as they said “not very high” or “performance certainly fluctuates.” It quickly became clear, however, that no one expected the average correlation to be zero.

Our message to the executives was that, at least when it came to building portfolios, the firm was rewarding luck as if it were skill. This should have been shocking news to them, but it was not. There was no sign that they disbelieved us. How could they? After all, we had analyzed their own esults, and they were sophisticated enough to see the implications, which we politely refrained from spelling out. We all went on calmly with our dinner, and I have no doubt that both our findings and their implications were quickly swept under the rug and that life in the firm went on just as before. The illusion of skill is not only an individual aberration; it is deeply ingrained in the culture of the industry. Facts that challenge such basic assumptions—and thereby threaten people's livelihood and self-esteem—are simply not absorbed. The mind does not digest them. This is particularly true of statistical studies of performance, which provide base-rate information that people generally ignore when it clashes with their personal impressions from experience. [...]

WHAT SUPPORTS THE ILLUSIONS OF SKILL AND VALIDITY?

Cognitive illusions can be more stubborn than visual illusions. What you learned about the Müller-Lyer illusion did not change the way you see the lines, but it changed your behavior. [...]

Why do investors, both amateur and professional, stubbornly believe that they can do better than the market, contrary to an economic theory that most of them accept, and contrary to what they could learn from a dispassionate evaluation of their personal experience? Many of the themes of previous chapters come up again in the explanation of the prevalence and persistence of an illusion of skill in the financial world.

The most potent psychological cause of the illusion is certainly that the people who pick stocks are exercising high-level skills. They consult economic data and forecasts, they examine income statements and balance sheets, they evaluate the quality of top management, and they assess the competition. All this is serious work that requires extensive training, and the people who do it have the immediate (and valid) experience of using these skills. Unfortunately, skill in evaluating the business prospects of a firm is not sufficient for successful stock trading, where the key question is whether the information about the firm is already incorporated in the price of its stock. [...]

Finally, the illusions of validity and skill are supported by a powerful professional culture. We know that people can maintain an unshakable faith on any proposition, however absurd, when they are sustained by a community of like-minded believers. Given the professional culture of the financial community, it is not surprising that large numbers of individuals in that world believe themselves to be among the chosen few who can do what they believe others cannot.

La vérité dépend-elle de nous ?

La chance existe t-elle ?

Faut-il préférer le bonheur à la vérité ?

Quel besoin avons-nous de chercher la vérité ?

THE ILLUSIONS OF PUNDITS

The idea that the future is unpredictable is undermined every day by the ease with which the past is explained. As Nassim Taleb pointed out in *The Black Swan*, our tendency to construct and believe coherent narratives of the past makes it difficult for us to accept the limits of our forecasting ability. Everything makes sense in hindsight, a fact that financial pundits exploit every evening as they offer convincing accounts of the day's events. And we cannot suppress the powerful intuition that what makes sense in hindsight today was predictable yesterday. The illusion that we understand the past fosters overconfidence in our ability to predict the future.

The often-used image of the “march of history” implies order and direction. Marches, unlike strolls or walks, are not random. We think that we would be able to explain the past by focusing on either large social movements and cultural and technological developments or the intentions and abilities of a few great men. The idea that large historical events are deterred by luck is profoundly shocking, although it is demonstrably true. It think of the history of the twentieth century, including its large social movements, without bringing in the role of Hitler, Stalin, and Mao zedong. But there was a moment in time, just before an egg was fertilized, when there was a fifty-fifty chance that the embryo that became Hitler could have been a female. Compounding the three events, there was a probability of one-eighth of a twentieth century without any of the three great villains and it is impossible to argue that history would have been roughly the same in their absence. The fertilization of these three eggs had momentous consequences, and it makes a joke of the idea that long-term developments are predictable. [...]

La chance existe t-elle ?

L'histoire est-elle une science ?

Tetlock interviewed 284 people who made their living “commenting or offering advice on political and economic trends.” He asked them to assess the probabilities that certain events would occur in the not too distant future, both in areas of the world in which they specialized and in regions about which they had less knowledge. Would Gorbachev be ousted in a coup? Would the United States go to war in the Persian Gulf? Which country would become the next big emerging market? In all, Tetlock gathered more than 80,000 predictions. He also asked the experts how they reached their conclusions, how they reacted when proved wrong. md how they evaluated evidence that did not support their positions. Respondents were asked to rate the probabilities of three alternative outcomes in every case: the persistence of the status quo, more of something such as political freedom or economic growth, or less of that thing.

The results were devastating. The experts performed worse than they would have if they had simply assigned equal probabilities to each of the three potential outcomes. In other words, people who spend their time, and earn their living, studying a particular topic produce poorer predictions than dart throwing monkeys who would have distributed their choices evenly over the options. Even in the region they knew best, experts were not significantly better than non specialists.

Those who know more forecast very slightly better than those who know less. But those with the most knowledge are often less reliable. The reason is that the person who acquires more knowledge develops an enhanced illusion of her skill and becomes unrealistically overconfident. “We reach the point of diminishing marginal predictive returns for knowledge disconcertingly quickly,” Tetlock writes. “In this age of academic hyperspecialization, there is no reason for supposing that contributors to top journals—distinguished political scientists, area study specialists, economists, and so on—are any better than journalists or attentive readers of *The Jew York Times* in ‘reading’ emerging situations.” [...]

Peut-on se fier à l’intuition ?

INTUITIONS VS. FORMULAS

[...]

In the slim volume that he later called “my disturbing little book,” Meehl reviewed the results of 20 studies that had analyzed whether *clinical predictions* based on the subjective impressions of trained professionals were more accurate than *statistical* predictions made by combining a few scores or ratings according to a rule. In a typical study, trained counselors predicted the grades of freshmen at the end of the school year. The counselors interviewed each student for forty-five minutes. They also had access to high school grades, several aptitude tests, and a four-page personal statement. The statistical algorithm used only a fraction of this information: high school grades and one aptitude test. Nevertheless, the formula was more accurate than 11 of the 14 counselors. Meehl reported generally similar results across a variety of other forecast outcomes, including violations of parole, success in pilot training, and criminal recidivism. [...]

The range of predicted outcomes has expanded to cover medical variables such as the longevity of cancer patients, the length of hospital stays, the diagnosis of cardiac disease, and the susceptibility of babies to sudden infant death syndrome; economic measures such as the prospects of success of new businesses, the evaluation of credit risks by banks, and the future career satisfaction of workers; questions of interest to government agencies, including assessments of the suitability of foster parents, the odds of recidivism among juvenile offenders, and the likelihood of other forms of violent behavior; and miscellaneous outcomes such as the evaluation of scientific presentations, the winners of football games, and the future prices of Bordeaux wine. Each of these domains entails a significant degree of uncertainty and unpredictability. We describe them as “low-validity environments”. In every case the accuracy of experts was matched or exceeded by a simple aIgorithm. [...]

Peut-on se fier à l’intuition ?

La chance existe t-elle ?

Peut-on avoir raison contre les faits ?

Another reason for the inferiority of expert judgment is that humans are incorrigibly inconsistent in making summary judgments of complex information. [...]

Unreliable judgments cannot be valid predictors of anything.

The widespread inconsistency is probably due to the extreme context dependency of System 1. We know from studies of priming that unnoticed stimuli in our environment have a substantial influence on our thoughts and actions. [...]

When predictability is poor—which it is in most of the studies reviewed by Meehl and his followers—inconsistency is destructive of any predictive validity.

The research suggests a surprising conclusion: to maximize predictive accuracy, final decisions should be left to formulas, especially in low-validity environments. [...]

Y a-t-il plus à espérer qu'à craindre de la technique ?

Serions-nous plus libres sans machines ?

The most important development in the field since Meehl’s original work is Robyn Dawes’s famous article “The Robust Beauty of Improper Linear models in Decision Making.” The dominant statistical practice in the social sciences is to assign weights to the different predictors by following an algorithm, called multiple regression, that is now built into conventional software. The logic of multiple regression is unassailable: it finds the optimal formula for putting together a weighted combination of the predictors. However, Dawes observed that the complex statistical algorithm adds little or no value. One can do just as well by selecting a set of scores that have some validity for predicting the outcome and adjusting the values to make them comparable (by using standard scores or ranks). A formula that combines these predictors with equal weights is likely to be just as accurate in predicting new cases as the multiple-regression formula that was optimal in the original sample. More recent research went further: formulas that assign equal weights to all the predictors are often superior, because they are not affected by accidents of sampling.

The surprising success of equal-weighting schemes has an important practical implication: it is possible to develop useful algorithms without any prior statistical research. Simple equally weighted formulas based on existing statistics or on common sense are often very good predictors of significant outcomes. In a memorable example, Dawes showed that marital stability is well predicted by a formula:

frequency of lovemaking minus frequency of quarrels

You don’t want your result to be a negative number. [...]

EXPERT INTUITION: WHEN CAN WE TRUST IT?

[...]

INTUITION AS RECOGNITION

[...]

“The situation has provided a cue; this cue has given the expert access to information stored in memory, and the information provides the answer. Intuition is nothing more and nothing less than recognition.”

This strong statement reduces the apparent magic of intuition to the everyday experience of memory. We marvel at the story of the firefighter vho has a sudden urge to escape a burning house just before it collapses, because the firefighter knows the danger intuitively, “without knowing how he knows.” However, we also do not know how we immediately know that a person we see as we enter a room is our friend Peter. The moral of Simon's remark is that the mystery of knowing without knowing is not a distinctive feature of intuition; it is the norm of mental life. [...]

THE ENVIRONMENT OF SKILL

[...]

Earlier I traced people's confidence in a belief to two related impressions: cognitive ease and coherence. We are confident when the story we tell ourselves comes easily to mind, with no contradiction and no competing scenario. But ease and coherence do not guarantee that a belief held with confidence is true. The associative machine is set to suppress doubt and to evoke ideas and information that are compatible with the currently dominant story. A mind that follows WYSIATI will achieve high confidence much too easily by ignoring what it does not know. It is therefore not surprising that many of us are prone to have high confidence in unfounded intuitions. Klein and I eventually agreed on an important principle: the confidence that people have in their intuitions is not a reliable guide to their validity. In other words, do not trust anyone—including yourself—to tell you how much you should trust their judgment.

If subjective confidence is not to be trusted, how can we evaluate the probable validity of an intuitive judgment? When do judgments reflect true expertise? When do they display an illusion of validity? The answer comes from the two basic conditions for acquiring a skill:

* an environment that is sufficiently regular to be predictable
* an opportunity to learn these regularities through prolonged practice

When both these conditions are satisfied, intuitions are likely to be skilled. Chess is an extreme example of a regular environment, but bridge and poker also provide robust statistical regularities that can support skill. Physicians, nurses, athletes, and firefighters also face complex but fundamentally orderly situations. The accurate intuitions that Gary Klein has described are due to highly valid cueshíiat the experts System 1 has learned to use, even if System 2 has not learned to name them. In contrast, stock pickers and political scientists who make long-term forecasts operate in a zero-validity environment. Their failures reflect the basic unpredictability of the events that they try to forecast. [...]

FEEDBACK AND PRACTICE

Some regularities in the environment are easier to discover and apply than Others. Think of how you developed your style of using the brakes on your car. As you were mastering the skill of taking curves, you gradually learned when to let go of the accelerator and when and how hard to use the brakes. Curves differ, and the variability you experienced while learning ensures that you are now ready to brake at the right time and strength for any curve you encounter. The conditions for learning this skill are ideal, because you receive immediate and unambiguous feedback every time you go around a bend: the mild reward of a comfortable turn or the mild punishment of some difficulty in handling the car if you brake either too hard or not quite hard enough. The situations that face a harbor pilot maneuvering large ships are no less regular, but skill is much more difficult to acquire by sheer experience because of the long delay between actions and their noticeable outcomes. Whether professionals have a chance to develop intuitive expertise depends essentially on the quality and speed of feedback, as well as on sufficient opportunity to practice. [...]

THE OUTSIDE VIEW

[...]

One day, as we were discussing procedures for estimating uncertain quantities, the idea of conducting an exercise occurred to me. I asked everyone to write down an estimate of how long it would take us to submit a finished draft of the textbook to the Ministry of Education. I was following a procedure that we already planned to incorporate into our curriculum: the proper way to elicit information from a group is not by starting with a public discussion but by confidentially collecting each person’s judgment. This procedure makes better use of the knowledge available to members of the group than the common practice of open discussion. [...]

DRAWN TO THE INSIDE VIEW

On that long-ago Friday, our curriculum expert made two judgments about the same problem and arrived at very different answers. The *inside view* is the one that all of us, including Seymour, spontaneously adopted to assess the future of our project. We focused on our specific circumstances and searched for evidence in our own experiences. We had a sketchy plan: we knew how many chapters we were going to write, and we had an idea of how long it had taken us to write the two that we had already done. The more cautious among us probably added a few months to their estimate as a margin of error.

Extrapolating was a mistake. We were forecasting based on the information in front of us—WYSIATI—but the chapters we wrote first were probably easier than others, and our commitment to the project was probably then at its peak. But the main problem was that we failed to allow for what Donald Rumsfeld famously called the “unknown unknowns.” There was no lo way for us to foresee, that day, the succession of events that would cause the project to drag out for so long. The divorces, the illnesses, the crises of coordination with bureaucracies that delayed the work could not be anticipated. Such events not only cause the writing of chapters to slow down, they also produce long periods during which little or no progress is made at all. The same must have been true, of course, for the other teams that Seymour knew about. The members of those teams were also unable to imagine the events that would cause them to spend seven years to finish, or ultimately fail to finish, a project that they evidently had thought was very feasible. Like us, they did not know the odds they were facing. There are many ways for any plan to fail, and although most of them are too improbable to be an the likelihood that something will go wrong in a big project is high. [...]

The argument for the outside view should be made on general grounds: if the reference class is properly chosen, the outside view will give an indication of where the ballpark is, and it may suggest, as it did in our case, that the inside-view forecasts are not even close to it. [...]

The preference for the inside view sometimes carries moral overtones. I once asked my cousin, a distinguished lawyer, a question about a reference class: “What is the probability of the defendant winning in cases like this one?” His sharp answer that “every case is unique” was accompanied by a look that made it clear he found my question inappropriate and superficial. A proud emphasis on the uniqueness of cases is also common in medicine, in spite of recent advances in evidence-based medicine that point the other way. Medical statistics and baseline predictions come up with increasing frequency in conversations between patients and physicians. However, the remaining ambivalence about the outside view in the medical profession is expressed in concerns about the impersonality of procedures that are guided by statistics and checklists. [...]

Peut-on se fier à l’intuition ?

La vérité dépend-elle de nous ?

A quoi peut-on reconnaître la vérité ?

Peut-on être sûr d'avoir raison ?

Ce qui est vrai en théorie peut-il être faux en pratique ?

Le doute: Une force ou une faiblesse ?

THE PLANNING FALLACY

[...]

This should not come as a surprise: overly optimistic forecasts of the outcome of projects are found everywhere. Amos and I coined the term *planning fallacy* to describe plans and forecasts that

* are unrealistically close to best-case scenarios
* could be improved by consulting the statistics of similar cases

The optimism of planners and decision makers is not the only cause of problems. Contractors of kitchen renovations and of weapon systems readily admit (though not to their clients) that they routinely make most of their profit on additions to the original plan. The failures of forecasting in these cases reflect the customer's’ inability to imagine how much their wishes will scalate over time. They end up paying much more than they would if they ad made a realistic plan and stuck to it. [...]

MITIGATING THE PLANNING FALLACY

The diagnosis of and the remedy for the planning fallacy have not changed since that Friday afternoon, but the implementation of the idea has come a kmg way. The renowned Danish planning expert Bent Flyvbjerg, now at Oxford University, offered a forceful summary:

The prevalent tendency to underweight or ignore distributional information is perhaps the major source of error in forecasting. Planners should therefore make every effort to frame the forecasting problem so as to facilitate utilizing all the distributional information that is available.

This may be considered the single most important piece of advice regarding how to increase accuracy in forecasting through improved methods. Using such distributional information from other ventures similar to that being forecasted is called taking an “outside view” and is the cure to the planning fallacy.

The treatment for the planning fallacy has now acquired a technician lame, *reference class forecasting*, and Flyvbjerg has applied it to transporon projects in several countries. The outside view is implemented by using a large database, which provides information on both plans and outcomes for hundreds of projects all over the world, and can be used to provide statistical information about the likely overruns of cost and time, and about the likely underperformance of projects of different types.

The forecasting method that Flyvbjerg applies is similar to the practices recommended for overcoming base-rate neglect:

1. Identify an appropriate reference class (kitchen renovations, large railway projects, etc.).
2. Obtain the statistics of the reference class (in terms of cost per mile of railway, or of the percentage by which expenditures exceeded budget). Use the statistics to generate a baseline prediction.
3. Use specific information about the case to adjust the baseline prediction, if there are particular reasons to expect the optimistic bias to be more or less pronounced in this project than in others of the same type.

[...]

FAILING A TEST

It is easier to change directions in a crisis, but this was not a crisis, only some new facts about people we did not know. The outside view was much easier to ignore than bad news in our own flPort. I can best describe our State as a form of lethargy—an unwillingness to think about what had happened. So we carried on. There was no further attempt at rational planning for the rest of the time I spent as a member of the team—a particularly troubling omission for a team dedicated to teaching rationality. I hope I am wiser today, and I have acquired a habit of looking for the outside view. But it will never be the natural thing to do. [...]

Quel besoin avons-nous de chercher la vérité ?

Suffit-il de voir le meilleur pour le suivre ?

THE ENGINE OF CAPITALISM

The planning fallacy is only one of the manifestations of a pervasive optimistic bias. Most of us view the world as more benign than it really is, our own attributes as more favorable than they truly are, and the goals we adopt as more achievable than they are likely to be. We also tend to exaggerate our ability to forecast the future, which fosters optimistic overconfidence. In terms of its consequences for decisions, the optimistic bias may well be the most significant of the cognitive biases. Because optimistic bias can be both a blessing and a risk, you should be both happy and wary if you are temperamentally optimistic.

OPTIMISTS

Optimism is normal, but some fortunate people are more optimistic than the rest of us. If you are genetically endowed with an optimistic bias, you hardly need to be told that you are a lucky person—you already feel fortunate. An optimistic attitude is largely inherited, and it is part of a general disposition for well-being, which may also include a preference for seeing the bright side of everything. If you were allowed one wish for your child. seriously consider wishing him or her optimism. Optimists are normally cheerful and happy, and therefore popular; they are resilient in adapting to failures and hardships, their chances of clinical depression are reduced, their immune system is stronger, they take better care of their health, they feel healthier than others and are in fact likely to live longer. A study of people who exaggerate their expected life span beyond actuarial predictions showed that they work longer hours, are more optimistic about their future income, are more likely to remarry after divorce (the classic “triumph of hope over experience”), and are more prone to bet on individual Stocks. Of course, the blessings of optimism are offered only to individuals who are only mildly biased and who are able to “accentuate the positive” without losing track of reality.

Optimistic individuals play a disproportionate role in shaping our lives. Their decisions make a difference; they are the inventors, the entrepreneurs, the political and military leaders—not average people. They got to where they are by seeking challenges and taking risks. They are talented and they have been lucky, almost certainly luckier than they acknowledge. They are probably optimistic by temperament; a survey of founders of small businesses concluded that entrepreneurs are more sanguine than mid level managers about life in general. Their experiences of success have confirmed their faith in their judgment and in their ability to control events. Their self-confidence is reinforced by the admiration of others. This reasoning leads to a hypothesis: the people who have the greatest influence on the lives of others are likely to be optimistic and overconfident, and to take more risks than they realize.

The evidence suggests that an optimistic bias plays a role—sometimes the dominant role—whenever individuals or institutions voluntarily take on significant risks. More often than not, risk takers underestimate the odds they face, and do not invest sufficient effort to find out what the odds are. Because they misread the risks, optimistic entrepreneurs often believe they are prudent, even when they are not. Their confidence in their future success sustains a positive mood that helps them obtain resources from others, raise the morale of their employees, and enhance their prospects of prevailing. When action is needed, optimism, even of the mildly delusional variety, may be a good thing. [...]

La chance existe t-elle ?

Quelle est la part de l’inné et de l’acquis dans le caractère ?

Exister, est-ce agir ?

Le bonheur est-il affaire privée ?

THE PREMORTEM: A PARTIAL REMEDY

Can overconfident optimism be overcome by training? I am not optimistic. [...]

Organizations may be better able to tame optimism and individuals than individuals are. The best idea for doing so was contributed by Gary Klein, my “adversarial collaborator” who generally defends intuitive decision making against claims of bias and is typically hostile to algorithms. He labels his proposal the *premortem*. The procedure is simple: when the organization has almost come to an important decision but has not formally committed itself, Klein proposes gathering for a brief session a group of individuals who are knowledgeable about the decision. The premise of the session is a short speech: “Imagine that we are a year into the future. We implemented the plan as it now exists. The outcome was a disaster. Please take 5 to 10 minutes to write a brief history of that disaster.” [...]

The premortem has two main advantages: it overcomes the groupthink that affects many teams once a decision appears to have been made, and it unleashes the imagination of knowledgeable individuals in a much-needed direction.

As a team converges on a decision—and especially when the leader tips her hand—public doubts about the wisdom of the planned move are gradually suppressed and eventually come to be treated as evidence of flawed loyalty to the team and its leaders. The suppression of doubt contributes to overconfidence in a group where only supporters of the decision have a voice. The main virtue of the premortem is that it legitimizes doubts. Furthermore, it encourages even supporters of the decision to search for possible threats that they had not considered earlier. The premortem is not a panacea and does not provide complete protection against nasty surprises. but it goes some way toward reducing the damage of plans that are subject to the biases of WYSIATI and uncritical optimism. [...]

L’imagination enrichit-elle la connaissance ?

Que nous apprend la mort ?

Toute prise de conscience est-elle libératrice ?

Notre liberté de pensée a-t-elle des limites ?

Peut-on être sûr d'avoir raison ?

Le doute: Une force ou une faiblesse ?

CHOICES

BERNOULLI’S ERRORS

[...]

Our approach to the problem was in the spirit of a field of psychology called psychophysics, which was founded and named by the German psychologist and mystic Gustav Fechner (1801-1887). Fechner was obsessed with the relation of mind and matter. On one side there is a physical quantity that can vary, such as the energy of a light, the frequency of a tone, or an amount of money. On the other side there is a subjective experience of brightness, pitch, or value. Mysteriously, variations of the physical quantity cause variations in the intensity or quality of the subjective experience Fechner’s project was to find the psychophysical laws that relate the subjective quantity in the observer’s mind to the objective quantity in the material world. He proposed that for many dimensions, the function is logarithmic — which simply means that an increase of stimulus intensity by a given factor (say, times 1.5 or times 10) always yields the same increment on the psychological scale. If raising the energy of the sound from 10 to 100 units of physical energy increases psychological intensity by 4 units, then auiirtrhe increase of stimulus intensity from 100 to 1,000 will also increase psychological intensity by 4 units.

Quelle différence peut-on faire entre l’esprit et le corps ?

Les apparences sont-elles trompeuses ?

BERNOULLI’S ERROR

[...]

Table 3

Wealth (millions) 1 2 3 4 5 6 7 8 9 10

Utility units 10 30 48 60 70 78 84 90 96 100

Table 3 shows a version of the utility function that Bernoulli calculated; it presents the utility of different levels of wealth, from 1 million to 10 million. You can see that adding 1 million to a wealth of 1 million yields an increment of 20 utility points, but adding 1 million to a wealth of 9 million adds only 4 points. Bernoulli proposed that the diminishing marginal value of wealth (in the modern jargon) is what explains risk aversion—the common preference that people generally show for a sure thing over a favorable gamble of equal or slightly higher expected value. Consider this choice:

Equal chances to have 1 million or 7 million Utility: (10 + 84)/2 = 47

OR

Have 4 million with certainty Utility: 60

The expected value of the gamble and the “sure thing” are equal in ducats (4 million), but the psychological utilities of the two options are different, because of the diminishing utility of wealth: the increment of utility from 1 million to 4 million is 50 units, but an equal increment, from 4 to 7 million, increases the utility of wealth by only 24 units. The utility of the gamble is 94/2 = 47 (the utility of its two outcomes, each weighted by its probability of ½). The utility of 4 million is 60. Because 60 is more than 47, an individual with this utility function will prefer the sure thing. Bernoulli’s insight was that a decision maker with diminishing marginal utility for wealth will be risk averse.

Bernoulli’s essay is a marvel of concise brilliance. He applied his new concept of expected utility (which he called “moral expectation”) to compute how much a merchant in St. Petersburg would be willing to pay to insure a shipment of spice from Amsterdam if “he is well aware of the fact that at this time of year of one hundred ships which sail from Amsterdam to Petersburg, five are usually lost.” His utility function explained why poor people buy insurance and why richer people sell it to them. As you can see in the table, the loss of 1 million causes a loss of 4 points of utility (from 100 to 96) to someone who has 10 million and a much larger loss of 18 points (from 48 to 30) to someone who starts off with 3 million. The poorer man will happily pay a premium to transfer the risk to the richer one, which is what insurance is about. [...]

The longevity of the theory is all the more remarkable because it is seriously flawed. The errors of a theory are rarely found in what it asserts explicitly; they hide in what it ignores or tacitly assumes. For an example, take the following scenarios:

Today Jack and Jill each have a wealth of 5 million.

Yesterday, Jack had 1 million and Jill had 9 million.

Are they equally happy? (Do they have the same utility?)

Bernoulli’s theory assumes that the utility of their wealth is what makes people more or less happy. Jack and Jill have the same wealth, and the theory therefore asserts that they should be equally happy, but you do not need a degree in psychology to know that today Jack is elated and Jill despondent. Indeed, we know that Jack would be a great deal happier than Jill even if he had only 2 million today while she has 5. So Bernoulli’s theory must be wrong.

The happiness that Jack and Jill experience is determined by the recent *change* in their wealth, relative to the different states of wealth that define their reference points (1 million for Jack, 9 million for Jill). This reference dependence is ubiquitous in sensation and perception. The same sound will be experienced as very loud or quite faint, depending on whether it was preceded by a whisper or by a roar. To predict the subjective experience of loudness, it is not enough to know its absolute energy; you also need to know the reference sound to which it is automatically compared. Similarly, you need to know about the background before you can predict whether a gray patch on a page will appear dark or light. And you need to know the reference before you can predict the utility of an amount of wealth.

For another example of what Bernoulli’s theory misses, consider Anthony and Betty:

Anthony’s current wealth is 1 million.

Betty’s current wealth is 4 million.

They are both offered a choice between a gamble and a sure thing.

The gamble: equal chances to end up owning 1 million or 4 million

OR

The sure thing: own 2 million for sure

In Bernoulli’s account, Anthony and Betty face the same choice: their expected wealth will be 2.5 million if they take the gamble and 2 million if they prefer the sure-thing option. Bernoulli would therefore expect Anthony and Betty to make the same choice, but this prediction is incorrect. Here again, the theory fails because it does not allow for the different *reference points* from which Anthony and Betty consider their options. [...]

All this is rather obvious, isn’t it? One could easily imagine Bernoulli himself constructing similar examples and developing a more complex theory to accommodate them; for some reason, he did not. One could also imagine colleagues of his time disagreeing with him, or later scholars objecting as they read his essay; for some reason, they did not either. [...]

PROSPECT THEORY

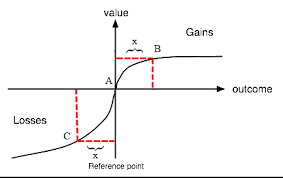
[...]

The four problems highlight the weakness of Bernoulli’s model. His theory is too simple and lacks a moving part. The missing variable is the *reference point*, the earlier state relative to which gains and losses are evaluated. In Bernoulli’s theory you need to know only the state of wealth to determine its utility but in prospect theory you also need to know the reference state. Prospect theory is therefore more complex than utility theory. [...]

* Evaluation is relative to a neutral reference point, which is sometimes referred to as an “adaptation level.” You can easily set up a compelling demonstration of this principle. Place three bowls of water in front of you. Put ice water into the left-hand bowl and warm water into the right-hand bowl. The water in the middle bowl should be at room temperature. Immerse your hands in the cold and warm water for about a minute, then dip both in the middle bowl. You will experience the same temperature as heat in one hand and cold in the other. For financial outcomes, the usual reference point is the status quo, but it can also be the outcome that you expect, or perhaps the outcome to which you feel entitled, for example, the raise or bonus that your colleagues receive. Outcomes that are better than the reference points are gains. Below the reference point they are losses.
* A principle of diminishing sensitivity applies to both sensory dimensions and the evaluation of changes of wealth. Turning on a weak light has a large effect in a dark room. The same increment of light may be undetectable in a brightly illuminated room. Similarly, the subjective reference between $900 and $1,000 is much smaller than the difference between $ 100 and $200.
* The third principle is loss aversion. When directly compared or weighted against each other, losses loom larger than gains. This asymmetry between the power of positive and negative expectations or experiences has an evolutionary history. Organisms that treat threats as more urgent than opportunities have a better chance to survive and reproduce.

The three principles that govern the value of outcomes are illustrated by figure 10. If prospect theory had a flag, this image would be drawn on it The graph shows the psychological value of gains and losses, which are the “carriers” of value in prospect theory (unlike Bernoulli’s model, in which states of wealth are the carriers of value). The graph has two distinct parts, to the right and to the left of a neutral reference point. A salient feature is that it is S-shaped, which represents diminishing sensitivity for both gains and losses. Finally, the two curves of the S are not symmetrical. The slope of the function changes abruptly at the reference point: the response to losses is stronger than the response to corresponding gains. This is loss aversion.

Figure 10



Le désir peut-il se satisfaire de la réalité ?

Changer, est-ce devenir quelqu’un d’autre ?

La vérité dépend-elle de nous ?

La détermination du bien n’est-elle qu’une affaire d’opinion ?

Comment définir le bien ?

Faut-il s'identifier à autrui pour le comprendre ?

LOSS AVERSION

[...]

BLIND SPOTS OF PROSPECT THEORY

[...]

But of course theory-induced blindness is not restricted to expected utility theory. Prospect theory has flaws of its own, and theory-induced blindness to these flaws has contributed to its acceptance as the main alternative to utility theory.

Consider the assumption of prospect theory, that the reference point, usually the status quo, has a value of zero. This assumption seems reasonable, but it leads to some absurd consequences. Have a good look at the following prospects. What would it be like to own them?

1. one chance in a million to win $1 million
2. 10% chance to win $12 and 90% chance to win nothing
3. 90% chance to win $1 million and 10% chance to win nothing

Winning nothing is a possible outcome in all three gambles, and prospect theory assigns the same value to that outcome in the three cases. Winning nothing is the reference point and its value is zero. Do these statements correspond to your experience? Of course not. Winning nothing is a nonevent in the first two cases, and assigning it a value of zero makes good sense. In contrast, failing to win in the third scenario is intensely disappointing. Like a salary increase that has been promised informally, the high probability of winning the large sum sets up a tentative new reference point. Relative to your expectations, winning nothing will be experienced as a large loss. Prospect theory cannot cope with this fact, because it does not allow the value of an outcome (in this case, winning nothing) to change when it is highly unlikely, or when the alternative is very valuable. In simple words, prospect theory cannot deal with disappointment. Disappointment and the anticipation of disappointment are real, however, and the failure to acknowledge them is as obvious a flaw as the counter-examples that I invoked to criticize Bernoulli’s theory.

Prospect theory and utility theory also fail to allow for regret. The two theories share the assumption that available options in a choice are evaluated separately and independently, and that the option with the highest value is selected. This assumption is certainly wrong, as the following example shows.

Problem 6: Choose between 90% chance to win $1 million OR $50 with certainty.

Problem 7: Choose between 90% chance to win $1 million OR $150,000 with certainty.

Compare the anticipated pain of choosing the gamble and *not* winning in the two cases. Failing to win is a disappointment in both, but the potential pain is compounded in problem 7 by knowing that if you choose the gamble and lose you will regret the “greedy” decision you made by spurning a sure gift of $150,000. In regret, the experience of an outcome depends on an option you could have adopted but did not.

Peut-on désirer sans souffrir ?

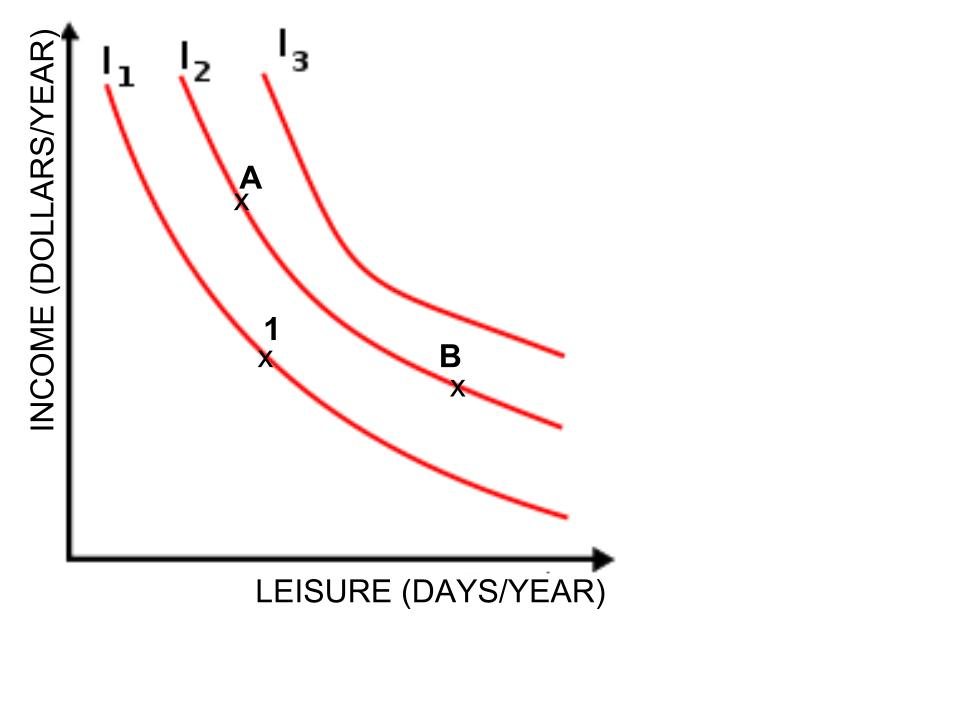
Several economists and psychologists have proposed models of decision making that are based on the emotions of regret and disappointment. It is fair to say that these models have had less influence than prospect theory, and the reason is instructive. The emotions of regret and disappointment are real, and decision makers surely anticipate these emotions when making their choices. The problem is that regret theories make few striking predictions that would distinguish them from prospect theory, which has the advantage of being simpler. The complexity of prospect theory was more acceptable in the competition with expected utility theory because it did predict observations that expected utility theory could not explain.

Richer and more realistic assumptions do not suffice to make a theory successful. Scientists use theories as a bag of working tools, and they will not take on the burden of a heavier bag unless the new tools are very useful. Prospect theory was accepted by many scholars not because it is “true” but because the concepts that it added to utility theory, notably the reference point and loss aversion, were worth the trouble; they yielded new predictions that turned out to be true. We were lucky. [...]

THE ENDOWMENT EFFECT

You have probably seen figure 11 or a close cousin of it even if you never had a class in economics. The graph displays an individual's “indifference map” for two goods.

Figure 11



What is missing from the figure is an indication of the individual’s current income and leisure. If you are a salaried employee, the terms of your employment specify a salary and a number of vacation days, which is a point on the map. This is your reference point, your status quo, but the figure does not show it. By failing to display it, the theorists who draw this figure invite you to believe that the reference point does not matter, but by now you know that of course it does. This is Bernoulli's error all over again. [...]

To appreciate the power that the reference point exerts on choices, consider Albert and Ben, “hedonic twins” who have identical tastes and currently hold identical starting jobs, with little income and little leisure time. Their current circumstances correspond to the point marked 1 in figure 11. The firm offers them two improved positions, A and B, and lets them decide who will get a raise of $10,000 (position A) and who will get an extra day of paid vacation each month (position B). As they are both indifferent, they toss a coin. Albert gets the raise, Ben gets the extra leisure. Some time passes as the twins get accustomed to their positions. Now the company suggests they may switch jobs if they wish.

The standard theory represented in the figure assumes that preferences are stable over time. Positions A and B are equally attractive for both twins and they will need little or no incentive to switch. In sharp contrast, prospect theory asserts that both twins will definitely prefer to remain as they are. This preference for the status quo is a consequence of loss aversion.

Let us focus on Albert. He was initially in position 1 on the graph, and from that reference point he found these two alternatives equally attractive:

Go to A: a raise of $10,000

OR

Go to B: 12 extra days of vacation

Taking position A changes Alberts reference point, and when he considers switching to B, his choice has a new structure:

Stay at A: no gain and no loss

OR

Move to B: 12 extra days of vacation and a $10,000 salary cut

You just had the subjective experience of loss aversion. You could feel it: a salary cut of $10,000 is very bad news. Even if a gain of 12 vacation days was as impressive as a gain of $10,000, the same improvement of leisure is not sufficient to compensate for a loss of $10,000. Albert will stay at A because the disadvantage of moving outweighs the advantage. The same reasoning applies to Ben, who will also want to keep his present job because the loss of now-precious leisure outweighs the benefit of the extra income.

This example highlights two aspects of choice that the standard model of indifference curves does not predict. First, tastes are not fixed; they vary with the reference point. Second, the disadvantages of a change loom larger than its advantages, inducing a bias that favors the status quo. Of course, loss aversion does not imply that you never prefer to change your situation; the benefits of an opportunity may exceed even overweighted losses. Loss aversion implies only that choices are strongly biased in favor of the reference situation (and generally biased to favor small rather than large changes).

Conventional indifference maps and Bernoulli’s representation of outcomes as states of wealth share a mistaken assumption: that your utility for a state of affairs depends only on that state and is not affected by your history. Correcting that mistake has been one of the achievements of behavioral economics.

THE ENDOWMENT EFFECT

[...]

Professor R (now revealed to be Richard Rosett, who went on to become the dean of the University of Chicago Graduate School of Business) was a firm believer in standard economic theory as well as a sophisticated wine lover. Thaler observed that Professor R was very reluctant to sell a bottle from his collection—even at the high price of $100 (in 1975 dollars!). Professor R bought wine at auctions, but would never pay more than $35 for a bottle of that quality. At prices between $35 and $100, he would neither buy nor sell. The large gap is inconsistent with economic theory, in which the professor is expected to have a single value for the bottle. If a particular bottle is worth $50 to him, then he should be willing to sell it for any amount in excess of $50. If he did not own the bottle, he should be willing to pay any amount up to $50 for it. The just-acceptable selling price and the just-acceptable buying price should have been identical, but in fact the minimum price to sell ($100) was much higher than the maximum buying price f $35. Owning the good appeared to increase its value. [...]

Chance intervened when Thaler met one of our former students at a conference and obtained an early draft of prospect theory. He reports that he read the manuscript with considerable excitement, because he quickly realized that the loss-averse value function of prospect theory could explain the endowment effect and some other puzzles in his collection. The solution was to abandon the standard idea that Professor R had a unique utility for the state of *having* a particular bottle. Prospect theory suggested that the willingness to buy or sell the bottle depends on the reference point— whether or not the professor owns the bottle now. If he owns it, he considers the pain of *giving up* the bottle. If he does not own it, he considers the pleasure of *getting* the bottle. The values were unequal because of loss aversion: giving up a bottle of nice wine is more painful than getting an equally good bottle is pleasurable. [...]

There is no loss aversion on either side of routine commercial exchanges.

What distinguishes these market transactions from Professor R’s reluctance to sell his wine, or the reluctance of Super Bowl ticket holders to sell even at a very high price? The distinctive feature is that both the shoes the merchant sells you and the money you spend from your budget for shoes are held “for exchange.” They are intended to be traded for other goods. Other goods, such as wine and Super Bowl tickets, are held “for use,” to be consumed or otherwise enjoyed. Your leisure time and the standard of living that your income supports are also not intended for sale or exchange. [...]

The cash value that the Sellers set on the mug is a bit more than twice as high as the value set by Choosers and Buyers. The ratio is very close to the loss aversion coefficient in risky choice, as we might expect if the same value function for gains and losses of money is applied to both riskless and risky decisions. A ratio of about 2:1 has appeared in studies of diverse economic domains, including the response of households to price changes. As economists would predict, customers tend to increase their purchases of eggs, orange juice, or fish when prices drop and to reduce their purchases when prices rise; however, in contrast to the predictions of economic theory, the effect of price increases (losses relative to the reference price) is about twice as large as the effect of gains. [...]

THINKING LIKE A TRADER

[...]

Veteran traders have apparently learned to ask the correct question, which is “How much do I want to *have* that mug, compared with other things I could have instead?” This is the question that Econs ask, and with this question there is no endowment effect, because the asymmetry between the pleasure of getting and the pain of giving up is irrelevant.

Recent studies of the psychology of “decision making under poverty” suggest that the poor are another group in which we do not expect to find the endowment effect. Being poor, in prospect theory, is living below one's reference point. There are goods that the poor need and cannot afford, so they are always “in the losses.” Small amounts of money that they receive are therefore perceived as a reduced loss, not as a gain. The money helps one climb a little toward the reference point, but the poor always remain on the steep limb of the value function.

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.

We all know people for whom spending is painful, although they are objectively quite well-off. There may also be cultural differences in the attitude toward money, and especially toward the spending of money on whims and minor luxuries, such as the purchase of a decorated mug. [...]

Ce qui est vrai en théorie peut-il être faux en pratique ?

As-t-on besoin du passé pour construire son avenir ?

L'action politique doit-elle être guidée par la connaissance de l'histoire ?

Peut-on ignorer le passé ?

Cela a-t-il un sens de vouloir échapper au temps ?

Doit-on faire du travail une valeur ?

Travailler est-ce perdre son temps ?

Que gagne-t-on à échanger ?

Une connaissance scientifique du vivant est-elle possible ?

Les principes de la raison sont-ils issus de l'expérience ?

Le passionné est-il ennemi de lui-même ?

Peut-on désirer sans souffrir ?

Peut-on dire d'un désir qu'il est anormal ?

Quelle est la part de l’inné et de l’acquis dans le caractère ?

BAD EVENTS

[...]

NEGATIVITY DOMINANCE

Figure 12



Your heartbeat accelerated when you looked at the left-hand figure. It accelerated even before you could label what is so eerie about that picture. After some time you may have recognized the eyes of a terrified person. The eyes on the right, narrowed by the raised cheeks of a smile, express happiness and they are not nearly as exciting. The two pictures were presented to people lying in a brain scanner. Each picture was shown for less than 2/100 of a second and immediately masked by “visual noise,” a random display of dark and bright squares. None of the observers ever consciously knew that he had seen pictures of eyes, but one part of their brain evidently knew: the amygdala, which has a primary role as the “threat center” of the brain, although it is also activated in other emotional states. Images of the brain showed an intense response of the amygdala to a threatening picture that the viewer did not recognize. The information about the threat probably traveled via a superfast neural channel that feeds directly into a part of the brain that processes emotions, bypassing the visual cortex that supports the conscious experience of “seeing.” The same circuit also causes schematic angry faces (a potential threat) to be processed faster and more efficiently than schematic happy faces. Some experimenters have reported that an angry face “pops out” of a crowd of happy faces, but a single happy face does not stand out in an angry crowd. The brains of humans and other animals contain a mechanism that is designed to give priority to bad news. By shaving a few hundredths of a second from the time needed to detect a predator, this circuit improves the animal’s odds of living long enough to reproduce. The automatic operations of System 1 reflect this evolutionary history. No comparably rapid mechanism for recognizing good news has been detected. Of course, we and our animal cousins are quickly alerted to signs of opportunities to mate or to feed, and advertisers design billboards accordingly. Still, threats are privileged above opportunities, as they should be. [...]

The psychologist Paul Rozin, an expert on disgust, observed that 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. As he points out, the negative trumps the positive in many ways, and loss aversion is one of many manifestations of a broad negativity dominance. Other scholars, in a paper titled “Bad Is Stronger Than Good,” summarized the evidence as follows: “Bad emotions, bad parents, and bad feedback have more impact than good ones, and bad information is processed more thoroughly than good. The self is more motivated to avoid bad self-definitions than to pursue good ones. Bad impressions and bad stereotypes are quicker to form and more resistant to disconfirmation than good ones.” They cite John Gottman, the well-known expert in marital relations, who observed that the long-term success of a relationship depends far more on avoiding the negative than on seeking the positive. Gottman estimated that a stable relationship requires that good interactions outnumber bad interactions by at least 5 to 1. Other asymmetries in the social domain are even more striking. We all know that a friendship that may take years to develop can be ruined by a single action. [...]

Notre liberté de pensée a-t-elle des limites ?

Est-ce illusoire de chercher á être heureux ?

Toute prise de conscience est-elle libératrice ?

Est-il préférable de se connaître ?

[...]

DEFENDING THE STATUS QUO

Animals, including people, fight harder to prevent losses than to achieve gains. In the world of territorial animals, this principle explains the success of defenders. A biologist observed that “when a territory holder is challenged by a rival, the owner almost always wins the contest—usually within a matter of seconds.” In human affairs, the same simple rule explains much of what happens when institutions attempt to reform themselves, in “reorganizations” and “restructuring” of companies, and in efforts to rationalize a bureaucracy, simplify the tax code, or reduce medical costs. As initially conceived, plans for reform almost always produce many winners and some losers while achieving an overall improvement. If the affected parties have any political influence, however, potential losers will be more active and determined than potential winners; the outcome will be biased in their favor and inevitably more expensive and less effective than initially planned. Reforms commonly include grandfather clauses that protect current stakeholders—for example, when the existing workforce is reduced by attrition rather than by dismissals, or when cuts in salaries and benefits apply only to future workers. Loss aversion is a powerful conservative force that favors minimal changes from the status quo in the fives of both institutions and individuals. This conservatism helps keep us stable in our neighborhood, our marriage, and our job; it is the gravitational force that holds our life together near the reference point.

Comment peut-il y avoir du nouveau ?

Comment peut-il y avoir un contre-pouvoir ?

LOSS AVERSION IN THE LAW

[...]

A small photocopying shop has one employee who has worked there for six months and earns $9 per hour. Business continues to be satisfactory, but a factory in the area has closed and unemployment has increased. Other small shops have now hired reliable workers at $7 an hour to perform jobs similar to those done by the photocopy shop employee. The owner of the shop reduces the employee’s wage to $7.

The respondents did not approve: 83% considered the behavior Unfair or Very Unfair. However, a slight variation on the question clarifies the nature of the employer's obligation. The background scenario of a profitable store in an area of high unemployment is the same, but now

the current employee leaves, and the owner decides to pay a replacement $7 an hour.

A large majority (73%) considered this action Acceptable. It appears that the employer does not have a moral obligation to pay $9 an hour. The entitlement is personal: the current worker has a right to retain his wage even if market conditions would allow the employer to impose a wage cut. The replacement worker has no entitlement to the previous workers reference wage, and the employer is therefore allowed to reduce pay without the risk of being branded unfair.

The firm has its own entitlement, which is to retain its current profit. If it faces a threat of a loss, it is allowed to transfer the loss to others. A substantial majority of respondents believed that it is not unfair for a firm to reduce its workers’ wages when its profitability is falling. We described the rules as defining dual entitlements to the firm and to individuals with whom it interacts. When threatened, it is not unfair for the firm to be selfish. It is not even expected to take on part of the losses; it can pass them on.

Different rules governed what the firm could do to improve its profits or to avoid reduced profits. When a firm faced lower production costs, the rules of fairness did not require it to share the bonanza with either its customers or its workers. Of course, our respondents liked a firm better and described it as more fair if it was generous when its profits increased, but they did not brand as unfair a firm that did not share. They showed indignation only when a firm exploited its power to break informal contracts with workers or customers, and to impose a loss on others in order to increase its profit. The important task for students of economic fairness is not to identify ideal behavior but to find the line that separates acceptable conduct from actions that invite opprobrium and punishment. [...]

More recent research has supported the observations of reference-dependent fairness and has also shown that fairness concerns are economically significant, a fact we had suspected but did not prove. Employers who violate rules of fairness are punished by reduced productivity, and merchants who follow unfair pricing policies can expect to lose sales. [...]

Unfairly imposing losses on people can be risky if the victims are in a position to retaliate. Furthermore, experiments have shown that strangers who observe unfair behavior often join in the punishment. Neuroeconolists (scientists who combine economics with brain research) have used MRI machines to examine the brains of people who are engaged in punishing one stranger for behaving unfairly to another stranger. Remarkably, altruistic punishment is accompanied by increased activity in the “pleasure centers” of the brain. It appears that maintaining the social order and the rules of fairness in this fashion is its own reward. Altruistic punishment could well be the glue that holds societies together. However, our brains are not designed to reward generosity as reliably as they punish meanness. Here again, we find a marked asymmetry between losses and gains. [...]

Pourquoi un acte est moral ?

Qu'avons-nous à gagner à faire notre devoir ?

Le juste et l’injuste ne sont-ils que des conventions ?

La détermination du bien n’est-elle qu’une affaire d’opinion ?

Comment définir le bien ?

SPEAKING OF LOSSES

[...]

“They would find it easier to renegotiate the agreement if they realized the pie was actually expanding. They’re not allocating losses; they are allocating gains.”

Peut-on concevoir une société sans conflit ?

[...]

THE FOURFOLD PATTERN

[...]

CHANGING CHANCES

[...]

The expectation principle does not correctly describe how you think about the probabilities related to risky prospects. In the four examples below, your chances of receiving $1 million improve by 5%. Is the news equally good in each case?

1. From 0 to 5%
2. From 5% to 10%
3. From 60% to 65%
4. From 95% to 100%

The expectation principle asserts that your utility increases in each case by exactly 5% of the utility of receiving $1 million. Does this prediction describe your experiences? Of course not.

Everyone agrees that 0 -► 5% and 95% -► 100% are more impressive than either 5% -►10% or 60% -► 65%. Increasing the chances from 0 to 5% transforms the situation, creating a possibility that did not exist earlier, a hope of winning the prize. It is a qualitative change, where 5 —► 10% is only a quantitative improvement. The change from 5% to 10% doubles the probability of winning, but there is general agreement that the psychological value of the prospect does not double. The large impact of 0 —► 5% illustrates the possibility effect, which causes highly unlikely outcomes to be weighted disproportionately more than they “deserve.” People who buy lottery tickets in vast amounts show themselves willing to pay much more than expected value for very small chances to win a large prize.

The improvement from 95% to 100% is another qualitative change that has a large impact, the *certainty effect*. Outcomes that are almost certain are given less weight than their probability justifies. To appreciate the certainty effect, imagine that you inherited $1 million, but your greedy step sister has contested the will in court. The decision is expected tomorrow. Your lawyer assures you that you have a strong case and that you have a 95% chance to win, but he takes pains to remind you that judicial decisions are never perfectly predictable. Now you are approached by a risk-adjustment company, which offers to buy your case for $910,000 outright—take it or leave it. The offer is lower (by $40,000!) than the expected value of waiting for the judgment (which is $950,000), but are you quite sure you would want to reject it? If such an event actually happens in your life, you should know that a large industry of “structured settlements” exists to provide certainty at a hefty price, by taking advantage of the certainty effect.

Possibility and certainty have similarly powerful effects in the domain of losses. When a loved one is wheeled into surgery, a 5% risk that an amputation will be necessary is very bad—much more than half as bad as a 10% risk. Because of the possibility effect, we tend to overweight small risks and are willing to pay far more than expected value to eliminate them altogether. The psychological difference between a 95% risk of disaster and the

certainty of disaster appears to be even greater; the sliver of hope that everything could still be okay looms very large. Overweighting of small probabilities increases the attractiveness of both gambles and insurance policies. [...]

Notre liberté de pensée a-t-elle des limites ?

La perception peut-elle s’éduquer ?

Ne fait-on que fuir le réel ?

Ce qui est vrai en théorie peut-il être faux en pratique ?

THE FOURFOLD PATTERN

When Amos and I began our work on prospect theory, we quickly reached two conclusions: people attach values to gains and losses rather than to wealth, and the decision weights that they assign to outcomes are different from probabilities. Neither idea was completely new, but in combination they explained a distinctive pattern of preferences that we called the fourfold pattern. The name has stuck. The scenarios are illustrated below.

| Figure 13 | GAINS | LOSSES |
| --- | --- | --- |
| HIGH  PROBABILITY  certainty Effect | 95% chance to win $10,000  Fear of disappointment  RISK AVERSE  Accept unfavorable settlement | 95% chance to lose $10,000  Hope to avoid loss  RISK SEEKING  Reject favorable settlement |
| LOW  PROBABILITY  Possibility Effect | 5% chance to win $10,000  Hope of large gain  RISK SEEKING  reject favorable settlement | 5% chance to lose $10,000  fear of large loss  RISK AVERSE  Accept unfavorable settlement |

[...]

Une connaissance scientifique du vivant est-elle possible ?

Many unfortunate human situations unfold in the top right cell. This is where people who face very bad options take desperate gambles, accepting a high probability of making things worse in exchange for a small hope of avoiding a large loss. Risk taking of this kind often turns manageable failures into disasters. The thought of accepting the large sure loss is too painful, and the hope of complete relief too enticing, to make the sensible decision that it is time to cut one's losses. This is where businesses that are losing ground to a superior technology waste their remaining assets in futile attempts to catch up. Because defeat is so difficult to accept, the losing side in wars often fights long past the point at which the victory of the other side is certain, and only a matter of time.

Peut-on vouloir le bien sans le faire ?

GAMBLING IN THE SHADOW OF THE LAW

The legal scholar Chris Guthrie has offered a compelling application of the fourfold pattern to two situations in which the plaintiff and the defendant in a civil suit consider a possible settlement. The situations differ in the strength of the plaintiff’s case.

As in a scenario we saw earlier, you are the plaintiff in a civil suit in which you have made a claim for a large sum in damages. The trial is going very well and your lawyer cites expert opinion that you have a 95% chance to win outright, but adds the caution, “You never really know the outcome until the jury comes in.” Your lawyer urges you to accept a settlement in which you might get only 90% of your claim. You are in the top left cell of the fourfold pattern, and the question on your mind is, “Am I willing to take even a small chance of getting nothing at all? Even 90% of the claim is a great deal of money, and I can walk away with it now.” Two emotions are evoked, both driving in the same direction: the attraction of a sure (and substantial) gain and the fear of intense disappointment and regret if you reject a settlement and lose in court. You can feel the pressure that typically leads to cautious behavior in this situation. The plaintiff with a strong case is likely to be risk averse.

Now step into the shoes of the defendant in the same case. Although you have not completely given up hope of a decision in your favor, you realize that the trial is going poorly. The plaintiff s lawyers have proposed a settlement in which you would have to pay 90% of their original claim, and it is clear they will not accept less. Will you settle, or will you pursue the case? Because you face a high probability of a loss, your situation belongs in the top right cell. The temptation to fight on is strong: the settlement that the plaintiff has offered is almost as painful as the worst outcome you face, and there is still hope of prevailing in court. Here again, two emotions are involved: the sure loss is repugnant and the possibility of winning in court is highly attractive. A defendant with a weak case is likely to be risk seeking, prepared to gamble rather than accept a very unfavorable settlement. In the trade-off between a risk-averse plaintiff and a risk-seeking defendant, the defendant holds the stronger hand. The superior bargaining position of the defendant should be reflected in negotiated settlements, with the plaintiff settling for less than the statistically expected outcome of the trial. This prediction from the fourfold pattern was confirmed by experiments conducted with law students and practicing judges, and also by analyses of actual negotiations in the shadow of civil trials. [...]

Consistent overweighting of improbable outcomes—a feature of intuitive decision making—eventually leads to inferior outcomes.

Une connaissance scientifique du vivant est-elle possible ?

SPEAKING OF THE FOURFOLD PATTERN

“He is tempted to settle this frivolous claim to avoid a freak loss, however unlikely. That’s overweighting of small probabilities. Since he is likely to face many similar problems, he would be better off not yielding.” [...]

Peut-on se fier à l’intuition ?

RARE EVENTS

[...]

OVERESTIMATION AND OVERWEIGHTING

[...]

Entrepreneurs and the investors who evaluate their prospects are prone both to overestimate their chances and to overweight their estimates.

VIVID OUTCOMES

[...]

The story, I believe, is that a rich and vivid representation of the outcome, whether or not it is emotional, reduces the role of probability in the evaluation of an uncertain prospect. This hypothesis suggests a prediction, in which I have reasonably high confidence: adding irrelevant but vivid details to a monetary outcome also disrupts calculation. Compare your cash equivalents for the following outcomes:

21% (or 84%) chance to receive $59 next Monday

21% (or 84%) chance to receive a large blue cardboard envelope containing $59 next Monday morning

The new hypothesis is that there will be less sensitivity to probability in the second case, because the blue envelope evokes a richer and more fluent representation than the abstract notion of a sum of money. You constructed the event in your mind, and the vivid image of the outcome exists there even if you know that its probability is low. Cognitive ease contributes to the certainty effect as well: when you hold a vivid image of an event, the possibility of its not occurring is also represented vividly, and overweighted. [...]

VIVID PROBABILITIES

The idea that fluency, vividness, and the ease of imagining contribute to decision weights gains support from many other observations. Participants in a well-known experiment are given a choice of drawing a marble from one of two urns, in which red marbles win a prize:

Urn A contains 10 marbles, of which 1 is red.

Urn B contains 100 marbles, of which 8 are red.

Which urn would you choose? The chances of winning are 10% in urn A and 8% in urn B, so making the right choice should be easy, but it is not: about 30%-40% of students choose the urn with the larger *number* of winning marbles, rather than the urn that provides a better chance of winning.

Seymour Epstein has argued that the results illustrate the superficial processing characteristic of System 1 (which he calls the experiential system).

As you might expect, the remarkably foolish choices that people make in this situation have attracted the attention of many researchers. The bias has been given several names; following Paul Slovic I will call it *denominator neglect*. If your attention is drawn to the winning marbles, you do not assess the number of non winning marbles with the same care. Vivid imagery contributes to denominator neglect, at least as I experience it. When I think of the small urn, I see a single red marble on a vaguely defined background of white marbles. When I think of the larger urn, I see eight winning red marbles on an indistinct background of white marbles, which creates a more hopeful feeling. The distinctive vividness of the winning marbles increases the decision weight of that event, enhancing the possibility effect. Of course. the same will be true of the certainty effect. If I have a 90% chance of winning a prize, the event of not winning will be more salient if 10 of 100 marbles are “losers” than if 1 of 10 marbles yields the same outcome.

The idea of denominator neglect helps explain why different ways of communicating risks vary so much in their effects. You read that “a vaccine that protects children from a fatal disease carries a 0.001% risk of permanent disability.” The risk appears small. Now consider another description of the same risk: “One of 100,000 vaccinated children will be permanently disabled.” The second statement does something to your mind that the first does not: it calls up the image of an individual child who is permanently disabled by a vaccine; the 99,999 safely vaccinated children have faded into the background. As predicted by denominator neglect, low-probability events are much more heavily weighted when described in terms of relative frequencies (how many) than when stated in more abstract terms of “chances,” “risk,” or “probability” (how likely). As we have seen, System 1 is much better at dealing with individuals than categories. [...]

DECISIONS FROM GLOBAL IMPRESSIONS

[...]

The conditions under which rare events are ignored or overweighted are better understood now than they were when prospect theory was formulated. The probability of a rare event will (often, not always) be overestimated, because of the confirmatory bias of memory. Thinking about that event, you try to make it true in your mind. A rare event will be overweighted if it specifically attracts attention. Separate attention is effectively guaranteed when prospects are described explicitly (“99% chance to win $1,000, and 1% chance to win nothing”). Obsessive concerns (the bus in jerusalem), vivid images (the roses), concrete representations (1 of 1,000), and explicit reminders (as in choice from description) all contribute to overweighting. And when there is no overweighting, there will be neglect. When it comes to rare probabilities, our mind is not designed to get things when it comes to rare probabilities, our mind is not designed to get things quite right. For the residents of a planet that may be exposed to events no one has yet experienced, this is not good news. [...]

RISK POLICIES

[...]

BROAD OR NARROW?

[...]

The example also shows that it is costly to be risk averse for gains and risk seeking for losses. These attitudes make you willing to pay a premium to obtain a sure gain rather than face a gamble, and also willing to pay a premium (in expected value) to avoid a sure loss. Both payments come out of the same pocket, and when you face both kinds of problems at once, the discrepant attitudes are unlikely to be optimal.

There were two ways of construing decisions i and ii:

* narrow framing: a sequence of two simple decisions, considered separately
* broad framing: a single comprehensive decision, with four options

Broad framing was obviously superior in this case. Indeed, it will be superior (or at least not inferior) in every case in which several decisions are to be contemplated together. Imagine a longer list of 5 simple (binary) decisions to be considered simultaneously. The broad (comprehensive) frame consists of a single choice with 32 options. Narrow framing will yield a sequence of 5 simple choices. The sequence of 5 choices will be one of the 32 options of the broad frame. Will it be the best? Perhaps, but not very likely. A rational agent will of course engage in broad framing, but Humans are by nature narrow framers. [...]

Decision makers who are prone to narrow framing construct a preference every time they face a risky choice. They would do better by having a *risk policy* that they routinely apply whenever a relevant problem arises. Familiar examples of risk policies are “always take the highest possible deductible when purchasing insurance” and “never buy extended warranties.” A risk policy is a broad frame. In the insurance examples, you expect the occasional loss of the entire deductible, or the occasional failure of an uninsured product. The relevant issue is your ability to reduce or eliminate the pain of the occasional loss by the thought that the policy that left you exposed to it will almost certainly be financially advantageous over the long run. [...]

SPEAKING OF RISK POLICIES

[...]

Each of our executives is loss averse in his or her domain. That’s perfectly natural, but the result is that the organization is not taking enough risk.”

KEEPING SCORE

Except for the very poor, for whom income coincides with survival, the main motivators of money-seeking are not necessarily economic. For the billionaire looking for the extra billion, and indeed for the participant in an experimental economics project looking for the extra dollar, money is a proxy for points on a scale of self-regard and achievement. These rewards and punishments, promises and threats, are all in our heads. We carefully keep score of them. They shape our preferences and motivate our actions, like the incentives provided in the social environment. As a result, we refuse to cut losses when doing so would admit failure, we are biased against actions that could lead to regret, and we draw an illusory but sharp distinction between omission and commission, not doing and doing, because the sense of responsibility is greater for one than for the other. The ultimate currency that rewards or punishes is often emotional, a form of mental self-dealing that inevitably creates conflicts of interest when the individual acts as an agent on behalf of an organization. [...]

The Econs of the rational-agent model do not resort to mental accounting: they have a comprehensive view of outcomes and are driven by external incentives. For Humans, mental accounts are a form of narrow framing; they keep things under control and manageable by a finite mind.

Mental accounts are used extensively to keep score. Recall that professional golfers putt more successfully when working to avoid a bogey than to achieve a birdie. One conclusion we can draw is that the best golfers create separate account for each hole; they do not only maintain a single account for their overall success. An ironic example that Thaler related in an early article remains one of the best illustrations of how mental accounting affects behavior:

Two avid sports fans plan to travel 40 miles to see a basketball game. One of hem paid for his ticket; the other was on his way to purchase a ticket when tie got one free from a friend. A blizzard is announced for the night of the game. Which of the two ticket holders is more likely to brave the blizzard to see the game?

The answer is immediate: we know that the fan who paid for his ticket is more likely to drive. Mental accounting provides the explanation. We assume that both fans set up an account for the game they hoped to see. Missing the game will close the accounts with a negative balance. Regardless of how they came by their ticket, both will be disappointed—but the closing balance is distinctly more negative for the one who bought a ticket and is now out of pocket as well as deprived of the game. Because staying home is worse for this individual, he is more motivated to see the game and therefore more likely to make the attempt to drive into a blizzard. These are tacit calculations of emotional balance, of the kind that System 1 performs without deliberation. The emotions that people attach to the state of their mental accounts are not acknowledged in standard economic theory. [...]

The escalation of commitment to failing endeavors is a mistake from the perspective of the firm but not necessarily from the perspective of the executive who “owns” a floundering project. Canceling the project will leave a permanent stain on the executive’s record, and his personal interests are perhaps best served by gambling further with the organization's resources in the hope of recouping the original investment—or at least in an attempt to postpone the day of reckoning. In the presence of sunk costs, the managers incentives are misaligned with the objectives of the firm and its shareholders, a familiar type of what is known as the agency problem. Boards of directors are well aware of these conflicts and often replace a CEO who is encumbered by prior decisions and reluctant to cut losses. The members of the board do not necessarily believe that the new CEO is more competent than the one she replaces. They do know that she does not carry the same mental accounts and is therefore better able to ignore the sunk costs of past investments in evaluating current opportunities. [...]

La perception peut-elle s’éduquer ?

Les apparences sont-elles trompeuses ?

Peut-on se fier à l’intuition ?

Peut-on percevoir sans juger ?

Faut-il préférer le bonheur à la vérité ?

REGRET

[...]

Regret is one of the counterfactual emotions that are triggered by the availability of alternatives to reality. After every plane crash there are special stories about passengers who “should not” have been on the plane—they got a seat at the last moment, they were transferred from another airline,they were supposed to fly a day earlier but had had to postpone. The common feature of these poignant stories is that they involve unusual events— and unusual events are easier than normal events to undo in imagination. Associative memory contains a representation of the normal world and its rules. An abnormal event attracts attention, and it also activates the idea of the event that would have been normal under the same circumstances.

To appreciate the link of regret to normality, consider the following scenario:

Mr. Brown almost never picks up hitchhikers. Yesterday he gave a man a ride and was robbed.

Mr. Smith frequently picks up hitchhikers. Yesterday he gave a man a ride and was robbed.

Who of the two will experience greater regret over the episode?

The results: Mr. Brown 23%, Mr. Smith 77%.

Regret and blame are both evoked by a comparison to a norm, but the relevant norms are different. The emotions experienced by Mr. Brown and Mr. Smith are dominated by what they usually do about hitchhikers. Taking a hitchhiker is an abnormal event for Mr. Brown, and most people therefore expect him to experience more intense regret. A judgmental observer, however, will compare both men to conventional norms of reasonable behavior and is likely to blame Mr. Smith for habitually taking unreasonable risks. We are tempted to say that Mr. Smith deserved his fate and that Mr. Brown was unlucky. But Mr. Brown is the one who is more likely to be kicking himself, because he acted out of character in this one instance.

Decision makers know that they are prone to regret, and the anticipation of that painful emotion plays a part in many decisions. Intuitions about regret are remarkably uniform and compelling, as the next example illustrates.

Paul owns shares in company A. During the past year he considered switching to stock in company B, but he decided against it. He now learns that he would have been better off by $1,200 if he had switched to the stock of company B.

George owned shares in company B. During the past year he switched to Stock in company A. He now learns that he would have been better off by $1,200 if he had kept his stock in company B.

Who feels greater regret?

The results are clear-cut: 8% of respondents say Paul, 92% say George.

This is curious, because the situations of the two investors are objectively identical. They both now own stock A and both would have been better off by the same amount if they owned stock B. The only difference is that George got to where he is by acting, whereas Paul got to the same place by failing to act. This short example illustrates a broad story: people expect to have stronger emotional reactions (including regret) to an outcome that is produced by action than to the same outcome when it is produced by inaction. This has been verified in the context of gambling: people expect to be happier if they gamble and win than if they refrain from gambling and get the same amount. The asymmetry is at least as strong for losses, and it applies to blame as well as to regret. The key is not the difference between commission and omission but the distinction between default options and actions that deviate from the default. When you deviate from the default, you can easily imagine the norm—and if the default is associated with bad consequences, the discrepancy between the two can be the source of painful emotions. The default option when you own a stock is not to sell it, but the default option when you meet your colleague in the morning is to greet him. Selling a stock and failing to greet your co worker are both departures from the default option and natural candidates for regret or blame. [...]

Exister, est-ce agir ?

RESPONSIBILITY

Losses are weighted about twice as much as gains in several contexts: choice between gambles, the endowment effect, and reactions to price changes. The loss-aversion coefficient is much higher in some situations. In particular, you may be more loss averse for aspects of your life that are more important than money, such as health. Furthermore, your reluctance to “sell” important endowments increases dramatically when doing so might make you responsible for an awful outcome. [...]

Anyone can understand and sympathize with the reluctance of parents to trade even a minute increase of risk to their child for money. It is worth noting, however, that this attitude is incoherent and potentially damaging to the safety of those we wish to protect. Even the most loving parents have finite resources of time and money to protect their child (the keeping-my-child-safe mental account has a limited budget), and it seems reasonable to deploy these resources in a way that puts them to best use. Money that could be saved by accepting a minute increase in the risk of harm from a pesticide could certainly be put to better use in reducing the child’s exposure to other harms, perhaps by purchasing a safer car seat or covers for electric sockets. The *taboo trade off* against accepting any increase in risk is not an efficient way to use the safety budget. In fact, the resistance may be motivated by a selfish fear of regret more than by a wish to optimize the child’s safety. The what-if? thought that occurs to any parent who deliberately makes such a trade is an image of the regret and shame he or she would feel in the event the pesticide caused harm. [...]

In the regulatory context, the precautionary principle imposes the entire burden of proving safety on anyone who undertakes actions that might harm people or the environment. [...]

The strong version of the precautionary principle is obviously untenable. But *enhanced loss aversion* is embedded in a strong and widely shared moral intuition; it originates in System 1. The dilemma between intensely loss-averse moral attitudes and efficient risk management does not have a simple and compelling solution. [...]

Is it reasonable, in particular, to let your choices be influenced by the anticipation of regret? Susceptibility to regret, like susceptibility to fainting spells, is a fact of life to which one must adjust. If you are an investor, sufficiently rich and cautious at heart, you may be able to afford the luxury of a portfolio that minimizes the expectation of regret even if it does not maximize the accrual of wealth.

You can also take precautions that will inoculate you against regret. Perhaps the most useful is to be explicit about the anticipation of regret. If you can remember when things go badly that you considered the possibility of regret carefully before deciding, you are likely to experience less of it. You should also know that regret and hindsight bias will come together, so anything you can do to preclude hindsight is likely to be helpful. My personal hindsight-avoiding policy is to be either very thorough or completely casual when making a decision with long-term consequences. Hindsight is worse when you think a little, just enough to tell yourself later, “I almost made a better choice.”

Daniel Gilbert and his colleagues provocatively claim that people generally anticipate more regret than they will actually experience, because they underestimate the efficacy of the psychological defenses they will deploy— they label the “psychological immune system.” Their recommendation is that you should not put too much weight on regret; even if you have some, it will hurt less than you now think. [...]

Suffit-il de voir le meilleur pour le suivre ?

Peut-on vouloir le bien sans le faire ?

Faut-il préférer le bonheur à la vérité ?

Le bonheur est-il dans l'inconscience ?

Ne peut-on être heureux qu’au passé ?

Peut-on désirer sans souffrir ?

Tout s'en va-t-il avec le temps ?

REVERSALS

You have the task of setting compensation for victims of violent crimes. You consider the case of a man who lost the use of his right arm as a result of a gunshot wound. He was shot when he walked in on a robbery occurring in a convenience store in his neighborhood.

Two stores were located near the victim’s home, one of which he frequented more regularly than the other. Consider two scenarios:

1. The burglary happened in the man’s regular store.
2. The man’s regular store was closed for a funeral, so he did his shopping in the other store, where he was shot.

Should the store in which the man was shot make a difference to his compensation?

You made your judgment in joint evaluation, where you consider two scenarios at the same time and make a comparison. You can apply a rule. If you think that the second scenario deserves higher compensation, you should assign it a higher dollar value.

There is almost universal agreement on the answer: compensation should be the same in both situations. The compensation is for the crippling injury, so why should the location in which it occurred make any difference? The joint evaluation of the two scenarios gave you a chance to examine your moral principles about the factors that are relevant to victim compensation. For most people, location is not one of these factors. As in other situations that require an explicit comparison, thinking was slow and System 2 was involved.

The psychologists Dale Miller and Cathy McFarland, who originally designed the two scenarios, presented them to different people for single evaluation. In their between-subjects experiment, each participant saw only one scenario and assigned a dollar value to it. They found, as you surely guessed, that the victim was awarded a much larger sum if he was shot in a store he rarely visited than if he was shot in his regular store. Poignancy (a close cousin of regret) is a counterfactual feeling, which is evoked because the thought “if only he had shopped at his regular store . . comes readily to mind. The familiar System 1 mechanisms of substitution and intensity matching translate the strength of the emotional reaction to the Story onto a monetary scale, creating a large difference in dollar awards.

The comparison of the two experiments reveals a sharp contrast. Almost everyone who sees both scenarios together (within-subject) endorses the principle that poignancy is not a legitimate consideration. Unfortunately, the principle becomes relevant only when the two scenarios are seen together, and this is not how life usually works. We normally experience life in the between-subjects mode, in which contrasting alternatives that might change your mind are absent, and of course WYSIATI. As a consequence, the beliefs that you endorse when you reflect about morality do not necessarily govern your emotional reactions, and the moral intuitions that come to your mind in different situations are not internally consistent. [...]

CHALLENGING ECONOMICS

CATEGORIES

[...]

Imagine receiving an email from an organization that you generally trust, requesting a contribution to a cause:

Dolphins in many breeding locations are threatened by pollution, which is expected to result in a decline of the dolphin population. A special fund supported by private contributions has been set up to provide pollution-free breeding locations for dolphins.

What associations did this question evoke? Whether or not you were fully aware of them, ideas and memories of related causes came to your mind. Projects intended to preserve endangered species were especially likely to be recalled. [...]

Like many other difficult questions, the assessment of dollar value can be solved by substitution and intensity matching. The dollar question is difficult, but an easier question is readily available. Because you like dolphins, you will probably feel that saving them is a good cause. The next step, which is also automatic, generates a dollar number by translating the intensity of your liking of dolphins onto a scale of contributions. You have a sense of your scale of previous contributions to environmental causes, which may differ from the scale of your contributions to politics or to the football team of your alma mater. You know what amount would be a “very large” contribution for you and what amounts are “large,” “modest,” and “small.” You also have scales for your attitude to species (from “like very much” to “not at all”). You are therefore able to translate your attitude onto the dollar scale, moving automatically from “like a lot” to “fairly large contribution” and from there to a number of dollars.

On another occasion, you are approached with a different appeal:

Farmworkers, who are exposed to the sun for many hours, have a higher rate of skin cancer than the general population. Frequent medical check-ups can reduce the risk. A fund will be set up to support medical check-ups for threatened groups.

Is this an urgent problem? Which category did it evoke as a norm when you assessed urgency? If you automatically categorized the problem as a public health issue, you probably found that the threat of skin cancer in farmworkers does not rank very high among these issues—almost certainly lower than the rank of dolphins among endangered species. As you translated your impression of the relative importance of the skin cancer issue into a dollar amount, you might well have come up with a smaller contribution than you offered to protect an endearing animal. In experiments, the dolphins attracted somewhat larger contributions in single evaluation than did the farmworkers.

Next, consider the two causes in joint evaluation. Which of the two, dolphins or farmworkers, deserves a larger dollar contribution? Joint evaluation highlights a feature that was not noticeable in single evaluation but is recognized as decisive when detected: farmers are human, dolphins are not. You knew that, of course, but it was not relevant to the judgment that you made in single evaluation. The fact that dolphins are not human did not arise because all the issues that were activated in your memory shared that feature. The fact that farmworkers are human did not come to mind because all public-health issues involve humans. The narrow framing of single evaluation allowed dolphins to have a higher intensity score, leading to a high rate of contributions by intensity matching. Joint evaluation changes the representation of the issues: the “human vs. animal” feature becomes salient only when the two are seen together. In joint evaluation people show a solid preference for the farmworkers and a willingness to contribute substantially more to their welfare than to the protection of a likable non human species. Here again, as in the cases of the bets and the burglary shooting, the judgments made in single and in joint evaluation will not be consistent.

Christopher Hsee, of the University of Chicago, has contributed the following example of preference reversal, among many others of the same type. The objects to be evaluated are second-hand music dictionaries.

|  | Dictionary A | Dictionary B |
| --- | --- | --- |
| Year of publication | 1993 | 1993 |
| Number of entries | 10,000 | 20,000 |
| Condition | Like new | Cover torn, otherwise like new |

When the dictionaries are presented in single evaluation, dictionary A is valued more highly, but of course the preference changes in joint evaluation. The result illustrates Hsee’s *evaluability hypothesis*: The number of entries is given no weight in single evaluation, because the numbers are not “evaluable” on their own. In joint evaluation, in contrast, it is immediately obvious that dictionary B is superior on this attribute, and it is also apparent that the number of entries is far more important than the condition of the cover.

UNJUST REVERSALS

[...]

As we have seen, rationality is generally served by broader and more comprehensive frames, and joint evaluation is obviously broader than single evaluation. Of course, you should be wary of joint evaluation when someone who controls what you see has a vested interest in what you choose. Sales-people quickly learn that manipulation of the context in which customers see a good can profoundly influence preferences. Except for such cases of deliberate manipulation, there is a presumption that the comparative judgment, which necessarily involves System 2, is more likely to be stable than single evaluations, which often reflect the intensity of emotional responses of System 1. We would expect that any institution that wishes to elicit thoughtful judgments would seek to provide the judges with a broad context for the assessments of individual cases. I was surprised to learn from Cass Sunstein that jurors who are to assess punitive damages are explicitly prohibited from considering other cases. The legal system, contrary to psychological common sense, favors single evaluation. [...]

you can see the absurdity only when the two cases are viewed together in a broad frame. The system of administrative penalties is coherent within agencies but incoherent globally. [...]

La perception peut-elle s’éduquer?

Les apparences sont-elles trompeuses ?

Peut-on se fier à l’intuition ?

Peut-on percevoir sans juger ?

Le juste et l’injuste ne sont-ils que des conventions ?

Notre liberté de pensée a-t-elle des limites ?

Le droit n'est-il qu'une justice par défaut ?

FRAMES AND REALITY

Italy and France competed in the 2006 final of the World Cup. The next two sentences both describe the outcome: “Italy won.” “France lost.” Do those statements have the same meaning? The answer depends entirely on what we mean by *meaning*.

For the purpose of logical reasoning, the two descriptions of the outcome of the match are interchangeable because they designate the same state of the world. As philosophers say, their truth conditions are identical: if one of these sentences is true, then the other is true as well. [...]

There is another sense of *meaning*, in which “Italy won” and “France lost” do not have the same meaning at all. In this sense, the meaning of a sentence is what happens in your associative machinery while you understand it. The two sentences evoke markedly different associations. “Italy won” evokes thoughts of the Italian team and what it did to win. “France lost” evokes thoughts of the French team and what it did that caused it to lose, including the memorable head butt of an Italian player by the French star Zidane. In terms of the associations they bring to mind—how System 1 reacts to them—the two sentences really “mean” different things. [...]

Le langage trahit-il la pensée ?

Peut-on dire que le langage entrave la pensée ?

Notre liberté de pensée a-t-elle des limites ?

Qu'est-ce qu'une idée ?

EMOTIONAL FRAMING

Amos and I applied the label of framing effects to the unjustified influences of formulation on beliefs and preferences. This is one of the examples we used:

Would you accept a gamble that offers a 10% chance to win $95 and a 90% chance to lose $5?

Would you pay $5 to participate in a lottery that offers a 10% chance to win $100 and a 90% chance to win nothing?

First, take a moment to convince yourself that the two problems are identical. In both of them you must decide whether to accept an uncertain prospect that will leave you either richer by $95 or poorer by $5. Someone whose preferences are reality-bound would give the same answer to both questions, but such individuals are rare. In fact, one version attracts many more positive answers: the second. A bad outcome is much more acceptable if it is framed as the cost of a lottery ticket that did not win than if it is simply described as losing a gamble. We should not be surprised: *losses* evokes stronger negative feelings than *costs*. Choices are not reality-bound because System 1 is not reality-bound.

The problem we constructed was influenced by what we had learned from Richard Thaler, who told us that when he was a graduate student he had pinned on his board a card that said COSTS ARE NOT LOSSES. In his early essay on consumer behavior. Thaler described the debate about whether gas stations would be allowed to charge different prices for purchases paid in cash or on credit. The credit-card lobby pushed hard to make differential pricing illegal, but it had a fallback position: the difference, if allowed, would be labeled a cash discount, not a credit surcharge. Their psychology was sound: people will more readily forgo a discount than pay a surcharge. The two may be economically equivalent, but they are not emotionally equivalent. [...]

Reframing is effortful and System 2 is normally lazy. Unless there is an obvious reason to do otherwise, most of us passively accept decision problems as they are framed and therefore rarely have an opportunity to discover the extent to which our preferences are *frame-bound* rather than *reality-bound*.

EMPTY INTUITIONS

Amos and I introduced our discussion of framing by an example that has become known as the “Asian disease problem”:

Imagine that the United States is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimates of the consequences of the programs are as follows:

If program A is adopted, 200 people will be saved

If program B is adopted, there is a one-third probability that 600 people will be saved and a two-thirds probability that no people will be saved.

A substantial majority of respondents choose program A: they prefer the certain option over the gamble.

The outcomes of the programs are framed differently in a second version:

If program A’ is adopted, 400 people will die.

If program B’ is adopted, there is a one-third probability that nobody will die and a two-thirds probability that 600 people will die.

Look closely and compare the two versions: the consequences of programs A and A’ are identical; so are the consequences of programs B and B’. In the second frame, however, a large majority of people choose the gamble.

The different choices in the two frames fit prospect theory, in which choices between gambles and sure things are resolved differently, depending on whether the outcomes are good or bad. Decision makers tend to prefer the sure thing over the gamble (they are risk averse) when the outcomes are good. They tend to reject the sure thing and accept the gamble (they are risk seeking) when both outcomes are negative. These conclusions were well established for choices about gambles and sure things in the domain of money. The disease problem shows that the same rule applies when the outcomes are measured in lives saved or lost. In this context, as well, the framing experiment reveals that risk-averse and risk-seeking preferences are not reality-bound. Preferences between the same objective outcomes reverse with different formulations.

An experience that Amos shared with me adds a grim note to the story. Amos was invited to give a speech to a group of public-health professionals—the people who make decisions about vaccines and other programs. He took the opportunity to present them with the Asian disease problem: half saw the “lives-saved” version, the others answered the “lives-lost” question. Like other people, these professionals were susceptible to the framing effects. It is somewhat worrying that the officials who make decisions that affect everyone’s health can be swayed by such a superficial manipulation— but we must get used to the idea that even important decisions are influenced, if not governed, by System 1.

Even more troubling is what happens when people are confronted with their inconsistency: “You chose to save 200 lives for sure in one formulation and you chose to gamble rather than accept 400 deaths in the other. Now that you know these choices were inconsistent, how do you decide?” The answer is usually embarrassed silence. The intuitions that determined the original choice came from System 1 and had no more moral basis than did the preference for keeping £20 or the aversion to losing £30. Saving lives with certainty is good, deaths are bad. Most people find that their System 2 has no moral intuitions of its own to answer the question. [...]

Our preferences are about framed problems, and our moral intuitions are about descriptions, not about substance. [...]

Notre liberté de pensée a-t-elle des limites ?

Peut-on dire que le langage entrave la pensée ?

Le langage trahit-il la pensée ?

La perception peut-elle s’éduquer ?

Les apparences sont-elles trompeuses ?

Peut-on se fier à l’intuition ?

Peut-on percevoir sans juger ?

Comment définir le bien ?

Le juste et l’injuste ne sont-ils que des conventions ?

TWO SELVES

The term *utility* has had two distinct meanings in its long history. Jeremy Bentham opened his *Introduction to the Principles of Morals and Legislation* with the famous sentence “Nature has placed mankind under the governance of two sovereign masters, *pain* and *pleasure*. It is for them alone to point out what we ought to do, as well as to determine what we shall do.” In an awkward footnote, Bentham apologized for applying the word *utility* to these experiences, saying that he had been unable to find a better word. To distinguish Bentham’s interpretation of the term, I will call it *experienced utility*.

For the last 100 years, economists have used the same word to mean something else. As economists and decision theorists apply the term, it means “wantability”—and I have called it *decision utility*. Expected utility theory, for example, is entirely about the rules of rationality that should govern decision utilities; it has nothing at all to say about hedonic experiences. Of course, the two concepts of utility will coincide if people want what they will enjoy, and enjoy what they chose for themselves—and this assumption of coincidence is implicit in the general idea that economic agents are rational. Rational agents are expected to know their tastes, both present and future, and they are supposed to make good decisions that will maximize these interests. [...]

Ne désirons-nous que les choses que nous estimons bonnes ?

Peut-on vouloir le bien sans le faire ?

EXPERIENCE AND MEMORY

[...]

A comment I heard from a member of the audience after a lecture illustrates the difficulty of distinguishing memories from experiences. He told of listening raptly to a long symphony on a disc that was scratched near the end, producing a shocking sound, and he reported that the bad ending ruined the whole experience.” But the experience was not actually ruined, only the memory of it. The experiencing self had had an experience that was almost entirely good, and the bad end could not undo it, because it had already happened. My questioner had assigned the entire episode a failing grade because it had ended very badly, but that grade effectively ignored 10 minutes of musical bliss. Does the actual experience count for nothing?

Confusing experience with the memory of it is a compelling cognitive illusion—and it is the substitution that makes us believe a past experience can be ruined. The experiencing self does not have a voice. The remembering self is sometimes wrong, but it is the one that keeps score and governs what we learn from living, and it is the one that makes decisions. What we learn from the past is to maximize the qualities of our future memories, not necessarily of our future experience. This is the tyranny of the remembering self. [...]

WHICH SELF SHOULD COUNT?

[...]

Each cold-hand episode is a set of moments, which the remembering seIf stores as a prototypical moment. This leads to a conflict. For an objective observer evaluating the episode from the reports of the experiencing self, what counts is the “area under the curve” that integrates pain over time; it has the nature of a sum. The memory that the remembering self keeps, in contrast, is a representative moment, strongly influenced by the peak and the end.

Of course, evolution could have designed animals’ memory to store integrals, as it surely does in some cases. It is important for a squirrel to “know” the total amount of food it has stored, and a representation of the average size of the nuts would not be a good substitute. However, the integral of pain or pleasure over time may be less biologically significant.

We know, for example, that rats show duration neglect for both pleasure and pain. In one experiment, rats were consistently exposed to a sequence in which the onset of a light signals that an electric shock will soon be delivered. The rats quickly learned to fear the light, and the intensity of their fear could be measured by several physiological responses. The main finding was that the duration of the shock has little or no effect on fear—all that matters is the painful intensity of the stimulus.

Other classic studies showed that electrical stimulation of specific areas in the rat brain (and of corresponding areas in the human brain) produce a sensation of intense pleasure, so intense in some cases that rats who can stimulate their brain by pressing a lever will die of starvation without taking a break to feed themselves. Pleasurable electric stimulation can be delivered In bursts that vary in intensity and duration. Here again, only intensity matters. Up to a point, increasing the duration of a burst of stimulation does not appear to increase the eagerness of the animal to obtain it. The rules that govern the remembering self of humans have a long evolutionary history. [...]

The cold-hand study showed that we cannot fully trust our preferences to reflect our interests, even if they are based on personal experience, and even if the memory of that experience was laid down within the last quarter of an hour! Tastes and decisions are shaped by memories, and the memories can be wrong. The evidence presents a profound challenge to the idea that humans have consistent preferences and know how to maximize them, a cornerstone of the rational-agent model. An inconsistency is built into the design of our minds. We have strong preferences about the duration of our experiences of pain and pleasure. We want pain to be brief and pleasure to last. But our memory, a function of System 1, has evolved to represent the most intense moment of an episode of pain or pleasure (the peak) and the feelings when the episode was at its end. A memory that neglects duration will not serve our preference for long pleasure and short pains. [...]

Ne peut-on être heureux qu’au passé ?

Notre liberté de pensée a-t-elle des limites ?

Qu'est-ce qu'une idée ?

La fête est-elle toujours un gaspillage ?

Exister, est-ce profiter de l’instant présent ?

Ne désirons-nous que les choses que nous estimons bonnes ?

Peut-on vouloir le bien sans le faire ?

Connaissons-nous mieux le présent que le passé ?

Les principes de la raison sont-ils issus de l'expérience ?

Daniel Kahneman, Thinking Fast and Slow, 2011