14

SELECT, DETECT, AND CORRECT THE PROPER ERRORS

Every company needs people who have made mistakes and then made the most of them.

—Bill Gates

Comedians revel in our shortcomings, foibles, and day-to-day mishaps. They satirize celebrities' idiosyncrasies, ridicule politicians' verbal miscues, and laugh at our mistakes. But one comedian was not the least bit amused by a mistake that befell him. It was a simple error that almost had fatal consequences.[1] His heart surgeon performed bypass on the wrong artery—one of his good ones. He had to endure two bypass surgeries: one life saving, another unnecessary. He was in no mood for joking when he slapped a lawsuit on the surgeon. Who would be?

Errors, mistakes, and mishaps are inevitable, but they have different consequences. After all, Dana Carvey made a pretty good living skewering politicians, celebrities, and religious leaders. That's relatively harmless stuff. But operating on the wrong artery, well, that's on the complete other end of the spectrum. In fact, data from studies during the 1990s indicated that tens of thousands of people died each year due to medical errors in U.S. hospitals.[2] Of course, it's not just medical institutions that are susceptible to errors; this problem occurs in every organization. Unfortunately, "most organizations do a poor job of learning from failures, large and small."[3]

BACKGROUND

The English word *error* originated from the Latin word *errare*, which meant "to stray." Today the word retains shades of that meaning because we use the word *error* to designate when something strays from the proper path. That does not mean, though, that all disappointing results are caused by errors. For example, a successful operation on the proper artery does not guarantee the patient will survive. In short, we want to distinguish errors from "decisions or acts that lead to suboptimal results."[4] Results may disappoint, but in some situations, this may not have occurred because of an error in the procedure or decision-making process.

Long before the concept of the "learning organization" became a buzz phrase, Chris Argyris and Donald Schön published a book titled *Organizational Learning*.[5] In fact, Professor Argyris noted that his publisher asked him at the time, "Do you think this topic will ever be of interest to the business community?"[6] He explained that learning was fundamental to organizational performance because it involved the "detection and correction of error."[7] Indeed, it is hard to see how any organization could heed the advice of the latest business gurus without properly learning from error. If a company wants to go from "Good to Great," then it will need to rectify errors. If a company wants to train a cadre of "Six-Sigma Black Belts," then it better start focusing on error management. Indeed, toolkits designed to assess an organization's learning capability place considerable weight on the ability to analyze and share lessons learned.[8]

Moreover, highly effective companies often attempt to front-load errors for prevention and innovation purposes. For example, engineers use programs such as Autodesk to catch mistakes early in the design process for products ranging from escalators to mountain bikes. This often results in significant time and dollars savings.[9]

ERROR MANAGEMENT FRAMEWORK

During World War II, the Allies developed sophisticated radar to help them track enemy planes. This was brilliantly chronicled in an aptly titled book, *The Invention That Changed the World: How a Small Group of Radar Pioneers Won the Second World War and Launched a Technological Revolution.* The author, Robert Buderi, concludes that "the Atomic bomb only ended the

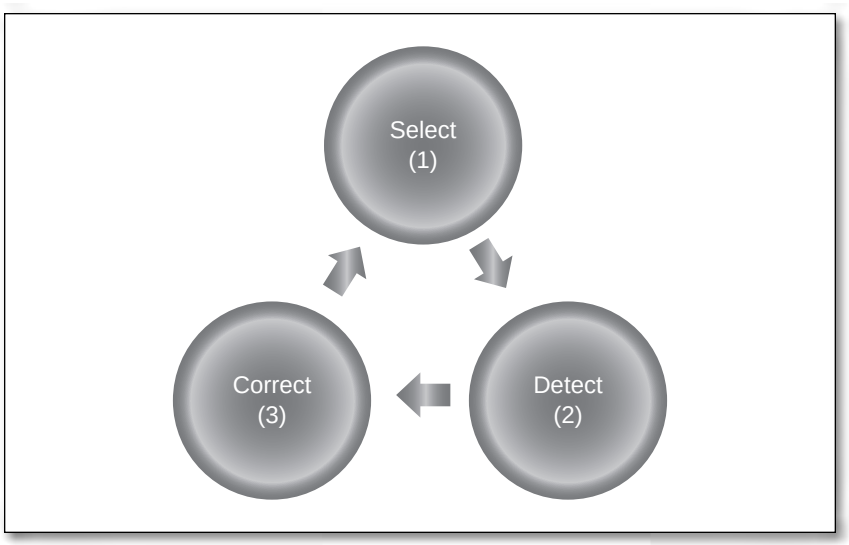
war. Radar won it."[10] Buderi's conclusion should cause us to pause and reflect for a moment. He suggests that the historical accounts and headlines often do us a disservice when attempting to discern important success factors. Organizations' error management practices possess the same stealthy characteristics of radar: They're often hidden from view but vital to victory.

Radar provides a useful metaphor for discussing error correction processes. Different types of radar are used to spot aircrafts, cars, ships, and weather formations. The police officer's radar gun would not be very helpful in predicting the next thunderstorm; best to use the NEXRAD high-resolution Doppler weather radar for that task. In short, the radar system you develop determines what you choose to pay attention to.

First, you have to select the type of errors you want to identify and the appropriate radar for the situation (see Figure 14.1)

Effective error management, like radar, starts with proper selection. Many discussions of error management focus attention on detection and correction. That presupposes that everyone agrees on what counts for an error. Sometimes that's an accurate assumption, such as an obvious spelling error. Other times

Figure 14.1 Error Management Model



it's not. Why not? Just as the radar pioneers during World War II thought about the types of objects they desired to identify, progress makers ask about the types of errors they wish to discover (see Figure 14.2). Those choices are critical. Should we aim our radar at errors of omission or commission? Random errors or systematic ones? Latent errors or apparent ones? Minor errors or major ones? In an ideal world, the answer would be "all of the above." Unfortunately, few organizations can claim to have such a robust error management system.

Figure 14.2 Basic Types of Errors

Error Types			
Omission	Random	Latent	Major
Commission	Systematic	Apparent	Minor

Second, you use the selected radar to detect errors

Click on your computer's automatic spell checker and it highlights potential spelling errors. It cannot detect all the errors, but it does a pretty good job. Sometimes you get "false positives" or spellings that the radar detects as an error but are not. For example, many spell checkers will flag the word *organisation* as a misspelling, but it's not considered an error in the United Kingdom. At other times, you get "false negatives" when the spell checker fails to pick up an error that would be obvious to an English teacher. Consider the sentence, "Jack Welch is defiantly the best CEO General Electric ever had." Jack Welch was *definitely* the CEO of GE. Was he *defiant*? We'll leave that debate to others. All radar, no matter how sophisticated, suffers from these potential problems.

Third, you correct certain errors exposed by the radar detector

Detection often leads to correction—but not always. The skilled writer, for example, does not accept every spell checker recommendation (false positives). Nor does the writer trust the spell checker as the final authority (false negatives). Experts use their judgment to decide which errors to confront and

when to correct them. This act of judgment can only be made in the context of the priorities at hand. Parents, for example, avoid correcting every syntax error of their 2-year-old.

In Figure 14.1, we show an arrow between correction and selection. We do this because sometimes unseen objects slip through the radar, fouling up the most thoughtful plans. In fact, the radar itself often needs to be fine tuned. For example, despite the most sophisticated radar in the world, Canadian geese brought down US Airways Flight 1549 in New York City. After Captain Sullenberger's heroic landing on the Hudson River, engineers started looking at how to develop radar specially designed to detect large flocks of geese in the path of airplanes.[11] Likewise, unidentified organizational errors often prompt executives to look for more refined tools to prevent similar incidents in the future.

THE COUNTERFORCES

Given the potential benefits of learning from error, it would seem reasonable that organizations would readily embrace error detection and correction. Most do not. Why not? There are very strong personal and organizational forces pushing against proper error management.

First, the natural human tendency to "save face" often inhibits employees, managers, and executives from acknowledging mistakes

A host of well-documented "defensive behaviors," such as making overly evaluative comments, showing expressions of superiority, and creating appearances of certainty, serve to protect fragile egos.[12] As two scholars wrote, "Honest acknowledgment of one's failures is not only unpleasant, it also can strike a blow to one's self-esteem, self-image, and identity."[13] When most people are given a choice between preserving their self-esteem and admitting they made an error, most will opt for self-esteem. Many people equate admitting error with admitting failure. As a result, they end up deceiving themselves and placing blame elsewhere. This keeps their self-confidence intact at the expense of a more realistic analysis of the situation.

For some people, this may be a passive reflexive response, but for others, error avoidance takes on a more active verbal character. In fact, this is not a

silent majority; it is often a quite vocal one. Consider a situation in which someone forgets to place contact information on a brochure sent to potential clients. A week later, after thousands were mailed to consumers, one astute executive, not involved in the decision, notices the omission. Now what? Think of the face-saving possibilities:

- "I was involved in another aspect of the brochure. Someone else was supposed to check the final edition." (*Shifting blame*)
- "Our energies were devoted to developing an innovative design that would really impress our customers. While we were trying so hard to be innovative, creative, and ground-breaking, I guess we just forgot that detail." (*Maximizing motives*)
- "The decision was made by a committee." (*Obscuring ownership*)
- "This was just an image campaign, and besides, they can get the contact information on our Web site." (*Minimizing impact*)
- "You've made your share of minor gaffes, as well." (*Attacking the accuser*)

These statements have one common attribute: No one takes responsibility for the error or acknowledges their own fallibility. They all envelop the employee in a cloak of what we might call "ego-protective foolhardiness."[14] The authors of the wonderfully titled book, *Mistakes Were Made (But Not by Me)*, sum up these tendencies best: "When we make mistakes, we must calm the cognitive dissonance that jars our feelings of self-worth. And so we create fictions that absolve us of responsibility, restoring our belief that we are smart, moral, and right—a belief that often keeps us on a course that is dumb, immoral, and wrong."[15]

Second, the "confirmation bias" amplifies all of our error-deflecting tendencies[16]

That is, humans actively seek out information that confirms preexisting opinions. Rather than acting like a respectable scientist, most people fail to seek out counterevidence. So, those employees who view themselves as competent will actively avoid any evidence that hints at a counterview.

Consider, for example, the candid revelations of the world-class physicist Freeman Dyson. As a young man, his collegiate career at the University of Cambridge was interrupted by World War II. He served in the Operational

Research Section of the British Royal Air Force's Bomber Command. His group's job was to provide scientific advice about the effectiveness of bombing campaigns and force protection measures. At the time, the prevailing wisdom was that as bomber crews gained more experience, their chances of survival significantly increased. That was a myth. Dyson acknowledged years later that "experience did not reduce loss rates."[17] He continues,

> The evidence showed that the main cause of losses was an attack that gave experienced crews no chance either to escape or to defend themselves. If we had taken the evidence more seriously, we might have discovered the Schräge Musik in time to respond with effective countermeasures.[18]

The mysterious weapon, the Shräge Musik, allowed German fighters to fly underneath the bombers and fire up at a 60-degree angle. As a result, the British bombers incurred substantial losses—they never knew what hit them. Unfortunately, that's how the confirmation bias works. We see what we want to see. We don't see the errors of our ways and are doomed to repeat them (ego-protective foolhardiness at work). The experience myth held powerful psychological sway, inhibiting careful assessment that could have revealed a thinking error and saved countless airmen's lives.

Third, organizational cultures can inhibit proper error management

Some federal regulators, for example, who tried to warn members of Congress about the potential financial troubles of Fannie Mae and Freddie Mac were ridiculed and denounced. Years later, many believe the defaults by these two quasi-governmental entities helped ignite a worldwide recession.[19] These types of organizational practices and reactions can lead to widespread suppression of error reporting. Employees will naturally engage in a cost-benefit analysis before discussing an error: They will weigh the benefits of reporting against the material costs, effort costs, and damage to personal reputation.[20] Often, they will choose silence and pass on those high costs to the organization or others—including taxpayers.[21]

Error reporting and analysis tends to diminish when an organization fails to create a shared problem-solving climate and the proper psychological safety for employees.[22] Conducting candid discussions about mistakes poses a special challenge for supervisors because they might be tempted to punish those who

admit errors. Unfortunately, many supervisors relish playing the "train 'em & blame 'em" game. On the flipside, a cooperative problem-solving climate helps change employees' cost-benefit analysis. For example, the U.S Air Force will not penalize pilots for reporting errors within 24 hours of an incident.[23]

WHAT TO DO?

Few people would argue against the *idea* of proper error management. Yet, as we have discussed, many powerful personal and organizational forces are aligned against the *practice* of it. Progress makers mount an equally potent counterattack against these forces. They know how to put the idea of effectively managing errors into practice. That's our focus in this section.

Conceptualize the Errors You Wish to Monitor

All errors are not created equal, nor should they be treated that way. The military uses different types of radar for different threats. Likewise, progress makers envision the types of errors they want others to pay attention to. That depends greatly on whether you are in the exploring or refining modes.

Exploring Errors

The exploring mode requires a different type of radar than the refining mode. When exploring or seeking innovations, there needs to be a high tolerance for what many might call errors or mistakes. Bell Labs, for instance, made a "deliberate mistake" by offering "no deposit" services to 100,000 high-risk consumers. Why? They wanted to test the assumptions of their financial models, which stipulated that those customers should pay a substantial deposit. The high deposits protected the company and discouraged some customers from purchasing the service. It turned out the models were flawed and the company learned something significant. Indeed, these "high-risk" customers ended up adding "on average, $137 million to the Bell System's bottom line every year for the next decade."[24] In short, they intentionally committed an "error" to test the assumptions of their business model.

Innovators embrace "mistakes." We should be disappointed when a promising AIDS vaccine fails a clinical trial but not surprised.[25] Innovation is about adroitly playing the odds. Even with the most brilliant insights, overflowing

energy, and the right resources, some new ideas or platforms just don't work out. How, then, should a leader define "error" when exploring, innovating, and establishing a new platform? Answer "no" to any of the questions below and you may be committing an exploring error.

- *Did we exercise due diligence before launching the innovative venture?* Researchers suggest that 80% to 90% of new products or services will fail within a year or two. Why? Two scholars conclude "they fail primarily because customers didn't want them."[26] Clearly, not every new platform will be successful. But the research suggests that the failure rate could be significantly reduced with more emphasis on better market research.
- *Did we fail early enough in the process?* Before the official launch of Amazon.com, Jeff Bezos asked his employees to engage friends in testing the site by making mock purchases. The test run lasted 3 months and eventually involved 300 people from various walks of life. By discovering and fixing these errors early in the process, the company was able to launch a virtually bug-free site.[27] The former CEO of Proctor & Gamble, A. G. Lafley, echoed Bezos's sentiments: "You learn more from failure . . . but the key is to fail early, fail cheaply, and don't make the same mistake twice."[28]
- *Did we identify lessons learned?* Zappos.com has sold more shoes online than anyone in the world. CEO Tony Hsieh walks with a calm confidence because he learned early in his career about the power of a company's culture. And if employees don't buy into the values quickly enough, best to quickly cut your losses and ask them to leave. Perhaps that explains the company's policy of offering "$2,000 to anyone who completes the week-long training program and doesn't want to stay."[29] Few choose to walk away with the cash.

Refining Errors

When refining or executing a routine task, the error detection radar shifts to other matters. Professor Lee Williams helped to design a special research project for this book about this particular issue.[30] He identified 17 typical errors that organizations often seek to manage such as customer service, information management, and scheduling. The research revealed that for most organizations, customer service and quality errors were the most likely to be selected and detected (see Table 14.1). These results were not particularly surprising.

Table 14.1 Types of Errors Most Organizations Recognize

Type of Recognized Error	*Rank*	*Mean*[a]	*Likely to Recognize Errors (%)*[b]
Customer service	1	5.5	62
Quality of product or service	2	5.3	57
Hiring decisions	3	5.0	46
Production	4	5.0	43
Management of crises	5	4.9	46
Public relations	5	4.9	43
Training	7	4.9	45
Scheduling	8	4.9	40
Use of technology	9	4.8	44
Marketing	10	4.6	34
Strategic direction	11	4.6	36
Purchasing decisions	11	4.6	31
Management of employee performance	13	4.6	32
Employee communications	14	4.5	32
Personnel promotions	15	4.5	30
Management of change	16	4.4	30
Management of information	17	4.3	31

a. Mean for a scale ranging from 1 = *highly unlikely to learn from errors* to 7 = *highly likely to learn from errors*, with 4 being *neutral*.

b. Collapsed *highly likely* (7) and *moderately likely* (6) to create *likely to recognize errors*.

However, the research about the different error detection practices used by well-led versus less well-led organizations raised a few eyebrows (see Table 14.2).

The research clearly demonstrated that well-led organizations chose significantly more issues to monitor than their less well-led counterparts.[31] In particular, Figure 14.3 compares the radar screens of well-led organizations to their counterparts. Note that the well-led organization paid attention to 12 issues; their counterparts only matched their concerns on two issues. Well-led organizations

Table 14.2 Learning From Errors: The Difference Between Well-Led and Not Well-Led Organizations

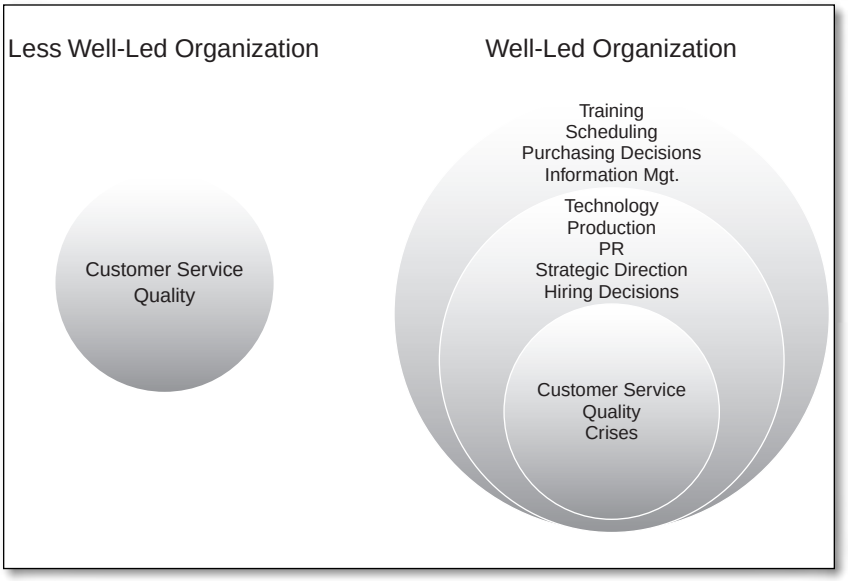
Type of Error	*Well-Led Organizations (%)*	*Not Well-Led Organizations (%)*	*Significant Difference*
Customer service	73	43	*
Quality of product or service	71	31	*
Management of crises	64	23	*
Use of technology	55	30	*
Production	63	25	*
Public relations	49	23	*
Strategic direction	51	16	*
Hiring decisions	56	24	*
Training	54	23	*
Scheduling	47	28	*
Purchasing decisions	40	28	*
Management of information	50	9	*
Marketing	38	19	*
Management of change	36	11	*
Employee communications	35	9	*
Management of employee performance	36	16	*
Personnel promotions	40	15	*

NOTE: The scale ranged from 1 = *highly unlikely to learn from errors* to 7 = *highly likely to learn from errors*, with 4 being *neutral*. The results were tabulated by adding the *highly likely* (7) and *moderately likely* (6) to create percentage of *likely to learn from errors.*

*A significant difference was noted when the *T* tests performed met the $p < .001$ criteria.

do something further; they tend to pay attention to more and "smaller" errors. They recognize that proactively and doggedly addressing "small errors" helps prevent larger ones.[32] For example, the quick detection and correction of scheduling errors can clearly decrease the likelihood of major customer service errors.

Figure 14.3 **Radar Screens of Well-Led and Less Well-Led Organizations**



A note of caution: We've implied that the radar might vary from department to department or from time to time. This is the crucial "selection" part of the process. But these shifts may lead to employee confusion. In particular, they might ask, "Why are the rules so different for that division?" "Why are the rules so different now?" Progress makers clearly, confidently, and directly answer the inquiry, even when the query has not been verbalized. They do not apologize for the variation. Instead, they use this as an educational opportunity to explain how the rules of the game have changed because they're now playing a different game. No one would expect the rules of ballroom dancing to be the same as those in football. Likewise, when you move from exploring to refining (and vice versa), you have to shift the error radar screen.

Systematically Document and Analyze Errors to Discern Underlying Error Patterns

"Error documentation" sounds about as appealing as cleaning dishes. Everybody wants the results, but few get very excited about putting in the

work to make it happen. Anyone who has used a Microsoft product has, at one time or another, been confronted with an annoying pop-up box that says, "The program is not responding . . . Please tell Microsoft about this problem." Every user benefits if the next version of the software eliminates the bug. Fortunately, many people do report their errors, resulting in upwards of 50 gigabytes of e-mails on an error-prone day.[33] Microsoft uses the reports to detect underlying software error patterns and make corrections in subsequent updates. Yet, many people blithely punch the "Don't send" button when they encounter this minor error reporting hassle. Even though most people know it helps build better software, they brush aside their mild obligation to the user community. After all, pushing the "Send" button may disrupt your thought process or interrupt a task; best just to ignore the report process and move on.

Unfortunately, such sentiments inhibit learning. Surgeon and MacArthur fellow Atul Gawande provides a more conscientious perspective. He offered some unusually simple advice to medical students: "count something."[34] In his quest to be a "positive deviant" (aka "a progress maker"), he notes that "if you count something you find interesting, you will learn something interesting."[35] He counted the number of times and situations in which surgical patients were sewed up with instruments or sponges inadvertently left in them. The patients with 13-inch retractors left in them weren't too happy with their surgical souvenirs. But it happens. More important, Dr. Gawande discovered a pattern to these incidents that could be corrected. In particular, the errors were far more likely to occur during emergency operations or when something unexpected happened during the procedure.

It was not an eclectic bunch of random errors but a systematic one. That's what positive deviants seek out and destroy. A random spelling *errror*, such as the one in this sentence, can be easily corrected and does not require any deep analytical investigation into underlying causes. Anyone—even the Scripps National Spelling Bee champion—who writes enough sentences will commit a random error. However, distinguishing between random and systematic errors is not always easy. In fact, the only way to do so is by (1) documenting all errors and (2) methodically analyzing them with an eye toward underlying patterns. The instructor, for instance, who notices a particular student's penchant for run-on sentences might encourage the student to head down to the writing center for some specialized instruction. In the ideal world, it would work just like that.

Rigorous documentation and analysis have allowed researchers to discover a number of intriguing patterns that have practical implications:

- DNA evidence has overturned a number of convictions. Eyewitness testimony errors accounted for the majority (71%) of the evidence used in these wrongful convictions. *So what?* Investigators should be wary of eyewitness accounts and focus on other types of evidence.[36]
- Researchers determined that professional tennis referees "called many more balls 'out' that were actually in play rather than vice versa."[37] *So what?* In tournaments where the players can challenge calls, they should "concentrate their challenges on balls that are called 'out.'" Or maybe the French have it right: Everyone should use clay courts. Then you can see the ball's skid mark.[38]
- Studies have shown that when gastroenterologists make errors conducting and reading colonoscopies, they usually miss the polyps on the right side of the colon. *So what?* Specialists speculate on several possible sources of this systematic error. But clearly one actionable idea is for gastroenterologists to be more vigilant during the procedure when examining the right side of the colon.[39]

In each of these cases, there are some powerful, natural human perceptual biases at the root of the error. For example, the tennis ball judgment error springs from a common and well-known perceptual mistake. These underlying causes may be important in crafting responses. Progress makers seize on the next steps or the "so what's." Doing so increases the likelihood of progress.

Evaluate, Recalibrate, and Adjust the Radar Detectors

Statisticians warn of two distinctly different types of errors that are inherent to any kind of testing: false-positive and false-negative errors.[40] As we discussed above, false-positive errors (Type I) occur when an error has been detected but did not actually occur. For example, when the spam filter on your computer incorrectly flags a message from your boss as spam, it commits a Type I error. False-negative errors (Type II) occur when a test fails to pick up an error that actually occurred. In this case, the spam filter fails to detect that the e-mail from a Tanzanian bank official promising riches is nothing more than a spam scam.

Statisticians tweak their methods and procedures to avoid both types. Their preoccupation with these concerns arises from the inherent nature of the process of error detection. Ironically, the more often you look for errors, the more likely you are bound to make errors. That does not mean you stop trying to detect the errors; rather, you seek to minimize the possibilities of either type of error. You don't throw away the spam filter because it makes mistakes; instead, you recalibrate and hone the decision-making rules.[41]

Progress makers confront similar issues. Unfortunately, grappling with flaws in the error detection radar screen often proves trickier than adjusting the spam filter decision rules. Consider, for example, the difficulty of accurately ascertaining who genuinely suffers a posttraumatic stress disorder (PTSD). How do you distinguish between war veterans experiencing the normal readjustment period to civilian life and those with PTSD? We would expect veterans to have some hellish nightmares. When does that cross over into PTSD? Richard McNally, a Harvard psychologist, argues, "PTSD is a real thing, without a doubt, but as a diagnosis PTSD has become so flabby and overstretched, so much a part of the culture, that we are almost certainly mistaking other problems for PTSD and thus mistreating them."[42]

Debating a complex issue like this reveals the difficulty and importance of confronting false-positive (Type I) errors. Those who raise such issues often encounter resistance to those with a vested interest in addressing the errors. In this case, some members of the psychiatric community deride Professor McNally's notions. Yet, the debate challenges should not obscure the importance of getting this right. If this particular error becomes institutionalized, then the misdiagnosis will result in soldiers receiving the wrong treatments and, in some cases, will actually promote chronic disability. Such are the stakes when someone selects a defective radar screen.

Similar dire consequences emerge from false-negative results. Progress makers also ask why they failed to pick up on a particular type of error earlier in the process. In other words, how do we adjust our radar screen to avoid false-negative (Type II) errors? Why, for example, would institutional investors such as Fairfield Greenwich Advisors and Bank Medici fail to recognize Bernie Madoff's massive Ponzi scheme?[43] Why would the editors of the *New York Times* fail to pick up on the almost propagandistic reports from their correspondent, Walter Duranty, about Stalinist Russia?[44] How could the reporter have missed the Stalin-induced Ukrainian famine-genocide that starved to death millions in the Ukraine? In both cases, the existing radar

detectors failed to detect a blip as massive as a formation of military cargo planes. The consequences of false negatives are worse than false positives. In these cases, we have executives, investors, and policymakers infused with false confidence.

Confronting both types of errors may seem complex, difficult, and potentially contentious. Correct on all counts. Nevertheless, the importance far outweighs the costs of getting the radar screens in place and making them function in the way intended.

Adjust Error Detection and Correction Responsibilities of Stakeholders

Can a quality control department or quality inspectors effectively reduce errors? Perhaps. But as one founder of the quality movement, W. Edwards Deming, wrote long ago in his ground-breaking book, "Unfortunately, quality control departments have taken the job of quality away from the people that can contribute most to quality—management, supervisors, managers of purchasing, and production workers."[45] Thoughtful leaders carefully think about who should have the primary error detection and correction responsibilities. Consider the following examples:

The U.S. Army—The U.S. Army prides itself on getting the mission accomplished whatever the odds. How do they do it? One widely emulated practice is the Army's After Action Review process or AAR (it's not official in the military without an appropriate acronym). What is it? The official definition: "a professional discussion of an event, focused on performance standards, that enables soldiers to discover for themselves what happened, why it happened, and how to sustain strengths and improve on weaknesses."[46] The discussion can be formal or informal. Regardless, the objective is to candidly detect and correct errors as quickly as possible. By doing so, they can weave the improvements into the next mission. That may be why the U.S. Army claims a difference between being "strong" and "Army strong." Indeed, businesses that make extensive use of AARs soon learn that "employees work harder to detect flaws and concoct fixes, because their ideas will live on long after the project has ended."[47]

Wikipedia—The vast majority of college students know that Wikipedia is "a freely licensed encyclopedia written by volunteers in many languages" and available to any Internet user.[48] Ready accessibility entices many, but so

does the Wikipedia's breathtaking scope. By containing over "10 million articles across some 200 languages," it is many times larger than two comprehensive competitors: *Encyclopedia Britannica* and another online encyclopedia, *Encarta.*[49] Sounds great, but what about quality? Since Wikipedia literally changes every second, any assessment about quality must be provisional. Therein lurks the hidden hazard and transparent allure. The hazard is that some in the digital community will vandalize the site or push political agendas.[50] To guard against these problems, Wikipedia has tightened its editing rules.[51] The allure of Wikipedia, though, allows users to quickly address its impurities, imbalances, and imperfections. The moment someone notices an error of omission or commission, it can be corrected. No one has to wait for *World Book Encyclopedia* to send out the amendment "stickers" to correct errors or add updates. In fact, Jimmy Wales remembers dutifully applying the stickers to the appropriate pages in this treasure trove of knowledge.[52] Who is Jimmy Wales? He's the one we have to thank for Wikipedia. He founded the enterprise.

In each of these cases, the responsibility for error detection, selection, and correction shifted from those who would have had the customary duty. The U.S. Army shifted away from a strictly hierarchical approach to error management, and Wikipedia moved error detection away from the experts to all the Netizens of the world. The responsibility shift builds three important attributes into the error management process: speed, habit, and collaboration.

First, in each case, the errors are quickly detected and corrected

The moment Wikipedia volunteers spot an error, they address it. Immediately after a mission, the Army unit can identify concerns and move on to the next mission. Speed combats our natural self-deception mechanisms, such as altering our memory of events and shifting blame.

Second, error detection and correction is considered a regular, routine part of day-to-day activities

Such practices certainly square with the advice of Joseph Hallinan, the author of *Why We Make Mistakes.* His advice about how to make fewer mistakes? "Think small."[53] We think small by making it a habit to routinely root out the everyday mistakes and learning the proper lessons.

Third, each example involves collaboration with others

Wikipedia involves a global alliance of volunteers checking, monitoring, and updating on a routine basis. In the U.S. Army, the team gets down to the nitty-gritty details in these candid discussions that even superiors might not recognize as potential problems. They heed Albert Einstein's maxim that "Not everything that can be counted counts and not everything that counts can be counted." A collaborative team engaged in a candid AAR discusses both the quantifiable results as well as more hazy impressions. This allows the team to develop a convergent view of events in order to better respond to similar situations in the future. And it combats our natural tendency to poorly understand the root causes of error.[54]

Champion Productive—as Opposed to Defensive—Learning

Auditors, copy editors, fact checkers, and aficionados of moviemistakes.com may delight in detecting and correcting errors.[55] But most people don't. That presents a challenge to any organizational leader. How do progress makers lead people out of this motivational ravine? They carry the banner of productive learning while adroitly navigating around various psychological boulders that impede progress.

Productive learners discover how to avoid similar errors in the future. They take into account a wide variety of potential sources of error such as latent design issues. For instance, many of the most deadly surgical mistakes used to occur when the anesthesiologist turned the drug-delivering valve the wrong way. How could this happen to such well-educated specialists? It turns out that many hospitals used two different anesthetizing machine models with two different ways to appropriately twist the valve. Once valve twisting was standardized, these problems abated and so did many of the deadly errors.[56] In fact, a growing body of evidence suggests that when hospital officials "own up to errors" and take active steps to prevent similar mishaps, they actually decrease the likelihood of lawsuits.[57] One study at the University of Illinois Medical Center in Chicago found that their formal apology program resulted in a 40% decline in the number of legal claims, despite a "20% increase in clinical activity."[58]

Defensive learners, on the other hand, concentrate their energy on avoiding responsibility and shunning change. They might, for example, excuse an unnecessary flap with a customer by saying, "I was having a bad day. The customer was pushing me and I let her know she couldn't talk to me that way. She left in a huff. What choice did I have?" Such responses inhibit learning

because they transform choices (e.g., words chosen) into inevitabilities (e.g., words spoken). In some organizations, employees discover devilishly creative ways to play "shift the blame," "obscure the owner," and "attack the accuser." And they don't hesitate to entice others to play the game with them. The result: not continuous improvement but continuous accountability avoidance.

Productive learning stands in sharp contrast to defensive learning; they take organizations in two completely different directions (see Figure 14.4). The progress maker accelerates productive learning and pushes the brake pedal on the defensive learning.

Easier said than done. Putting the brakes on defensive learning requires the progress maker to have some back-pocket retorts ready for the typical face-saving attempts. Let's revisit the brochure example in the "Counterforces" section as a case in point. When the employee attempts to shift blame for the omission of the contact information to other people, how would a progress maker respond? A progress maker might convey, "I'm less interested in fixing blame than in fixing the problem and never repeating the mistake again. How can you help us achieve those goals?" Note that the progress maker deflects the face-saving attempt, assigns responsibility, and seeks action. In Table 14.3, we provide additional ideas for dealing with the other tactics defensive learners might use.

While progress makers recognize that new processes and technical fixes can eliminate many errors, they also know that human error is the source of most problems. After all, 90% of car accidents, 70% of airplane crashes, and 90% of workplace mishaps ultimately come down to human mistakes.[59]

Progress makers hold people accountable while encouraging personal growth. The balance between the two is often tenuous. If you come down too

Figure 14.4 Types of Learning Gleaned From Errors

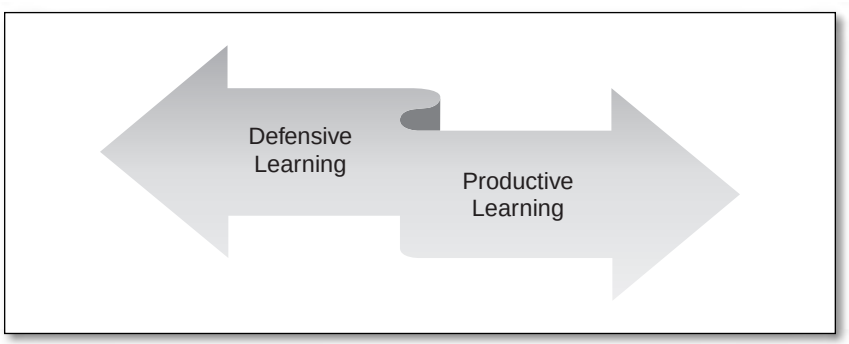


Table 14.3 Responses to Defensive Tactics

Defensive Tactic	*Example*	*Progress Maker Retort*
Shifting blame	"I was involved in another aspect of the brochure. Someone else was supposed to check the final edition."	"The chain of responsibility is an important issue that merits further discussion in the future. Today, I want to focus on that fact that the entire team shares a responsibility to meet the customers' needs. That did not happen in this case."
Maximizing motives	"Our energies were devoted to developing an innovative design that would really impress our customers. While we were trying so hard to be innovative, creative, and ground-breaking, I guess we just forgot that detail."	"We are not questioning anyone's motives. Rather we are focusing on how to get the performance up to customer expectations."
Obscuring ownership	"The decision was made by a committee."	"Who made the decision is really less important than making sure we meet our obligations to the customer."
Minimizing impact	"This was just an image campaign, and besides, they can get the contact information on our Web site."	"We want to make it easy for our customers to find out about us. We have to make our brochure as user-friendly as possible."
Attacking the accuser	"You've made your share of minor gaffes, as well."	"Shifting focus away from the present concerns will not solve the problem."

hard on accountability, you risk your team members becoming overly defensive, not talking about their shortcomings, and hiding their errors. Yet, emphasizing learning at the expense of accountability undermines progress. Progress makers would never stop giving tests and issuing grades in order to emphasize "natural" learning. If they did, it would actually undermine learning because employees

would not receive the feedback they need to gauge performance and make necessary adjustments.

Acting with patient accountability strikes the right balance. A progress maker's patience allows the team to learn, align, and move forward. Progress makers avoid fretting about fixing the blame for errors and focus on fixing the problems, procedures, and responsibilities. They demand productive learning and then move on. They don't get mired in a finger-pointing kind of accountability. Instead, they tolerate mistakes even as they create accountabilities, expecting progress-making lessons to be learned in the process. Dr. Jerome Groopman of Harvard Medical School may have summed up this ideal best:

> Studies show that expertise is largely acquired not only by sustained practice but by receiving feedback that helps you understand your technical errors and misguided decisions. During my training, I met a cardiologist who had a deserved reputation as one of the best in his field, not only a storehouse of knowledge but also a clinician with excellent judgment. He kept a log of all the mistakes he knew he made over the decades, and at times revisited this compendium when trying to figure out a particularly difficult case. He was characterized by many of his colleagues as eccentric, an obsessive oddball. Only later did I realize his implicit message to us was to admit our mistakes to ourselves, then analyze them, and keep them accessible at all times if we wanted to be stellar clinicians.[60]

CONCLUDING THOUGHTS

Sports broadcasters ushered in something unexpected when they introduced instant replay and slow motion to U.S. football fans. Not only could the highlights be endlessly replayed and analyzed, but so could the obvious errors by officials. Most were inconsequential; others were game changers. What happened after this innovation? At first nothing much. In fact, there was even resistance to using the tool as a hedge against officiating errors. The arguments against using instant replay were plentiful as well as persuasive: (1) it would slow down the game, (2) it would undermine the credibility of officials, and (3) it would destroy fan confidence in the integrity of the game. Today, of course, coaches and officials in the booth rely on instant replay to correct important errors on the spot.[61]

The story of the evolving role of instant replay proves instructive. Managers, like many in the NFL, often resist discussing errors for fear of undermining their

credibility or even slowing down production. The research suggests, though, that well-led organizations monitor many potential error sources and learn the relevant lessons. This can only happen by selecting, detecting, and correcting the proper errors. That's the kind of progress every explorer or refiner craves.

NOTES

1. T. Nordenberg, *Make No Mistake: Medical Errors Can Be Deadly Serious.* http://www.fda.gov/fdad/features/2000/500_err.html (accessed October 31, 2008).

2. M. Chiang, "Promoting Patient Safety: Creating a Workable Reporting System." *Yale Journal on Regulation* 18 (2001): 383–407.

3. M. D. Cannon and A. C. Edmondson, "Failing to Learn and Learning to Fail (Intelligently): How Great Organizations Put Failure to Work to Innovate and Improve." *Long Range Planning* 38, no. 3 (2005): 299–319, p. 300.

4. B. Zhao and F. Olivera, "Error Reporting in Organizations." *Academy of Management Review* 31, no. 4 (2006): 1012–30, p. 1013.

5. C. Argyris and D. Schön, *Organizational Learning: A Theory of Action Perspective.* Reading, MA: Addison-Wesley, 1978.

6. M. Crossan, "Altering Theories of Learning and Action: An Interview With Chris Argyris." *Academy of Management Executive* 17, no. 2 (2003): 40–46, p. 40.

7. Ibid., 40.

8. D. Garvin, A. Edmondson, and F. Gino. "Is Yours a Learning Organization? *Harvard Business Review* 86, no. 3 (2008): 109–16.

9. K. Johnson, "Is It Real, or Is It Autodesk?" *Business 2.0,* July 2007, 42–44.

10. R. Buderi, *The Invention That Changed the World: How a Small Group of Radar Pioneers Won the Second World War and Launched a Technological Revolution.* New York: Simon & Schuster, 1996, 246.

11. S. McCartney, "On the Radar, Bird-Proofing U.S. Air Traffic." *Wall Street Journal,* May 26, 2009, D1, 4.

12. D. Rothwell, *In Mixed Company: Communicating in Small Groups and Teams.* Belmont, CA: Thomson Learning, 2007.

13. Cannon and Edmondson, "Failing to Learn and Learning to Fail (Intelligently)," 7.

14. L. Gonzales, "Why Smart People Make Dumb Mistakes." *National Geographic Adventure,* August 2007, 45–51, 85–86; "Margin for Error." *National Geographic Adventure,* November 2004, 53–58, 87–89.

15. C. Tavris and E. Aronson, *Mistakes Were Made (But Not by Me).* New York: Harcourt, Inc., 2007, cover flap.

16. L. Mlodinow, *The Drunkard's Walk: How Randomness Rules Our Lives.* New York: Pantheon, 2008; D. Ariely, *Predictably Irrational: The Hidden Forces That Shape Our Decisions.* New York: HarperCollins, 2008.

17. F. Dyson, "A Failure of Intelligence." *Technology Review,* November/December 2006, 62–71, p. 67.

18. Ibid., 68.

19. L. McDonald and P. Robinson, *A Colossal Failure of Common Sense: The Inside Story of the Collapse of Lehman Brothers.* New York: Crown Business, 2009.

20. Zhao and Olivera, "Error Reporting in Organizations."

21. L. Perlow and S. Williams, "Is Silence Killing Your Company?" *Harvard Business Review* 81, no. 5 (2003): 52–58.

22. D. Tjosvold, Z. Yu, and C. Hui, "Team Learning From Mistakes: The Contribution of Cooperative Goals and Problem-Solving." *Journal of Management Studies* 41, no. 7 (2004): 1223–45.

23. N. Ron, R. Lipshitz, and M. Popper, "How Organizations Learn: Post-Flight Reviews in an F-16 Fighter Squadron." *Organization Studies* 27, no. 8 (2006): 1069–89.

24. P. Schoemaker and R. Gunther, "The Wisdom of Deliberate Mistakes." *Harvard Business Review* 84, no. 6 (2006): 108–15, p. 110.

25. J. Cohen, "Promising AIDS Failure Leaves Field Reeling." *Science* 318 (2007): 28–29.

26. C. Carlson and W. Wilmot, *Innovation: The Five Disciplines for Creating What Customers Want.* New York: Crown Business, 2006, 5.

27. "This Is How It's Done." *Inc.*, April 2009, 90–95.

28. Quoted in an interview by Roger O. Crockett, "How P&G Plans to Clean Up." *BusinessWeek,* April 13, 2009, 44–45, p. 44.

29. J. McGregor, "Zappos' Secret: It's an Open Book." *BusinessWeek,* March 23 & 30, 2009, 62.

30. P. Clampitt and M. L. Williams, "The Selection, Detection and Correction of Organizational Errors: The Role of Communication." Paper presented at the International Communication Association, May 2009, Chicago. Available at www.imetacomm.com under the "Other Publications" tab.

31. For a discussion of how the researchers distinguished between well-led and less well-led organizations, see Clampitt and Williams, "The Selection, Detection and Correction of Organizational Errors."

32. McGregor, "Zappos' Secret."

33. L. Gomes, "Rage, Report, Reboot, and, Finally, Accept Another System Crash." *Wall Street Journal,* October 31, 2007, B1.

34. A. Gawande, *Better: A Surgeon's Notes on Performance.* New York: Metropolitan Books, 254.

35. Ibid., 255.

36. M. Saks and J. Koehler, "The Coming Shift in Forensic Identification Science." *Science* 309 (2005): 892–95.

37. D. Whitney, N. Wurnitsch, B. Hontiveros, and E. Louie, "Perceptual Mislocalization of Bouncing Balls by Professional Tennis Referees." *Current Biology* 18, no. 20 (2008): R947–49.

38. Ibid.

39. N. Baxter, M. Goldwasser, L. Paszat, R. Saskin, D. Urbach, and L. Rabeneck, "Association of Colonoscopy and Death From Colorectal Cancer." *Annals of Internal Medicine* 150, no. 1 (2009): 1–9.

40. L. Meyers and N. Grossen, *Behavioral Research: Theory, Procedure, and Design.* San Francisco: Freeman, 1974, 87.

41. G. Gigerenzer, W. Gaissmaier, E. Kurz-Milcke, L. Schwartz, and S. Woloshin, "Knowing Your Chances." *Scientific American Mind* 20, no. 2 (2009): 44–51.

42. R. McNally, quoted in D. Dobbs, "The Post-Traumatic Stress Trap." *Scientific American,* April 2009, 64–69, p. 67.

43. R. Chernow, "Madoff and His Models." *New Yorker,* March 23, 2009, 28–33.

44. D. McCollam, "Should This Pulitzer Be Pulled?" *Columbia Journalism Review,* November/December 2003, 43–48.

45. W. E. Deming, *Out of the Crisis.* Cambridge: Massachusetts Institute of Technology, 1986, 133–34.

46. http://www.au.af.mil/au/awc/awcgate/army/tc_25–20/chap1.htm.

47. L. Buchanan, "Leadership: Armed With Data." *Inc.,* March 2009, 98–100, p. 100.

48. A. Lih, *The Wikipedia Revolution: How a Bunch of Nobodies Created the World's Greatest Encyclopedia.* New York: Hyperion, 2009, xv.

49. Ibid, xv.

50. Ibid., 213.

51. J. Angwin and G. A. Fowler, "Volunteers Log Off as Wikipedia Ages." *Wall Street Journal,* November 23, 2009, A1, 17.

52. Ibid., 19.

53. J. Hallinan, *Why We Make Mistakes.* New York: Broadway Books, 2009, 210.

54. Ibid., 189.

55. J. McPhee, "Checkpoints: Fact-Checkers Do It a Tick at a Time." *New Yorker,* February 9 and 16, 2009, 56–63; B. Newman, "In Movies, to Err Is Human, to Nitpick Is Even More So." *Wall Street Journal,* March 25, 2010, A1, A6.

56. Hallinan, *Why We Make Mistakes,* 6.

57. L. Landro, "Hospitals Own Up to Errors." *Wall Street Journal,* August 25, 2009, D1–D2.

58. C. Arnst, "10 Ways to Cut Health-Care Costs Right Now." *BusinessWeek,* November 23, 2009, 34–39, p. 39.

59. Ibid., 2.

60. J. Groopman, *How Doctors Think.* Boston: Houghton Mifflin, 2007, 21.

61. Personal interview with Mark Murphy, Green Bay Packers President and CEO, March 10, 2010.