Lessons from Everest:
The Interaction of Cognitive Bias, Psychological Safety, and System Complexity

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Business leaders and scholars have learned important lessons from tragedies such as the Challenger disaster, the Bay of Pigs fiasco, and the Three Mile Island accident.[1] Similarly, we can learn important lessons about leadership and decision making from the unfortunate events that took place on Mount Everest several years ago. Survivors have offered many competing explanations for this tragedy. While they have focused on the tactical blunders, this research examines the underlying cognitive, interpersonal, and systemic forces that played a role in the incident. This conceptual analysis suggests that cognitive biases, team beliefs about interpersonal risk taking, and system complexity interacted to create a fatal disaster.

Incredible achievement and great tragedy unfolded on the treacherous slopes of Everest on May 10, 1996. Twenty-three people reached the summit along the South Col route in Nepal on that day, including Rob Hall and Scott Fischer, two of the world's most skilled and experienced high-altitude climbers. Unfortunately, Hall, Fischer, and three members of their expeditions died as a storm enveloped the mountain during their descent. Others barely escaped with their lives after many hours wandering in the dark while braving subzero temperatures.

Hall, the leader of the Adventure Consultants expedition, had established an impressive track record of Everest ascents, guiding thirty-nine climbers to the summit over the previous six years. Fischer, the leader of the Mountain Madness team, also had an impressive reputation as a high-altitude climber, though he had only reached the Everest summit once. Each expedition included the team

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FIGURE 1. The Expedition Teams

Adventure Consultants Expedition		Mountain Madness Expedition	
Rob Hall	Leader	Scott Fischer	Leader
Mike Groom	Guide	Anatoli Boukreev	Guide
Andy Harris	Guide	Neal Beidleman	Guide
Beck Weathers	Client	Sandy Pittman	Client
Yasuko Namba	Client	Charlotte Fox	Client
Stuart Hutchison	Client	Tim Madsen	Client
Frank Fischbeck	Client	Pete Schoenig	Client
Lou Kasischke	Client	Klev Schoenig	Client
John Taske	Client	Lene Gammelgaard	Client
Jon Krakauer	Client	Martin Adams	Client
Doug Hansen	Client	Dale Kruse	Client

Note: Each expedition also included climbing Sherpas, a Base Camp Doctor, and other Base Camp support personnel.

leader, two guides, eight paying clients, and several Sherpa mountaineers who assisted in many ways (see Figure 1).[2] In the spring of 1996, the teams gathered at Base Camp, and the climbers began to adjust gradually to the lower levels of oxygen at high altitudes. Just before midnight on May 9th, the climbers launched their final push for the summit. They planned to arrive at the top shortly after midday on May 10. Unfortunately, many of the climbers encountered great difficulty during the ascent and arrived at the summit well behind schedule. They were forced to descend as nightfall enveloped the mountain. As the teams began to make their way down the mountain, a severe storm created blizzard-like conditions. The lack of visibility, howling wind, and frigid temperatures made the descent a slow and painful experience. Many climbers ran out of supplemental oxygen and became lost and disoriented. Five climbers did not survive, making this one of the deadliest days in Everest history.

Since then, many have sought to understand what happened and have cited a number of possible causes of the tragedy. High-altitude climbers have tried to identify the mistakes made by the Fischer and Hall expeditions so that they can prevent future fatalities. However, this tragic event provides a learning opportunity that extends well beyond the realm of mountain climbing. The purpose of this discussion is to examine the factors that contributed to this tragedy and to distill lessons learned that are applicable to all executives who are leading complex initiatives and making high-stakes decisions. To accomplish this, I draw upon several first-hand accounts of the 1996 summit attempt. These accounts include books and articles written by survivors from the Hall and Fischer expeditions as well as by others climbing the mountain at that time. I also have gathered

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evidence from transcripts of a debriefing that several climbers conducted just a few days after the incident.

Multiple Explanations

To learn from the Everest incident, we must understand the causes of the tragedy. Unfortunately, many theories abound, and much disagreement remains among those involved in the 1996 Everest disaster. Some have blamed the powerful storm that created blizzard-like conditions during the descent.[3] Over the years, storms, avalanches, and collapses of large chunks of ice have caused many deaths and serious injuries on Everest. More than 160 people have died trying to climb Everest since the first summit attempt in 1922, and countless others have experienced serious injuries.[4] In short, this school of thought recognizes that mistakes may have been made, but emphasizes that climbing Everest will always be a very risky and dangerous endeavor. Others have argued that human error caused the tragedy, and therefore, these deaths could have been prevented. One accomplished guide put it rather bluntly: "The events of May 10 were not an accident, nor an act of God. They were the end result of people who were making decisions about how and whether to proceed."[5] For example, many have argued that Hall and Fischer should have been more careful as they selected expedition members, provided better radio communication for the climbers, and not allowed individuals to summit without bottled oxygen.[6]

With so many competing explanations, how can business leaders draw any broad conclusions and derive any lessons learned from this incident? To begin, we must recognize that it may be nearly impossible to pinpoint a single cause of the tragedy. To understand what happened, we may need to examine the events from multiple theoretical perspectives. The purpose of this analysis is to develop an integrated explanation for the tragic events of May 1996 and to highlight the implications for executives leading business initiatives that require tight coordination within and among multiple work teams.

This discussion draws upon three conceptual frameworks—behavioral decision theory, the team effectiveness literature, and complex systems theory—to identify and analyze the multiple factors that may have caused the Everest tragedy. One explanation, drawn from behavioral decision-making research, suggests that cognitive biases may have impaired the climbers' judgment. These biases include overconfidence, a failure to ignore sunk costs, and a tendency to overestimate the probability of recent events. A second analytical lens focuses on group dynamics. The evidence strongly suggests that the conditions and beliefs required for effective team learning and performance did not exist. Finally, the complex systems perspective suggests that multiple, interconnected breakdowns occurred within the human, technological, and natural systems involved in the Everest ascent. Human error alone did not cause the tragedy, and the usual precautions and safeguards could not have prevented a serious accident. Instead, the complexity of the system made failure inevitable. These three analytical perspectives are *not* simply alternative explanations for the tragedy. Instead, factors

FIGURE 2. Three Interconnected Levels of Analysis

at each level—individual, group, and organizational system—reinforce and interrelate with one another.[7] The integration of these perspectives presents a rich explanation of this tragedy and provides key lessons for those who wish to prevent similar failures in the future (see Figure 2).

Cognitive Biases

A long stream of research, known as behavioral decision theory, has shown that systematic biases often impair the judgments and choices that individuals make. These cognitive biases are quite predictable and affect people in many different professions.[8] The evidence suggests that three cognitive biases—the sunk cost effect, the overconfidence bias, and the recency effect—played a particularly prominent role in the Everest tragedy.

Sunk Cost Effect

The sunk cost effect refers to the tendency for people to escalate commitment to a course of action in which they have made substantial prior investments of time, money, or other resources. If people behaved rationally, they would make choices based on the marginal costs and benefits of their actions. The amount of any previous unrecoverable investment is a sunk cost and should not affect the current decision. However, research demonstrates that people often do consider past investment decisions when choosing future courses of action. In particular, individuals tend to pursue activities in which they have made prior investments. Often, they become overly committed to certain activities despite consistently poor results. They "throw good money after bad," and the situation continues to escalate.[9]

Hall and Fischer recognized that a dangerous escalation of commitment could occur as climbers approached the summit. The final push to the top required a very difficult eighteen hour round trip from Camp IV to the summit.[10] Individuals faced enormous danger if they did not reach the top until long after midday, because the descent would last into the night and the climbers would run out of supplemental oxygen. Climbers needed to turn around if they realized that they would not reach the summit until mid-afternoon or later. However, Hall and Fischer knew that individuals would find it difficult to turn around after coming so far and expending such effort. Guy Cotter, a guide who had climbed Everest with Hall in the past, described the problem that they had experienced on previous summit attempts: "It's very difficult to turn someone around high on the mountain. If a client sees that the summit is close and they're dead set on getting there, they're going to laugh in your face and keep going up."[11]

Hall and Fischer spoke often about the need to establish a predetermined turn-around time in order to avoid a dangerous situation. In fact, just six weeks before the climb, a journalist had written a story about Scott Fischer's famous "Two O'Clock Rule"—"If you aren't on top by two, it's time to turn around. Darkness is not your friend."[12] Jon Krakauer, a member of Hall's expedition, later wrote that, "Rob had lectured us repeatedly about the importance of having a predetermined turnaround time on summit day—in our case it would probably be 1:00 P.M. or 2:00 p.m. at the very latest—and abiding by it no matter how close we were to the top."[13] Unfortunately, Hall never made it clear whether climbers should turn around at one or two o'clock. Krakauer explained that this was "curious considering how much he'd talked about the importance of designating a hard deadline and sticking to it no matter what."[14] Similarly, Fischer did not set a definitive turnaround time, but instead told his team that he would make the decision to turn people around if he felt they could not reach the summit by two o'clock.[15]

During the final push to the summit, only four individuals adhered to the turnaround time philosophy. Krakauer described their decision to turn back despite being so close to the top:

> "In order to succeed you must be exceedingly driven, but if you're too driven you're likely to die. Above 26,000 feet, moreover, the line between appropriate zeal and reckless summit fever becomes grievously thin. Thus the slopes of Everest are littered with corpses. Taske, Hutchison, Kasischke, and Fischbeck had each spent as much as $70,000 and endured weeks of agony to be granted this one shot at the summit . . . and yet, faced with a tough decision, they were among the few who made the right choice that day."[16]

Krakauer's comments warrant close attention. Note that he expresses how difficult it can become to turn around once you have moved beyond 26,000 feet, i.e., when you have climbed most of the mountain and believe that you are very close to attaining your goal. In addition, Krakauer makes explicit reference to the magnitude of the sunk costs ($70,000 and weeks of agony) that Taske and his colleagues ignored when they decided to turn back.

All of the other climbers chose to proceed despite the danger associated with falling behind schedule. No one arrived at the summit by 1:00 P.M., and only six individuals reached the top before 2:00 P.M. Seventeen others, including Hall and Fischer, arrived later in the afternoon. What happened? Krakauer explained that, "predetermined turnaround times were egregiously ignored."[17] The climbers could not ignore the sunk costs that they had incurred. They did not wish to "waste" their entire investment by abandoning their summit bid just a short way from the top. Doug Hansen, a climber on Hall's team, expressed this very sentiment during the final ascent: "I've put too much of myself into this mountain to quit now, without giving it everything I've got."[18] Hansen had climbed the mountain with Hall's expedition in 1995, and Hall had turned him around just 330 vertical feet from the summit. According to Krakauer, Hansen was "absolutely determined to bag the top" on this trip, and Hall felt very bad about stopping him after he had come this far a second time.[19] On May 10, Hansen struggled mightily, but continued to press toward the summit long after midday. He did not reach the top until 4:00 P.M. Hall never turned him around despite the late hour, and both men died during their descent.

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Other climbers also expressed an intense unwillingness to turn back despite severe medical problems and a clear understanding of the dangers associated with reaching the summit well past midday. Beck Weathers continued climbing despite a serious vision impairment.[20] He recalled that, "one eye was completely blurred over, I could barely see out of the other, and I'd lost all depth perception."[21] Nevertheless, when Rob Hall tried to send him back to Camp IV, he convinced Hall to let him try to continue. Weathers never reached the summit that day. He became lost and disoriented, and others left him for dead at one point. Miraculously, Weathers managed to survive, but he suffered permanent disabilities.[22] Lane Gammelgaard also ignored the turnaround time and arrived at the summit after two o'clock. She too nearly died during the descent. Nevertheless, Gammelgaard explained that it would have been nearly impossible to persuade her to turn back after she had expended so much time and effort during the climb.[23]

This sad story demonstrates that experts as well as novices can become victims of the sunk cost effect.[24] Less experienced climbers such as Hansen and Weathers engaged in a dangerous escalation of commitment as they approached the summit. Hall and Fischer's experience did not prevent a similar lapse in judgment. They ignored their own rules designed specifically to combat the sunk cost bias and put themselves and their clients in grave danger.

Overconfidence Bias

The overconfidence bias also impaired the judgment of the climbers in this case. Researchers have found that people typically are overconfident in their judgment. Scholars have confirmed this finding in studies of people from a wide range of fields including academia, business, medicine, and the military.[25] Hall and Fischer had plenty of reasons to be confident. They had climbed many of the world's most difficult peaks. Incredibly, Hall had climbed to the top of Everest four times and guided thirty-nine clients to the summit. They also knew that approximately four hundred individuals had completed a successful ascent in the previous five years, and most of them did not have the ability and experience that Hall and Fischer possessed.

Hall and Fischer each made bold statements during the climb that demonstrated classic signs of overconfidence bias. Fischer had endured many harrowing climbing experiences and had become accustomed to accomplishing incredible feats in the face of adversity. He once told his team, "We've got the Big E figured out, we've got it totally wired. These days, I'm telling you, we've built a yellow brick road to the summit."[26] Apparently, Fischer used that reference to *The Wizard of Oz* on more than one occasion, because climbers from other expeditions have quoted him making a similar statement.[27] Fischer often dismissed those who pressed him about the risks associated with climbing Everest. He told one journalist: "I believe 100 percent that I'm coming back. My wife believes 100 percent that I'm coming back. She isn't concerned about me at all when I'm guiding because I'm going to make all the right choices."[28]

Hall and Fischer each made bold statements during the climb that demonstrated classic signs of overconfidence bias.

Rob Hall also exhibited signs of overconfidence. During the climb, Hall occasionally "bragged that he could get almost any reasonably fit person to the summit."[29] Hall had reason to feel confident. He had compiled an impressive track record as a guide and had overcome adverse conditions on many occasions. When Krakauer expressed doubts about the climb at one point, Hall reminded him of his past success: "It's worked 39 times so far, pal, and a few of the blokes who summitted with me were nearly as pathetic as you."[30] This does not mean that Hall failed to recognize the risks. He firmly believed that a commercial Everest expedition would experience a major disaster in the near future. However, "Rob's feeling was that it wouldn't be him; he was just worried about 'having to save another team's ass.'"[31]

Krakauer observed that this overconfidence extended to many of the other climbers as well. He described the incredibly positive self-assessments of many individuals, and wondered whether they were "clinically delusional."[32] Like many individuals with deep expertise in their fields, the climbers on these expeditions had great confidence in their abilities. Without it, they could not have set out to accomplish such a remarkably ambitious objective. However, the climbers appeared to develop overly positive assessments of the risks and

obstacles associated with climbing Everest. This contributed to the lapses in judgment that took place on May 10.

Recency Effect

Scholars have shown that decision makers tend to place too much emphasis on the information and evidence that is most readily available to them. One particular form of this availability bias concerns the tendency to pay too much attention to recent events.[33] For example, one study found that a firm's chemical engineers often misdiagnosed product failures because they tended to focus too heavily on causes that they had experienced recently.[34]

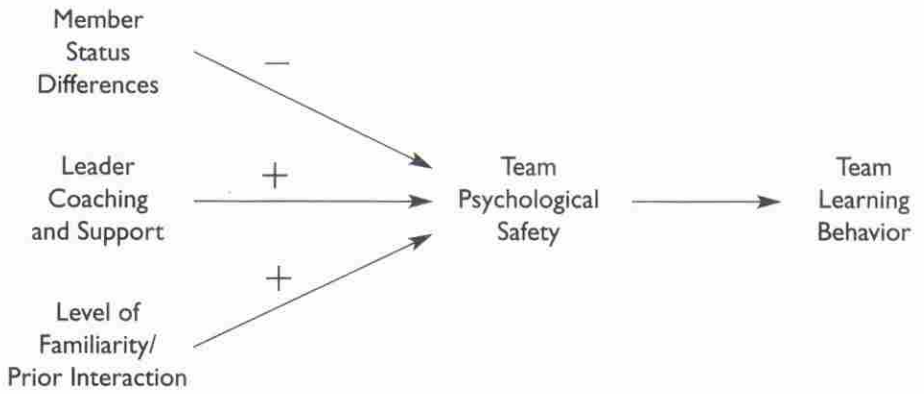
The evidence suggests that recency bias may have impaired the judgment of the expedition leaders. Climbers had enjoyed remarkably good weather on Everest in recent years. This caused them to underestimate the likelihood of dangerous storms. David Breashears, leader of the 1996 IMAX film expedition, described how recent events distorted people's judgment: "Several seasons of good weather have led people to think of Everest as benevolent, but in the mid-eighties—before many of the guides had been on Everest—there were three consecutive seasons when no one climbed the mountain because of the ferocious wind."[35]

Many climbers considered the storm surprising and unusual, but in fact, history shows that this was rather typical for Everest. As Breashears has said, these storms are the norm rather than the exception on Everest. The poor weather should not have surprised anyone climbing the mountain that day. However, Rob Hall's recent experience may have distorted his judgment. Breashears explained that, "Season after season, Rob had brilliant weather on summit day. He'd never been caught in a storm high on the mountain."[36] For that reason, the expedition teams did not prepare adequately for the blizzard-like conditions that developed on May 10.[37]

Team Effectiveness

The cognitive bias perspective provides a compelling explanation for many of the lapses in judgment that occurred high on the mountain. Individuals did make faulty decisions while climbing the mountain, but this does not fully explain why these expeditions failed. Climbing Everest could not be accomplished alone. Individuals needed to cooperate with one another and work together as a team to ascend the mountain. Unfortunately, several participants have noted that the climbers did not perform effectively as a team. At critical junctures, the teams did not discuss mistakes openly, exchange information freely, and challenge prevailing views and assumptions. The absence of these learning behaviors impaired the effectiveness of the two expedition teams. In particular, the lack of open and candid discussion made it more difficult for the teams to identify and address the cognitive biases that impaired individual decision making.

FIGURE 3. Conditions Affecting Team Psychological Safety



Psychological Safety and Team Learning Behavior

First-hand accounts indicate that the teams did not discuss issues and errors openly and that group members did not feel comfortable expressing dissenting views. The unwillingness to question team procedures and exchange ideas openly prevented the groups from revising and improving their plans as conditions changed. Why did the teams fail to discuss problems and concerns openly? The evidence suggests a lack of team psychological safety diminished the learning and performance of the two expeditions. Team psychological safety has been defined as the "shared belief that the team is safe for interpersonal risk taking."[38] It means that team members demonstrate a high level of trust and mutual respect for one another. Moreover, it means that team members do not believe that the group will rebuke, marginalize, or penalize individuals for speaking up and challenging prevailing opinions.

Several conditions tend to undermine the development of team psychological safety, and thereby diminish the learning and performance of teams. These conditions include perceived status differences within the team, the style of the expedition leader, and a lack of familiarity among group members.[39] To some degree, each of these factors diminished psychological safety and learning behavior on the expedition teams (see Figure 3).

Several examples suggest that perceptions and beliefs about status differences within the teams diminished psychological safety, and discouraged individuals from discussing issues and concerns openly. For example, Andy Harris, a guide on Hall's team, became disoriented during the descent and made a critical error; he mistakenly concluded that no supplemental oxygen remained at the South Summit. Krakauer remarked that he did not question Harris' plans to proceed or raise concerns about his physical condition because of what he described as the "guide-client protocol." Krakauer explained: "On this expedition, he [Harris] had been cast in the role of invincible guide, there to look after

me and the other clients; we had been specifically indoctrinated not to question our guides' judgment."[40] Krakauer has said that he never considered the notion that an experienced guide such as Harris might be in trouble and require his assistance.

The guides as well felt uncomfortable speaking up. Neil Beidleman, a guide on the Mountain Madness expedition, has indicated that he had serious reservations about people climbing well past midday. However, he did not feel comfortable telling Fischer and other team members that they should turn around. Krakauer argued that Beidleman did not speak up because he "was quite conscious of his place in the expedition pecking order."[41] Beidleman's comments support this view. He knew that Scott Fischer and guide Anatoli Boukreev had much more high-altitude climbing experience, and he believed that they enjoyed much more prestige and status within the Mountain Madness team. Beidleman also could point to Boukreev's compensation as evidence of differences in status; the Russian guide earned $15,000 more than him to serve as on the Mountain Madness Expedition. Beidleman explained how his perceptions about each person's relative status affected his behavior: "I was definitely considered the third guide . . . so I tried not to be too pushy. As a consequence, I didn't always speak up when maybe I should have, and now I kick myself for it."[42]

Leadership style and behavior also affected shared beliefs about interpersonal risk taking and discouraged members from expressing dissenting views.[43] Krakauer recalled one very memorable incident that influenced his team's willingness to discuss problems and concerns candidly. According to him, Rob Hall addressed a team meeting at Base Camp, and he made the following statement: "I will tolerate no dissension up there. My word will be absolute law, beyond appeal. If you don't like a particular decision I make, I'd be happy to discuss it with you afterward, not while we're up on the hill."[44] Hall believed that a clear statement of his authority prevented distracting arguments during the climb and insured that reckless behavior would not imperil the team's safety. He worried that clients would argue with him if he directed them to turn around before the summit. Ironically, on summit day, Hall should have turned around, but his team did not question his decision to proceed. Krakauer observed that, as a result of Hall's forceful speech, "passitivity on the part of the clients had thus been encouraged throughout our expedition."[45] Hall failed to recognize that his forceful statement discouraged climbers from raising valid concerns. He did not realize that constructive dissent could have played a useful role in combating some of the cognitive biases that impaired his judgment during the climb.[46]

At one point during the climb, he admitted to himself that they were "a team in name only."

The team members also lacked familiarity with one another. Krakauer described his team as "a group of complete strangers."[47] Indeed, when the expedition began, many of the team members had never met one another. This made it difficult for individuals to trust one another and to feel comfortable disagreeing with other team members.[48] Krakauer has said that "we never really had this

feeling that we were all in it together . . . we never coalesced as a team."[49] At one point during the climb, he admitted to himself that they were "a team in name only."[50]

Many climbers had concerns about the experience and skills of fellow team members and did not know if they could rely on them during difficult times.[51] They recognized that "trust in one's partners is a luxury denied those who sign on as clients on a guided ascent."[52] The climbers simply did not have time to develop trusting relationships with their teammates. Several climbers have admitted that they worried a great deal about what others thought about them. Because team members had not worked together often, they fretted about the possibility of being embarrassed or rejected for expressing their views.[53] The lack of trust and mutual respect made it difficult to exchange opinions freely and to question one another candidly.

The Mountain Madness team members also lacked familiarity with one another. Anatoli Boukreev knew Fischer and Beidleman, but he had never met most of the Mountain Madness clients and had never climbed a mountain with Fischer. He did not find it easy to develop relationships with the other climbers, in part because he did not speak English fluently. Boukreev has explained that he did not speak up forcefully despite serious concerns about his team's acclimatization routine. Boukreev felt uncomfortable discussing his views with Fischer. He believed that Fischer had a stronger and more trusting relationship with Rob Hall, because the two of them had known each other for a long time. He also did not know how other team members, whom he did not know well, would react to his arguments.[54]

Boukreev believed that Fischer's plans did not enable the climbers to adjust adequately to the lower levels of oxygen at high altitudes. However, he recalls that his objections remained muted: "I tried not to be argumentative, choosing instead to downplay my intuitions."[55] Boukreev's concerns appear to have been valid, as several climbers, including Scott Fischer, struggled with altitude-related illnesses later during the ascent. Many climbers noticed Fischer's deteriorating health, yet no one questioned his plans to proceed. As several climbers descended to Camp IV, they saw Fischer still trying to ascend with great difficulty, yet "nobody discussed Fischer's exhausted appearance" or advised him to turn around.[56] Once again, the absence of candid discussion proved to be very costly.

Complex Systems

Complex systems theory suggests that we cannot identify a single cause of the Everest incident. Human errors, group procedures, the terrible storm, and equipment failures each played an important role. We cannot evaluate these or other factors in isolation. Instead, complex systems theory suggests that the tragedy resulted from an interaction of multiple failures. To understand why calamity struck, we need to examine the nature of the entire high-risk system

involved in climbing the mountain and evaluate the complex interconnections among many different elements of an Everest expedition.

Scholars argue that two system characteristics—complex interactions and tight coupling—tend to enhance the likelihood of a serious accident. First, the risk of an accident increases if different elements of a system interact in ways that are unexpected and difficult to perceive or comprehend. Second, tight coupling exists if there is very little slack available in the system such that a problem in one area quickly triggers failures in other aspects of the system.[57] An Everest expedition exhibits each of these characteristics of a complex system.

Complex Interactions

Firsthand accounts suggest that a series of interconnected breakdowns and failures occurred during the expedition. Consider the experience of the Mountain Madness team. Some problems emerged before the climb even began. A customs problem at a Russian border crossing delayed the delivery of the team's oxygen supply from Russia to Nepal. The customs issue did not concern the oxygen canisters, but rather an item that happened to be on the same truck, but which was unrelated to the Everest expedition. A problem with a charter plane flight inhibited the delivery of a high-altitude tent. In Nepal, poor weather slowed the progress of the yaks carrying oxygen canisters, tents, and other supplies from Kathmandu to Base Camp. Then, a conflict with the Nepali porters erupted, because they chose to demand a large wage increase. This too impeded the delivery of oxygen and other supplies to Base Camp.[58]

Fischer could not have anticipated the complex interactions among these different events. He did not expect flight delays in Russia, rain in Nepal, pay hike requests by Nepali porters, and a company's customs problem at the Russian border to affect his planning and high-altitude adjustment routine in the mountains of Nepal. All of these logistical problems interacted to create an immense burden on Fischer. He spent a considerable amount of time resolving these issues, rather than planning the team's course of action or acclimating himself properly to the higher altitude. Many noted that he seemed exhausted at times during the early days of the expedition. His physical condition became a major factor in the events that unfolded.[59]

Many other interconnected breakdowns occurred during the climb itself. Space does not allow a complete analysis, but one series of events illustrates the point. Three expeditions were scheduled to climb to the summit prior to May 10. The Montenegrin team climbed farther than the other groups, but mistakenly wasted all of their rope in the first 1,400 feet above Camp IV. Thus, no ropes had been affixed along the remaining 1,600 feet of the climb. The Fischer and Hall teams assumed incorrectly that the Montenegrins had affixed rope lines along the entire path to the summit. For that reason, the Sherpas did not leave early on May 10 to install rope lines.[60] Krakauer and Ang Dorje, one of the Sherpas, first recognized the problem at 5:30 A.M. However, Hall's safety procedures required all clients to wait for the guides before proceeding beyond the Balcony. This meant that Krakauer could not affix any rope beyond that point. The two

climbers waited over an hour for the rest of Hall's team to arrive. Huge bottlenecks delayed the climbers for the remainder of the ascent, as they waited for guides to affix rope lines.[61]

According to Fischer's usual procedures, Lopsang Jangbu Sherpa should have been climbing near the front of the pack and been available to help Ang Dorje while Krakauer waited for the others. However, Lopsang became exhausted and nauseous on summit day and could not maintain his usual place at the head of the pack. Interestingly, his problems relate back to a failed negotiation that occurred long before May 1996. Beginning two years earlier, Fischer tried to recruit *Outside* magazine journalist Jon Krakauer to join his expedition. He believed that an article by Krakauer would provide great publicity for his fledging company. Negotiations between Fischer and *Outside* magazine broke down in January 1996, and Krakauer joined Hall's team. Fischer recruited Sandy Pittman as an alternative. She planned to file Internet reports from Everest for NBC Interactive Media. Despite considerable climbing experience, Pittman struggled very much during the ascent (much more than Krakauer). On summit day, Lopsang sensed that Pittman needed assistance, and towed her on a short-rope for nearly six hours. A day earlier, he had carried her satellite phone for hours. These extraordinary efforts left Lopsang exhausted and ill on summit day, causing him to fall well behind the lead climbers.[62]

Where was Fischer while these problems occurred? His safety procedures required him to serve as the "sweep" on summit day. He remained at the back of the pack to assist struggling clients and turn them around if necessary. However, the previously described logistics problems had disrupted Fischer's acclimatization routine and impaired his physical condition. In addition, Fischer seems to have experienced a recurrence of a chronic illness contracted more than a decade earlier. These health problems caused him to lag far behind the others and prevented him from performing his "sweep" duties. As a result, he could not assess this situation, or turn clients around when the delays occurred. He also could not communicate with those at the front of the pack, because he and Lopsang had the only two radios on the expedition (because the procedures called for them to climb at the front and back respectively).[63] In sum, the team fell behind schedule and encountered the dangerous storm because of a complex set of interactions among a customs problem in Russia, Scott Fischer's acclimatization routine in Nepal, a Montenegrin expedition's use of rope, a failed negotiation with *Outside* magazine, and so on.

Tight Coupling

Complex interactions become more dangerous if tight coupling also exists within a system. Tight coupling means one breakdown triggers a series of other problems. Tightly coupled systems have four characteristics: time-dependent processes, a fairly rigid sequence of activities, one dominant path to achieving the goal, and very little slack.[64]

Time dependence plays a major role in an Everest expedition. Climbers needed to attempt their ascent in early May because this represented a narrow

window of opportunity between the hurricane-like winds of April and the monsoon season that begins later in May. With many teams on the mountain, a few expeditions planned to summit each day so as to not get in each other's way. The groups climbed on a tight eighteen-hour schedule for two reasons. First, the teams wanted to avoid the danger associated with descending after nightfall. They planned to depart Camp IV at approximately midnight, reach the summit by midday, and return to their tents before sundown. Very little slack existed in this schedule. The second limiting factor concerned the supply of supplemental oxygen. Physical limitations meant that each person could only carry two oxygen canisters. Each provided six hours of supplemental oxygen. A third canister remained at the South Summit for climbers to pick up on their descent back to camp. Climbers had to stay on schedule, or they would have to proceed for some time without oxygen until arriving at the South Summit. The weather patterns, oxygen supply, and need to avoid a nighttime descent left very little room for error and made time a critical factor.

A strict sequence of activities and a single path to the goal also characterized the Everest expeditions. Climbers needed to perform a series of shorter climbs in April in order to acclimate to the higher altitudes. They had to perform these in a specific order and to complete them by a particular date. They needed to proceed from Base Camp through Camps I-IV on their push to the summit. Once they departed Base Camp, they had no choice but to follow the South Col route to the summit. Furthermore, no alternative modes of transportation existed. They had to hike up *and* down the mountain. Helicopter rescues could only occur at low elevations.

Finally, very little slack existed in the system. Each individual could only carry two oxygen canisters at one time. Therefore, they could not depend on a buffer in their oxygen supply. Physical limitations also restricted the amount of protective gear, rope, food, and medicine that climbers could bring with them. Waste proved very costly on these expeditions. If someone used more oxygen than planned, the danger increased for everyone involved.

Inevitable Failure

Theorists argue that catastrophic failures are inevitable in complex, high-risk systems. Complex interactions and tight coupling create an environment in which a small breakdown can trigger a series of other problems and cause a serious accident. Preventing a dangerous failure becomes nearly impossible, because typical safety procedures and preventive measures often add complexity to the system.[65] For instance, Hall's procedure for remaining together as a team served to enhance client safety, but of course, it played a role in the creation of bottlenecks on summit day. Similarly, for safety reasons, the regulator and the gauge on the oxygen canisters enabled each person to monitor the level of oxygen in their canister. However, the dangerous storm created ice on Andy Harris' regulator during the descent. This caused his gauge to register empty even though many canisters remained full at the South Summit. As a guide, he also carried

a radio for safety reasons, but managed to use it to mistakenly tell many others that no supplemental oxygen remained.[66]

Krakauer later recognized the inevitability of failure during these expeditions. He wrote: "Four of my teammates died not so much because Rob Hall's systems were faulty—indeed, nobody's were better—but because on Everest it is the nature of systems to break down with a vengeance."[67] Historical data supports Krakauer's conclusions. By 1996, 148 people had died trying to climb Everest. May 10 did represent the deadliest day in the mountain's history, but the overall percentage of climbers that died in the spring of 1996 lagged the historical average.[68] Deaths on Everest are not isolated incidents, but rather a "normal" occurrence.

Integrating the Perspectives

This case study provides important lessons about how the problems of cognitive bias, team psychological safety, and complex systems relate to one another and together enhance the risk of serious organizational failures. Often, we view these individual, group, and system-level explanations as distinct ways to explain flawed organizational strategies and outcomes. This case demonstrates that an absence of team psychological safety makes it more difficult to avoid cognitive bias, because individuals do not question one another, test assumptions, or express minority views. Systematic biases in judgment become especially problematic in complex systems, because one mistake can trigger a series of other breakdowns in the system. Finally, an absence of psychological safety increases the risk inherent in complex systems, because candid discussions do not occur about the sources of failure and the interconnections among different components of the system.

Systematic biases in judgment become especially problematic in complex systems, because one mistake can trigger a series of other breakdowns in the system.

Cognitive Biases and Team Psychological Safety

These two explanations for the Everest tragedy—cognitive biases and the lack of psychological safety—are fundamentally interrelated. Effective teams discuss issues openly and encourage members to express dissenting views. These behaviors help to combat cognitive biases that impair individual judgments. In the Everest expeditions, the absence of psychological safety impaired the teams' ability to spot biases in judgment and to question flawed choices.

The turnaround time issue demonstrates the link between team psychological safety and systematic biases in individual judgment. Several climbers worried about the time on summit day. They recognized that most individuals found it difficult to stop just short of the top when they had expended so much time and effort attempting to reach the summit. However, they did not express their opinions or challenge the decision to proceed long after midday. For

instance, Neil Beidleman stated that he felt uncomfortable speaking up about his concerns. He did not feel that he had the status or authority to object to Fischer's plans. Similarly, people did not want to speak up when Hall continued to climb long after his prescribed turnaround time, because they had heard him explain that he would not tolerate dissent during the final push for the summit. These examples illustrate that cognitive biases and an absence of psychological safety worked together to cause serious problems during the 1996 Everest expeditions.

Cognitive Biases and Complex Systems

Cognitive biases and system complexity interact to enhance the risk of failure as well. If cognitive biases tend to be prevalent in a complex system, then the probability of catastrophic failure increases. Because of complex interactions and tight coupling, small errors in human judgment can trigger many other breakdowns throughout a high-risk system. These breakdowns often involve non-human elements of the system including equipment, materials and supplies, organizational rules and procedures, and the natural environment. Cognitive biases also may undermine safety precautions designed to limit risk in complex systems. Furthermore, systematic errors in judgment may cause us to underestimate the probability of failure and the inherent level of risk in complex systems. For this reason, executives managing high-risk, complex systems need to be particularly attentive to biases that may be affecting their decisions.

The Everest case demonstrates the relationship between system complexity and systematic biases in individual judgment. Overconfidence bias may have caused Fischer to underestimate the importance of maintaining a proper acclimatization routine and to misjudge his ability to manage the logistics of the expedition. Ultimately, a series of interconnected breakdowns disrupted Fischer's adjustment to the higher altitude and affected his physical condition. These and other failures interacted to generate bottlenecks and delays during the summit push. The expedition leaders had designed the turnaround time rule to prevent schedule setbacks from creating a dangerous situation whereby climbers needed to descend after nightfall without supplemental oxygen. Systematic biases in judgment undermined the efficacy of this safety precaution. Many climbers did not adhere to the turnaround rule—the sunk cost bias made it difficult to turn back, and the recency bias may have caused them to underestimate the probability of a dangerous storm. The tight coupling in the system exacerbated the problems created by this flawed decision to proceed after midday. The climbers ran out of supplemental oxygen because they climbed for more than twelve hours before arriving at the South Summit where additional canisters had been stored. The lack of oxygen heightened the dangers associated with the storm, which of course, created further delays. Moreover, the cold temperatures from the storm caused Harris to mistakenly inform others that no supplemental oxygen remained for them to pick up on their descent. In sum, this case illustrates that human error due to cognitive bias can exacerbate the problems associated with system complexity.

Complex Systems and Team Psychological Safety

A lack of psychological safety enhances the risk inherent in complex systems. An absence of candid discussion and constructive dissent makes it difficult to identify and solve problems before they trigger a series of other breakdowns in the system. In the absence of team psychological safety, a human error may not be noticed or discussed, and may interact with other elements of the system to cause a serious accident. Psychological safety plays another important role in complex systems. If people feel comfortable discussing mistakes, teams may come to recognize that a single human error does not cause failures in complex systems. Candid discussions of mistakes could enable groups to determine how complex interactions among multiple subsystems cause organizational failures. With that recognition, teams could address accident prevention more productively by trying to root out unnecessary sources of complexity.

The Everest case suggests that leaders need to engage in a delicate balancing act with regard to nurturing confidence, dissent, and commitment within their organizations.

Lopsang Sherpa's decision to tow Sandy Pittman on a short rope demonstrates the link between team psychological safety and system complexity. At the time, Pittman recognized that Lopsang's extraordinary level of assistance might place a tremendous burden on him, but she did not object to his decision. Status differences and psychological safety played an important role in this instance. Pittman has explained that, "she didn't unclip herself from the Sherpa out of respect for his authority."[69] As described earlier, this decision played a pivotal role in a series of interconnected breakdowns during the final push to the summit. Krakauer has noted that, "it didn't seem like a particularly serious mistake at the time. But it would end up being one of many things—a slow accrual, compounding steadily and imperceptibly toward critical mass."[70]

Implications for Leaders

This multi-lens analysis of the Everest case provides a framework for understanding, diagnosing, and preventing serious failures in many types of organizations. However, it also has important implications for how leaders can shape and direct the processes through which their organizations make and implement high-stakes decisions. The Everest analysis suggests that leaders must pay close attention to how they balance competing pressures in their organizations, and how their words and actions shape the perceptions and beliefs of organization members. In addition, the case provides insight regarding how firms approach learning from past failures.

Balancing Competing Forces

The Everest case suggests that leaders need to engage in a delicate balancing act with regard to nurturing confidence, dissent, and commitment within

their organizations. First, executives must strike a balance between overconfidence on the one hand and insufficient confidence on the other. Leaders must act decisively when faced with challenges, and they must inspire others to do so as well. A lack of confidence can enhance anticipatory regret, or the apprehension that individuals often experience prior to making a decision. High levels of anticipatory regret can lead to indecision and costly delays.[71] This anxiety can be particularly problematic for executives in fast-moving industries. Successful management teams in turbulent industries develop certain practices to cope with this anxiety. For instance, some leaders develop the confidence to act decisively in the face of considerable ambiguity by seeking the advice of one or more "expert counselors," i.e., highly experienced executives who can serve as a confidante and a sounding board for various ideas.[72] Naturally, too much confidence can become dangerous as well, as the Everest case clearly demonstrates. To combat overconfidence, leaders must seek out information that disconfirms their existing views, and they should discourage subordinates from hiding bad news. Leaders also must take great care to separate facts from assumptions, and they must encourage everyone to test critical assumptions vigorously to root out overly optimistic projections.

Fostering constructive dissent poses another challenge for managers. As we see in the Everest case, insufficient debate among team members can diminish the extent to which plans and proposals undergo critical evaluation. Flawed ideas remain unchallenged, and creative alternatives are not generated. On the other hand, when leaders arrive at a final decision, they need everyone to accept the outcome and support its implementation. They cannot allow continued dissension to disrupt the effort to turn that decision into action. As Cyrus the Great once said, leaders must balance the need for "diversity in counsel, unity in command." To accomplish this, leaders must insure that each participant has a fair and equal opportunity to voice their opinions during the decision process, and they must demonstrate that they have considered those views carefully and genuinely. Moreover, they must clearly explain the rationale for their final decision, including why those chose to accept some input and advice while rejecting other suggestions.[73] By doing so, leaders can encourage divergent thinking while building decision acceptance.

Finally, leaders must balance the need for strong buy-in against the danger of escalating commitment to a failing course of action over time. To implement effectively, managers must foster commitment by providing others with ample opportunities to participate in decision making, insuring that the process is fair and legitimate, and minimizing the level of interpersonal conflict that emerges during the deliberations. Without strong buy-in, they risk numerous delays including efforts to re-open the decision process after implementation is underway. However, leaders must be aware of the dangers of over-commitment to a flawed course of action, particularly after employees have expended a great deal of time, money, and effort. The ability to "cut your losses" remains a difficult challenge as well as a hallmark of courageous leadership. Simple awareness of the sunk cost trap will not prevent flawed decisions. Instead, leaders must be

vigilant about asking tough questions such as: What would another executive do if he assumed my position today with no prior history in this organization?[74] Leaders also need to question themselves and others repeatedly about why they wish to make additional investments in a particular initiative. Managers should be extremely wary if they hear responses such as: "Well, we have put so much money into this already. We don't want to waste all of those resources." Finally, leaders can compare the benefits and costs of additional investments with several alternative uses of those resources. By encouraging the consideration of multiple options, leaders may help themselves and others recognize how overcommitment to an existing project may be preventing the organization from pursuing other promising opportunities.

Shaping Perceptions and Beliefs

The Everest case also demonstrates how leaders can shape the perceptions and beliefs of organization members, and thereby affect how these individuals will interact with one another and with their leaders in critical situations. Hall and Fischer made a number of seemingly minor choices about how the teams were structured that had an enormous impact on people's perceptions of their roles, status, and relationships with other climbers. Ultimately, these perceptions and beliefs constrained the way that people behaved when the groups encountered serious obstacles and dangers.

Leaders can shape the perceptions and beliefs of others in many ways. In some cases, the leaders' words or actions send a clear signal as to how they expect people to behave. For instance, Hall made it very clear that he did not wish to hear dissenting views while the expedition made the final push to the summit. Most leaders understand the power of these very direct commands or directives. However, this case also demonstrates that leaders shape the perceptions and beliefs of others through subtle signals, actions, and symbols. For example, the compensation differential among the guides shaped people's beliefs about their relative status in the expedition. It is hard to believe that the expedition leaders recognized that their compensation decisions would affect perceptions of status, and ultimately, the likelihood of constructive dissent within the expedition teams. Nevertheless, this relatively minor decision did send a strong signal to others in the organization. The lesson for managers is that they must recognize the symbolic power of their actions and the strength of the signals they send when they make decisions about the formation and structure of work teams in their organizations.

Learning from Failure

Often, when an organization suffers a terrible failure, others attempt to learn from the experience. Trying to avoid repeating the mistakes of the past seems like an admirable goal. Naturally, some observers attribute the poor performance of others to human error of one kind or another. They blame the firm's leaders for making critical mistakes, at times even going so far as to accuse them of ignorance, negligence, or indifference. Attributing failures to the flawed

decisions of others has certain benefits for outside observers. In particular, it can become a convenient argument for those who have a desire to embark on a similar endeavor. By concluding that human error caused others to fail, ambitious and self-confident managers can convince themselves that they will learn from those mistakes and succeed where others did not.[75]

This research demonstrates a more holistic approach to learning from large-scale organizational failures. It suggests that we cannot think about individual, group, and organizational levels of analysis in isolation. Instead, we need to examine how cognitive, interpersonal, and systemic forces interact to affect organizational processes and performance. System complexity, team structure and beliefs, and cognitive limitations are not alternative explanations for failures, but rather complementary and mutually reinforcing concepts.

Business executives and other leaders typically recognize that equifinality characterizes many situations. In other words, most leaders understand that there are many ways to arrive at the same outcome. Nevertheless, we have a natural tendency to blame other people for failures, rather than attributing the poor performance to external and contextual factors.[76] We also tend to pit competing theories against one another in many cases, and try to argue that one explanation outperforms the others. The Everest case suggests that both of these approaches may lead to erroneous conclusions and reduce our capability to learn from experience. We need to recognize multiple factors that contribute to large-scale organizational failures, and to explore the linkages among the psychological and sociological forces involved at the individual, group, and organizational system level. In sum, all leaders would be well-served to recall Anatoli Boukreev's closing thoughts about the Everest tragedy: "To cite a specific cause would be to promote an omniscience that only Gods, drunks, politicians, and dramatic writers can claim."[77]

System complexity, team structure and beliefs, and cognitive limitations are not alternative explanations for failures, but rather complementary and mutually reinforcing concepts.

Notes

1. For example, see D. Vaughan, *The Challenger Launch Decision: Risky Technology, Culture, and Deviance at NASA* (Chicago, IL: The University of Chicago Press, 1996); I. Janis, *Victims of Groupthink* (Boston, MA: Houghton Mifflin, 1972); C. Perrow, *Normal Accidents: Living with High-Risk Technologies* (Princeton, NJ: Princeton University Press, 1999).
2. Sherpas are Buddhist mountain people of Nepal. Young male Sherpas strive to join one of the Mount Everest expeditions because the pay is very high relative to their other job opportunities. Each commercial expedition typically employs the Sherpas to assist in the logistics of the climb.
3. A. Boukreev and G. Weston DeWalt, *The Climb: Tragic Ambitions on Everest* (New York, NY: St. Martin's, 1998).
4. B. Coburn, *Everest: Mountain without Mercy* (New York, NY: National Geographic Society, 1997).
5. Ibid.

6. Coburn, op. cit.; Boukreev, op. cit.; J. Krakauer, *Into Thin Air: A Personal Account of the Mount Everest Disaster* (New York, NY: Anchor Books, 1997); G. Child, "Everest a Year Later: Lessons in Futility," *Outside* (May 1997).
7. For a classic example of an analysis of organizational decision making through different conceptual lenses, see G. Allison, *Essence of Decision: Explaining the Cuban Missile Crisis* (Boston, MA: Little Brown, 1971). For an insightful multi-level analysis of a failure, see S. Snook, *Friendly Fire: The Accidental Shootdown of U.S. Black Hawks over Northern Iraq* (Princeton, NJ: Princeton University Press, 2000).
8. For a comprehensive overview of cognitive bias research, see M. Bazerman, *Judgment in Managerial Decision Making* (New York, NY: John Wiley & Sons, 1998). To access another useful guide for managers, see J.E. Russo and P. Schoemaker, *Decision Traps: The Ten Barriers to Brilliant Decision Making and How to Overcome Them* (New York, NY: Fireside, 1989).
9. B. Staw and J. Ross, "Understanding Behavior in Escalation Situations," *Science*, 246 (1989): 216-220. For more information on sunk cost bias, see H. Arkes and C. Blumer, "The Psychology of Sunk Cost," *Organizational Behavior and Human Decision Processes*, 35 (March 1985): 124-140; J. Brockner, "The Escalation of Commitment to a Failing Course of Action," *Academy of Management Review*, 17 (March 1992): 39-61.
10. The expeditions established a series of camps along the path to the summit, beginning with Base Camp at an altitude of 17,600 feet. Camp IV, at an altitude of approximately 26,000 feet, was the highest such location on the mountain.
11. B. Coburn, op. cit., p. 293.
12. Boukreev and DeWalt, op. cit., p. 145.
13. Krakauer, op. cit., p. 190.
14. Ibid., p. 232.
15. Boukreev and DeWalt, op. cit.
16. Krakauer, op. cit., pp. 233-234.
17. Ibid., p. 355.
18. Ibid., p. 191.
19. Ibid., p. 293.
20. B. Weathers, *Left for Dead: My Journey Home from Everest* (New York, NY: Villard Books, 2000)
21. Krakauer, op. cit., p. 248.
22. Weathers, op. cit.
23. Boukreev and DeWalt, op. cit.
24. As evidence that experts can encounter this problem, many scholars point to the tragic story of Jeffrey Rubin. He was a respected academic who studied the sunk cost effect for many years. Several years ago, he died while climbing a mountain; it is believed that he engaged in an escalation of commitment during this ill-fated climb.
25. For more on overconfidence bias, see S. Lichtenstein, B. Fischhoff, and L. Phillips, "Calibration of Probabilities: The State of the Art to 1980," in D. Kahneman, P. Slovic, and A. Tversky, eds., *Judgment under Uncertainty: Heuristics and Biases* (New York, NY: Cambridge University Press, 1982). In addition, see Bazerman, op. cit.; Russo and Schoemaker, op. cit.
26. Krakauer, op. cit., p. 84.
27. Coburn, op. cit.
28. Krakauer, op. cit., p. 84.
29. Ibid., p. 354.
30. Ibid., p. 91.
31. Ibid., p. 64.
32. Ibid., p. 114.
33. Tversky and Kahneman, op. cit.
34. Russo and Schoemaker, op. cit.
35. Coburn, op. cit., p. 23.
36. Krakauer, op. cit., p. 354.
37. An alternative explanation may be that egocentrism played a role in Hall's interpretation of data. In particular, Hall may have paid more attention to his own positive weather experiences while climbing Everest and less attention to the overall statistical trends regarding poor weather on Everest.
38. A. Edmondson, "Psychological Safety and Learning Behavior in Work Teams," *Administrative Science Quarterly*, 44 (1999): 350-383, at p. 354.
39. For more on the conditions that undermine team psychological safety, see A. Edmondson, op. cit.; A. Edmondson, R. Bohmer, and G. Pisano, "Disrupted Routines: Team Learning and

New Technology Implementation in Hospitals," *Administrative Science Quarterly*, 46 (2001): 685-716.

40. Krakauer, op. cit., p. 245.
41. Ibid., p. 260.
42. Ibid.
43. For more on how leaders can encourage learning in their organizations, see D. Garvin, *Learning in Action: A Guide to Putting the Learning Organization to Work* (Boston, MA: Harvard Business School Press, 2000).
44. Krakauer, op. cit., p. 216.
45. Ibid., p. 219.
46. For additional information on the role of conflict and minority dissent in group decision-making processes, see Janis, op. cit.; A. Amason, "Distinguishing the Effects of Functional and Dysfunctional Conflict on Strategic Decision Making," *Academy of Management Journal*, 39 (1996): 123-148;K. Eisenhardt, J. Kahwajy, and L. Bourgeois, "Conflict and Strategic Choice: How Top Management Teams Disagree," *California Management Review*, 39/2 (Winter 1997): 42-62; D. Garvin and M. Roberto, "What You Don't Know About Making Decisions," *Harvard Business Review*, 79/8 (September 2001): 108-116.
47. Krakauer, op. cit., p. 46.
48. Boukreev and DeWalt, op. cit.
49. M. Bryant, "Everest a Year Later: False Summit," *Outside* (May 1997).
50. Krakauer, op. cit., p. 213.
51. Boukreev and DeWalt, op. cit.
52. Krakauer, op. cit., p. 47.
53. Boukreev and DeWalt, op. cit.
54. Ibid.
55. Ibid., p. 121.
56. Krakauer, op. cit., p. 265.
57. For more on complex systems theory, see Perrow, op. cit.; S. Sagan, *Limits of Safety: Organizations, Accidents, and Nuclear Weapons* (Princeton, NJ: Princeton University Press, 1993); K. Weick, "The Vulnerable System: An Analysis of the Tenerife Air Disaster," in K. Roberts, ed., *New Challenges in Understanding Organizations* (New York, NY: MacMillan, 1993).
58. Boukreev and DeWalt, op. cit.
59. Ibid.
60. Ibid.; Krakauer, op. cit.
61. Krakauer, op. cit.
62. Boukreev and DeWalt, op. cit.
63. Ibid.
64. Perrow, op. cit.
65. Ibid.
66. Krakauer, op. cit.
67. Ibid., p. 358.
68. Coburn, op. cit.; Krakauer, op. cit.
69. Krakauer, op. cit., p. 221.
70. Ibid., p. 223.
71. For a more extensive discussion of anticipatory regret, see I. Janis and L. Mann, *Decision Making: A Psychological Analysis of Conflict, Choice, and Commitment* (New York, NY: Free Press, 1977).
72. For more on the issue of developing confidence to make decisions quickly in turbulent environments, see K. Eisenhardt, "Making Fast Strategic Decisions in High-Velocity Environments," *Academy of Management Journal*, 32 (1989): 543-576.
73. See A. Korsgaard, D. Schweiger, and H. Sapienza, "Building Commitment, Attachment, and Trust in Strategic Decision-Making Teams: The Role of Procedural Justice," *Academy of Management Journal*, 38 (1995): 60-84.
74. In the famous story of Intel's exit from the DRAM business, this is exactly what Gordon Moore and Andrew Grove asked themselves as they were contemplating whether to continue investing in the loss-making DRAM business.
75. Jon Krakauer has cautioned that this could occur quite easily with respect to the Everest tragedy. In his book, he wrote, "If you can convince yourself that Rob Hall died because he made a string of stupid errors and that you are too clever to repeat those same errors, it

makes it easier for you to attempt Everest in the face of some rather compelling evidence that doing so is injudicious." Krakauer, op. cit., pp. 356-357.

76. E. Jones and R. Nisbett, "The Actor and the Observer: Divergent Perceptions of the Causes of Behavior," in E. Jones, D. Kanouse, H. Kelley, R. Nisbett, S. Valins, and B. Weiner, eds., *Attribution: Perceiving the Causes of Behavior* (Morristown, NJ: General Learning Press, 1971).
77. Boukreev and DeWalt, op cit., pp. 226-227.

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