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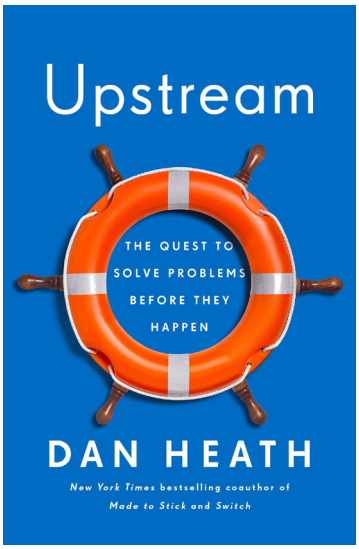

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Upstream

THE SUMMARY

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Chapter 1: Moving Upstream

Downstream actions react to problems once they've occurred. Upstream efforts aim to prevent those problems from happening. Surely, we'd all prefer to live in the upstream world where problems are prevented rather than reacted to. What holds us back? So often in life, we get stuck in a cycle of response. We put out fires. We deal with emergencies. We handle one problem after another, but we never get around to fixing the systems that caused the problems.

Therapists rehabilitate people addicted to drugs, and corporate recruiters replace talented executives who leave, and pediatricians prescribe inhalers to kids with breathing problems. And obviously it's great that there are professionals who can address these problems, but wouldn't it be better if the addicts never tried drugs, and the executives were happy to stay put, and the kids never got asthma? So why do our efforts skew so heavily toward reaction rather than prevention?

In this book, I'm defining upstream efforts as those intended to prevent problems before they happen or, alternatively, to systematically reduce the harm caused by those problems. Teaching kids to swim, for instance, is an excellent upstream way to prevent drownings. But sometimes even experienced swimmers can find themselves at risk of drowning. That's why, to me, a life preserver is also upstream technology. At first glance, life preservers seem reactive—anyone who needs a life preserver tossed to them is already

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experiencing a problem, after all. But if the "problem" we want to solve is people dying from drowning, then the life preserver can prevent that.

A telltale sign of upstream work is that it involves systems thinking: Because authorities are aware of the risk of drowning, life preservers are purchased and distributed to locations where they will be readily available if an emergency happens. By contrast, a father frantically diving into the pool at the waterpark to assist his struggling son—that's reactive. (There is usually an interplay between downstream and upstream: After the father saves his son, the waterpark will likely review the incident and make systemic changes to ensure something similar doesn't happen again. The downstream rescue leads to the upstream improvement.)

I prefer the word upstream to preventive or proactive because I like the way the stream metaphor prods us to expand our thinking about solutions. Consider the parable of the drowning kids, which contrasts two locations: downstream and upstream. But the reality is that we can intervene at many points along an almost limitless timeline. In other words, you don't head upstream, as in a specific destination. You head upstream, as in a direction. Swim lessons are further upstream than life preservers. And there's always a way to push further upstream—at the cost of more complexity.

It's not that the upstream solution is always right. And it's certainly not the case that we should abandon downstream work—we will always want someone there to rescue us. The point is that our attention is grossly asymmetrical. We're so focused on saving the drowning kids in the river that we fail to investigate why they need saving at all.

Most of us would agree that "an ounce of prevention is better than a pound of cure," but our actions don't match those words. In most of our efforts in society, we've optimized ourselves to deliver pounds of cure. Speedy, efficient pounds of cure. We celebrate the response, the recovery, the rescue. But we're capable of greater things: less Undo and more Outdo. What the world needs now is a quieter breed of hero, one actively fighting for a world in which rescues are no longer required. How many problems in our lives and in society are we tolerating simply because we've forgotten that we can fix them?

SECTION I: THE THREE BARRIERS TO UPSTREAM THINKING

Chapter 2: Problem Blindness

To succeed upstream, leaders must detect problems early, target leverage points in complex systems, find reliable ways to measure success, pioneer new ways of working together, and embed their successes into systems to give them permanence. For that to happen, leaders first have to awaken from problem blindness. You can't solve a problem that you can't see, or one that you perceive as a regrettable but inevitable condition of life. (Football is a tough game—of course, people are gonna get hurt.)

Why do we fall prey to problem blindness? We often fall prey to a phenomenon called "inattentional blindness," a phenomenon in which our careful attention to one task leads us to miss important information that's unrelated to that task. Inattentional blindness leads to a lack of peripheral vision. When it's coupled with time pressure, it can create a lack of curiosity. "I've got to stay focused on what I'm doing."

We grow accustomed to stimuli that are consistent. You walk into a room, immediately notice the loud drone of an air conditioner, and five minutes later, the hum has receded into normalcy. That's called habituation. To reinforce that last point about attaining "normalcy," consider that habituation is frequently used as a therapy for people's phobias.

People with a fear of needles, for instance, might be asked to look at images of needles, or to handle needles, so many times that eventually their irrational fear yields. The needle has been destigmatized. Normalized. In a therapeutic context, that normalization is desirable. But habituation cuts both ways: Imagine instead that what's being normalized is corruption or abuse.

The escape from problem blindness begins with the shock of awareness that you've come to treat the abnormal as normal. *Wait, why did I feel pressured to get a C-section? Wait, why have we come to accept a 52% high school graduation rate?* The seed of improvement is dissatisfaction. Next comes a search for community: Do other people feel this way? And with that recognition—that this phenomenon is a problem and we see it the same way—comes strength.

Something remarkable often happens next: People voluntarily hold themselves responsible for fixing problems they did not create. A journalist makes the choice to fight on behalf of the millions of women enduring sexual harassment. A woman pressured into a C-section becomes a champion for thousands of other mothers she'll never meet.

The upstream advocate concludes: *I was not the one who created this problem. But I will be the one to fix it.*

Chapter 3: A Lack of Ownership

What's odd about upstream work is that, despite the enormous stakes, it's often optional. With downstream activity—the rescues and responses and reactions—the work is demanded of us. A doctor can't opt out of a heart surgery; a day care worker can't opt out of a diaper change. By contrast, upstream work is chosen, not demanded.

A corollary of that insight is that if the work is not chosen by someone, the underlying problem won't get solved. This lack of ownership is the second force that keeps us downstream. The first force, problem blindness, means: *I don't see the problem*. (Or, *This problem is inevitable*.) A lack of ownership, though, means that the parties who are capable of addressing a problem are saying, *That's not mine to fix*.

Why do some problems lack "owners"? Sometimes self-interest is to blame: Tobacco companies are in the best position to prevent the millions of deaths caused by their products, but of course doing so would interfere with their ability to make money. Other times the lack of ownership is more innocent, the result of fragmented responsibilities.

In some cases, people may resist acting on a perceived problem because they feel as though it's not their place to do so. Think of a young man in college who is appalled by the incidence of date rape on campus but wonders if it's appropriate for him to join protests led by women. The Stanford researchers Dale Miller, Daniel Effron, and Sonya Zak, in a paper exploring this sense of reluctance, wrote "what often prevents people from protesting is not a lack of motivation to protest, but rather their feeling that they lack the legitimacy to do so."

They call this sense of legitimacy "psychological standing," inspired by the concept of legal standing. You can't bring a suit in the justice system simply because something offended your sensibilities—you've got to show that it affected you. The evidence that you were harmed gives you standing to bring a case. The young man who's reluctant to join a protest against date rape may feel he lacks psychological standing, since he hasn't been affected personally by the issue. Might the rest of us be unwittingly allowing problems to persist that we could help solve? How do we open our own eyes?

One idea comes from Jeannie Forrest. Before joining Yale, she was a clinical psychologist and executive coach, and that training in deciphering human motives has aided her work as a manager. In February 2019, for instance, she had to

untangle a dispute between staff members. One woman—we'll call her "Dawn"—reported to another woman, "Ellen." Dawn had filed a complaint about Ellen, accusing her of constantly undermining and belittling her.

Forest brought the two women together in her office. Then she said, "I'd like each of you to tell the story of this situation as though you're the only one in the world responsible for where we are." Both had a hard time honoring this request. They lapsed quickly into finger-pointing.

Eventually, they got it. Ellen said, "Well, I assumed her questions were mean-spirited. I thought that, well, she should just take what I said without questioning me. But I could have explained what I wanted better."

Dawn said, "I accepted her huffing and eye-rolling and didn't address it immediately. I should have said, 'Look, you're huffing at me and I don't understand what you want. Help me understand it better.'"

All three women (including Forrest) had initially handled the situation as though they were trapped in it. But when Forrest prodded them to explain the situation as if they were the ones responsible, they uncovered their power. They went from feeling like victims of the problem to feeling like co-owners of the solution.

Forrest's question can help us filter out the noise in complex situations. What if you told the story of your relationship problems as if you were the only one responsible? What if employers told the story of their employees' health as if they were the only ones responsible? What if school districts told the story of high school dropouts as if they were the only ones responsible? Asking those questions might help us overcome indifference and complacency and see what's possible: *I choose to fix this problem, not because it's demanded of me, but because I can, and because it's worth fixing.*

Chapter 4: Tunneling

If upstream thinking is so simple—and so effective in eliminating recurring problems—why is it so rare? Researchers have found that when people experience scarcity—of money or time or mental bandwidth—the harm is not that the big problems crowd out the little ones. The harm is that the little ones crowd out the big ones. Imagine a single mother who can barely pay the bills each month and who has maxed out her credit card. Her kid needs $150 to play in a local basketball league. She can't bear to say no—it's one of the few healthy opportunities open to him in the neighborhood. But she doesn't have the money and is still 10 days from her next paycheck. So she takes out a payday loan from the lender down the street. She'll need to repay the loan in a month with 20% interest (the equivalent of a 240% APR). And if she doesn't, it will roll over, and the interest will mount. It's not a huge amount of money, but it might be enough extra debt to make her precarious finances topple.

A financial advisor would say the woman has made a bad financial decision. But her son got his opportunity, and she has bought herself a few days or a few weeks of crucial maneuvering room. The crisis may come, but not today. The psychologists Eldar Shafir and Sendhil Mullainathan, in their book *Scarcity*, call this "tunneling": When people are juggling a lot of problems, they give up trying to solve them all. They adopt tunnel vision. There's no long-term planning; there's no strategic prioritization of issues. And that's why tunneling is the third barrier to upstream thinking—because it confines us to short-term, reactive thinking. In the tunnel, there's only forward.

People who are tunneling can't engage in systems thinking. They can't prevent problems; they just react. And tunneling isn't just something that happens to poor people—it can also be caused by a scarcity of time. "Scarcity, and tunneling in particular, leads you to put off important but not urgent things—cleaning your office, getting a

colonoscopy, writing a will—that are easy to neglect," wrote Shafir and Mullainathan. "Their costs are immediate, loom large, and are easy to defer, and their benefits fall outside the tunnel. So they await a time when all urgent things are done."

It's a terrible trap: If you can't systematically solve problems, it dooms you to stay in an endless cycle of reaction. Tunneling begets more tunneling.

Tunneling is not only self-perpetuating, it can even be emotionally rewarding. There is a kind of glory that comes from stopping a big screw-up at the last second. Look at all the clichés we have at our disposal: "Team, we owe Steve a big round of applause for putting out that fire / saving the day / bailing us out / rescuing us from disaster. If it weren't for him, those inventory stock-out reports would have been a day late." Saving the day feels awfully good, and heroism is addictive. We all have colleagues who actually seem to relish those manic "stay up all night to meet the critical deadline" adventures. And it's not that the day doesn't need saving, sometimes, but we should be wary of this cycle of behavior. The need for heroism is usually evidence of systems failure.

How do you escape the tunnel? You need slack. Slack, in this context, means a reserve of time or resources that can be spent on problem solving. Some hospitals, for instance, create slack with a morning "safety huddle" where staffers meet to review any safety "near-misses" from the previous day—patients almost hurt, errors almost made—and preview any complexities in the day ahead.

The safety huddle isn't slack in the sense of idle time. Rather, it's a guaranteed block of time when staffers can emerge from the tunnel and think about systems-level issues. Think of it as structured slack: A space that has been created to cultivate upstream work. It's collaborative and it's disciplined.

Escaping the tunnel can be difficult, because organizational structure resists it. Mark Okerstrom, the CEO of Expedia said: "When we create organizations, we're doing it to give people focus. We're essentially giving them a license to be myopic." Focus is both an enemy and an ally. It can accelerate work and make it more efficient, but it puts blinders on people. (Racehorses wear blinders so they'll ignore distractions and run faster.) When your emphasis is always forward, forward, forward, you never stop to ask whether you're going in the right direction.

SECTION II: SEVEN QUESTIONS FOR UPSTREAM LEADERS

Chapter 5: How Will You Unite the Right People

To succeed, leaders of upstream interventions need to address seven key questions. The first of those seven questions is: *How will you unite the right people?*

Recall that many upstream efforts are a kind of volunteer work. Chosen, not obligated. So the first step, as in many upstream efforts, is to surround the problem—to recruit a multifaceted group of people and organizations united by a common aim. How will you unite the right people? Each one of the people on the team gets a role. Given your progress may hinge on people's voluntary effort, it's smart to maintain a big tent.

But a philosophy of "the more, the merrier" is not sufficient. The core team should be selected more strategically. Preventive interventions often require a new kind of integration among splintered components. To succeed in upstream efforts, you need to surround the problem. Meaning you need to attract people who can address all the key dimensions of the issue.

Once you've surrounded the problem, then you need to organize all those people's efforts. And you need an aim that's compelling and important—a shared goal that keeps them contributing even in stressful situations where people's lives may depend on your work.

There's one additional factor: the primacy of data, which was a theme I observed repeatedly in my research, and one that surprised me. I knew data would be important for generating insights and measuring progress, but I didn't anticipate that it would be the centerpiece of many upstream efforts.

Joe McCannon says what is needed is "data for the purpose of learning." McCannon is an expert in scaling up efforts in the social sector—a former nonprofit and government leader, he has advised movements in many countries. McCannon distinguishes "data for the purpose of learning" from "data for the purpose of inspection." When data is used for inspection, it sounds like this: S*mith, you didn't meet your sales targets last quarter—what happened? Williams, your customer satisfaction numbers are going down—that's unacceptable.*

Using data for inspection is so common that leaders are sometimes oblivious to any other model. McCannon said that when he consults with social sector leaders, he'll ask them, *What are your priorities when it comes to data and measurement?* "And I never hear back 'It's important to set up data systems that are useful for people on the front lines.' Never," he said. "But that's the first principle! When you design the system, you should be thinking: How will this data be used by teachers to improve their classrooms? How will this data be used by doctors and nurses to improve patient care? How can the local community use the information? But that's rarely how the systems are designed."

McCannon believes that groups do their best work when they are given a clear, compelling aim and a useful, real-time stream of data to measure their progress, and then... left alone. The team members hold each other accountable, and the data keeps them honest and keeps them pushing. Making data useful for the front lines can be a daunting task. But sometimes grounding an effort in concrete data is the only way to unlock the solution to a major problem.

Data takes you away from philosophical insights. You move away from anecdotal fights about what people *think* is happening to what *is* happening. You can't solve a dynamic problem with static data.

Chapter 6: How Will You Change the System?

Systems are machines that determine probabilities. In the most well-designed systems—like the neighborhoods with the highest life expectancies—the probabilities are overwhelmingly in your favor. It's like playing a game of roulette where you win if you hit red—and you win if you hit black. In badly flawed systems, like the worst neighborhoods, you still get to play roulette. There's still an element of choice and chance. But the only way you can win is by hitting one of those green pockets, 0 and 00.

When we marvel at the inner-city kid who gets into Harvard, we're marveling at the odds she defied. But what we don't appreciate is that our celebration of her carries an implicit indictment of the environment we put her in. We forced you to climb Everest to get ahead in life—and you did it! Congratulations! (No one gets misty-eyed reading the story about the Greenwich, Connecticut, hedge funder's kid who makes it into Harvard.)

Upstream work is about reducing the probability that problems will happen, and for that reason, the work must culminate in systems change. Because systems are the source of those probabilities. To change the system is to change the rules that govern us or the culture that influences us.

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The writer David Foster Wallace once told a story: "There are these two young fish swimming along and they happen to meet an older fish swimming the other way, who nods at them and says 'Morning, boys. How's the water?' And the two young fish swim on for a bit, and then eventually one of them looks over at the other and goes, 'What the hell is water?'" The system is the water.

What's the "water" you're not seeing in your home life or at work? What's interesting is that our kids can often see the water. They pick up on things we're not even aware of. My friend told me about watching his baby daughter hunched over a pack of playing cards, running her index finger back and forth and poking it. He was confused until he realized: She's mimicking me on my phone. "That's when I realized maybe I was spending a bit too much time on my iPhone," he said. Our kids see the real us.

They don't see everything, of course. For our children, we're the system architects. We are the justice system, the housing department, social services, and (for a while at least) the education system.

Systems change is important within organizations as well as outside them. Consider, for instance, the efforts of many organizations to hire a more diverse workforce. The first thing to realize is that if you have a large organization filled with a relatively homogenous population of employees, then that composition did not happen by chance. Remember the quote: "Every system is perfectly designed to get the results it gets." I'm not implying that these hiring systems were engineered consciously to discriminate. In this age, not many organization leaders are opposed to diversity. But good intentions can't overcome bad systems.

The mystery to be solved is: Why, if most people in this organization want to hire more diverse employees, are we failing to do so? The answer will likely be complex: We're casting our net for employees in a pond that's shallower than we think. Or we're valuing certain kinds of credentials that limit our pool of applicants while not contributing much to job performance. Or we're filtering out candidates because of biases that we're not even aware of.

The solutions to these problems are systemic, not personal. The advocates for change inside the organization should rethink every part of the mis-engineered system. *Maybe we shouldn't recruit only at those same 10 college campuses. Maybe we should disguise the names and genders on the resumes we consider. Maybe we should train our leaders how to conduct better interviews, so that the conversations don't degenerate into small talk.* (Small talk leads us to favor "likable" candidates—in other words, candidates who are just like us.)

Systems change starts with a spark of courage. A group of people unite around a common cause and they demand change. But a spark can't last forever. The endgame is to eliminate the need for courage, to render it unnecessary, because it has forced change within the system. Success comes when the right things happen by default—not because of individual passion or heroism. Success comes when the odds have shifted.

Chapter 7: Where Can You Find a Point of Leverage?

The Greek polymath Archimedes said, "Give me a lever long enough and a fulcrum on which to place it, and I shall move the world." It's an inspiring quote for change leaders.

Actually, though, if you give the quote a second reading, you'll notice that there's an awful lot riding on that request for a lever and fulcrum. What he's really saying is: If you rig up a system that makes it easy for me to move the world, then I shall move the world! Nobody's going to put that one on a coffee mug. Because when it comes to preventing problems in complex systems, finding the right lever and fulcrum is precisely hard part.

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While every domain of upstream work will have its own unique equation—and thus its own leverage points—the strategy to find those leverage points is closer to universal: Immerse yourself in the problem. By getting close to the problem, we find leverage points to make change.

When you get close to a problem, what exactly are you looking for? How do you know a promising lever and fulcrum when you spot it? In searching for a viable leverage point, your first pass might be to consider the risk and protective factors for the problem trying to prevent. For teenage alcohol abuse, a protective factor is being involved in formal sports—it eats up a teen's time and provides a source of natural highs. A risk factor is parental inattention—if her parents are always gone, she'll be more likely to act out. Every problem will have its own array of factors that increase risk for or protect against it, and each of those factors is a potential leverage point.

As an alternative to the focus on risk and protective factors, consider whether your leverage point might be a specific subpopulation of people. Many successful upstream interventions are actually very expensive programs targeted at groups of people. At first glance this may seem like an inherently undesirable combination: Why would we ever want to spend a lot on a few people? Because in many domains, a very small set of people can create an inordinate burden on the system.

A necessary part of finding a viable leverage point is to consider costs and benefits. We'll always want the biggest bang for our buck. But I want to draw a sharp line between "bang for the buck," which is critical, and another, more pernicious idea. One of the most baffling and destructive ideas about preventive efforts is that they must save us money. Discussions of upstream interventions always seem to circle back to ROI: Will a dollar invested today yield us more in the long run? If we provide housing to the homeless, will it pay for itself in the form of fewer social service needs? If we provide air conditioners to asthmatic kids, will the units pay for themselves via fewer ER visits?

These aren't irrelevant questions—but they aren't necessary ones, either. Nothing else in health care, other than prevention, is viewed through this lens of saving money. Your neighbor with the heroic all-bacon diet—when he finally ends up needing heart bypass surgery, there's literally no one who is going to ask whether he "deserves" the surgery or whether the surgery is going to save the system money in the long haul. When he needs the procedure, he'll get it. But when we start talking about preventing children from going hungry, suddenly the work has to pay for itself. This is madness. The reason to house the homeless or prevent disease or feed the hungry is not because of the financial returns but because of the moral returns. Let's not sabotage upstream efforts by subjecting them to a test we never impose on downstream interventions.

Getting proximate is not a guarantee of progress. It's a start, not a finish. Upstream change often means fumbling our way forward, figuring out what works and what doesn't, and under what conditions. But in this context, even a defeat is effectively a victory. Because every time we learn something, we fill in one more piece of the map as we hunt for the levers that can move the world.

Chapter 8: How Will You Get Early Warning of the Problem?

When we can foresee a problem, we have more maneuvering room to fix it. That's why a key question bearing on upstream efforts is: How can you get early warning of the problem you're trying to solve? There's no inherent advantage to early warning signals. Their value hinges on the severity of the problem. You may not need or want an early-warning signal that the bulb in your bedside lamp is about to burn out. (Versus it might be incredibly valuable to have an early-warning signal for the bulb at the top of a lighthouse.) The value also depends on whether the warning

provides sufficient time to respond. A car tire that gave you a 30-second advance warning of a blowout might save your life. A half-second warning might be worthless.

The anti-terrorism "If You See Something, Say Something" campaign is an example of early detection work that hinges on human beings. The slogan was created by adman Allen Kay on the day after the 9/11 attacks. "The model that I had in my head was 'Loose Lips Sink Ships,'" Kay told the New York Times. "In this case, I thought it was ironic because we want just the opposite. We want people to talk. I wanted to come up with something that would carry like that. That would be infectious." In a sense, we have all become sensors deployed to provide early warning of potential terrorist acts.

To anticipate problems, we need eyes and ears in the environment. But we need to be cautious about what we learn: Sometimes we may detect things that are not as they seem. Some early-warning systems work wonders: They can keep elevators from failing and customers from churning. Other times, they may cause more harm than benefit. How do we distinguish between the two? One key factor is the prevalence of false positives: warnings that incorrectly signal trouble.

Have you ever rolled your eyes when you heard a fire alarm? That's alarm fatigue, and it's a critical problem. A group of researchers studied five ICUs (intensive care units), treating 461 patients, for a month in 2013. Over that period, there were more than 2.5 million alarms triggered on the bedside monitors: automated alerts about changes in heart rates, respiratory intake, blood pressure levels, and more. Granted, many of those alarms were just text messages flashing on a screen for nurses and clinicians to observe. The hospital had restricted the audible alarms to those considered clinically important. Nevertheless, there were almost 400,000 audible alarms logged in which broke down to 187 audible alarms per bed per day. When everything is cause for alarm, nothing is cause for alarm.

As we design early-warning systems, we should keep these questions in mind: Will the warning give us enough time to act effectively? (If not, why bother?) What rate of false positives can we expect? Our comfort with that level of false positives may, in turn, hinge on the relative cost of handling false positives versus the possibility of missing a real problem.

Chapter 9: How Will You Know You're Succeeding?

A question that bedevils many upstream interventions is: What counts as success? With downstream work, success can be wonderfully tangible, and that's partly because it involves restoration. Downstream efforts restore the previous state. *My ankle hurts—can you make it stop? My laptop broke—can you fix it?* In these situations, there's not much conceptual handwringing about what constitutes success. If your laptop starts working again, that's victory.

But with upstream efforts, success is not always self-evident. Often, we can't apprehend success directly, and we are forced to rely on approximations—quicker, simpler measures that we hope will correlate with long-term success. But because there is a separation between (a) the way we're measuring success and (b) the actual results we want to see in the world, we run the risk of a "ghost victory": a superficial success that cloaks failure.

There are three kinds of ghost victories. To foreshadow the three varieties, let's imagine a long-struggling baseball team that is determined to remake itself as a winner. Because that journey may take years, the manager decides to emphasize power hitting—especially more home runs—as a more proximate measure of success. In the first kind of ghost victory, your measures show that you're succeeding, but you've mistakenly attributed that success to your own

work. (The team applauds itself for hitting more home runs—but it turns out every team in the league hit more too, because pitching talent declined.) The second is that you succeeded on your short-term measures, but they didn't align with your long-term mission. (The team doubled its home runs but barely won any more games.) And the third is that your short-term measures *became* the mission in a way that really undermined the work. (The pressure to hit home runs led several players to start taking steroids, and they got caught.)

Ghost victories, all their forms, can fool almost anyone—even (or perhaps especially) the people achieving the "successes." It's only when you examine them very closely that you can spot the cracks—the signs of separation between apparent and real success.

When measures become the mission is the most destructive form of ghost victory, because it's possible to ace your measures while undermining your mission. I've "won" this kind of ghost victory. When I was a boy, my father offered to pay me $1 for every book of the Bible I read. With 66 books in the Bible, I stood to gain a windfall of $66, which could immediately be reinvested into Atari 2600 cartridges. My father intended for me to start with Genesis and read from beginning to end. Instead, I started with Second John, Third John, and Philemon—the three shortest books in the Bible. I can remember the look of disappointment and disbelief on his face as I tried to claim my first $3 installment.

We've all heard stories like this before. People "gaming" measures is a familiar phenomenon. But gaming is a revealing word, because often these stories are told with an air of playfulness. But for many upstream interventions, gaming is not a little problem—just a quirky, mischievous aspect of human behavior—it's a destructive force that can and will doom your mission, if you allow it. We need to escalate the rhetoric; People aren't "gaming metrics," they're defiling the mission.

We cannot be naive about this phenomenon of gaming. When people are rewarded for achieving a certain number, or punished for missing it, they will cheat. They will skew. They will skim. They will downgrade. In the mindless pursuit of "hitting the numbers," people will do anything that's legal without the slightest remorse—even if it grossly violates the spirit of the mission—and they will find ways to look more favorably upon what's illegal. All of us won't stoop to this behavior all the time. But most of us will some of the time.

Any upstream effort that makes use of short-term measures—which, presumably, is most of them—should devote time to "pre-gaming." meaning the careful consideration of how the measures might be misused. Anticipating these abuses before the fact can be productive and even fun, in sharp contrast to reacting to them after the fact.

Chapter 10: How Will You Avoid Doing Harm?

Systems are complicated. Upstream interventions tinker with complex systems, and as such, we should expect reactions and consequences beyond the immediate scope of our work. In "shaping the water," we will create ripple effects. Always. How can we ensure that, in our quest to make the world better, we don't unwittingly do harm?

"As you think about a system, spend part of your time from a vantage point that lets you see the whole system, not just the problem that may have drawn you to focus on the system to begin with," wrote Donella Meadows in an essay. Meadows was a biophysicist and systems thinker. She continued, "And realize that, especially in the short term, changes for the good of the whole may sometimes seem to be counter to the interests of a part of the system."

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Here's a painful illustration of Meadows's point: In July 2009, a young Google engineer was walking through Central Park when he was struck by a falling oak tree branch causing brain injuries and paralysis. It seemed like a tragic but fluke injury. Except that, later, the comptroller of New York City, Scott Stringer, started analyzing the claims paid by the city to settle lawsuits, and he discovered an unexpectedly large number of settlements resulting from falling branches. Curious, Stringer investigated further and discovered that the city's pruning budget had been cut in previous years, in an effort to save money. "Whatever money we thought we were saving on the maintenance side, we were paying out on the lawsuit side," said David Saltonstall, the NYC assistant comptroller for policy.

This is what Meadows meant about the interests of the "part" and the "whole" diverging. You can save money by cutting the pruning budget, and that's good for the parks department. But then you end up paying claims, in amounts far greater than the cuts, to innocent people who got hurt by falling branches. This linkage, though, was invisible to the people involved. It was only when Stringer's team began to compile and study the data that the pattern became apparent.

In planning upstream interventions, we've got to look outside the lines of our own work. Zoom out and pan from side to side. Are we intervening at the right level of the system? And what are the second-order effects of our efforts: If we try to eliminate X, what will fill the void? If we invest more time and energy in a particular problem, what will receive less focus as a result, and how might that inattention affect the system as a whole?

When we fail to anticipate second-order consequences, it's an invitation to disaster, as the "cobra effect" makes clear. The cobra effect occurs when an attempted solution to a problem makes the problem worse. The name derives from an episode during the UK's colonial rule of India, when a British administrator was worried by the prevalence of cobras in Delhi. He thought: I*'ll use the power of incentives to solve this problem!* A bounty on cobras was declared: Bring in a dead cobra, get some cash. "And he expected this would solve the problem," said Vikas Mehrotra, a finance professor, on the Freakonomics podcast. "But the population in Delhi, at least some of it, responded by farming cobras. And all of the sudden, the administration was getting too many cobra skins. And they decided the scheme wasn't as smart as initially it appeared, and they rescinded the scheme. But by then, the cobra farmers had this little population of cobras to deal with. And what do you do if there's no market? You just release them." The effort to reduce the number of cobras yielded more cobras.

For experimentation to succeed, we need prompt and reliable feedback. Consider navigation as an analogy: To travel somewhere new we need almost constant feedback about our location: we follow the arrow on a compass or the blue dot on Google Maps. Yet that kind of feedback is often missing from upstream interventions.

"The first thing I would say is you just need to be aware that whatever the plan you have is, it's going to be wrong," said Andy Hackbarth, a former RAND Corporation researcher who also helped design measurement systems for Medicare and Medicaid. I had asked him what advice would he give to people who were designing systems to make the world better. "The only way you're going to know it's wrong is by having these feedback mechanisms and these measurement systems in place."

Hackbarth's point is that we don't succeed by foreseeing the future accurately. We succeed by ensuring that we have the feedback we need to navigate. To be clear, there absolutely are some consequences we can and should foresee. But we can't foresee everything; we will inevitably be mistaken about some of the consequences of our work. And if we aren't collecting feedback, we won't know how we're wrong and we won't have the ability to change course. Feedback loops spur improvement. And where those loops are missing, they can be created.

Chapter 11: Who Will Pay for What Does Not Happen?

Reactive efforts succeed when problems happen and they're fixed. Preventive efforts succeed when nothing happens. Who will pay for what does not happen? That's not an unanswerable question. There are people who will pay for what does not happen. But creating payment models to fund upstream efforts can be almost unbelievably complicated.

First, though, we should remind ourselves how easy it should be to pay for upstream efforts. Take the case of Poppy Rose, a comfort food restaurant in downtown Los Angeles. Diana Yin, the co-owner, monitored customer reviews carefully, and she noticed a customer had complained online about receiving cold waffles for brunch. She did some detective work and discovered that the restaurant's one waffle maker could not keep up with demand at brunch. So cooks had started making waffles before the rush hit to build up a stash in reserve. A clever workaround—but it led to cold waffles. Nobody likes a cold waffle. So Yin sprung for a second waffle maker.

This is the dream scenario from the perspective of paying for prevention. It's so simple: The person who paid, Diana Yin, is the one who will reap the rewards. Think of it in terms of "pockets": The money was spent from one pocket, and it will be returned to that same pocket. And Yin will probably recoup her investment quickly. This same one-pocket logic would apply, of course, to an investment you made in yourself: a certification or a graduate degree. You might spend thousands of dollars today in the hopes of earning many more thousands in the future.

Our story gets more complicated quickly, though. There's an example of another situation called the "wrong pocket problem": a situation where the entity that bears the cost of the intervention does not receive the primary benefit. One pocket pays, but the returns are scattered across many pockets.

Ideally, you'd fix that by passing the hat around to all the relevant parties who'd benefit—taking up a collection to fund the program. But here are the objections you'll encounter: *There's no precedent for that. No line item in my budget for chipping in for a program that may pay me back eventually. And, Let's say you're wrong and we don't save money downstream—does that mean you'll refund my money?* Concerns like these explain why programs which could create enormous social benefit, simply can't get funded at the level they deserve.

We can pay to fix problems once they happen, or we can pay in advance to prevent them. What we need are more business and social entrepreneurs who can figure out how to flip payment models to support the preventive approach. Here's a trivial example of how that can work: A few years ago, my wife and I flipped to "upstream" pest control. We'd had a problem with spiders, so we called an exterminator. When he visited, he offered us a subscription service. The idea was that they'd visit on a regular basis—not requiring an appointment, just spraying outside our home periodically—using the best strategies they'd learned to keep bugs at bay. At first, we were skeptical— "Are we getting ripped off here?"—but ultimately what won us over was the beautiful vision of removing bugs from our life concerns. So we did it, and we removed one small source of drama from our lives. No longer are we cycling from Infestation to Rescue to Inaction (and repeat) Now it's just a quiet and mostly invisible routine: maintain, maintain, maintain.

Paying for upstream efforts ultimately boils down to three questions: Where are there costly problems? Who is in the best position to prevent those problems? And, how do you create incentives for them to do so?

SECTION III: FAR UPSTREAM

Chapter 12: The Chicken Little Problem: Distant and Improbable Threats

We've spent most of our time studying primarily recurring problems. These problems aren't mysterious: We can observe them directly, and we can measure their incidence. But now we'll examine upstream efforts to address problems that are unpreventable (like hurricanes) or uncommon (like an IT network being hacked) or downright far-fetched (humanity being extinguished by new technologies).

There's a concept called "the prophet's dilemma": a prediction that prevents what it predicts from happening. A self-defeating prediction. What if Chicken Little's warnings actually stopped the sky from falling? The Y2K bug was an example of the prophet's dilemma. The warnings that the sky would fall triggered the very actions that kept the sky from falling. Maybe what society needs is a new generation of enlightened Chicken Littles. Not the conspiracy theorists who use hate to sell gold and vitamins. Not the fear-entrepreneurs using hysteria to hock consulting services. But people like Nick Bostrom, who founded the Future of Humanity Institute to attract interest in research about existential risks and humanity's long-range future. Or writers like the computer security guru Bruce Schneier who wrote about the "weakest link" problem in network security—whose book *Click Here to Kill Everybody* is essential reading for anyone involved in setting the policy or norms for networked technology.

And maybe we need to start building a system that can act on the warnings of these enlightened Chicken Littles. Believe it or not, we have a historical model that can provide some inspiration: an effort in which parties around the globe came together in the 1950s and 1960s to address an ambiguous scientific threat. The threat? The possibility of bringing back destructive alien life from a mission to Moon.

In the 1950s, just before the launch of the USSR's Sputnik program, a group of scientists began to warn of the dangers of contamination from space exploration. The scientists, including the biologist J. B. S. Haldane and the Nobel laureates Melvin Calvin and Joshua Lederberg, warned of two types of contamination: backward and forward. "Backward contamination" is the contamination of Earth by a returning spaceship and "forward contamination" is the contamination of another planet with organisms from Earth. (We are in far upstream territory here.)

The interest in these issues sparked a new scientific field that Lederberg labeled "exobiology." (It's now called astrobiology.) "Exobiology profoundly influenced the way space exploration was conducted," wrote the astronomer Caleb Scharf in *Nautilus*, "Strict protocols were developed for the sterilization of spacecraft, and for quarantines to restrict what they might bring back. NASA built clean rooms, and technicians swabbed and baked equipment before sealing it up for launch. Scientists got to work and hurriedly computed the acceptable risks for biological contamination of other worlds."

When the Apollo astronauts came back from the Moon, they were immediately put into quarantine. To be clear, most scientists did not think the Moon was capable of supporting life. They weren't unduly worried that the astronauts would bring back deadly Moon bugs. But, to their credit, they worried about what they didn't know. Why take life-and-death chances in a domain (space travel) we barely understand? They put in place a number of obsessive protocols to try to protect against an improbable risk. Humanity wasn't forced to do this; we did it voluntarily. Perhaps these were our first baby steps upstream to work collectively on the civilization-threatening problems we may face in the years ahead.

The person in charge of these efforts was a NASA employee called the Planetary Protection Officer (originally the Planetary Quarantine Officer). The office still exists; the Planetary Protection Officer in 2019 was Lisa Pratt. One of her predecessors, Catharine Conley, said something striking about the office's history: "So far as I can tell, planetary protection is the first time in human history that humans as a global species decided to prevent damage before we were capable of doing something."

May there be a second time.

Chapter 13: You, Upstream

Upstream thinking is not just for organizations, it's for individuals. Where there's a recurring problem in your life, go upstream. And don't let the problem's longevity deter you from acting. As an old proverb goes, "The best time to plant a tree is 20 years ago. The second-best time is now." Maybe you're also motivated to help solve a bigger problem in society. There are countless places you could invest your time or money.

"Try and leave this world a little better than you found it," goes a famous quote, but until I researched it, I never realized that the source was Robert Baden-Powell, founder of the movement that gave us the Boy Scouts, Girl Guides, and Girl Scouts, and someone who taught multiple generations of kids to "Be Prepared." That is to say: Anticipate the future and be ready to shape it.

We are drawn to the glory of the rescue and the response. But our heroes shouldn't only be the people who restore things to normal, extinguishing fires and capturing felons and fishing drowning kids out of rivers. Our heroes should also include a teacher who skips lunch to help a freshman with math, in hopes that she'll get back on track to graduate. And a cop who makes himself a conspicuous presence around an abused woman's home, ensuring her ex-husband will think twice before coming around. And an activist who rallies an underserved community to fight for the parks and investments they've always been denied. These should be our heroes, too: The people who are unsatisfied with normal. People who clamor for better.