



Aaron Brown

The Beginning of Wisdom¹

*fear like a dog stuffed in my mouth,
fear like dung stuffed up my nose,
fear where water turns into steel,
fear as my breast flies into the Disposall,
fear as flies tremble in my ear,
fear as the sun ignites in my lap,
fear as night can't be shut off*

—Anne Sexton, *The Death King*

In the summer of 1984, I visited a friend in Village of the Branch, Long Island. We spent the day biking and sailing. After dinner, I volunteered to drive to a nearby store for supplies. I took a wrong turn on the way back, and found myself on a dirt road, too narrow to turn the car around. I drove forward, looking for a wider spot, but the road came to an abrupt end. The headlights illuminated a small clearing in the woods, at the far end of which was a stone altar.

I recall the next few moments very clearly. My conscious brain seemed calm and clinical. It noted that there was no danger, but that my heart was pounding, I felt a strong chill, my palms were sweating, and the hair on my arms was standing up. This was fear, not horror. The difference is that fear stimulates the fight-or-flight response and creates a strong urge to do something, even run screaming in unreasoning panic if no better idea is available. Horror prevents action, freezing you in place and draining strength from your muscles. I had to exert strong conscious control to sit still.

At first, I had no idea what had stimulated the fear. I had to observe my thoughts as if reading another person's mind to guess the reason. I recalled reading stories of a sensational torture-murder case by Satan-worshipping teens led by a disturbed guy named Ricky Kasso. That had occurred a few weeks before, in similar woods a couple of kilometers away. In the ensuing media frenzy, teenage Satan worshippers from Long



A long way from Main Street

Island became the biggest threat to life and civilization. It was claimed, seriously, that between 50,000 and 2,000,000 people per year were kidnapped and murdered in Satanic rituals. I had thought I had ignored the stories, beyond noting a few headlines while passing newsstands and hearing jokes.

Some more introspection revealed that I did not have the silly but rational fear of being murdered by local teenagers in hooded black capes. I was afraid of Satan herself. I wanted a crucifix, and to be able to chant prayers in Latin – never mind that I'm not religious or that the religion I don't belong to isn't Catholic.

My fear was even more specific than Satan. I realized that I knew where I was: in Caleb Blood Smith State Park, no more than a hundred meters from my friend's house. My friend had told me why the place was named after Caleb, an associate of Abraham Lincoln's who had lived in Indiana. The connection was that his family traced back on Long Island to Richard Smythe, who acquired the parkland 350 years ago as ransom, by kidnapping the daughter of the local chief Wyandanch on her wedding day. After Caleb died, some mysterious people from New York showed up in Indiana asking where the body was. (The same people who gave him the middle name of "Blood"? Who knows.) Caleb's widow got so nervous that she decided to move the body. Inquiries from New York continued to come in until the 1930s. In 1977, an amateur historian from Indiana got permission to exhume Caleb's grave, and of course his body wasn't there. No one knows where it is, but at that moment in 1984, I was sure it was right outside my car.

I thought of this moment when reading Daniel Gardner's *The Science of Fear*.² My experience fits neatly into some of the neurological, psychological, and behavioral findings he reviews about fear. One major theme is the independence between head, which feels no danger and realizes the "stone altar" is actually a barbecue grill, and gut, which is busy dredging up connections with every horror movie and ghost story; a neurologically impressive feat with negative survival value. The roles of physical tiredness (it had been an active day), stress (I was probably dehydrated), disorientation (lost in a strange place), surprise (you don't expect roads to end suddenly and without warning), and inhibited perception (a twisty road in thick woods at night gives wide scope to imaginative interpretations of visual stimulation) are discussed. Word associations, like Caleb's middle name or the odd "Village of the Branch," matter more than word meanings.

Gardner does not stop with summarizing research. He examines the interplay between fear and decision making. Marketers, both commercial and political, invent or exaggerate dangers to get us to buy their products. Or if fear arises spontaneously, opportunists spur it on, hoping it will

carry them to wealth or power. News outlets and fiction writers find or invent support for the fear. Once we are afraid, confirmation bias keeps us finding reasons to stay afraid, and association causes us to prefer the company of those who share our fear, which we mutually reinforce.

Some fears, like teenage Satanists, pit bulls, killer bees, right-wing militias, and cell phone-caused explosions at gas stations, sweep up large numbers of people, then disappear silently when a new fear fad comes along. Other fears, like Communism, drugs, crime, and cancer, spawn long-term self-sustaining constituencies. A few, like Y2K, come and go for explainable reasons. These dangers range from silly to serious, but the point is that fear causes irrational responses even to the

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serious ones. There are other things we don't fear enough, because they don't trigger our psychological mechanisms and therefore do not reward anyone who tries to profit from fanning them.

Gardner devotes some chapters to documenting news biases that can lead to irrational fear-based decision making. This is not an example he uses, but I have always wondered why the cause of every airplane crash is discussed in minute technical detail, while automobile crashes, if reported at all, are seldom analyzed for cause. Not only is the average newspaper reader far more likely to be injured in an automobile accident than a plane crash, but knowledge of automobile accident causes is actually useful to her. She's not going to de-ice the airplane wings or fix the autopilot, but she can get her brakes checked, turn on her headlights during the day, and steer into skids. The one automobile crash whose cause was the object of media attention was the one that killed Princess Diana, and is so atypical that the information is unlikely to help anyone.

The book spends a lot of pages documenting how news media, interest groups, and politicians

concentrate on unusual events that create and fan fears – the young mother who dies of breast cancer or the murder of an elderly woman in a good neighborhood. Balanced statistics may be presented, but the gut will remember only the vivid, frightening images, and, therefore, some irrational fears.

While this analysis is interesting, it does not address the question of which events should be singled out for reporting. Whose profile should be used in the breast cancer story, and which murder should make the front page? If you're wondering what any of this has to do with quantitative finance, I'm going to use this answer to think about which stress scenarios should be presented by a risk manager.

Consider a simple story: first A happened, then B. Remember that we're considering gut reactions to vivid memories, so complicated stories don't get through. The value of this story depends on the frequency with which I'm going to experience A, the utility of recognizing a connection between A and B, and the impact of B. For example, "I heard a rattle, and then a snake fatally bit my companion," scores high, at least for a person in rattlesnake country. Rattles are reasonably frequent, there's a lot you can do to avoid getting bitten by a poisonous snake if you know where it is, and getting bitten is very bad. On the other hand, "A snake fatally bit my companion, then made a rattling noise," scores much lower on all three criteria.

I did my own experiment, starting with the results of a Gallup poll that listed the top 10 fears of a large sample of Americans in order. For each one, I thought about how useful it would be in terms of frequency, utility, and impact. For example, the average American's chance of being directly involved in a terrorist attack is extremely low and knowing a lot about previous attacks is

not likely to help much. On the other hand, the impact of such an event is high. The average American is more likely to encounter a dangerous spider, and knowledge is quite useful – but even dangerous spiders seldom cause much harm to humans, so the impact is low. Clearly, there is room for argument about some of these categorizations, but I think you will reach a similar conclusion to mine if you redo the exercise yourself.

I already had rankings based on how much people fear these; I added my own estimated rankings for the amount of news coverage each of these fears gets, and their prominence in politics. For example, “crime” topped my list of news coverage, but “terrorist attacks” got more attention in political debates. “Being alone” was the least likely of any of these to be the subject of a news story, while “heights” figures the least in politics. Again, do it yourself if you disagree with my estimates.

Finally, I averaged the ranks for each type. Starting with politics, the low frequency fears have an average rank of 2.3, getting much more attention than moderate (6.0 average) or high (7.5 average) frequency fears. Low utility was the most prominent, with a 3.3 average versus 5.0 (moderate utility) and 7.5 (high utility). High-impact fears mattered most, with an average rank of 3.7 versus 7.3 (low impact) and 5.0 (moderate impact).

News media also preferred low frequency (3.7 for low frequency versus 4.3 for moderate and 7.8 for high), but liked moderate utility (4.0 for moderate utility versus 4.7 for low and 7.3 for high) and moderate impact (4.0 for moderate impact versus 7.5 for low and 4.3 for high).

People are most afraid of things with moderate frequency (4.0 for moderate frequency versus 5.3 for low and 6.8 for high), high utility (4.3 for high utility versus 6.7 for low and 6.0 for moderate), and high impact (4.7 for high impact versus 5.8 for low and 6.0 for moderate).

This seems to make some rational sense. Politics is concerned about the low frequency, low utility, high impact fears. Individuals cannot

Fear	Frequency	Utility of Information	Impact	People	News Coverage	Politics
Terrorist attacks	Low	Low	High	1	3	1
Spiders	Moderate	High	Low	2	8	9
Death	Moderate	High	High	3	4	6
Failure	High	High	Low	4	7	7
War	Low	Moderate	Moderate	5	2	2
Heights	High	Moderate	Moderate	6	9	10
Crime/violence	Moderate	Moderate	Moderate	7	1	3
Being alone	High	High	Low	8	10	8
The future	High	Low	Low	9	5	5
Nuclear war	Low	Low	High	10	6	4

get much experience about them directly, or do much about them, but they do matter.

Collectively, we can gather more data and take more useful actions. The news media also concentrate on rare events, but ones people have more ability to control on their own, even if the impact is not as great as political issues. So, you can learn useful things from reading news. Individuals direct their fears to moderate frequency events that they can do a lot about, and have high impact.

There is one hole. No one is focused on the high-frequency, low-impact events. In the table, these are “failure,” “being alone,” and “the future.” Everyone fails, but usually it’s not too bad. Everyone spends some time alone, and some people spend far too much time alone, but the harm is small compared to nuclear war. The future happens to everyone all the time, but on average things get better. I think the answer here is that our fear-processing system is not suitable for these kinds of events, even if they make the top 10 fear list. Worrying about these things is only bad; we should assess them rationally, then plan our actions accordingly.

If I’m correct, the news media and politicians seem to be at least roughly focused on the right issues. The problem is how they treat them. A fear response is inappropriate to information of low utility. Scaring people about things they can’t do anything about is counterproductive. Also, fear is costly; it’s not efficient to scare people about low- or moderate-impact dangers. While these issues belong in newspapers and political campaigns, they should be addressed with logic, data, and rationality, to be assessed by the head.

People seem to know this, reserving their major fears for high-utility information about high-impact dangers. But only when frequency is moderate. We habituate to dangers that happen too frequently, and we ignore dangers that happen too rarely. While the head may know something is dangerous, for most people it takes fear to change habitual behavior. You have to feel disgust at overly fatty

foods, not just know that they are bad for your health. And you need fear to bring the necessary alertness to rare events. Your smoke detector may not sound frequently (depending on your cooking practices), but when it does, it’s helpful to instantly flush your brain of non-essentials and take rapid action. Dramatic stories and pictures can help to condition people’s gut to the optimal response.

According to Gardner’s survey, this job is not done well. Frequencies and impacts of events are distorted. Visceral cues are added to stories with little actionable information, or with misleading actionable information like “buy my product,” “contribute to the charity that pays my salary,” or “vote for me.” Stories where emotionally compelling information is needed are either ignored as too common to report, or trivialized as too unlikely to concern anyone.

In financial risk management, we try to make these decisions in a systematic way. We begin by computing VaR at the beginning of every day, then testing that actual losses exceed VaR on 1 percent of days, no more and no less, and that these “VaR break” days are not predictable. Once we have a reliable VaR system, we should not be afraid of any losses less than the VaR amount (if we are afraid, then we reduce VaR). The theory is that front-line business managers, portfolio managers, traders, and other risk takers have enough personal experience with these days to make the correct risk decisions. And if they don’t make the correct risk decisions, we find out quickly.

Next, we design some stress scenarios which generate losses greater than VaR – typically, 3 to 10 times times the VaR. These should be the scenar-

ios' large expected losses, that is, large product of frequency and impact. However, they should also be actionable. There's little point in stress tests for an asteroid collision destroying all life on earth, or a Communist revolution that results in all financial workers being shot, or everyone on earth suddenly deciding not to want money anymore.

Although these scenarios appear to be quantitative exercises, we know that we can't estimate probabilities with any accuracy, and that the amount of the stress is entirely arbitrary. (What happens if stock prices fall 50 percent in a month? Why not 40 percent or 60 percent or some other number?) The main purpose is to work through them with risk takers and senior management, to make sure everyone agrees about how they will be handled, and sometimes to make changes to improve the response or change the likelihood. You know the future will be different from any predesigned scenario, but you hope the discipline of preparing for what you can foresee helps your chances of surviving what actually happens.

The scenarios should have enough dramatic detail to get through to the gut, not just the head. Risk takers need a feel for low-probability, high-impact dangers, not just an intellectual understanding. They must weigh both quantitative and qualitative factors in making risk decisions. A stress test of unknown probability and arbitrary severity cannot be included in quantitative analysis, so decision makers need a gut feel for how much weight to put on it.

This exploits the things that the gut does best. It filters out tremendous amounts of input, but sounds a loud alarm when something triggers a fear. It is excellent at picking up analogies and combining highly disparate information, including information that is not sent to conscious processing centers of the brain. The gut seizes your attention ruthlessly, and gives you the energy to act.

Operational risk management works on the opposite problem: high-frequency events that cause negligible short-term damage, but kill a firm in the long run. For example, I once took a look at rogue traders to find some common denominator that could be used to identify them before they inflicted huge losses on a firm. One

thing I turned up is that every single one lied on his resume, usually claiming a fictitious degree. This suggests that a financial firm should consider checking every fact on a resume. Some firms do, some don't. There are costs to the strategy. Lots of people who would be excellent employees lie on their resume; you'll lose them. Other candidates will be put off by the delay or appearance of distrust, or just the annoyance of having to prove some minor bullet point. Of course, there's the cost of the checking as well. And there's the argument that once people figure out that you check, they'll start telling the truth, and the value of the signal will disappear.

Whether you check or not is primarily a rational decision for the head to make. But once you make it, you should enlist the gut in support. A properly framed strategy of checking is an endorsement of honesty. An improperly framed

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strategy of checking seems like bureaucratic pettiness and treating candidates as guilty until proven innocent. Current and new employees should feel proud to work for a firm that demands the best of everyone, not angry at being forced to spend time at a place that looks for ways to diminish people. People doing the checking should feel that it is a meaningful contribution to firm culture, and should feel strong disinclination to skip over a few checks in order to make it home in time for dinner.

Lots of silly rules about low-impact dangers can destroy morale at a workplace, and the rules will be ineffective as well. People will ignore the rules, or find ways around them that are more dangerous than the original activity. Rule enforcement will be costly and divisive. On the other hand, changing culture so that people are proud to do the right thing automatically can be a source of morale and an effective way to reduce losses.

Oh yeah, what happened to me back in 1984? I didn't mean to leave you sitting in a car while

Caleb Blood Smith's zombie corpse smashed through the windshield. As I said, I was intellectually calm and aware of what my brain was doing and why, but unable to slow my heart or breathing. I did try that (telling myself, "Take a deep breath and relax, find your happy place, say 'there's no such thing as zombies',...") but it failed. However, I realized to my satisfaction that my gut didn't know how to drive a car. In the movies, you see people floor the accelerator and crash into a tree in panic, but at least in my case, it didn't happen. My gut didn't know to switch my right foot from the brake to the gas pedal. It wanted to get away, but it didn't want to get out of the car (car ... cave ... safe). So, it just sent urgent messages to my head, "Get us out of here, now!"

One thing about physiologic fear – if you're not actually afraid, it's pleasant. I'm sure my bloodstream was filled with all the feel-good hor-

mones that my glands could make, so minor aches and pains (or a broken leg for that matter) wouldn't inhibit my fight or flight. My senses were sharp and my muscles were steady and responsive. That was all very good, because I had to back the car out on a twisty, narrow dirt road in thick woods, using my back lights. In normal times, this would have been a painstaking effort. But with fear on my side, it was like driving on an empty freeway at noon. So, everything ended well.

Except...there are no barbeque grills in Caleb Blood Smith park.

FOOTNOTES

1. "Fear is the main source of superstition, and one of the main sources of cruelty. To conquer fear is the beginning of wisdom." Bertrand Russell, *Unpopular Essays: An Outline of Intellectual Rubbish*, 1950.
2. Daniel Gardner, *The Science of Fear: Why We Fear the Things We Shouldn't – and Put Ourselves in Greater Danger*, Dutton Adult (July 17, 2008) ISBN-13: 978-0525950622.