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Why Bad Decisions Happen to Good Managers

Most strategic decisions are flawed. Yours don't have to be.

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Collection Overview

Making strategic decisions is your *most* crucial job. It's also your riskiest. Three-fourths of strategic decisions fail: A merger doesn't pay off. A new division won't perform as intended. An innovative product languishes on store shelves.

Why the dismal failure rate? While mulling over strategic decisions, we make poor use of our cognitive powers. For example, we wrongly assume that a successful competitive strategy that worked in one industry will prove just as effective in another. Or we let the first information we receive distort our interpretation of subsequent information. Or we only consider data that supports a choice we favor.

There's nothing wrong with drawing an analogy between two industries or filtering information to arrive at a decision. In fact, such techniques can offer important advantages—such as revealing valuable new opportunities. But wielded carelessly, cognitive shortcuts can also lead us down a disastrous path.

How to tap your mental prowess to make successful strategic decisions? Understand the dangers lurking in common cognitive processes, then apply potent countermeasures. This *Harvard Business Review* OnPoint collection provides guidelines and tools to help you get started.

The Articles

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1st article from the collection:
Why Bad Decisions Happen to Good Managers

How Strategists Really Think

Tapping the Power of Analogy

by Giovanni Gavetti and Jan W. Rivkin

Included with this full-text *Harvard Business Review* article:

Product 9661

How Strategists Really Think

Tapping the Power of Analogy

The Idea in Brief

When Charles Lazarus replicated successful strategies from the supermarket industry to launch Toys R Us (think exhaustive selection, low prices, self-service), he used **analogical thinking**: He drew lessons from one business setting and applied them to another.

Sometimes analogies spark breakthrough strategies—as Toys R Us's successful launch shows. But when analogies are based on surface-level similarities, they can lead managers astray. Consider Enron: By ignoring key differences between natural gas trading and broadband trading, Enron embarked on a diversification scheme that proved disastrous.

How to tap the power of analogical thinking while sidestepping its pitfalls? First, **articulate the analogy** your management team is using to weigh a potential new strategy. Only by making your analogy explicit can you then **assess its soundness**. Ford Motor Company, for example, examined Dell Computer's innovative supply chain model before deciding that production similarities between the auto and PC industries were outweighed by differences in industry cost structures. Finally, **decide how well your strategy will translate to a new setting**—and fine-tune it to address key differences.

It's impossible to make analogies 100% safe. But by employing several straightforward steps, you can boost your chances of avoiding analogical thinking's dangers—and make smart, successful strategic choices.

The Idea in Practice

To tap the power of analogical thinking, apply these steps:

- **Articulate the analogy.** In deciding to launch CarMax, a chain of used-car outlets, successful electronics retailer Circuit City drew an analogy between the electronics-retailing environment of the 1970s (its "source" setting) and the used-car industry of the 1990s (its "target" setting).
- **Identify why the "source" strategy worked.** The 1970s electronics-retailing industry was dominated by small, local retailers of variable quality and efficiency. Untapped efficiencies (for example, unexploited economies of scale) and unmet customer needs (stores suffered frequent stockouts) also characterized the industry.

  Circuit City's strategy? Offer large stores that stocked exhaustive selections and pair automated distribution centers with sales-tracking technology to ensure product availability. Differentiating itself on selection and product availability, the company crushed smaller rivals.
- **Assess similarities *and* differences between the source and target setting.** The 1990s used-car industry strongly resembled the 1970s electronics-retailing industry. For example, customers didn't trust retailers; economies of scale and barriers to entry were limited; and information and distribution technology were primitive.

  But important differences existed as well. For instance, in consumer electronics, Circuit City had a large base of dependable, reputable suppliers—while most used-car dealers bought inventory from variably reliable wholesalers or individual car owners.
- **Translate your strategy to the new setting.** Circuit City's strategy for CarMax closely matched its electronics-retailing operation. For example, CarMax's large-lot superstores offered broad inventories of 200 to 550 vehicles. Moreover, the company sold cars at fixed, posted prices, with no haggling—which reduced mistrust between customers and used-car dealers. It also paid salespeople a flat fee per vehicle—eliminating incentives to push more expensive cars on customers.

  But CarMax adjusted Circuit City's formula to reflect the two settings' differences. For instance, unlike the electronics-retailing industry, the used-car industry lacked reliable supply sources. CarMax addressed this difference by placing well-trained buyers in each store who offered to buy used cars directly from consumers. Then it thoroughly inspected and reconditioned used cars before reselling them.

  CarMax's reward? Revenues of $4.6 billion in 2004, a multibillion-dollar market capitalization, and equity returns that roughly matched the S&P 500's.

Much of the time, executives use analogies to make strategic choices. The best strategists know both the power and peril of such comparisons.

How Strategists Really Think

Tapping the Power of Analogy

by Giovanni Gavetti and Jan W. Rivkin

Strategy is about choice. The heart of a company's strategy is what it chooses to do and not do. The quality of the thinking that goes into such choices is a key driver of the quality and success of a company's strategy. Most of the time, leaders are so immersed in the specifics of strategy—the ideas, the numbers, the plans—that they don't step back and examine how they think about strategic choices. But executives can gain a great deal from understanding their own reasoning processes. In particular, reasoning by analogy plays a role in strategic decision making that is large but largely overlooked. Faced with an unfamiliar problem or opportunity, senior managers often think back to some similar situation they have seen or heard about, draw lessons from it, and apply those lessons to the current situation. Yet managers rarely realize that they're reasoning by analogy. As a result, they are unable to make use of insights that psychologists, cognitive scientists, and political scientists have generated about the power and the pitfalls of analogy. Managers who pay attention to their own analogical thinking will make better strategic decisions and fewer mistakes.

When Analogies Are Powerful

We've explained the notion of analogical reasoning to executives responsible for strategy in a variety of industries, and virtually every one of them, after reflecting, could point to times when he or she relied heavily on analogies. A few well-known examples reflect how common analogical reasoning is:

• Throughout the mid-1990s, Intel had resisted providing cheap microprocessors for inexpensive PCs. During a 1997 training seminar, however, Intel's top management team learned a lesson about the steel industry from Harvard Business School professor Clayton Christensen: In the 1970s, upstart minimills established themselves in the steel business by making cheap concrete-reinforcing bars known as rebar. Established players like U.S. Steel ceded the low end of the business to them, but deeply regretted that decision when the minimills crept into higher-end products. Intel's CEO at the

time, Andy Grove, seized on the steel analogy, referring to cheap PCs as "digital rebar." The lesson was clear, Grove argued: "If we lose the low end today, we could lose the high end tomorrow." Intel soon began to promote its low-end Celeron processor more aggressively to makers and buyers of inexpensive PCs.

• Starting in the 1970s, Circuit City thrived by selling consumer electronics in superstores. A wide selection, professional sales help, and a policy of not haggling with customers distinguished the stores. In 1993, Circuit City surprised investors by announcing that it would open CarMax, a chain of used-car outlets. The company argued that the used-car industry of the 1990s bore a close resemblance to the electronics retailing environment of the 1970s. Mom-and-pop dealers with questionable reputations dominated the industry, leaving consumers nervous when they purchased and financed complex, big-ticket, durable goods. Circuit City's managers felt that its success formula from electronics retailing would work well in an apparently analogous setting.

• The supermarket, a retail format pioneered during the 1930s, has served as an analogical source many times over. Charlie Merrill relied heavily on his experience as a supermarket executive as he developed the financial supermarket of Merrill Lynch. Likewise, Charles Lazarus was inspired by the supermarket when he founded Toys R Us in the 1950s. Thomas Stemberg, the founder of Staples and a former supermarket executive, reports in his autobiography that Staples began with an analogical question: "Could we be the Toys R Us of office supplies?"

Each of these instances displays the core elements of analogical reasoning: a novel problem that has to be solved or a new opportunity that begs to be tapped; a specific prior setting that managers deem to be similar in its essentials; and a solution that managers can transfer from its original setting to the unfamiliar context. When managers face a problem, sense "Ah, I've seen this one before," and reach back to an earlier experience for a solution, they are using analogy.

Strategy makers use analogical reasoning more often than they know. Commonly, credit for a strategic decision goes to one of two other approaches: deduction and the process of trial and error. When managers use deduction, they apply general administrative and economic principles to a specific business situation, weigh alternatives, and make a rational choice. They choose the alternative that, according to their analysis, would lead to the best outcome. Trial and error, on the other hand, involves learning after the fact rather than thinking in advance.

Both deduction and trial and error play important roles in strategy, but each is effective only in specific circumstances. Deduction typically requires a lot of data and is therefore at its most powerful only in information-rich settings—for instance, mature and stable industries. Even where information is available, processing a great deal of raw data is very challenging, particularly if there are many intertwined choices that span functional and product boundaries. The mental demands of deduction can easily outstrip the bounds on human reasoning that psychologists have identified in numerous experiments. For this reason, deduction works best for modular problems that can be broken down and tackled piece by piece.

Trial and error is a relatively effective way to make strategic decisions in settings so ambiguous, novel, or complex that any cognitively intensive effort is doomed to fail. In altogether new situations, such as launching a radically new product, there may be no good substitute for trying something out and learning from experience.

Many, perhaps most, strategic problems are neither so novel and complex that they require trial and error nor so familiar and modular that they permit deduction. Much of the time, managers have only enough cues to see a resemblance to a past experience. They can see how an industry they're thinking about entering looks like one they already understand, for example. It is in this large middle ground that analogical reasoning has its greatest power.

Analogical reasoning makes enormously efficient use of the information and the mental processing power that strategy makers have. When reasoning by analogy, managers need not understand every aspect of the problem at hand. Rather, they pay attention to select features of it and use them to apply the patterns of the past to the problems of the present. Imagine, for instance, the challenge facing Charles Lazarus in the fast-changing, complex toy industry of the 1950s. Had he sat down and analyzed all of the interdependent configura-

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tions of choices in toy retailing—from marketing to operations, from human resource management to logistics—it is unlikely he would have come up with a strategy as coherent and effective as the one Toys R Us adopted. The analogy he drew to supermarkets was extraordinarily efficient from an informational and cognitive point of view. In one stroke, it gave Lazarus an integrated bundle of choices: exhaustive selection, relatively low prices, rapid replenishment of stock, deep investment in information technology, self-service, shopping carts, and so forth.

Analogical reasoning can also be a source of remarkable insight. Analogies lie at the root of some of the most compelling and creative thinking in business as a whole, not just in discussions of strategy. For instance, Taiichi Ohno, the foremost pioneer of Toyota's famed production system, supposedly invented the *kanban* system for replenishing inventory after he watched shelf-stocking procedures at U.S. supermarkets, and he devised the *andon* cord to halt a faulty production line after seeing how bus passengers signaled a driver to stop by pulling a cord that rang a bell.

Reasoning by analogy is prevalent among strategy makers because of a series of close matches: between the amount of information available in many strategic situations and the amount required to draw analogies; between the wealth of managerial experience and the need for that experience in analogical reasoning; and between the need for creative strategies and analogy's ability to spark creativity. Reflecting these matches, business schools typically teach strategy by means of case studies, which provide an abundance of analogies from which the students can draw. (See the sidebar "Strategic Decision Making and the Case Method.") Similarly, some of the foremost strategy consultants are famed for their ability to draw lessons from one industry and apply them to another. Thus we have ample reason to believe that analogical reasoning is a key implement in the toolbox of the typical real-world strategist.

How Analogies Fail

Though analogical reasoning is a powerful and prevalent tool, it is extremely easy to reason poorly through analogies, and strategists rarely consider how to use them well. Indeed, analogies' very potency requires that they be used wisely. To understand the potential pitfalls, consider for a moment the anatomy of analogy. Cognitive scientists paint a simple picture of analogical reasoning. An individual starts with a situation to be handled—the *target problem* (for Intel, the competition from makers of low-end microprocessors). The person then considers other settings that she knows well from direct or vicarious experience and, through a process of *similarity mapping,* identifies a setting that, she believes, displays similar characteristics. This setting is the

Strategic Decision Making and the Case Method

The case method in business education has often been criticized, most recently by Henry Mintzberg, because it depicts management as an abstract theoretical exercise removed from the reality of managerial work. We believe this criticism misses the cognitive underpinnings of managerial decision making. In their role as strategists, managers often face situations in which thinking by analogy or by case has more power than other forms of reasoning. Thus, teaching managers with cases, and to reason from cases, is an appropriate and powerful approach. In fact, the case method has extraordinary potential to enable managers to draw better analogies, for two reasons.

First, the case method creates a large repertoire of secondhand experiences from which students can reason. During their managerial careers, former business students will seldom, if ever, encounter a situation exactly like one they discussed in the classroom. But having studied and debated hundreds of cases from diverse settings, managers can draw upon a large set of vicarious experiences as they make choices.

Second, the case method gives students extensive experience in deciding what is and what isn't important in a given business situation. This skill is crucial to analogical reasoning. The difference between a superficial and a deep similarity mapping is relevance. A superficial mapping focuses on irrelevant similarity (such as the home state of the president in the experiment described in the main text); a deep one emphasizes similarity along dimensions that truly drive business performance.

It is probably not surprising that two professors at Harvard, the bastion of the case method, would defend it. Yet our support comes with important reservations. Too often, students and managers alike reason loosely and fail to assess whether there is a clear causal mapping of their solution onto the problem. Students who are taught by the case method should be trained in the careful use of analogy—and that, we fear, occurs too rarely. Indeed, that fear was one of the factors that fueled our interest in analogical reasoning.

It is extremely easy to reason poorly through analogies, and strategists rarely consider how to use them well.

source problem (the steel industry). From the source emerges a *candidate solution* that was or should have been adopted for the source problem (a vigorous defense of the low end). The candidate solution is then applied to the target problem.

In a variant of this picture, the solution seeking a problem, an individual starts with a source problem and a candidate solution, then uses similarity mapping to find a target problem where the solution would work well. Circuit City's managers, for instance, had an effective solution in consumer electronics retailing. They then found a new setting, used-car retailing, to which they believed their solution could be applied with success.

Dangers arise when strategists draw an analogy on the basis of superficial similarity, not deep causal traits. Take Ford, for instance. In overhauling its supply chain, the automaker looked carefully at Dell's key strategic principle of "virtual integration" with its suppliers as a possible source for an analogy. On the surface, computer and auto production resemble one another. Both involve the assembly of a vast variety of models from a set of fairly standardized components. It is easy, however, to pinpoint differences between the two industries. In the PC business, for example, prices of inputs decline by as much as 1% per week—much, much faster than in the auto industry. To the extent that rapidly falling input prices play a role in Dell's success formula, overlooking this underlying difference could seriously undermine the usefulness of the analogy. Fortunately, Ford executives thought carefully about the differences between the auto industry and the PC business, as well as the difficulty of changing their existing supply chain, as they used the analogy.

The experience of Enron shows how a seductive but bad analogy can lead to flawed decisions. Many factors contributed to Enron's startling collapse, but headlong diversification based on loose analogies played an important role. After apparently achieving success in trading natural gas and electric power, Enron executives moved rapidly to enter or create markets for other goods ranging from coal, steel, and pulp and paper to weather derivatives and broadband telecom capacity. In a classic example of a solution seeking problems, executives looked for markets with certain characteristics reminiscent of the features of the gas and electricity markets. The characteristics included fragmented demand, rapid change due to deregulation or technological progress, complex and capital-intensive distribution systems, lengthy sales cycles, opaque pricing, and mismatches between long-term supply contracts and short-term fluctuations in customer demand. In such markets, managers were confident that Enron's market-creation and trading skills would allow the company to make hefty profits.

On the broadband opportunity, for instance, Enron Chairman Kenneth Lay told *Gas Daily,* "[Broadband]'s going to start off as a very inefficient market. It's going to settle down to a business model that looks very much like our business model on [gas and electricity] wholesale, which obviously has been very profitable with rapid growth." But Enron's executives failed to appreciate important, deeper differences between the markets for natural gas and bandwidth. The broadband market was based on unproven technology and was dominated by telecom companies that resented Enron's encroachment. The underlying good—bandwidth—did not lend itself to the kinds of standard contracts that made efficient trading possible in gas and electricity. Perhaps worst, in broadband trading, Enron had to deliver capacity the "last mile" to a customer's site—an expensive challenge that gas wholesalers didn't face.

The danger of focusing on superficial similarity is very real, for two reasons. First, distinguishing between a target problem's deep, structural features and its superficial characteristics is difficult, especially when the problem is new and largely unknown. In the earliest days of the Internet portal industry, for instance, it was far from clear what structure would emerge in the business. Players in the market adopted analogies that reflected idiosyncrasies of the management teams rather than deep traits of the evolving industry. The tech-savvy founders of Lycos, for instance, saw themselves competing on a high-tech battlefield and assumed that the company with the best search technology would win. Magellan's founders, the twin daughters of publishing magnate Robert Maxwell, aimed to build "the Michelin guide to the Web" and developed editorial abilities. The pioneers of Yahoo, seeing the portal industry as a media business, invested in the company's brand and the look

and feel of its sites.

But this is only part of the picture. Not only is it difficult to distinguish deep similarities from surface resemblances in some contexts, but people typically make little effort to draw such distinctions. In laboratory experiments conducted by psychologists, subjects—even well-educated subjects—are readily seduced by similarities they should know to be superficial. In a study by psychologist Thomas Gilovich, students of international conflict at Stanford were told of a hypothetical foreign-policy crisis: A small, democratic nation was being threatened by an aggressive, totalitarian neighbor. Each student was asked to play the role of a State Department official and recommend a course of action. The descriptions of the situation were manipulated slightly. Some of the students heard versions with cues that were intended to make them think of events that preceded World War II. The president at the time, they were told, was "from New York, the same state as Franklin Roosevelt," refugees were fleeing in boxcars, and the briefing was held in Winston Churchill Hall. Other students heard versions that might have reminded them of Vietnam. The president was "from Texas, the same state as Lyndon Johnson," refugees were escaping in small boats, and the briefing took place in Dean Rusk Hall. Clearly, there is little reason that the president's home state, the refugees' vehicles, or the name of a briefing room should influence a recommendation on foreign policy. Yet subjects in the first group were significantly more likely to apply the lessons of World War II—that aggression must be met with force—than were participants in the second group, who veered toward a hands-off policy inspired by Vietnam. Not only were the students swayed by superficial likenesses, they were not even aware that they had been swayed.

Strategists will seek evidence that their analogy is legitimate, not evidence that it is invalid. As a result, a company may continue to act on a superficial analogy for a long time.

The implications are unsettling. Thanks to his or her particular history and education, each manager carries around an idiosyncratic tool kit of possible sources of analogies. In choosing among tools or identifying new problems for old tools, the manager may be guided by something other than a careful look at the similarity between the source and the target.

The tendency to rely on surface similarity is made even worse by two other common flaws in how people reach judgments:

Anchoring. Once an analogy or other idea anchors itself in a management team, it is notoriously hard to dislodge. Psychologists have shown that this is true even when decision makers obviously have no reason to believe the initial idea. In a demonstration of this effect, Nobel Prize winner Daniel Kahneman and his coauthor Amos Tversky told experimental subjects they would be asked to estimate the percentage of African countries in the membership of the United Nations. A roulette wheel with numbers from zero to 100 was spun, and after it had stopped, the subjects were asked whether the actual percentage was greater or less than the number showing on the wheel. They were then asked to estimate the correct percentage. Surprisingly, the roulette wheel had a strong impact on final estimates. For instance, subjects who saw 10% on the wheel estimated the real percentage at 25%, on average, while those who saw 65% gave an average estimate of 45%. The roulette wheel knew nothing about the composition of the United Nations, obviously, yet it had a powerful influence on people's judgment. (The current answer: African nations make up 24% of the U.N.'s membership.)

The anchoring effect suggests that early analogies in a company, even if they have taken root casually, can have a lasting influence. This is especially true if decision makers become emotionally attached to their analogies. For years, Sun Microsystems has focused on delivering entire systems of hardware and software even as the computer industry has grown less and less integrated. CEO Scott McNealy often justifies his contrarian position by highlighting an analogy to the automotive industry. "You guys are all focusing on piston rings," he once told reporters. "Go and ask Ford about its strategy in piston rings. And carburetors. You don't. You talk about the whole car." Though Sun has suffered financially, McNealy has been reluctant to shift strategy, and, indeed, he continues to use the auto analogy. Perhaps that is inevitable for an individual whose father worked in the auto industry and whose sons are named after vehicle models—Maverick, Scout, Colt, and Dakota.

Confirmation Bias. The anchoring effect is reinforced by another problem: decision makers' tendency to seek out information that confirms their beliefs and to ignore contradictory data. To some degree, this tendency arises simply because managers like to be right—

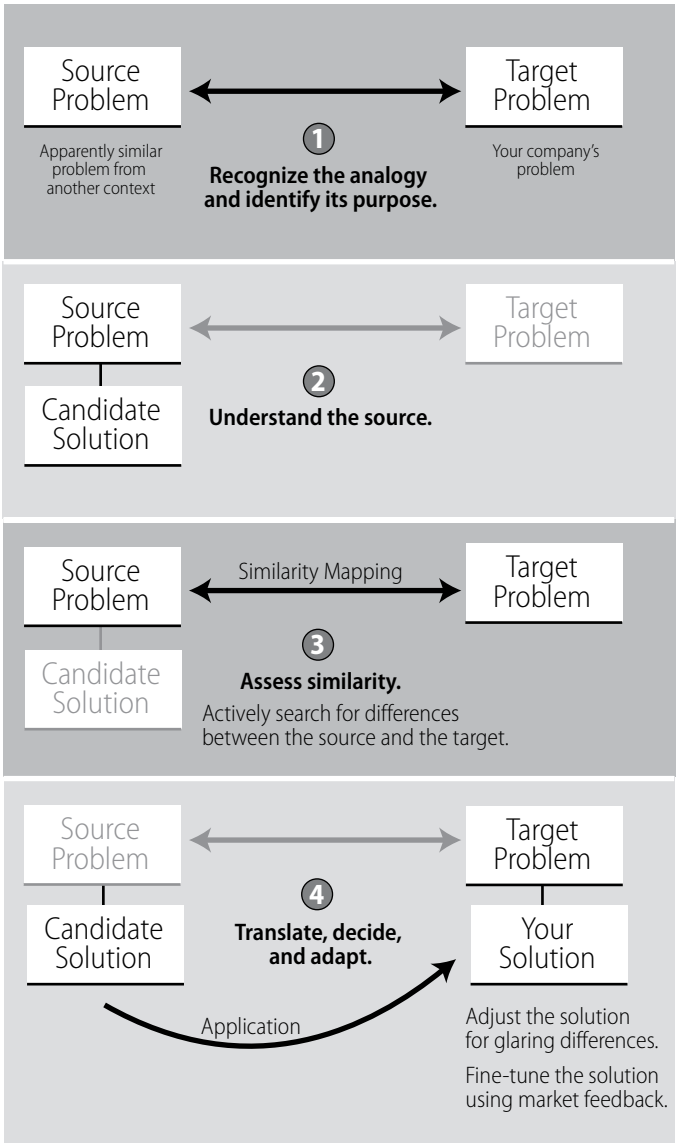
and like to be seen as right. But there is evidence from psychology that people are better equipped to confirm beliefs than to challenge them, even when they have no vested interest in the beliefs.

Consider an illustration. Experimental subjects in Israel were asked during the 1970s, "Which pair of countries is more *similar,* West Germany and East Germany, or Sri Lanka and Nepal?" Most people answered, "West Germany and East Germany." A second set of subjects was asked, "Which pair of countries is more *different,* West Germany and East Germany, or Sri Lanka and Nepal?" Again, most people answered, "West Germany and East Germany." How can we reconcile the two sets of results? The accepted interpretation starts with the fact that the typical Israeli knew more about the Germanys than about Sri Lanka and Nepal. When asked to test a hypothesis of similarity, subjects sought evidence of similarity and found more between the Germanys than between Sri Lanka and Nepal. When asked to test a hypothesis of difference, they sought differences and found more of them between the Germanys. Subjects search for the attribute they are prompted to seek—similarity or difference—and do not look for evidence of the contrary attribute.

Together, anchoring and the confirmation bias suggest real problems for strategists who rely on analogies. Having adopted an analogy, perhaps a superficial one, strategy makers will seek out evidence that it is legitimate, not evidence that it is invalid. Intel's managers will tend to look for reasons that microprocessors really are like steel; Circuit City will try to confirm that consumer electronics and used cars truly are alike. Given the variety of information available in most business situations, anyone who looks for confirming data will doubtless find something that supports his or her beliefs. Thanks to the anchoring effect, any contradictory information may well be disregarded. As a result, a company may continue to act on a superficial analogy for a long time.

Avoiding Superficial Analogies

It's often difficult to tell whether similarities between a familiar and an unfamiliar problem are deep or superficial. Managers facing strategic choices can improve their odds of using analogies well by following these four steps.



How to Avoid Superficial Analogies

Reasoning by analogy, then, poses a dilemma for senior managers. On the one hand, it is a powerful tool, well suited to the challenges of making strategy in novel, complex settings. It can spark breakthrough thinking and fuel successes like those of Toys R Us and Intel. On the other, it raises the specter of superficiality. Can managers tap the power of analogy but sidestep its pitfalls? The bad news is that it is impossible to make analogies 100% safe. Managers are especially likely to rely on analogical reasoning in unfamiliar, ambiguous environments where other forms of thinking, like deduction, break down. In those settings, it's

hard to distinguish the deep traits from the superficial. The good news is that four straightforward steps can improve a management team's odds of using analogies skillfully. (See the exhibit "Avoiding Superficial Analogies.")

Before laying out these steps, we must acknowledge our debt to political scientists, especially Harvard's Ernest May and Richard Neustadt, who found that analogical reasoning often leads policy makers astray. The approaches they developed to train such people to make better use of history have informed our thinking.

Recognize the analogy and identify its purpose. To defend against flawed analogies, a management team first must recognize the analogies it is using. Sometimes they are obvious. It is hard to forget that "digital rebar" is a reference to the steel industry, for instance. In other cases, influential analogies remain hidden. They often come from executives' backgrounds. Though Merrill Lynch's distinctive approach to retail brokerage owed much to the years that Charlie Merrill spent in the supermarket business, only occasionally did Merrill confess that "although I am supposed to be an investment banker, I think I am really and truly a grocery man at heart."

It's also important to identify *how* a company is using any analogies it recognizes. Managers use analogies for a variety of purposes, after all—to brainstorm, to communicate complexity, and to motivate employees, for example. (For thoughts on the uses of analogies, see the sidebar "A Versatile Tool.") Often, analogies are used to spark ideas and emotions. In such cases, creativity and impact may be more important than strict validity. But when a company moves from brainstorming to deciding, and when resources are at stake, managers need to ask tough, objective questions about whether the analogy is more than superficial. To answer these questions well, strategists must analyze chains of cause and effect. It is useful to break this task into three further steps.

Understand the source. Begin by examining why the strategy worked in the industry from which the analogy was drawn. The classic tools of strategy analysis are extremely useful here. Indeed, the key is to lay out in-depth analyses that are familiar to strategists, particularly analyses of the source environment, the solution or strategy that worked well (or that failed) in the original context, and the link between the source environment and the winning (or losing) strategy.

Consider Circuit City's effort to apply its retailing solution to the used-car business, and start by analyzing the source environment. When the company began its rise to prominence in the 1970s, the consumer electronics industry was dominated by mom-and-pop retailers of varying quality and efficiency. Burgeoning demand kept the retailers afloat, despite three negatives: Consumers were more committed to the national brands than to the retailers, the cost to switch from one retailer to another was low, and customers often feared that retailers were preying on their ignorance of high-tech products. The environment was marked by untapped efficiencies (for example, few economies of scale were exploited) and unmet customer needs (each store carried a limited selection of brands, and products were often out of stock).

Circuit City devised a highly effective strategy that took advantage of the opportunities and neutralized the threats in this setting. Key to the strategy was a series of fixed investments: large stores that could stock an exhaustive selection of consumer electronics, information technology that could track sales

A Versatile Tool

This article focuses on the use of analogy as a tool for choosing among possible solutions to strategic problems, but managers also use analogies for other purposes. Most important, analogies can be catalysts for generating creative options. Seeking outside-the-box ways to speed customers through gas stations, for instance, Mobil executives looked far afield—at the operations of race-car pit crews. And to improve service, they examined the world-class operations of the Ritz-Carlton hotel chain. Similarly, a management team might choose a company it deeply admires in a distant business and ask itself, "What would it mean to be the Wal-Mart or GE or Dell of our industry?" We see little danger in using analogies this way—as long as managers test any analogy carefully when they move from generating options to choosing among them.

Analogies are also powerful tools for communicating complex messages quickly. When the executives turning around Ducati began to speak of the legendary Italian motorcycle maker as an entertainment company comparable to Disney, they made it clear, to insiders and outsiders, that they planned to invest more in the experiential aspects of the brand and less in the physical product. Chosen well, analogies have an emotional impact that can rally a management team. By referring to cheap PCs as "digital rebar," Andy Grove sharpened his colleagues' fears that Intel could go the way of U.S. Steel. Sports and military analogies are often used in this way, to motivate teams.

patterns closely, automated distribution centers that were tied to the sales-tracking technology, and brand-building efforts. The company differentiated itself from competitors on the basis of selection, availability, and consumer trust. It simultaneously drove down costs. Circuit City's low prices and its other strengths led to extraordinarily large sales volumes, which reduced unit costs. Those cost reductions permitted lower prices, which drove even greater volume, and so on in a virtuous cycle.

Note how well this strategy matched the demands of the external environment. By meeting consumer needs and by building a brand that shoppers valued, Circuit City made it less attractive for customers to switch from store to store. As Circuit City's brand rose to prominence, as sales volume grew, and as customers came to rely on the recommendations of Circuit City's salespeople, the company became far more powerful in negotiations with suppliers. Investments in branding, distribution, information technology, and large stores raised new barriers to entry. And scale-driven cost advantages gave the company a powerful way to overcome smaller rivals.

The preceding three paragraphs lay out a chain of cause and effect that explains why Circuit City's original strategy worked in the consumer electronics environment. The strategist's goal is to figure out whether the causal logic holds up in the target environment. In preparing to make that analysis, the strategy maker will find it useful to compile two lists of industry features: those that play a crucial role in the causal logic and those that don't. In the Circuit City example, the list of crucial elements includes the following features of the pre–Circuit City electronics retailing industry:

- unsatisfied customer needs, especially for product selection, product availability, and trustworthy retailers;
- untapped economies of scale and latent, but largely unrealized, barriers to entry;
- a fragmented base of rivals, many of them weak;
- unexploited opportunities to apply information and distribution technologies for better inventory management;
- branded, powerful, reliable suppliers;
- modest switching costs among consumers; and
- an absence of goods that are close substitutes at the high end of the market.

At least one notable feature of the industry appears *not* to have played a major role in the causal logic, according to our analysis. Demand for consumer electronics was growing rapidly when Circuit City became a success, but the industry growth rate does not loom large in the causal story. The sheer size of the industry plays a role—without a critical mass of demand, economies of scale cannot be tapped—but the growth rate does not seem critical.

Assess similarity. The strategist now maps similarities between the source and the target and determines whether the resemblance is more than superficial. The understanding of the source that he or she has built up is crucial in this step. Rather than wrestling with the entire target problem, which is much less familiar than the source, the strategist can focus on the key features of the causal logic. The question is whether the source and the target are similar or different along these features.

Similarities usually spring to mind quickly. But the team must also *search actively for differences*, seeking evidence that each essential feature of the source problem is absent in the target. This process rarely comes naturally—it is often thwarted by the confirmation bias. The team should also do something else that doesn't come naturally: *ask whether the similarities are largely superficial*. The list of industry features that are *not* crucial in the causal logic

Background of the Work

Field research sparked our interest in analogical reasoning. While exploring the origins of strategies in the Internet portal industry, we were struck by the prevalence of analogies. Discussions with managers and academic colleagues, along with personal reflections, led us to recognize the broader significance of analogical reasoning in strategy making. This recognition fueled a series of efforts, including a review of the literature on analogy in psychology, cognitive science, political science, and linguistics; an initiative to examine and improve the use of analogical reasoning in the MBA classroom; and development, with Wharton's Daniel Levinthal, of a simulation in which computer-modeled "managers" use analogical reasoning to solve strategic problems. Perhaps the crucial ingredient in the research is that we—the authors of this article—come from very different academic backgrounds. One of us was raised within Wharton's behavioral approach to management, which emphasizes the limits on human reasoning, and the other comes from Harvard's strategy tradition, which stresses the power of rational economic choice. Analogical reasoning lies in the middle ground between the two of us. It is a form of reasoning that is potent because it makes the most of bounded cognitive abilities.

is very useful in this step. If many of the similarities are on this list rather than the list of crucial correspondences, the management team should sound an alarm. The analogy may be based on superficial similarity.

Circuit City's entry into the used-car market illustrates the process of assessing similarity. In many ways, the target industry in the 1990s resembled the consumer electronics retailing industry of the 1970s:

- Many customers were unsatisfied with, and distrustful of, current retailers.
- Economies of scale and barriers to entry were limited.
- The industry was fragmented.
- Information and distribution technologies remained fairly primitive, even though the inventory was highly diverse.
- Consumers incurred few costs if they switched from one retailer to another.

Note that all of these similarities match crucial elements of the causal logic in electronics retailing. This bodes well for the analogy. On the other hand, there were important differences:

- In consumer electronics, Circuit City could rely on a large base of dependable, reputable suppliers. In contrast, most used-car dealers bought their autos from individual sellers or from wholesalers, some reliable and some not.
- The inventory of used cars was even more diverse than that of consumer electronics. It would be difficult to keep a predictable range of products in stock. This might make it hard for CarMax to detect sales trends quickly and adjust its inventory to meet demand. Moreover, the distribution expertise Circuit City had developed might not be useful in the used-car industry.
- It was not clear whether economies of scale existed or barriers to entry could be built in auto retailing.
- The used-car retailing market had an important substitute at the high end of the market: new-car dealers.

Translate, decide, and adapt. The final step is to decide whether the original strategy, properly translated, will work in the target industry. This step requires, first, that the management team say clearly what the strategy would look like in the new setting. Precisely what would it take to be the Circuit City of the used-car industry or the supermarket of toys? This requires some adjustment. Even the best analogies involve some differences between the source and the target settings. By now, executives have a sense of the most important differences, and, in translating the strategy, they try to make adjustments that deal with them. After the translation comes a go-no-go decision on whether to pursue the analogy in the marketplace. This involves a clearheaded assessment of whether the translated strategy is likely to fare well in the new context. If executives opt to pursue the analogy, they face another round of adjustment—adapting in the marketplace in response to feedback from customers, rivals, suppliers, and others. It is here, in the market, that managers truly learn how good their analogies are.

Circuit City's translated strategy bore a close resemblance to the company's electronics retailing operation. On lots of up to 14 acres, each CarMax superstore offered an unusually broad inventory of 200 to 550 vehicles. CarMax went to special lengths to foster customers' trust. It sold cars at fixed, posted prices, with no haggling. It hired salespeople with retailing experience, but *not* auto retailing experience, and gave them extensive training. CarMax compensated salespeople with a flat fee per vehicle sold rather than a fraction of the revenue they generated. The company also put in place a sophisticated inventory tracking system that mirrored the electronics retailing system, and it offered money-back guarantees and warranties that resembled those in Circuit City stores.

At the same time, CarMax adjusted the Circuit City formula to reflect the differences between the two settings. This required, for instance, that the company find reliable sources of used cars. Toward this end, CarMax placed well-trained buyers in each of its stores and offered to buy used cars directly from consumers, even those who did not intend to buy a vehicle from CarMax. The company started to sell new cars at some sites, in part to generate used cars from trade-ins. By 2002, individual consumers were CarMax's single largest source of used cars. Regardless of source, all CarMax used cars were thoroughly inspected and reconditioned before they were resold.

The diverse inventory of used cars presented a new challenge. No single used-car lot could show the full array of vehicles in CarMax's inventory. So CarMax developed a computer system that allowed consumers to peruse the company's full inventory. The system told

customers what was available nationwide and what it would cost to transfer a desired car to the customer's locale.

CarMax was neither an immediate nor an unmixed success. It took Circuit City most of a decade to tailor its formula to the used-car market. The company built some stores that were too large and adopted an overly ambitious rollout plan, and price wars in the new-car market and expansion by other used-car superstores occasionally hurt its stock price. Nonetheless, the effort to reproduce Circuit City's success in the used-car industry has produced a viable company with revenue of $4.6 billion in fiscal year 2004, a return on sales of 2% to 3%, a multibillion-dollar market capitalization, and equity whose returns have roughly matched the S&P 500's since the IPO in 1997. This positive outcome reflects the close resemblance between the electronics retailing industry and the used-car industry, especially in features pertinent to the causal logic of the original success. It also reflects the company's careful attention to the essential differences between the industries—or at least the company's ability to adapt to those differences.

A critical question in this final step is how much a company should translate the candidate solution, on the basis of forethought alone, before launching it in the marketplace. In studying the transfer of best practices within companies, say from one bank branch to another, Insead's Gabriel Szulanski and Wharton's Sidney Winter have found that managers overestimate how well they understand cause and effect relationships and, accordingly, adjust too much on the basis of forethought. This lesson applies to analogies, too. It makes sense to adjust a candidate solution beforehand to account for glaring differences between the target and the source. But in novel, uncertain environments, where strategists rely the most on analogies, it is often wise to hold off on fine-tuning the solution until the market can give its guidance.

Toward Better Strategic Choices

Analogies lie on a spectrum. At one end lie perfect analogies, where the source and target are truly alike on the dimensions that drive economic performance. The toy retailing industry of the 1950s deeply resembled the grocery business, much to the benefit of Toys R Us, and the demands on Toyota's kanban system closely mirrored those related to supermarket reshelving. At the opposite end of the spectrum are profoundly problematic analogies, such as Enron's comparison of broadband and natural gas trading, that are based on superficial similarities yet plagued by underlying differences. The vast majority of analogies fall somewhere in between—they're imperfect but useful. The challenge is to get the most out of them. In our experience, the best users of analogy harness deduction and trial and error to test and improve the analogies that lie in the middle of the spectrum. Intel's analogy involving the steel industry, for instance, was supported by a deductive theory of cause and effect—Clayton Christensen's ideas about disruptive technologies. It also drew strength from trial-and-error experiments that gradually refined Intel's approach to the low end of the microprocessor market, much as Circuit City's adjustments served to fine-tune CarMax's strategy. Managers who wish to tap the great power of analogy and sidestep its pitfalls must master multiple modes of thought.

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Further Reading

ARTICLES

Selection Bias and the Perils of Benchmarking
by Jerker Denrell
Harvard Business Review
April 2005
Product no. R0504H

Like analytical thinking, benchmarking—studying the practices of successful companies in order to make strategic decisions—is a double-edged sword. When business leaders study only high-performing companies, they draw conclusions from unrepresentative data samples—falling into the classical statistical trap of selection bias. This form of bias leads decision makers to overvalue big-bet business practices, seeing only those companies that won big and not the ones that lost dismally by using the same practices. It also prevents decision makers from distinguishing cause from effect.

To discover what made a strategy successful, look at both successes *and* failures. Even if data about failed companies is hard to come by, you can use relatively simple tools to correct for selection bias.

Don't Trust Your Gut
by Eric Bonabeau
Harvard Business Review
May 2003
Product no. 3604

Using intuition to make strategic decisions also has advantages and disadvantages. It saves time, but it subjects us to dangerous biases as well. For example, we give disproportionate weight to information that confirms our assumptions. And we let the first information we receive distort our interpretation of subsequent data.

To avoid these biases, Bonabeau recommends using computer-based tools to help managers make strategic decisions about problems with many interrelated but unpredictable elements—such as global markets or supply chains. Southwest Airlines, for example, used computer-based modeling to revamp its cargo-handling rules—saving $2 million on labor annually.

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2nd article from the collection:
Why Bad Decisions Happen to Good Managers

The Hidden Traps in Decision Making

by John S. Hammond, Ralph L. Keeney, and Howard Raiffa

Included with this full-text *Harvard Business Review* article:

Product 5408

The Hidden Traps in Decision Making

The Idea in Brief

Making business decisions is your most crucial job—and your riskiest. New product development, mergers and acquisitions, executive hirings—bad decisions about any of these can ruin your company and your career.

Where do bad decisions come from? Mostly from distortions and biases—a whole series of mental flaws—that sabotage our reasoning. We all fall right into these psychological traps because they're unconscious—hardwired into the way we all think. Though we can't get rid of them, we *can* learn to be alert to them and compensate for them—monitoring our decision making so that our thinking traps don't cause judgment *disasters*.

The Idea in Practice

The higher the stakes of your decision, the higher the risk of getting caught in a thinking trap. Worse, these traps can amplify one another—compounding flaws in our reasoning. Here are five of the nine traps:

ANCHORING:

Giving disproportionate weight to the first information you receive

▶ Example:
A marketer projects future product sales by looking only at past sales figures. In a fast-moving marketplace, poor forecasts result.

Avoiding the Trap:

- Pursue other lines of thought in addition to your first one.
- Seek information from a variety of people and sources after thinking through the problem on your own.

STATUS QUO:

Favoring alternatives that perpetuate the existing situation

▶ Example:
A key merger stumbles because the acquiring company avoids imposing a new management structure on the acquired company.

Avoiding the Trap:

- Ask if the status quo really serves your objectives.
- Ask if you'd choose the status quo if it *weren't* the status quo.
- Downplay the effort or cost of switching from the status quo.

SUNK COSTS:

Making choices in a way that justifies past, flawed choices

▶ Example:
Bankers who originate problem loans keep advancing more funds to the debtors, to protect their earlier decisions. But the loans fail anyway.

Avoiding the Trap:

- Get views of people who *weren't* involved in the original decisions.
- Remind yourself that even the best managers make mistakes.
- Don't encourage failure-fearing.

CONFIRMING EVIDENCE:

Seeking information that supports your existing point of view

▶ Example:
A CEO considering canceling a plant expansion asks an acquaintance, who canceled such an expansion, for advice. She, of course, says to cancel.

Avoiding the Trap:

- Check whether you're examining all evidence with equal rigor.
- Ask a respected colleague to argue *against* your potential decision.
- Avoid "yes-men."

ESTIMATING AND FORECASTING:

Being overly influenced by vivid memories when estimating

▶ Example:
Lawyers overestimate probability of large awards because the media aggressively publicizes massive awards. Lawyers then offer too large settlements.

Avoiding the Trap:

- Be very disciplined in forecasting.
- Start by considering extremes, and then challenge those extremes.
- Get actual statistics, not just impressions.

In making decisions, your own mind may be your worst enemy.

The Hidden Traps in Decision Making

by John S. Hammond, Ralph L. Keeney, and Howard Raiffa

Making decisions is the most important job of any executive. It's also the toughest and the riskiest. Bad decisions can damage a business and a career, sometimes irreparably. So where do bad decisions come from? In many cases, they can be traced back to the way the decisions were made—the alternatives were not clearly defined, the right information was not collected, the costs and benefits were not accurately weighed. But sometimes the fault lies not in the decision-making process but rather in the mind of the decision maker. The way the human brain works can sabotage our decisions.

Researchers have been studying the way our minds function in making decisions for half a century. This research, in the laboratory and in the field, has revealed that we use unconscious routines to cope with the complexity inherent in most decisions. These routines, known as *heuristics*, serve us well in most situations. In judging distance, for example, our minds frequently rely on a heuristic that equates clarity with proximity. The clearer an object appears, the closer we judge it to be. The fuzzier it appears, the farther away we assume it must be. This simple mental shortcut helps us to make the continuous stream of distance judgments required to navigate the world.

Yet, like most heuristics, it is not foolproof. On days that are hazier than normal, our eyes will tend to trick our minds into thinking that things are more distant than they actually are. Because the resulting distortion poses few dangers for most of us, we can safely ignore it. For airline pilots, though, the distortion can be catastrophic. That's why pilots are trained to use objective measures of distance in addition to their vision.

Researchers have identified a whole series of such flaws in the way we think in making decisions. Some, like the heuristic for clarity, are sensory misperceptions. Others take the form of biases. Others appear simply as irrational anomalies in our thinking. What makes all these traps so dangerous is their invisibility. Because they are hardwired into our thinking process, we fail to recognize them—even as we

fall right into them.

For executives, whose success hinges on the many day-to-day decisions they make or approve, the psychological traps are especially dangerous. They can undermine everything from new-product development to acquisition and divestiture strategy to succession planning. While no one can rid his or her mind of these ingrained flaws, anyone can follow the lead of airline pilots and learn to understand the traps and compensate for them.

In this article, we examine a number of well-documented psychological traps that are particularly likely to undermine business decisions. In addition to reviewing the causes and manifestations of these traps, we offer some specific ways managers can guard against them. It's important to remember, though, that the best defense is always awareness. Executives who attempt to familiarize themselves with these traps and the diverse forms they take will be better able to ensure that the decisions they make are sound and that the recommendations proposed by subordinates or associates are reliable.

The Anchoring Trap

How would you answer these two questions?

Is the population of Turkey greater than 35 million?

What's your best estimate of Turkey's population?

If you're like most people, the figure of 35 million cited in the first question (a figure we chose arbitrarily) influenced your answer to the second question. Over the years, we've posed those questions to many groups of people. In half the cases, we used 35 million in the first question; in the other half, we used 100 million. Without fail, the answers to the second question increase by many millions when the larger figure is used in the first question. This simple test illustrates the common and often pernicious mental phenomenon known as *anchoring*. When considering a decision, the mind gives disproportionate weight to the first information it receives. Initial impressions, estimates, or data anchor subsequent thoughts and judgments.

Anchors take many guises. They can be as simple and seemingly innocuous as a comment offered by a colleague or a statistic appearing in the morning newspaper. They can be as insidious as a stereotype about a person's skin color, accent, or dress. In business, one of the most common types of anchors is a past event or trend. A marketer attempting to project the sales of a product for the coming year often begins by looking at the sales volumes for past years. The old numbers become anchors, which the forecaster then adjusts based on other factors. This approach, while it may lead to a reasonably accurate estimate, tends to give too much weight to past events and not enough weight to other factors. In situations characterized by rapid changes in the marketplace, historical anchors can lead to poor forecasts and, in turn, misguided choices.

Because anchors can establish the terms on which a decision will be made, they are often used as a bargaining tactic by savvy negotiators. Consider the experience of a large consulting firm that was searching for new office space in San Francisco. Working with a commercial real-estate broker, the firm's partners identified a building that met all their criteria, and they set up a meeting with the building's owners. The owners opened the meeting by laying out the terms of a proposed contract: a ten-year lease; an initial monthly price of $2.50 per square foot; annual price increases at the prevailing inflation rate; all interior improvements to be the tenant's responsibility; an option for the tenant to extend the lease for ten additional years under the same terms. Although the price was at the high end of current market rates, the consultants made a relatively modest counteroffer. They proposed an initial price in the midrange of market rates and asked the owners to share in the renovation expenses, but they accepted all the other terms. The consultants could have been much more aggressive and creative in their counterproposal—reducing the initial price to the low end of market rates, adjusting rates biennially rather than annually, putting a cap on the increases, defining different terms for extending the lease, and so forth—but their thinking was guided by the owners' initial proposal. The consultants had fallen into the anchoring trap, and as a result, they ended up paying a lot more for the space than they had to.

What can you do about it?

The effect of anchors in decision making has been documented in thousands of experiments. Anchors influence the decisions not only of managers, but also of accountants and engineers, bankers and lawyers, consultants

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and stock analysts. No one can avoid their influence; they're just too widespread. But managers who are aware of the dangers of anchors can reduce their impact by using the following techniques:

• Always view a problem from different perspectives. Try using alternative starting points and approaches rather than sticking with the first line of thought that occurs to you.

• Think about the problem on your own before consulting others in order to avoid becoming anchored by their ideas.

• Be open minded. Seek information and opinions from a variety of people to widen your frame of reference and to push your mind in fresh directions.

• Be careful to avoid anchoring your advisers, consultants, and others from whom you solicit information and counsel. Tell them as little as possible about your own ideas, estimates, and tentative decisions. If you reveal too much, your own preconceptions may simply come back to you.

• Be particularly wary of anchors in negotiations. Think through your position before any negotiation begins in order to avoid being anchored by the other party's initial proposal. At the same time, look for opportunities to use anchors to your own advantage—if you're the seller, for example, suggest a high, but defensible, price as an opening gambit.

Decision makers display a strong bias toward alternatives that perpetuate the status quo.

The Status-Quo Trap

We all like to believe that we make decisions rationally and objectively. But the fact is, we all carry biases, and those biases influence the choices we make. Decision makers display, for example, a strong bias toward alternatives that perpetuate the status quo. On a broad scale, we can see this tendency whenever a radically new product is introduced. The first automobiles, revealingly called "horseless carriages," looked very much like the buggies they replaced. The first "electronic newspapers" appearing on the World Wide Web looked very much like their print precursors.

On a more familiar level, you may have succumbed to this bias in your personal financial decisions. People sometimes, for example, inherit shares of stock that they would never have bought themselves. Although it would be a straightforward, inexpensive proposition to sell those shares and put the money into a different investment, a surprising number of people don't sell. They find the status quo comfortable, and they avoid taking action that would upset it. "Maybe I'll rethink it later," they say. But "later" is usually never.

The source of the status-quo trap lies deep within our psyches, in our desire to protect our egos from damage. Breaking from the status quo means taking action, and when we take action, we take responsibility, thus opening ourselves to criticism and to regret. Not surprisingly, we naturally look for reasons to do nothing. Sticking with the status quo represents, in most cases, the safer course because it puts us at less psychological risk.

Many experiments have shown the magnetic attraction of the status quo. In one, a group of people were randomly given one of two gifts of approximately the same value—half received a mug, the other half a Swiss chocolate bar. They were then told that they could easily exchange the gift they received for the other gift. While you might expect that about half would have wanted to make the exchange, only one in ten actually did. The status quo exerted its power even though it had been arbitrarily established only minutes before.

Other experiments have shown that the more choices you are given, the more pull the status quo has. More people will, for instance, choose the status quo when there are two alternatives to it rather than one: A and B instead of just A. Why? Choosing between A and B requires additional effort; selecting the status quo avoids that effort.

In business, where sins of commission (doing something) tend to be punished much more severely than sins of omission (doing nothing), the status quo holds a particularly strong attraction. Many mergers, for example, founder because the acquiring company avoids taking swift action to impose a new, more appropriate management structure on the acquired company. "Let's not rock the boat right now," the typical reasoning goes. "Let's wait until the situation stabilizes." But as time passes, the existing structure becomes more entrenched, and altering it becomes harder, not easier. Having failed to seize the occasion when change would have been expected, management finds itself stuck with the status quo.

What can you do about it?

First of all, remember that in any given decision, maintaining the status quo may indeed be the best choice, but you don't want to

choose it just because it is comfortable. Once you become aware of the status-quo trap, you can use these techniques to lessen its pull:

• Always remind yourself of your objectives and examine how they would be served by the status quo. You may find that elements of the current situation act as barriers to your goals.

• Never think of the status quo as your only alternative. Identify other options and use them as counterbalances, carefully evaluating all the pluses and minuses.

• Ask yourself whether you would choose the status-quo alternative if, in fact, it weren't the status quo.

• Avoid exaggerating the effort or cost involved in switching from the status quo.

• Remember that the desirability of the status quo will change over time. When comparing alternatives, always evaluate them in terms of the future as well as the present.

• If you have several alternatives that are superior to the status quo, don't default to the status quo just because you're having a hard time picking the best alternative. Force yourself to choose.

We tend to subconsciously decide what to do before figuring out why we want to do it.

The Sunk-Cost Trap

Another of our deep-seated biases is to make choices in a way that justifies past choices, even when the past choices no longer seem valid. Most of us have fallen into this trap. We may have refused, for example, to sell a stock or a mutual fund at a loss, forgoing other, more attractive investments. Or we may have poured enormous effort into improving the performance of an employee whom we knew we shouldn't have hired in the first place. Our past decisions become what economists term *sunk costs*—old investments of time or money that are now irrecoverable. We know, rationally, that sunk costs are irrelevant to the present decision, but nevertheless they prey on our minds, leading us to make inappropriate decisions.

Why can't people free themselves from past decisions? Frequently, it's because they are unwilling, consciously or not, to admit to a mistake. Acknowledging a poor decision in one's personal life may be purely a private matter, involving only one's self-esteem, but in business, a bad decision is often a very public matter, inviting critical comments from colleagues or bosses. If you fire a poor performer whom you hired, you're making a public admission of poor judgment. It seems psychologically safer to let him or her stay on, even though that choice only compounds the error.

The sunk-cost bias shows up with disturbing regularity in banking, where it can have particularly dire consequences. When a borrower's business runs into trouble, a lender will often advance additional funds in hopes of providing the business with some breathing room to recover. If the business does have a good chance of coming back, that's a wise investment. Otherwise, it's just throwing good money after bad.

One of us helped a major U.S. bank recover after it made many bad loans to foreign businesses. We found that the bankers responsible for originating the problem loans were far more likely to advance additional funds—repeatedly, in many cases—than were bankers who took over the accounts after the original loans were made. Too often, the original bankers' strategy—and loans—ended in failure. Having been trapped by an escalation of commitment, they had tried, consciously or unconsciously, to protect their earlier, flawed decisions. They had fallen victim to the sunk-cost bias. The bank finally solved the problem by instituting a policy requiring that a loan be immediately reassigned to another banker as soon as any problem arose. The new banker was able to take a fresh, unbiased look at the merit of offering more funds.

Sometimes a corporate culture reinforces the sunk-cost trap. If the penalties for making a decision that leads to an unfavorable outcome are overly severe, managers will be motivated to let failed projects drag on endlessly—in the vain hope that they'll somehow be able to transform them into successes. Executives should recognize that, in an uncertain world where unforeseeable events are common, good decisions can sometimes lead to bad outcomes. By acknowledging that some good ideas will end in failure, executives will encourage people to cut their losses rather than let them mount.

What can you do about it?

For all decisions with a history, you will need to make a conscious effort to set aside any sunk costs—whether psychological or economic—that will muddy your thinking about the choice at hand. Try these techniques:

• Seek out and listen carefully to the views of people who were uninvolved with the earlier

decisions and who are hence unlikely to be committed to them.

• Examine why admitting to an earlier mistake distresses you. If the problem lies in your own wounded self-esteem, deal with it head-on. Remind yourself that even smart choices can have bad consequences, through no fault of the original decision maker, and that even the best and most experienced managers are not immune to errors in judgment. Remember the wise words of Warren Buffet: "When you find yourself in a hole, the best thing you can do is stop digging."

• Be on the lookout for the influence of sunk-cost biases in the decisions and recommendations made by your subordinates. Reassign responsibilities when necessary.

• Don't cultivate a failure-fearing culture that leads employees to perpetuate their mistakes. In rewarding people, look at the quality of their decision making (taking into account what was known at the time their decisions were made), not just the quality of the outcomes.

The Confirming-Evidence Trap

Imagine that you're the president of a successful midsized U.S. manufacturer considering whether to call off a planned plant expansion. For a while you've been concerned that your company won't be able to sustain the rapid pace of growth of its exports. You fear that the value of the U.S. dollar will strengthen in coming months, making your goods more costly for overseas consumers and dampening demand. But before you put the brakes on the plant expansion, you decide to call up an acquaintance, the chief executive of a similar company that recently mothballed a new factory, to check her reasoning. She presents a strong case that other currencies are about to weaken significantly against the dollar. What do you do?

You'd better not let that conversation be the clincher, because you've probably just fallen victim to the confirming-evidence bias. This bias leads us to seek out information that supports our existing instinct or point of view while avoiding information that contradicts it. What, after all, did you expect your acquaintance to give, other than a strong argument in favor of her own decision? The confirming-evidence bias not only affects where we go to collect evidence but also how we interpret the evidence we do receive, leading us to give too much weight to supporting information and too little to conflicting information.

In one psychological study of this phenomenon, two groups—one opposed to and one supporting capital punishment—each read two reports of carefully conducted research on the effectiveness of the death penalty as a deterrent to crime. One report concluded that the death penalty was effective; the other concluded it was not. Despite being exposed to solid scientific information supporting counterarguments, the members of both groups became even more convinced of the validity of their own position after reading both reports. They automatically accepted the supporting information and dismissed the conflicting information.

There are two fundamental psychological forces at work here. The first is our tendency to subconsciously decide what we want to do before we figure out why we want to do it. The second is our inclination to be more engaged by things we like than by things we dislike—a tendency well documented even in babies. Naturally, then, we are drawn to information that supports our subconscious leanings.

What can you do about it?

It's not that you shouldn't make the choice you're subconsciously drawn to. It's just that you want to be sure it's the smart choice. You need to put it to the test. Here's how:

• Always check to see whether you are examining all the evidence with equal rigor. Avoid the tendency to accept confirming evidence without question.

• Get someone you respect to play devil's advocate, to argue against the decision you're contemplating. Better yet, build the counterarguments yourself. What's the strongest reason to do something else? The second strongest reason? The third? Consider the position with an open mind.

• Be honest with yourself about your motives. Are you really gathering information to help you make a smart choice, or are you just looking for evidence confirming what you think you'd like to do?

• In seeking the advice of others, don't ask leading questions that invite confirming evidence. And if you find that an adviser always seems to support your point of view, find a new adviser. Don't surround yourself with yes-men.

The Framing Trap

The first step in making a decision is to frame the question. It's also one of the most dangerous steps. The way a problem is framed can profoundly influence the choices you make. In a case involving automobile insurance, for example, framing made a $200 million difference. To reduce insurance costs, two neighboring states, New Jersey and Pennsylvania, made similar changes in their laws. Each state gave drivers a new option: by accepting a limited right to sue, they could lower their premiums. But the two states framed the choice in very different ways: in New Jersey, you automatically got the limited right to sue unless you specified otherwise; in Pennsylvania, you got the full right to sue unless you specified otherwise. The different frames established different status quos, and, not surprisingly, most consumers defaulted to the status quo. As a result, in New Jersey about 80% of drivers chose the limited right to sue, but in Pennsylvania only 25% chose it. Because of the way it framed the choice, Pennsylvania failed to gain approximately $200 million in expected insurance and litigation savings.

The framing trap can take many forms, and as the insurance example shows, it is often closely related to other psychological traps. A frame can establish the status quo or introduce an anchor. It can highlight sunk costs or lead you toward confirming evidence. Decision researchers have documented two types of frames that distort decision making with particular frequency:

Frames as Gains Versus Losses.

In a study patterned after a classic experiment by decision researchers Daniel Kahneman and Amos Tversky, one of us posed the following problem to a group of insurance professionals:

You are a marine property adjuster charged with minimizing the loss of cargo on three insured barges that sank yesterday off the coast of Alaska. Each barge holds $200,000 worth of cargo, which will be lost if not salvaged within 72 hours. The owner of a local marine-salvage company gives you two options, both of which will cost the same:

Plan A: This plan will save the cargo of one of the three barges, worth $200,000.

Plan B: This plan has a one-third probability of saving the cargo on all three barges, worth $600,000, but has a two-thirds probability of saving nothing.

Which plan would you choose?

Plan C: This plan will result in the loss of two of the three cargoes, worth $400,000.

Plan D: This plan has a two-thirds probability of resulting in the loss of all three cargoes and the entire $600,000 but has a one-third probability of losing no cargo.

Faced with this choice, 80% of these respondents preferred Plan D.

The pairs of alternatives are, of course, precisely equivalent—Plan A is the same as Plan C, and Plan B is the same as Plan D—they've just been framed in different ways. The strikingly different responses reveal that people are risk averse when a problem is posed in terms of gains (barges saved) but risk seeking when a problem is posed in terms of avoiding losses (barges lost). Furthermore, they tend to adopt the frame as it is presented to them rather than restating the problem in their own way.

Framing with Different Reference Points.

The same problem can also elicit very different responses when frames use different reference points. Let's say you have $2,000 in your checking account and you are asked the following question:

Would you accept a fifty-fifty chance of either losing $300 or winning $500?

Would you accept the chance? What if you were asked this question:

Would you prefer to keep your checking account balance of $2,000 or to accept a fifty-fifty chance of having either $1,700 or $2,500 in your account?

Once again, the two questions pose the same problem. While your answers to both questions should, rationally speaking, be the same, studies have shown that many people would refuse the fifty-fifty chance in the first question but accept it in the second. Their different reactions result from the different reference points presented in the two frames. The first frame, with its reference point of zero, emphasizes incremental gains and losses, and the thought of losing triggers a conservative response in many people's minds. The second frame, with its reference point of $2,000, puts things into perspective by emphasizing the real financial impact of the decision.

What can you do about it?

A poorly framed problem can undermine even the best-considered decision. But any adverse effect of framing can be limited by taking

the following precautions:

• Don't automatically accept the initial frame, whether it was formulated by you or by someone else. Always try to reframe the problem in various ways. Look for distortions caused by the frames.

• Try posing problems in a neutral, redundant way that combines gains and losses or embraces different reference points. For example: *Would you accept a fifty-fifty chance of either losing $300, resulting in a bank balance of $1,700, or winning $500, resulting in a bank balance of $2,500?*

• Think hard throughout your decision-making process about the framing of the problem. At points throughout the process, particularly near the end, ask yourself how your thinking might change if the framing changed.

• When others recommend decisions, examine the way they framed the problem. Challenge them with different frames.

Even though most of us are not very good at making estimates, we tend to be overconfident about our accuracy—which can lead to bad decisions.

Estimating and Forecasting Traps

Most of us are adept at making estimates about time, distance, weight, and volume. That's because we're constantly making judgments about these variables and getting quick feedback about the accuracy of those judgments. Through daily practice, our minds become finely calibrated.

Making estimates or forecasts about uncertain events, however, is a different matter. While managers continually make such estimates and forecasts, they rarely get clear feedback about their accuracy. If you judge, for example, that the likelihood of the price of oil falling to less than $15 a barrel one year hence is about 40% and the price does indeed fall to that level, you can't tell whether you were right or wrong about the probability you estimated. The only way to gauge your accuracy would be to keep track of many, many similar judgments to see if, after the fact, the events you thought had a 40% chance of occurring actually did occur 40% of the time. That would require a great deal of data, carefully tracked over a long period of time. Weather forecasters and bookmakers have the opportunities and incentives to maintain such records, but the rest of us don't. As a result, our minds never become calibrated for making estimates in the face of uncertainty.

All of the traps we've discussed so far can influence the way we make decisions when confronted with uncertainty. But there's another set of traps that can have a particularly distorting effect in uncertain situations because they cloud our ability to assess probabilities. Let's look at three of the most common of these uncertainty traps:

The Overconfidence Trap.

Even though most of us are not very good at making estimates or forecasts, we actually tend to be overconfident about our accuracy. That can lead to errors in judgment and, in turn, bad decisions. In one series of tests, people were asked to forecast the next week's closing value for the Dow Jones Industrial Average. To account for uncertainty, they were then asked to estimate a range within which the closing value would likely fall. In picking the top number of the range, they were asked to choose a high estimate they thought had only a 1% chance of being exceeded by the closing value. Similarly, for the bottom end, they were told to pick a low estimate for which they thought there would be only a 1% chance of the closing value falling below it. If they were good at judging their forecasting accuracy, you'd expect the participants to be wrong only about 2% of the time. But hundreds of tests have shown that the actual Dow Jones averages fell outside the forecast ranges 20% to 30% of the time. Overly confident about the accuracy of their predictions, most people set too narrow a range of possibilities.

Think of the implications for business decisions, in which major initiatives and investments often hinge on ranges of estimates. If managers underestimate the high end or overestimate the low end of a crucial variable, they may miss attractive opportunities or expose themselves to far greater risk than they realize. Much money has been wasted on ill-fated product-development projects because managers did not accurately account for the possibility of market failure.

The Prudence Trap.

Another trap for forecasters takes the form of overcautiousness, or prudence. When faced with high-stakes decisions, we tend to adjust our estimates or forecasts "just to be on the safe side." Many years ago, for example, one of the Big Three U.S. automakers was deciding how many of a new-model car to produce in anticipation of its busiest sales season. The market-planning department, responsible for the decision, asked other departments to sup-

A dramatic or traumatic event in your own life can also distort your thinking.

ply forecasts of key variables such as anticipated sales, dealer inventories, competitor actions, and costs. Knowing the purpose of the estimates, each department slanted its forecast to favor building more cars—"just to be safe." But the market planners took the numbers at face value and then made their own "just to be safe" adjustments. Not surprisingly, the number of cars produced far exceeded demand, and the company took six months to sell off the surplus, resorting in the end to promotional pricing.

Policymakers have gone so far as to codify overcautiousness in formal decision procedures. An extreme example is the methodology of "worst-case analysis," which was once popular in the design of weapons systems and is still used in certain engineering and regulatory settings. Using this approach, engineers designed weapons to operate under the worst possible combination of circumstances, even though the odds of those circumstances actually coming to pass were infinitesimal. Worst-case analysis added enormous costs with no practical benefit (in fact, it often backfired by touching off an arms race), proving that too much prudence can sometimes be as dangerous as too little.

The Recallability Trap.

Even if we are neither overly confident nor unduly prudent, we can still fall into a trap when making estimates or forecasts. Because we frequently base our predictions about future events on our memory of past events, we can be overly influenced by dramatic events—those that leave a strong impression on our memory. We all, for example, exaggerate the probability of rare but catastrophic occurrences such as plane crashes because they get disproportionate attention in the media. A dramatic or traumatic event in your own life can also distort your thinking. You will assign a higher probability to traffic accidents if you have passed one on the way to work, and you will assign a higher chance of someday dying of cancer yourself if a close friend has died of the disease.

In fact, anything that distorts your ability to recall events in a balanced way will distort your probability assessments. In one experiment, lists of well-known men and women were read to different groups of people. Unbeknownst to the subjects, each list had an equal number of men and women, but on some lists the men were more famous than the women while on others the women were more famous. Afterward, the participants were asked to estimate the percentages of men and women on each list. Those who had heard the list with the more famous men thought there were more men on the list, while those who had heard the one with the more famous women thought there were more women.

Corporate lawyers often get caught in the recallability trap when defending liability suits. Their decisions about whether to settle a claim or take it to court usually hinge on their assessments of the possible outcomes of a trial. Because the media tend to aggressively publicize massive damage awards (while ignoring other, far more common trial outcomes), lawyers can overestimate the probability of a large award for the plaintiff. As a result, they offer larger settlements than are actually warranted.

What can you do about it?

The best way to avoid the estimating and forecasting traps is to take a very disciplined approach to making forecasts and judging probabilities. For each of the three traps, some additional precautions can be taken:

• To reduce the effects of overconfidence in making estimates, always start by considering the extremes, the low and high ends of the possible range of values. This will help you avoid being anchored by an initial estimate. Then challenge your estimates of the extremes. Try to imagine circumstances where the actual figure would fall below your low or above your high, and adjust your range accordingly. Challenge the estimates of your subordinates and advisers in a similar fashion. They're also susceptible to overconfidence.

• To avoid the prudence trap, always state your estimates honestly and explain to anyone who will be using them that they have not been adjusted. Emphasize the need for honest input to anyone who will be supplying you with estimates. Test estimates over a reasonable range to assess their impact. Take a second look at the more sensitive estimates.

• To minimize the distortion caused by variations in recallability, carefully examine all your assumptions to ensure they're not unduly influenced by your memory. Get actual statistics whenever possible. Try not to be guided by impressions.

Forewarned Is Forearmed

When it comes to business decisions, there's rarely such a thing as a no-brainer. Our brains are always at work, sometimes, unfortunately, in ways that hinder rather than help us. At every stage of the decision-making process, misperceptions, biases, and other tricks of the mind can influence the choices we make. Highly complex and important decisions are the most prone to distortion because they tend to involve the most assumptions, the most estimates, and the most inputs from the most people. The higher the stakes, the higher the risk of being caught in a psychological trap.

The traps we've reviewed can all work in isolation. But, even more dangerous, they can work in concert, amplifying one another. A dramatic first impression might anchor our thinking, and then we might selectively seek out confirming evidence to justify our initial inclination. We make a hasty decision, and that decision establishes a new status quo. As our sunk costs mount, we become trapped, unable to find a propitious time to seek out a new and possibly better course. The psychological miscues cascade, making it harder and harder to choose wisely.

As we said at the outset, the best protection against all psychological traps—in isolation or in combination—is awareness. Forewarned is forearmed. Even if you can't eradicate the distortions ingrained into the way your mind works, you can build tests and disciplines into your decision-making process that can uncover errors in thinking before they become errors in judgment. And taking action to understand and avoid psychological traps can have the added benefit of increasing your confidence in the choices you make.

For further discussions of decision traps, see: J. Edward Russo and Paul J. H. Schoemaker, Decision Traps: The Ten Barriers to Brilliant Decision Making and How to Overcome Them *(New York: Simon & Schuster, 1989) and Max Bazerman,* Judgment in Managerial Decision Making *(New York: John Wiley & Sons, fourth edition, 1998).*

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The Hidden Traps in Decision Making

Further Reading

ARTICLES

Even Swaps: A Rational Method for Making Trade-Offs
by John S. Hammond III, Ralph L. Keeney, and Howard Raiffa
Harvard Business Review
March–April 1998
Product no. 98206

Most decisions involve trade-offs so difficult that we end up "defaulting" to the flawed thinking described in "The Hidden Traps in Decision Making." In "Even Swaps," these same authors help you *strengthen* your power of reasoning while making decisions. Hammond, Keeney, and Raiffa arm you with an easy-to-use, powerful methodology for making choices that involve multiple trade-offs. For example, you want to book a low airline fare, but you also want a convenient departure time, a direct flight, an aisle seat, an airline with a strong safety record, frequent-flyer miles, etc. As the authors point out, making wise trade-offs is one of the most important and difficult challenges in decision making. The challenge lies not so much in the volume of trade-offs involved, but in the fact that each one has its own basis of comparison—from precise numbers (34% versus 38%) to relationships (high versus low) to descriptive terms (red versus blue). You're not just trading off apples and oranges; you're trading off apples, oranges, and elephants! Happily, the authors' methodology—which they call "Even Swaps"—takes the guesswork out of evaluating trade-offs. With their system, you'll still have to make hard choices, but now you'll have a reliable mechanism and a coherent framework with which to make them.

Meetings That Work: Plans Bosses Can Approve
by Paul D. Lovett
Harvard Business Review
November–December 1988
Product no. 4266

In "The Hidden Traps in Decision Making," the authors use a broad range of decision examples to illustrate the various traps that await the unwary decision maker. In "Meetings That Work," Lovett focuses on one of the most crucial decisions that businesspeople everywhere frequently face: whether to move forward with an idea. Lovett maintains that the problem starts with meetings in which managers present a potential plan to their CEO. According to Lovett, most managers overload a plan presentation with unimportant details or fail to supply adequate information. But CEOs want answers to just four questions before they'll approve a plan: 1) What is the plan? 2) Why do you recommend it? 3) What are the goals? and 4) How much will it cost? Here's how to focus your presentation so that you provide clear answers to these central questions—and help everyone agree on a course of action.

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3rd article from the collection:
Why Bad Decisions Happen to Good Managers

Delusions of Success

How Optimism Undermines Executives' Decisions

by Dan Lovallo and Daniel Kahneman

Included with this full-text *Harvard Business Review* article:

Product 4279

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Delusions of Success

How Optimism Undermines Executives' Decisions

The Idea in Brief

Three-quarters of business initiatives flounder—new manufacturing plants close prematurely, mergers and acquisitions don't pay off, start-ups fail to gain market share. Why? Delusional optimism: we overemphasize projects' potential benefits and underestimate likely costs, spinning success scenarios while ignoring the possibility of mistakes.

The culprits? Cognitive biases and organizational pressures to accentuate the positive. We can't eradicate either, but we *can* take a more objective view of an initiative's likely outcome. How? **Reference forecasting**: comparing a project's potential outcomes with those of similar, past projects—to produce more accurate predictions.

The Idea in Practice

ROSE-COLORED GLASSES

We're subject to numerous **cognitive biases**:

- **Anchoring.**
  Competing for limited funding, we create project proposals accentuating the positive. These initial forecasts skew subsequent analyses of market and financial information toward overoptimism: we don't adjust our original estimates enough to account for inevitable problems.
- **Competitor neglect.**
  We ignore competitors' capabilities and plans. Rushing to secure a new market, for example, we forget that rivals will follow suit. As competitors ramp up production and marketing, supply outstrips demand—rendering the market unprofitable.
- **Exaggerating our abilities and control.**
  We take credit for positive outcomes while attributing negative outcomes to external factors and deny the role of chance in our plans' outcomes. Result? We assume we can avoid or overcome all project problems.

We also fall victim to **organizational pressures**:

- **We proposals with the highest probability of failure.**
  Since only the most promising proposals attract investment dollars, we make overoptimistic forecasts. *Highly* overoptimistic proposals are approved.
- **We reward optimism and interpret pessimism as disloyalty.**
  Reinforcing one another's unrealistic views of the future, we undermine our company's critical thinking.

THE OUTSIDE VIEW

How to counteract cognitive biases and organizational pressures? Awareness *and* a more objective forecasting method—especially with never-before-attempted initiatives. These steps can give us an "outside view" to augment our intuitive "inside view":

1. Select a set of past projects to serve as your reference class.
A studio executive forecasting sales of a new film selects recent films in the same genre, featuring similar actors and comparable budgets.

2. Assess the distribution of outcomes.
Identify the average and extremes in the reference-class projects' outcomes. The studio executive's reference-class movies sold $40 million in tickets on average. But 10% sold less than $2 million and 5% sold more than $120 million.

3. Predict your project's position in the distribution.
Intuitively estimate where your project would fall along the reference class's distribution. The studio executive predicted $95 million as his new film's sales.

4. Assess your prediction's reliability.
Counteract your biased prediction from Step 3. Based on how well your past predictions matched actual outcomes, estimate the correlation between your *intuitive* prediction and the *actual* outcome. Express your estimate as a coefficient between 0 and 1 (0 = no correlation; 1 = complete correlation). The studio executive expressed his correlation coefficient as 0.6.

5. Correct your intuitive estimate.
Adjust your intuitive prediction based on your predictability analysis. The studio executive's *corrected* estimate was $62 million: $95M + [0.6 ($40M - $95M)].

In planning major initiatives, executives routinely exaggerate the benefits and discount the costs, setting themselves up for failure. Here's how to inject more reality into forecasting.

Delusions of Success

How Optimism Undermines Executives' Decisions

by Dan Lovallo and Daniel Kahneman

In 1992, Oxford Health Plans started to build a complex new computer system for processing claims and payments. From the start, the project was hampered by unforeseen problems and delays. As the company fell further behind schedule and budget, it struggled, vainly, to stem an ever rising flood of paperwork. When, on October 27, 1997, Oxford disclosed that its system and its accounts were in disarray, the company's stock price dropped 63%, destroying more than $3 billion in shareholder value in a single day.

Early in the 1980s, the United Kingdom, Germany, Italy, and Spain announced that they would work together to build the Eurofighter, an advanced military jet. The project was expected to cost $20 billion, and the jet was slated to go into service in 1997. Today, after nearly two decades of technical glitches and unexpected expenses, the aircraft has yet to be deployed, and projected costs have more than doubled, to approximately $45 billion.

In 1996, the Union Pacific railroad bought its competitor Southern Pacific for $3.9 billion, creating the largest rail carrier in North America. Almost immediately, the two companies began to have serious difficulties merging their operations, leading to snarled traffic, lost cargo, and massive delays. As the situation got worse, and the company's stock price tumbled, customers and shareholders sued the railroad, and it had to cut its dividend and raise new capital to address the problems.

Debacles like these are all too common in business. Most large capital investment projects come in late and over budget, never living up to expectations. More than 70% of new manufacturing plants in North America, for example, close within their first decade of operation. Approximately three-quarters of mergers and acquisitions never pay off—the acquiring firm's shareholders lose more than the acquired firm's shareholders gain. And efforts to enter new markets fare no better; the vast majority end up being abandoned within a few years.

According to standard economic theory, the high failure rates are simple to explain: The fre-

quency of poor outcomes is an unavoidable result of companies taking rational risks in uncertain situations. Entrepreneurs and managers know and accept the odds because the rewards of success are sufficiently enticing. In the long run, the gains from a few successes will outweigh the losses from many failures.

This is, to be sure, an attractive argument from the perspective of executives. It effectively relieves them of blame for failed projects—after all, they were just taking reasonable risks. But having examined this phenomenon from two very different points of view—a business scholar's and a psychologist's—we have come to a different conclusion. We don't believe that the high number of business failures is best explained as the result of rational choices gone wrong. Rather, we see it as a consequence of flawed decision making. When forecasting the outcomes of risky projects, executives all too easily fall victim to what psychologists call the planning fallacy. In its grip, managers make decisions based on delusional optimism rather than on a rational weighting of gains, losses, and probabilities. They overestimate benefits and underestimate costs. They spin scenarios of success while overlooking the potential for mistakes and miscalculations. As a result, managers pursue initiatives that are unlikely to come in on budget or on time—or to ever deliver the expected returns.

Executives' overoptimism can be traced both to cognitive biases—to errors in the way the mind processes information—and to organizational pressures. These biases and pressures are ubiquitous, but their effects can be tempered. By supplementing traditional forecasting processes, which tend to focus on a company's own capabilities, experiences, and expectations, with a simple statistical analysis of analogous efforts completed earlier, executives can gain a much more accurate understanding of a project's likely outcome. Such an *outside view*, as we call it, provides a reality check on the more intuitive *inside view*, reducing the odds that a company will rush blindly into a disastrous investment of money and time.

Rose-Colored Glasses

Most people are highly optimistic most of the time. Research into human cognition has traced this overoptimism to many sources. One of the most powerful is the tendency of individuals to exaggerate their own talents—to believe they are above average in their endowment of positive traits and abilities. Consider a survey of 1 million students conducted by the College Board in the 1970s. When asked to rate themselves in comparison to their peers, 70% of the students said they were above average in leadership ability, while only 2% rated themselves below average. For athletic prowess, 60% saw themselves above the median, 6% below. When assessing their ability to get along with others, 60% of the students judged themselves to be in the top decile, and fully 25% considered themselves to be in the top 1%.

The inclination to exaggerate our talents is amplified by our tendency to misperceive the causes of certain events. The typical pattern of such attribution errors, as psychologists call them, is for people to take credit for positive outcomes and to attribute negative outcomes to external factors, no matter what their true cause. One study of letters to shareholders in annual reports, for example, found that executives tend to attribute favorable outcomes to factors under their control, such as their corporate strategy or their R&D programs. Unfavorable outcomes, by contrast, were more likely to be attributed to uncontrollable external factors such as weather or inflation. Similar self-serving attributions have been found in other studies of annual reports and executive speeches.

We also tend to exaggerate the degree of control we have over events, discounting the role of luck. In one series of studies, participants were asked to press a button that could illuminate a red light. The people were told that whether the light flashed was determined by a combination of their action and random chance. Afterward, they were asked to assess what they experienced. Most people grossly overstated the influence of their action in determining whether the light flashed.

Executives and entrepreneurs seem to be highly susceptible to these biases. Studies that compare the actual outcomes of capital investment projects, mergers and acquisitions, and market entries with managers' original expectations for those ventures show a strong tendency toward overoptimism. An analysis of start-up ventures in a wide range of industries found, for example, that more than 80% failed to achieve their market-share target. The stud-

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No matter how detailed, the business scenarios used in planning are generally inadequate.

ies are backed up by observations of executives. Like other people, business leaders routinely exaggerate their personal abilities, particularly for ambiguous, hard-to-measure traits like managerial skill. Their self-confidence can lead them to assume that they'll be able to avoid or easily overcome potential problems in executing a project. This misapprehension is further exaggerated by managers' tendency to take personal credit for lucky breaks. Think of mergers and acquisitions, for instance. Mergers tend to come in waves, during periods of economic expansion. At such times, executives can overattribute their company's strong performance to their own actions and abilities rather than to the buoyant economy. This can, in turn, lead them to an inflated belief in their own talents. Consequently, many M&A decisions may be the result of hubris, as the executives evaluating an acquisition candidate come to believe that, with proper planning and superior management skills, they could make it more valuable. Research on postmerger performance suggests that, on average, they are mistaken.

Managers are also prone to the illusion that they are in control. Sometimes, in fact, they will explicitly deny the role of chance in the outcome of their plans. They see risk as a challenge to be met by the exercise of skill, and they believe results are determined purely by their own actions and those of their organizations. In their idealized self-image, these executives are not gamblers but prudent and determined agents, who are in control of both people and events. When it comes to making forecasts, therefore, they tend to ignore or downplay the possibility of random or uncontrollable occurrences that may impede their progress toward a goal.

The cognitive biases that produce overoptimism are compounded by the limits of human imagination. No matter how detailed, the business scenarios used in planning are generally inadequate. The reason is simple: Any complex project is subject to myriad problems—from technology failures to shifts in exchange rates to bad weather—and it is beyond the reach of the human imagination to foresee all of them at the outset. As a result, scenario planning can seriously understate the probability of things going awry. Often, for instance, managers will establish a "most likely" scenario and then assume that its outcome is in fact the most likely outcome. But that assumption can be wrong. Because the managers have not fully considered all the possible sequences of events that might delay or otherwise disrupt the project, they are likely to understate the overall probability of unfavorable outcomes. Even though any one of those outcomes may have only a small chance of occurring, in combination they may actually be far more likely to happen than the so-called most likely scenario.

Accentuating the Positive

In business situations, people's native optimism is further magnified by two other kinds of cognitive bias—anchoring and competitor neglect—as well as political pressures to emphasize the positive and downplay the negative. Let's look briefly at each of these three phenomena.

Anchoring. When executives and their subordinates make forecasts about a project, they typically have, as a starting point, a preliminary plan drawn up by the person or team proposing the initiative. They adjust this original plan based on market research, financial analysis, or their own professional judgment before arriving at decisions about whether and how to proceed. This intuitive and seemingly unobjectionable process has serious pitfalls, however. Because the initial plan will tend to accentuate the positive—as a proposal, it's designed to make the case for the project—it will skew the subsequent analysis toward overoptimism. This phenomenon is the result of anchoring, one of the strongest and most prevalent of cognitive biases.

In one experiment that revealed the power of anchoring, people were asked for the last four digits of their Social Security number. They were then asked whether the number of physicians in Manhattan is larger or smaller than the number formed by those four digits. Finally, they were asked to estimate what the number of Manhattan physicians actually is. The correlation between the Social Security number and the estimate was significantly positive. The subjects started from a random series of digits and then insufficiently adjusted their estimate away from it.

Anchoring can be especially pernicious when it comes to forecasting the cost of major capital projects. When executives set budgets for such initiatives, they build in contingency funds to cover overruns. Often, however, they

fail to put in enough. That's because they're anchored to their original cost estimates and don't adjust them sufficiently to account for the likelihood of problems and delays, not to mention expansions in the scope of the projects. One Rand Corporation study of 44 chemical-processing plants owned by major companies like 3M, DuPont, and Texaco found that, on average, the factories' actual construction costs were more than double the initial estimates. Furthermore, even a year after startup, about half the plants produced at less than 75% of their design capacity, with a quarter producing at less than 50%. Many of the plants had their performance expectations permanently lowered, and the owners never realized a return on their investments.

Competitor Neglect. One of the key factors influencing the outcome of a business initiative is competitors' behavior. In making forecasts, however, executives tend to focus on their own company's capabilities and plans and are thus prone to neglect the potential abilities and actions of rivals. Here, again, the result is an underestimation of the potential for negative events—in this case, price wars, overcapacity, and the like. Joe Roth, the former chairman of Walt Disney Studios, expressed the problem well in a 1996 interview with the *Los Angeles Times*: "If you only think about your own business, you think, 'I've got a good story department, I've got a good marketing department, we're going to go out and do this.' And you don't think that everybody else is thinking the same way."

When pessimistic opinions are suppressed, while optimistic ones are rewarded, an organization's ability to think critically is undermined.

Neglecting competitors can be particularly destructive in efforts to enter new markets. When a company identifies a rapidly growing market well suited to its products and capabilities, it will often rush to gain a beachhead in it, investing heavily in production capacity and marketing. The effort is often justified by the creation of attractive pro forma forecasts of financial results. But such forecasts rarely account for the fact that many other competitors will also target the market, convinced that they, too, have what it takes to succeed. As all these companies invest, supply outstrips demand, quickly rendering the new market unprofitable. Even savvy venture capitalists fell into this trap during the recent ill-fated Internet boom.

Organizational Pressure. Every company has only a limited amount of money and time to devote to new projects. Competition for this time and money is intense, as individuals and units jockey to present their own proposals as being the most attractive for investment. Because forecasts are critical weapons in these battles, individuals and units have big incentives to accentuate the positive in laying out prospective outcomes. This has two ill effects. First, it ensures that the forecasts used for planning are overoptimistic, which, as we described in our discussion of anchoring, distorts all further analysis. Second, it raises the odds that the projects chosen for investment will be those with the most overoptimistic forecasts—and hence the highest probability of disappointment.

Other organizational practices also encourage optimism. Senior executives tend, for instance, to stress the importance of stretch goals for their business units. This can have the salutary effect of increasing motivation, but it can also lead unit managers to further skew their forecasts toward unrealistically rosy outcomes. (And when these forecasts become the basis for compensation targets, the practice can push employees to behave in dangerously risky ways.) Organizations also actively discourage pessimism, which is often interpreted as disloyalty. The bearers of bad news tend to become pariahs, shunned and ignored by other employees. When pessimistic opinions are suppressed, while optimistic ones are rewarded, an organization's ability to think critically is undermined. The optimistic biases of individual employees become mutually reinforcing, and unrealistic views of the future are validated by the group.

The Outside View

For most of us, the tendency toward optimism is unavoidable. And it's unlikely that companies can, or would even want to, remove the organizational pressures that promote optimism. Still, optimism can, and should, be tempered. Simply understanding the sources of overoptimism can help planners challenge assumptions, bring in alternative perspectives, and in general take a balanced view of the future.

But there's also a more formal way to improve the reliability of forecasts. Companies can introduce into their planning processes an objective forecasting method that counteracts the personal and organizational sources of op-

timism. We'll begin our exploration of this approach with an anecdote that illustrates both the traditional mode of forecasting and the suggested alternative.

In 1976, one of us was involved in a project to develop a curriculum for a new subject area for high schools in Israel. The project was conducted by a small team of academics and teachers. When the team had been operating for about a year and had some significant achievements under its belt, its discussions turned to the question of how long the project would take. Everyone on the team was asked to write on a slip of paper the number of months that would be needed to finish the project—defined as having a complete report ready for submission to the Ministry of Education. The estimates ranged from 18 to 30 months.

One of the team members—a distinguished expert in curriculum development—was then posed a challenge by another team member: "Surely, we're not the only team to have tried to develop a curriculum where none existed before. Try to recall as many such projects as you can. Think of them as they were in a stage comparable to ours at present. How long did it take them at that point to reach completion?" After a long silence, the curriculum expert said, with some discomfort, "First, I should say that not all the teams that I can think of, that were at a comparable stage, ever did complete their task. About 40% of them eventually gave up. Of the remaining, I cannot think of any that completed their task in less than seven years, nor of any that took more than ten." He was then asked if he had reason to believe that the present team was more skilled in curriculum development than the earlier ones had been. "No," he replied, "I cannot think of any relevant factor that distinguishes us favorably from the teams I have been thinking about. Indeed, my impression is that we are slightly below average in terms of resources and potential." The wise decision at this point would probably have been for the team to disband. Instead, the members ignored the pessimistic information and proceeded with the project. They finally completed the initiative eight years later, and their efforts went largely for naught—the resulting curriculum was rarely used.

In this example, the curriculum expert made two forecasts for the same problem and arrived at very different answers. We call these two distinct modes of forecasting the inside view and the outside view. The inside view is the one that the expert and all the other team members spontaneously adopted. They made forecasts by focusing tightly on the case at hand—considering its objective, the resources they brought to it, and the obstacles to its completion; constructing in their minds scenarios of their coming progress; and extrapolating current trends into the future. Not surprisingly, the resulting forecasts, even the most conservative ones, were exceedingly optimistic.

The outside view, also known as reference-class forecasting, is the one that the curriculum expert was encouraged to adopt. It completely ignored the details of the project at hand, and it involved no attempt at forecasting the events that would influence the project's future course. Instead, it examined the experiences of a class of similar projects, laid out a rough distribution of outcomes for this reference class, and then positioned the current project in that distribution. The resulting forecast, as it turned out, was much more accurate.

The contrast between inside and outside views has been confirmed in systematic research. Recent studies have shown that when people are asked simple questions requiring them to take an outside view, their forecasts become significantly more objective and reliable. For example, a group of students enrolling at a college were asked to rate their future academic performance relative to their peers in their major. On average, these students expected to perform better than 84% of their peers, which is logically impossible. Another group of incoming students from the same major were asked about their entrance scores and their peers' scores before being asked about their expected performance. This simple detour into pertinent outside-view information, which both groups of subjects were aware of, reduced the second group's average expected performance ratings by 20%. That's still overconfident, but it's much more realistic than the forecast made by the first group.

Most individuals and organizations are inclined to adopt the inside view in planning major initiatives. It's not only the traditional approach; it's also the intuitive one. The natural way to think about a complex project is to focus on the project itself—to bring to bear all one knows about it, paying special attention to

How to Take the Outside View

Making a forecast using the outside view requires planners to identify a reference class of analogous past initiatives, determine the distribution of outcomes for those initiatives, and place the project at hand at an appropriate point along that distribution. This effort is best organized into five steps:[1]

1. Select a reference class. Identifying the right reference class involves both art and science. You usually have to weigh similarities and differences on many variables and determine which are the most meaningful in judging how your own initiative will play out. Sometimes that's easy. If you're a studio executive trying to forecast sales of a new film, you'll formulate a reference class based on recent films in the same genre, starring similar actors, with comparable budgets, and so on. In other cases, it's much trickier. If you're a manager at a chemical company that is considering building an olefin plant incorporating a new processing technology, you may instinctively think that your reference class would include olefin plants now in operation. But you may actually get better results by looking at other chemical plants built with new processing technologies. The plant's outcome, in other words, may be more influenced by the newness of its technology than by what it produces. In forecasting an outcome in a competitive situation, such as the market share for a new venture, you need to consider industrial structure and market factors in designing a reference class. The key is to choose a class that is broad enough to be statistically meaningful but narrow enough to be truly comparable to the project at hand.

2. Assess the distribution of outcomes. Once the reference class is chosen, you have to document the outcomes of the prior projects and arrange them as a distribution, showing the extremes, the median, and any clusters. Sometimes you won't be able to precisely document the outcomes of every member of the class. But you can still arrive at a rough distribution by calculating the average outcome as well as a measure of variability. In the film example, for instance, you may find that the reference-class movies sold $40 million worth of tickets on average, but that 10% sold less than $2 million worth of tickets and 5% sold more than $120 million worth.

3. Make an intuitive prediction of your project's position in the distribution. Based on your own understanding of the project at hand and how it compares with the projects in the reference class, predict where it would fall along the distribution. Because your intuitive estimate will likely be biased, the final two steps are intended to adjust the estimate in order to arrive at a more accurate forecast.

4. Assess the reliability of your prediction. Some events are easier to foresee than others. A meteorologist's forecast of temperatures two days from now, for example, will be more reliable than a sportscaster's prediction of the score of next year's Super Bowl. This step is intended to gauge the reliability of the forecast you made in Step 3. The goal is to estimate the correlation between the forecast and the actual outcome, expressed as a coefficient between 0 and 1, where 0 indicates no correlation and 1 indicates complete correlation. In the best case, information will be available on how well your past predictions matched the actual outcomes. You can then estimate the correlation based on historical precedent. In the absence of such information, assessments of predictability become more subjective. You may, for instance, be able to arrive at an estimate of predictability based on how the situation at hand compares with other forecasting situations. To return to the movie example, say that you are fairly confident that your ability to predict the sales of films exceeds the ability of sportscasters to predict point spreads in football games but is not as good as the ability of weather forecasters to predict temperatures two days out. Through a diligent statistical analysis, you could construct a rough scale of predictability based on computed correlations between predictions and outcomes for football scores and temperatures. You can then estimate where your ability to predict film scores lies on this scale. When the calculations are complex, it may help to bring in a skilled statistician.

5. Correct the intuitive estimate. Due to bias, the intuitive estimate made in Step 3 will likely be optimistic—deviating too far from the average outcome of the reference class. In this final step, you adjust the estimate toward the average based on your analysis of predictability in Step 4. The less reliable the prediction, the more the estimate needs to be regressed toward the mean. Suppose that your intuitive prediction of a film's sales is $95 million and that, on average, films in the reference class do $40 million worth of business. Suppose further that you have estimated the correlation coefficient to be 0.6. The regressed estimate of ticket sales would be:

$$\$95M + [0.6\ (\$40M - \$95M)] = \$62M$$

As you see, the adjustment for optimism will often be substantial, particularly in highly uncertain situations where predictions are unreliable.

1. This discussion builds on "Intuitive Predictions: Biases and Corrective Procedures," a 1979 article by Daniel Kahneman and Amos Tversky that appeared in *TIMS Studies in Management Science*, volume 12 (Elsevier/North Holland).

its unique or unusual features. The thought of going out and gathering statistics about related cases seldom enters a planner's mind. The curriculum expert, for example, did not take the outside view until prompted—even though he already had all the information he needed. Even when companies bring in independent consultants to assist in forecasting, they often remain stuck in the inside view. If the consultants provide comparative data on other companies or projects, they can spur useful outside-view thinking. But if they concentrate on the project itself, their analysis will also tend to be distorted by cognitive biases.

While understandable, managers' preference for the inside view over the outside view is unfortunate. When both forecasting methods are applied with equal intelligence and skill, the outside view is much more likely to yield a realistic estimate. That's because it bypasses cognitive and organizational biases. In the outside view, managers aren't required to weave scenarios, imagine events, or gauge their own levels of ability and control—so they can't get all those things wrong. And it doesn't matter if managers aren't good at assessing competitors' abilities and actions; the impact of those abilities and actions is already reflected in the outcomes of the earlier projects within the reference class. It's true that the outside view, being based on historical precedent, may fail to predict extreme outcomes—those that lie outside all historical precedents. But for most projects, the outside view will produce superior results.

The outside view is more likely to produce accurate forecasts and much less likely to deliver highly unrealistic ones.

The outside view's advantage is most pronounced for initiatives that companies have never attempted before—like building a plant with a new manufacturing technology or entering an entirely new market. It is in the planning of such de novo efforts that the biases toward optimism are likely to be great. Ironically, however, such cases are precisely where the organizational and personal pressures to apply the inside view are most intense. Managers feel that if they don't fully account for the intricacies of the proposed project, they would be derelict in their duties. Indeed, the preference for the inside view over the outside view can feel almost like a moral imperative. The inside view is embraced as a serious attempt to come to grips with the complexities of a unique challenge, while the outside view is rejected as relying on a crude analogy to superficially similar instances. Yet the fact remains: The outside view is more likely to produce accurate forecasts and much less likely to deliver highly unrealistic ones.

Of course, choosing the right class of analogous cases becomes more difficult when executives are forecasting initiatives for which precedents are not easily found. It's not like in the curriculum example, where many similar efforts had already been undertaken. Imagine that planners have to forecast the results of an investment in a new and unfamiliar technology. Should they look at their company's earlier investments in new technologies? Or should they look at how other companies carried out projects involving similar technologies? Neither is perfect, but each will provide useful insights—so the planners should analyze both sets of analogous cases. We provide a fuller explanation of how to identify and analyze a reference class in the sidebar "How to Take the Outside View."

Putting Optimism in Its Place

We are not suggesting that optimism is bad, or that managers should try to root it out of themselves or their organizations. Optimism generates much more enthusiasm than it does realism (not to mention pessimism), and it enables people to be resilient when confronting difficult situations or challenging goals. Companies have to promote optimism to keep employees motivated and focused. At the same time, though, they have to generate realistic forecasts, especially when large sums of money are at stake. There needs to be a balance between optimism and realism—between goals and forecasts. Aggressive goals can motivate the troops and improve the chances of success, but outside-view forecasts should be used to decide whether or not to make a commitment in the first place.

The ideal is to draw a clear distinction between those functions and positions that involve or support decision making and those that promote or guide action. The former should be imbued with a realistic outlook, while the latter will often benefit from a sense of optimism. An optimistic CFO, for example, could mean disaster for a company, just as a lack of optimism would undermine the visionary qualities essential for superior R&D and the esprit de corps central to a successful sales

force. Indeed, those charged with implementing a plan should probably not even see the outside-view forecasts, which might reduce their incentive to perform at their best.

Of course, clean distinctions between decision making and action break down at the top. CEOs, unit managers, and project champions need to be optimistic and realistic at the same time. If you happen to be in one of these positions, you should make sure that you and your planners adopt an outside view in deciding where to invest among competing initiatives. More objective forecasts will help you choose your goals wisely and your means prudently. Once an organization is committed to a course of action, however, constantly revising and reviewing the odds of success is unlikely to be good for its morale or performance. Indeed, a healthy dose of optimism will give you and your subordinates an advantage in tackling the challenges that are sure to lie ahead.

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Delusions of Success

How Optimism Undermines Executives' Decisions

Further Reading

ARTICLES

The High Cost of Accurate Knowledge
by Kathleen M. Sutcliffe and Klaus Weber
Harvard Business Review
May 2003
Product no. R0305E

These authors agree that senior managers' ability to interpret information is critical to making better decisions. Today's complex information, they maintain, is rarely precise—and often ambiguous and conflicting. Therefore, companies should think carefully about whether to invest heavily in systems for collecting and organizing vast amounts of competitive data. Information's accuracy and abundance are less important for strategy and organizational change than the ways in which executives *interpret* such information—and communicate their interpretations. In other words, executives must manage *meaning* more than they manage *information*.

Sutcliffe and Weber aren't suggesting that accurate information doesn't matter at all. Corporate leaders must have clear knowledge of their industries. But managers' interpretive *outlooks* determine their companies' competitive advantage more than the information itself. And the most successful leaders interpret information through a curious blend of optimism and pessimism that the authors call "humble optimism": They embrace opportunities—but they're not overly confident in their ability to control those opportunities. They thus manage ambiguity—while simultaneously mobilizing action.

What Do Managers Know, Anyway?
by John M. Mezias and William H. Starbuck
Harvard Business Review
May 2003
Product no. F0305A

Mezias and Starbuck also contend that accurate competitive information may be less important to a company's success than previously assumed. And they add another important piece to the decision-making puzzle: managers' willingness to seek and make wise use of feedback.

Managers, the authors maintain, often have badly distorted pictures of their businesses and their competitive environments. And they have great confidence in their own distorted perceptions. Why? They tend to focus on what's happening right now, in their specific jobs, in their specific business units, operating in their very specific competitive worlds. Busy among the trees, they lose sight of the forest. They also base their analyses on sources of varied reliability—such as corporate documents they often misunderstand, personal experiences, and rumors. And they also surround themselves with yea-sayers.

This may sound like a recipe for disastrously large errors in judgment. But when managers get prompt feedback on the impact of their decisions, their misperceptions may cause only small errors—if they respond appropriately. The challenge lies in overcoming managers' fear of sanctions if they're wrong. Companies must accept that distorted perception is a fact of management—and design decision processes that work despite inaccurate perceptions. The implications? Encourage managers to admit their errors and modify their approaches accordingly.