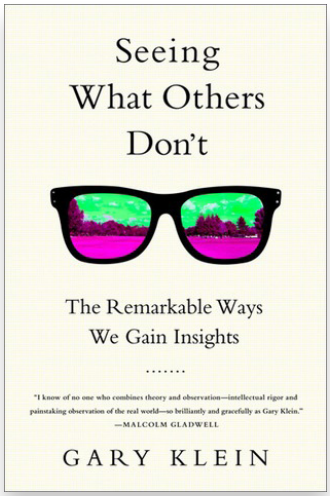

ABOUT THE AUTHOR

Gary Klein

Gary Klein, PhD, was instrumental in founding the field of naturalistic decision making. Dr. Klein left academia to work as a research psychologist for the U.S. Air Force, founded Klein Associates, and is now a senior scientist at MacroCognition LLC.

Seeing What Others Don't

THE SUMMARY

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PART I - ENTERING THROUGH THE GATES OF INSIGHT: HOW DO INSIGHTS GET TRIGGERED?

1. Hunting for Insights

Two cops stuck in traffic, on a routine patrol. Waiting for the light to change, one cop glanced at the fancy new BMW in front of them. The driver took a long drag on his cigarette, took it out of his mouth, and flicked the ashes on the upholstery.

"Did you see that? He just ashed his car," the cop exclaimed. He couldn't believe it. "That's a new car and he just ashed his cigarette in that car." That was his insight. Who would ash his cigarette in a brand new BMW? Not the owner of the car. Not a friend who borrowed the car. Possibly a guy who had just stolen the car. They lit up. Wham! They're in pursuit of a stolen car.

To improve performance, we need to do two things. We have to reduce errors. We have to increase insights. Performance improvement depends on doing both of those things.

We tend to look for ways to eliminate errors. But if we eliminate all errors, we haven't created any insights. When we put too much energy into eliminating mistakes, we're less likely to gain insights. Eliminating errors won't help us catch a car thief who chooses the wrong moment

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to flick his ashes. Everyday insights are much more common than we might think. We all have a natural tendency to look for patterns and connections and inconsistencies. But where do our insights come from?

2. The Flash of Illumination

Insights differ from intuition. My research showed that fire fighters make rapid decisions by intuition which means relying on their experience and the patterns they have acquired over decades to quickly size up situations and recognize the option most likely to work. *Intuition* is the use of patterns already built up and learned, whereas *insight* is the discovery of new patterns.

I have a working definition of insight: an unexpected shift to a better story. Compared with routine problem solving, insights are not conscious or deliberate. They come without warning. Our minds do their heavy lifting without our awareness.

When they do appear, insights are coherent and unambiguous. They don't come as a part of a set of possible answers. When we have the insight, we think, "Oh yes, that's it!" We feel a sense of closure. This sense of closure produces a feeling of confidence and certainty in the insight.

So what produces the flash of illumination? I collected a set of 120 incidents involving people who made an unexpected shift in their beliefs. My collection came together in a somewhat haphazard way. Most of the stories were about successes. But concluding from a success that a certain strategy resulted in an insight does not factor in the failures where the same strategy didn't pay off. Late in my project I selected a small set of cases that had a built-in control. These cases described not only the person who had the insight, but also another person who had access to the same data yet didn't achieve the insight.

3. Connections

Insights can come from "connecting the dots" and solving a problem by being exposed to more ideas. We get a new piece of information that combines with other information we already have, and, presto, we make a discovery.

The Battle of Taranto (Italy), Nov. 11-12, 1940, showed that battleships were vulnerable to airplanes launched from carriers. Japanese Admiral Isoroku Yamamoto saw the attack's implications, and had the insight that the American naval fleet "safely" anchored at Pearl Harbor might also be a sitting duck, vulnerable to an unexpected air attack. Admiral Harold Stark, Chief of Naval Operations for the United States, saw the implications and had the same insight even more quickly than Yamamoto. Two admirals in two opposing navies made the same connection. The Japanese turned that insight into a battle plan for a surprise attack. The Americans did not act on Admiral Stark's warning.

Seeing What Others Don't

Connections were involved in 98 out of the 120 cases I looked at, but this statistic is misleading. Other insight strategies also turned up a lot when I coded the data. I coded each incident for all five insight strategies: connections, coincidences, curiosities, contradictions, and creative desperation. Most of the insights were a blend. They depended on more than one of the strategies. Thus, in most of the 98 cases in which I found the connection strategy, only 45 used the connection strategy alone. The other 53 depended on making a connection, plus one or more of the other strategies. That's why we shouldn't be too quick to conclude that insights are simply about making connections.

4. Coincidences and Curiosities

When we notice a coincidence, we may not be sure what to make of it. Coincidences are chance concurrences that should be ignored except that every so often they provide us with an early warning about a new pattern. We tend to notice coincidences, associations we don't fully understand, based on relationships we can't articulate. People who can pick up on trends tend to spot patterns, wonder about irregularities, and notice coincidences as an important resource. They may often be wrong, so we shouldn't automatically believe them even if they feel very confident. But they may be onto something.

Coincidence insights are different from connection insights. In connection insights, new pieces of information provide important details. The details count. In contrast, what matters for coincidence insights is the repetition.

Late in my project a third insight strategy emerged which I call curiosities. Some insights were sparked by a single event or observation that provoked the reaction "What's going on here?" Curiosity-driven investigations often lead to impressive discoveries.

We are taught that we need to test coincidences before giving them credence. However, this may put too much faith in our ability to do the testing. Flawed data can appear to "disprove" an accurate insight.

We shouldn't take the ridiculous position of believing in coincidences regardless of the evidence, but we shouldn't automatically believe the evidence either. Evidence can be tainted by variables we are not aware of meaning you may have to reject the prevailing wisdom. Of the 12 cases we coded for coincidence, 8 of them also coded for contradictions.

5. Contradictions

Contradiction insights spark the emotional reaction "No way!" We give this almost involuntary expression of disbelief when we encounter ideas that just don't make sense. But contradiction insights signal that there's something seriously wrong with the story we're currently telling ourselves.

Einstein wondered what would happen if he was traveling at the speed of light and turned on a light. That light beam would travel away from him at the speed of light which was a paradox, a

contradiction, because nothing can go faster than light. Einstein's theory of special relativity showed that for the speed of light to be constant, time must appear to pass more slowly the faster you move.

Hedge fund manager Michael Burry predicted the impending collapse of the housing bubble when he spotted a contradiction in 2003. The subprime market was starting to rise. If housing prices could be counted on to always go up, why did lending institutions have to go after less qualified applicants? Burry felt all the risky loans made at low teaser rates in 2005 would lead to high defaults in 2007 when those adjustable rates increased to 11 percent.

Contradictions are different from curiosity insights because curiosities make us wonder what's going on, whereas contradictions make us think, "That can't be right." I wasn't expecting insights to emerge from contradictions. Yet contradictions turned up in more than a third of my sample, 45 out of 120 cases. Even when they overlapped with some of the other themes, such as connections and coincidences, they usually were a dominant part of the process.

6. Creative Desperation: Trapped by Assumptions

Creative desperation is very different from connecting ideas or noticing coincidences or curiosities or contradictions. It is discovering a solution, the right answer, through a flash of illumination rather than steady analysis. Creative desperation finds a way out of a trap that seems inescapable.

In 1949, a team of smokejumpers in Mann Gulch, Montana, caught by a sudden firestorm, tried to outrun the raging fire up a 76% slope. 12 men were killed, and two reached a rocky patch where there was no fuel for the fire. One man, Wagner Dodge, survived through creative desperation. He could not persuade anyone to join him as the others thought "he must have gone nuts." Dodge's insight was to light a fire in front of him. His fire raced up the hill, consuming the tall dry grass in front of him, and Dodge dove facedown in those ashes as the firestorm roared past.

In 1793, a 24-year-old Napoleon Bonaparte relied on creative desperation. An Anglo-Spanish force occupied the Mediterranean port city of Toulon and were too strong, too numerous, and too well defended to be defeated by force. Napoleon realized he didn't have to overpower the invaders or force them to surrender. He just needed them to leave. Since the invaders were being resupplied by sea, Napoleon installed light artillery in two small forts overlooking the Toulon harbor to control movement in and out of the harbor preventing the invaders from getting necessary supplies and leading them to quickly sail away.

A total of 29 out of my 120 cases fit this creative desperation strategy, almost a quarter. But how can we reconcile these cases with the others?

7. Different Ways to Look at Insight

My attempt to penetrate the mystery of how insights originate had turned up these five candidates: connection, coincidence, curiosity, contradictions, and creative desperation. To sort things out, I

tried several different types of investigation. I studied the coding results for the data I had collected. I reviewed the scientific literature on insight, and I dived into the stories themselves.

I found connection insights in 82 percent of the cases. Contradictions showed up in 38 percent of the cases. Coincidences played a role in 10 percent of the cases. Curiosities contributed to 7.5 percent. Impasses and creative desperation were found in 25 percent of the cases.

I didn't want to begin by reviewing the scientific literature, concerned that I would be seeing all my cases through the same lenses as the other investigators, which would interfere with my own process of discovery. So after I collected and categorized most of the cases, I then studied more than eighty recently published scientific research papers on insight, plus about 15 books. I found the different researchers argued with each other about all kinds of fundamental issues.

I wondered if I could build upon my definition of insight as an unexpected shift to a better frame or story for understanding how things work. The notion of a frame includes slots for fitting data into the frame. In each of my cases a few of the slots usually stood out. They were more important for anchoring the story than the other slots were. These glimmers would lead me to a new model of insight, an explanation of how we make discoveries.

8. The Logic of Discovery

I noticed something odd as I thumbed through the stories. I had five insight strategies, and two of them worked in opposite directions. They weren't just different from each other; they seemed to be reverse activities. No wonder I couldn't synthesize the strategies. These were two different paths to insight.

Insights spring from different motivations, either wanting to escape from a bad situation or wanting to rethink conventional wisdom. They have different triggers, either searching for a flawed assumption or encountering an inconsistency. They also rely on different activities, either replacing the flawed assumption or building on the weak assumption that leads to the inconsistency.

They also have some similarities. These insights are disruptive in that they don't let us retain our comfortable beliefs. Instead we have to modify the core beliefs that anchor our understanding. We abandon some beliefs/anchors and revise others. The two paths also lead to the same kinds of outcomes. We change what we understand. In addition, we sometimes change our ideas about the actions we can take, the way we see situations, how we feel about things, and what we desire.

The *TRIPLE PATH MODEL OF INSIGHT* captures these features. The "Contradiction Path" trigger uses a weak anchor to rebuild a story activity, the "Connection Path" trigger adds a new anchor, and the "Creative Desperation Path" trigger discards a weak anchor. All three of these activities lead to changes in how we "Understand" (act, see, feel, desire).

Seeing What Others Don't

Now that we have a fuller picture of how insights work, it's time to turn to the dark side of insights, to the forces that stifle the discovery process. What stops people from having more insights?

PART II - SHUTTING THE GATES: WHAT INTERFERES WITH INSIGHTS?

9. Stupidity

Many years ago I flew to New York City with my two young daughters. We took a train back to Toledo, where my mother-in-law, Bessie, picked us up and on the way she dropped me off at the Dayton airport, so I could pick up my car. Since she would continue driving to our home for a family event, I left my suitcase and briefcase in her car. As I approached my car, I realized three things: My car keys were in my briefcase, as usual. My briefcase was in Bessie's car. Bessie's car was driving out of the airport.

I view this as an example of stupidity. If I had remembered that my car keys were in my briefcase, I wouldn't claim that memory as an insight. I didn't notice the contradiction within my beliefs. I had all the facts and I knew my current situation differed from what I had originally intended, but I failed to see the implication.

There have also been times when I failed to make obvious connections. I've wanted to show my wife, Helen, a locker I had rented to store research materials, and recently we had to run an unanticipated errand that took us right past the facility but I hadn't brought along my keys for the locker. I missed the opportunity. Dumb.

The topic of stupidity deserves its own treatment. However, I don't have the ambition to be a researcher of stupidity. It is bad enough to be a practitioner.

10. The Study of Contrasting Twins

To investigate my new mystery—the reason that people fail to have an insight even if they have all the necessary information—I could take advantage of natural comparison. 30 of my 120 cases described a person who didn't have the insight along with the person who did.

I sorted through the contrasting "twin" stories several times, trying to find what distinguished the successes from the failures. Eventually, I arrived at four reasons why we might miss the chance to have an insight.

Flawed beliefs—in 21 of 30 cases, the failure twin fixated on some erroneous ideas (whether data or theory) that blinded them to the discovery.

Lack of experience—two-thirds of my 120 cases depended on experience. People without the necessary experience couldn't have gained the insight. 17 of the 30 failure twins simply lacked the experience to see the implications and gain the insight.

Seeing What Others Don't

A passive stance—many of the failure twins took care of the necessary tasks but didn't actively scan for new developments and opportunities. 21 of the 30 successful twins were actively skeptical, questioning of the prevailing wisdom, considered new data, and were open to unexpected possibilities and they were persistent.

A concrete reasoning style—some people become impatient with speculation. They see the playful exploration of ideas as a sign of immaturity. They want closure. They are concrete thinkers who just want to work with facts, not with flights of fancy which doesn't leave them very open to insights. It was tough to rate, but I judged in almost half my sample—14 of 30—the failure twin was more prone to concrete thinking.

Finally, let's not forget about luck. Certainly luck has played a part in the successes of many.

11. Dumb by Design

At times we also make things even more difficult by erecting additional barriers, such as the computer systems we use. Software designers don't deliberately try to stifle our insights, but some of the methods they use have unintended consequences.

Frontiersman Daniel Boone's 13-year-old daughter and her two friends were kidnapped by a Shawnee/Cherokee raiding party. Boone and a hastily formed rescue party set after them.

Some of the men were on horses, which are fast in open country, but the Indians had fled into the forest. So instead of having them chase the Indians, Boone redirected those men ahead to a likely river-crossing to prepare an ambush. Boone and the others on foot tracked the Indians. When they spotted a freshly butchered buffalo, Boone changed their strategy from directly chasing the Indians to racing them to the nearest point along the nearby river's edge, to ambush them there when they were likely to make camp (and cook the buffalo).

A computer system supports clearly defined tasks, but would have required reprogramming several times in this situation such as when Boone's horsemen shifted from searching to ambush mode. Critical cues determined in advance would become useless when Boone made moves based on new information and insights. A computer system is designed to filter out irrelevant data and might downplay the buffalo carcass Boone spotted, which turned out to be a central anchor to a new insight. A system that keeps us on track to reach our original goals is likely to interfere when we revise or discover new goals. Computer systems depend on order and structure, whereas insights are disorderly.

If rigidly designed information technologies can sometimes get in the way of insights, that's nothing compared to what organizations do.

Seeing What Others Don't

12. How Organizations Obstruct Insights

Organizations inadvertently suppress the insights of their workers, and they do so in ways that are ingrained and invisible. They value predictability, they recoil from surprises, and they crave perfection, the absence of errors. In their zeal to reduce uncertainty and minimize errors, organizations fall into the predictability trap and the perfection trap.

Insight is the opposite of predictable. Insights are disruptive. They carry risks which includes unseen complications and pitfalls that can get you in trouble. They take extra work. You can't schedule them on a timeline.

Methods for reducing errors and uncertainty include imposing stricter standards and controls, increasing reviews, documenting sources, justifying conclusions, tightening schedules and relying on checklists and procedures. This has the effect of discouraging speculation and intuition, increasing passivity, and repressing anomalies. A checklist mentality is contrary to a playful, exploratory, curiosity-driven mentality.

FBI Special Agent Kenneth Williams, in Phoenix, Arizona, spotted suspicious signs two months before the 9/11 attacks. The coincidence was that several Arab men were taking flying lessons in the Phoenix area. The contradiction was they didn't want to practice takeoffs and landings, two of the toughest skills to master. Williams sent a letter to FBI headquarters on July 10, 2011, warning about a possible terrorist mission. He suggested investigating flight schools and looking at visa information of foreign applicants to flight schools. But his warnings were so discrepant, so unusual, that higher-ups in the FBI refused to act on his warnings or pass them along.

13. How *Not* to Hunt for Insights

What research methods could we use to study insights that would actually *prevent* us from learning anything valuable? Here are some possibilities:

- Insights pop up unexpectedly, so we'd schedule a specific date, a specific starting time, for capturing an insight.

- Insights flow from people's own interests, so we would assign an insight task to the subjects rather than using problems they were already thinking about.

- Insights spring from the themes that matter to us and keep churning in our minds even when we're not attending to them, so we'd make sure to use a meaningless task that people don't care about.

- Many insights grow over long periods of time, so we'd keep the available time short, no more than an hour.

- Evaluation pressure interferes with insight, so we would make sure people knew we were timing them and appraising their ability.

- Making people verbalize their thought processes can interfere with insight, so we might ask for "think-aloud" reports throughout the session.

- Many insights emerge from connections, coincidences, curiosities, and contradictions, so we would use only tasks that created an impasse and ignore other paths.

- In two-thirds of my cases, people used their experience to make connections and see contradictions, so we'd study the way people handle a task they've never seen before.

- If we wanted to get even more diabolical, we would use methods that make a person's experience actually interfere with insights.

PART III - OPENING THE GATES: HOW CAN WE FOSTER INSIGHTS?

14. Helping Ourselves

How can we gain more insights?

One thing we can do is make better use of the power of contradictions. We don't need to be Columbo to spot inconsistencies. We can do it ourselves, using confusions, contradictions, and conflicts as springboards to insights.

The connection path thrives on having lots of ideas swirling around and on making accidental linkages. The more swirl and turbulence, the greater the chance for a discovery. We could find ways to increase the density of ideas to which we are exposed and increase our contact with creative people.

The path of creative desperation calls for a type of divining rod that directs us to the shaky and unwarranted assumptions we've been making. Perhaps a conflict among team members will sound the alarm. Perhaps a competent team member that is confused about something will alert us. Perhaps we encounter a surprise, something we expected that didn't happen, or a contradiction. We need to logically review and analyze our evidence for an assumption, not sit down and make an exhaustive list of all our assumptions with the hope of ferreting out the bad ones.

Incubation, meaning a break, a night's sleep, a bike ride, or long time-frames can also help increase our chances of having an insight. Incubation can help our unconscious mind continue to chew on a problem, recover from mental fatigue, and summon forth remote associations blocked by our critical analysis.

When it comes to ways for gaining insights, the *TRIPLE PATH MODEL* describes different routes we might take. We use the contradiction path to notice, search for, and apply inconsistencies and

anomalies. We use the connection path to increase our exposure to novel ideas. When we get stuck, we use critical thinking methods to locate and correct flawed assumptions and beliefs.

15. Helping Others

Our challenge is very different when we shift from helping ourselves to helping others. It often means trying to correct their flawed beliefs, which in turn means we have to understand what those flawed beliefs are. The fundamental part, often the toughest part of helping others, is diagnosing the confusion by determining what is wrong with their thinking.

Helping people correct their flawed beliefs doesn't mean offering unsolicited advice. We don't always have to tell people what we think they need to know, which usually entails trying to convince them that they need to know it. We know how tedious and irritating that can be. It's much better to be patient and plug into the person's desire for insights rather than trying to push information.

The first step for helping others achieve insight is diagnosis. Once the flaw in the person's thinking is discovered, it's easy to provide the information that would set things straight. However, there are times when insight alone isn't enough and we have to facilitate insight and then translate it into action.

Just because someone has a good insight doesn't mean they'll behave with more maturity or make wiser choices. Helping others can be more complicated than correcting their beliefs. To be effective, we may have to guide the person into new ways of behaving. It takes more than knowing the right answers. It takes curiosity and compassion and the ability to de-center to take someone else's perspective. It depends on skill at using contradictions to help people make discoveries. It is an ability that I admire and envy.

16. Helping Our Organizations

People working in organizations face pressure for predictability and perfection (reducing errors and deviations), which motivates managers to specify tasks and timetables as precisely as possible and to view insights as disruptive. Helping organizations gain more insights means breaking down the tyranny of the War on Error. The simple solution is to back off, to reduce the amount of reviews and cut back on the activities designed to prevent errors.

However, if I work in a large organization, I can visualize the effect on my career and my reputation if I make a blunder. I can visualize lots of ways my team and I can blunder. However, I can't visualize insights as clearly or what they might achieve. Also, I can recall times when people took on the organization to advocate for their insights and most of those instances ended unhappily for their crusaders.

Seeing What Others Don't

The organization problem may go deeper than discouraging people from having insights or filtering out insights. In many cases, the problem isn't about having or noticing insights; it is about *acting* on them. The organization lacks the willpower to make changes. It may be blind to how urgent the situation is. Leaders know what they need to do, but they cannot muster the energy to do it or are unable to overcome risk-adverse organizational forces.

Organizations can demonstrate willpower when they act on insights, particularly insights about their primary goals. But an insight about a goal isn't about being flexible and adapting plans in order to reach the original goal. It's about changing the goal itself.

17. Tips for Becoming an Insight Hunter

Opening the gates to insight also means opening ourselves to insights by being able to track and unpack them. By this point, you should be more sensitized to insights, so you are probably seeing more of them. That's the tracking part. Next comes the dissection, trying to understand how the person gained the insight. That's the unpacking part.

We can't do much unpacking of insights we spot in newspapers and magazine articles because we can't ask any questions. Nevertheless, we'll usually learn more when we can talk with the person who actually had the insight. The best situation, of course, is to watch the insight unfold and then probe for more details. There is a middle ground between secondary sources and direct observation of insights, and that's to interview the person afterward about an insight worth examining.

You never know when you'll spot an insight, or when you'll have a chance to interview someone, so you always have to be ready to go hunting. There's more to probing than appreciative listening. When trying to understand why people acted in a certain way, you might use this short checklist to guide your probing so you can understand their story better. Ask about their knowledge, beliefs and experience, motivation and competing priorities, and the constraints they were operating under.

18. The Magic of Insights

Insights often appear like magic because all we see is the surprising finale, the rabbit popping out of the hat. We don't see the steps leading up to that finale, the years that the magician spent practicing, the design of the hat, the way the rabbit was smuggled on stage, the way the magician's assistant leaned forward to give us a glimpse of her cleavage at a critical moment.

Although we may not be able to predict the exact instant when a person has an insight, the process is not as mysterious as many people think. Earlier I presented a *TRIPLE PATH MODEL OF INSIGHT* with separate pathways relying on contradictions, creative desperation, and connections. Each pathway has its own means of altering the beliefs that anchor the way we understand things. This process

Seeing What Others Don't

of restructuring beliefs by changing the story we use to understand events gives rise to the flash of illumination. Insights unexpectedly replace one story with a new one that is more accurate and useful.

Having an insight is an act of creation. Each insight is the creation of a new idea that didn't exist before, often in opposition to defective ideas that formerly prevailed. No one expected this new idea to emerge, and other people who possessed the same information were unaware of its existence. No matter how much we unpack insights and demystify them, we shouldn't discard the sense that something unusual has happened, something magical, something for which we can be grateful. Something we can savor. It's now a new story we can tell to ourselves and to others.