Science of Fear

Daniel Gardner – New York, NY: Penguin Group, 2008

p. 3-4 – Following 9/11, travel shifted from air to automobile
Assuming 1 airline hijacking per week in the U.S., with all aboard dying, the risk is 1:135,000
Risk from automobile travel: 1:6,000 per annum

First full calendar year following 9/11 – 1,595 excess deaths from car accidents (Gigerenzer)

p. 5 – Franklin Roosevelt, 1932 inauguration, depth of Great Depression:
"the only thing we need fear is fear itself – nameless, unreasoning, unjustified terror which paralyzes needed efforts to convert retreat into advance."

Lifted from Henry David Thoreau, who got it from Michel de Montaigne

p. 7 – "Peering into the future and imagining all the ways things could go horribly wrong has become something of a parlor game for intellectuals. … <but> to think the potential dangers facing us today are somehow more awful than those of the past is both ignorant and arrogant."

p. 8-10 – a very long list of nice empiric examples of the many ways in which life today is the best the world has ever seen, with much lower risks, dramatically better than that experienced by any previous generation.

p. 9-12 – long list of examples of things that modern people fear, but that make little or no empiric sense

p. 15 – Psychologists call it "**group polarization**" – "when people who share beliefs get together in groups, they become more convinced that their beliefs are right and they become more extreme in their views." <See also p. 113, below>

Combine with confirmation bias and culture, and "we start to understand why people can come to completely different views about what is frightening and which aren't worth a second thought." <also explicated at about p. 113, Chapter 6 – the Herd Senses Danger – below>

p. 16 – System 1 and System 2 – Feeling (Gut) and Reason (Head). Cites Kahneman. System 1 works without conscious thought and is lightening fast; a hunch, an intuition, or emotions like unease, worry, or fear.

System 1 uses built-in rules of thumb and seeks recalled examples (personal anecdote). The brain subconsciously seeks examples of people experiencing consequences of the risk being assessed. If it comes up with 1 or more examples, it fires off an alarm.

System 1's rule of thumb = **The Example Rule**: If examples of something can be recalled easily, that thing must be common. Called the "**availability heuristic**."

Works fast, but is highly reliant an (recent) availability of examples, all based on subjective recall (e.g., graphic news reports). One of many rules and automatic settings used by System 1.

p. 17 – "The problem is that System 1 wasn't created for the world we live in." It works quite well, though, for nomadic bands living in a hunter / gatherer environment.

p. 21-22 – Cites Gilbert Ryle, who scornfully challenged René Descartes' idea of "the ghost in the machine." Argues for scientific materialism, purely by extending the philosophy of evolution and perceptions of scientific trend over time. Nicely tracks best current theory regarding history of human brain and societal development, though.

p. 23 – Extends these ideas into recent field of Evolutionary Psychology.

p. 24 – Links this to natural reaction most people show to snakes.

p. 25 – Extends this to **the Law of Similarity: Appearance equals reality**. If it walks like a duck and quacks like a duck, it's a duck. Example of students asked to eat fudge shaped to look like dog feces. They really struggled to do so, even though they knew it was fudge. Often surfaces as magical beliefs, like voodoo. Example of remote tribes first encountering photographs, which terrified them – the camera steals the person's spirit.

p. 27 – **Head cannot look into Gut … it has no idea how Gut assembles its judgements. This is why psychologists believe that focus groups are far less insightful than some marketers think**. People can make quick, reactive judgements but they can't accurately say why they reacted so. When challenged, they make up plausible but usually incorrect answers.

"**So we have, in effect, two minds working semi-independently of each other. … our thoughts … <are the> complex interactions between the two**. Things can move from Head to Gut, over time with practice <e.g., "muscle memory">. In fact, once a skill has transitioned, actively thinking about it as you perform it degrades performance.

p. 29 – **Gut decides, Head reviews: This process is how most of our thoughts and decisions are made**. "One of psychology's fundamental insights," writes Harvard psychologist Daniel Gilbert, "is that judgments are generally the products of nonconscious systems that operate quickly on the basis of scant evidence, and in a routine manner, and then pass their hurried approximations to consciousness, which slowly and deliberately adjusts them."

So, Head has to step in and tweak Gut's estimates … . But will it? Unfortunately, there's a good chance that it won't. <metaphor of Head as a very gifted but lazy, disinterested teenager>

p. 32 – **When "very round number" statistics are cited, there is a good chance they were made up out of whole cloth without any empiric basis**. Many examples cited. Usually cited in passive voice, often citing some official who is citing it in passive voice. When asked, those citing such "made up" statistics often make up sources. These numbers are, at best, "guesses made by persons unknown." "… unreliable statistics are all too common in public discourse."

p. 35-36 – **the "anchoring and adjustment" heuristic, or Anchoring Rule – when we're uncertain about a correct number, Gut grabs hold of the last number it heard, then Head adjusts it – but "adjustments tend to be insufficient**" (Epley and Gilovich) … "leaving people's final estimates biased toward the initial anchor value." "When psychologists ask people if the first number they

hear influences their guess, the answer is always no." Example: signs in supermarket putting forth an anchoring number regarding how many cans you buy of whatever.

p. 37-38 – The Anchoring Rule can be used to skew public opinion surveys to suit one's purposes. Examples: How much is the typical voter willing to spend to clean up a local lake? "… the value of the Anchoring Rule to someone marketing fear should be obvious."

p. 39 – For every problem there is a solution this is simple, clean, and wrong." H.L. Menken

p. 40 – Kahneman & Tversky. Judgement under uncertainty: Heuristics and biases – published in Science, 1974. **The idea of *bounded rationality*, formed as 3 primary heuristics:**

The Anchoring Rule
The Rule of Typical Things
The Example Rule (availability heuristic)

p. 41-45 – **The Rule of Typical Things**

" … generally favors outcomes that make good stories or good hypotheses. … Gut is a sucker for good stories." Thus, adding credible details makes the story seem more likely, even though from a technical standpoint those additional details make it less likely. Adding a string of plausible events, each of which must be true to arrive at the final event, makes the end event seem more likely rather than less likely, even though the full chain is significantly less likely than just the unembellished event by itself. Pundits, politicians, newspaper reporters, etc., routinely use this to make things seem more plausible, even though their prognostications are no better than random chance. "Guided by the Rule of Typical Things," Gut "latches onto plausible details and uses them to judge the likelihood of the whole scenario coming true." Kahneman & Tversky: "This effect contributes to the appeal of scenarios and the illusory insight they often provide." For example, "a political analyst can improve scenarios by adding plausible causes and representative consequences." Pooh-Bah in the *Mikado*: "corroborative details intended to give artistic verisimilitude to an otherwise bald and unconvincing narrative."

This means that elaborate explanations of things are judged (by Gut) to be more likely, as a total scenario, than simple explanations of things.

p. 46-58 – **The Example Rule (availability heuristic)**

"the easier it is to recall examples of something, the more common that something must be." "Common" means "more likely."

In a highly emotional / threatening situation, the amygdala releases a wave of hormones including cortisol and adrenaline. These hormones not only stimulate the "fight or flight response," but also stimulate / enhance memory – they make the event much more long-term memorable. "… traumatic memories last, and they are potent." As a result, people tend to remember negative images far more readily than neutral or positive images. But any emotional content makes a memory "stickier." Other things that cause a response in the amygdala and make memories stick: things related to human faces, novelty, what happened most recently (within a particular class of similar events), concentration, repetition.

A really big one: stories, especially those with high emotional impact, while visualizing the events being described. But Gut can distinguish, to some degree, between fiction versus real lived experiences as told by others.

However, "people who <first actively> imagine an event consistently feel that the odds of the event actually happening are higher than those who don't <first imagine it happening>." However, "it's not merely the act of imagining that raises Gut's estimate of how likely something is, it's how easy it is to imagine that thing.

p. 52 – **Memory is unreliable, and this affects the Example Rule**
"Memories routinely fade, vanish, or transform – sometimes dramatically. Even the strongest memories – those formed when our attention is riveted and our emotions are pumping – are subject to change."

p. 53 – **"The mind can even fabricate memories."** "In one series of experiments, researchers invented scenarios such as being lost in a shopping mall or staying overnight in a hospital with an ear infection. They then asked volunteers to imagine the event for a few days or to write down how they imagine it played out. Then, days later, the researchers interviewed the subjects and discovered that between 20 and 40 percent believed the imagined scenarios had actually happened.

p. 53 – **The Example Rule is biased, because of how memory works.**
"Recent, emotional, vivid, or more novel events are more likely to be remembered …"

Gut discounts things that haven't happened recently, then says "be very afraid" around things that have happened recently even if they are not likely to happen again soon. After the (emotionally impactful, vivid) event people question why no one prepared.

p. 57 – "The torrent of instantaneous communications." As the ability to record and share images has exploded (e.g.: pictures of a tsunami in Thailand), perceived "examples" of rare events that harm people (convey risk) have become much more common. Gut thus judges them to be much more likely. <Think of what this means as the news media fractures into competing, self-reinforcing, echo chambers.>

"One of the most consistent findings of risk-perception research is that we overestimate the likelihood of being killed by the things that make the evening news and underestimate those that don't. What makes the evening news? The rare, vivid, and catastrophic killers. Murder, terrorism, fire, and flood. What doesn't make the news is the routine cause of death that kills one person at a time and doesn't lend itself to strong emotions and pictures. Diabetes, asthma, heart disease. … the gaps between perception and reality <are> often stunning."

Other sources extend even beyond TV, magazines, social media, and movies. Example: A movie "called *The Day After Tomorrow*, a disaster film depicting a series of sudden, spectacular catastrophes unleashed by global warming. The science of *The Day After Tomorrow* is dubious, to say the least."

p. 58 – "Of course, Head can always step in, look at the evidence, and overrule. As we have seen, it routinely does not. But even if it did, it could only modify or overrule Gut's judgment, not erase it. Head can't wipe out intuition. It can't change how we *feel*."

p. 60 – **low-probability/high-consequence events** – asteroid strikes, volcanic eruptions in populated areas (perhaps w large tsunamis)

p. 62 – lists estimated odds of asteroids of various sizes hitting.

Recommends cost-benefit analysis as a means of assessing potential risks that are worth protecting against – probability of event, impact of event in money and lives, cost of mitigation.

p. 65 – **Intuitive perception of risk is based on a series of factors independent of body count:**
1. Catastrophic potential: events w large body counts in a single event, as opposed to body count dispersed over time.
2. Familiarity: Novel / unfamiliar events were judged much more risky.
3. Understanding: Things perceived to be less well understood are perceived as higher risk.
4. Personal control: Events perceived as being beyond our personal control <including ability to dodge the consequence?>.
5. Voluntariness: Do we choose to expose ourselves to the risk. Ability to choose implies lower perceptions of overall risk.
6. Children: Things that hurt children are much, much riskier.
7. Future generations: If it might affect future generations, it has higher risk.
8. Victim identify: Events with identifiable victims have higher perceived risk than do events that merely produce harm statistics.
9. Dread: Events that generate fear are worse than those that don't.
10. Trust: If the institutions involved are not trusted, then perceived risk goes up.
11. Media attention: More media means more worry (the Example Rule).
12. Accident history: Events that happened in the recent past are perceived as being riskier.
13. Equity: If dangers go to some identifiable groups while benefits accrue to others, it's worse.
14. Benefits: If the benefits of a technology or activity are not clear, then it is perceived as risker.
15. Reversibility: If the harms cannot be reversed, it is seen as riskier.
16. Personal risk: If it endangers me personally, it's riskier.
17. Timing: Immediate threats loom larger while those in the future tend to be discounted.

Familiarity is one of the most important – familiarity breeds contempt (and lower perceptions of risk). That's why the risks of driving a car get discounted so heavily.

p. 66 – **Habituation**: things "we repeatedly experience without positive or negative consequences … gradually fade from our attention."

"Habituation is particularly important in coping with risk because risk is everywhere." It also can work directly against the underlying science / statistics (measures of real risk).

p. 68 – The main problem with the foregoing list: "Gut is a black box; Head can't peer inside. And when a researcher asks someone to say why she feels the way she does about a risk, it's not Gut she is talking to. It's Head. … But **Head is a compulsive rationalizer. If it doesn't have an answer, it makes one up**."

p. 69 – **Dread – plain old fear – strongly correlated on the list with catastrophe, involuntary, and inequitable**. Unlike other items, these terms were **loaded with emotional content** (= Gut). Dread was by far the strongest predictor of peoples' reaction to an activity or technology.

p. 71 – **The Good-Bad Rule**: Anything that Gut judges to be good, will also be low risk. Anything that Gut decides is Bad, will by definition be high risk. This is independent of actual associated risk for activities or technologies. We make emotional (Gut) decisions, then use reason and logic (Head) to justify those decisions.

p. 73 – "**We're not used to thinking of our feelings as the sources of our conscious decisions, but research leaves no doubt**. … for example, … people are willing to pay more to insure a car feel is attractive than one that is not, even when the monetary value is the same. … people were willing to pay more for airline travel insurance that covered 'terrorist acts' than for deaths from 'all possible causes.' Logically, that makes no sense, but 'terrorist acts' is a vivid phrase dripping with bad feelings, while 'all possible causes' is bland and empty. It leaves Gut out."

p. 74 – "the brain system that slaps emotional labels on things – nuclear power: bad! – is buried within the unconscious mind. So your brain can feel something is good or bad even though you never consciously feel good or bad." <as usual, when asked for reasons around this, the subjects' Head made up plausible answers> "The conscious mind <Head> hates to admit it simply doesn't know."

The initial emotional labels that the brain sticks on something persist over time, even if we don't know they exist (experiments that repeated the same approach but leaning toward 'good', on the same items, didn't change the initial 'bad' internal, emotional label).

p. 75 – "… positive feeling for something can be created simply by repeated exposure to it, while positive feelings can be strengthened with more exposure. Now known as the "**mere exposure effect**," this phenomenon is nearly summed up in the phrase "**familiarity breeds liking**." Corporations have long understood this, even if only intuitively. The point of much advertising is simply to expose people to a corporation's name or logo in order to increase familiarity, and, as a result, positive feelings toward them." <**branding strategies**>

"**The mere exposure effect has considerable implications for how we feel about risks.**" Gives examples like chewing tobacco: When it was socially common, Gut labelled it "good" so the risk of it causing cancer was low.

Note that the process here is similar to that of habituation, but it doesn't require the level of exposure necessary for habituation to occur.

Example: All 5 NFL teams that wore black uniforms (which produce strong unconscious negative reactions) received more than the league-average number of penalty yards in every season but one between 1970 and 1986. Similar experience in the Natl Hockey League.

p. 77 – "The fact that Gut so often has instantaneous, emotional reactions that it uses to guide its judgments has a wide array of implications. A big one is the role of justice in how we react to risk and tragedy." "Philosophers and scholars may debate the nature of justice, **but for most of**

us justice is experienced as outrage at a wrong and satisfaction at the denunciation and punishment of that wrong. It is a primal emotion. … She *must* be punished. Evolutionary psychologists argue that this urge to punish wrongdoing is hardwired because it is an effective way to discourage bad behavior. 'People who are emotionally driven to retaliate against those who cross them, even at a cost to themselves, are more credible adversaries and less likely to be exploited,' writes cognitive psychologist Steven Pinker."

p. 78 – "… **the instinct for blame and punishment is often a critical component in our reactions to risk**." <when we have someone to blame, we perceive the risk to be higher; if there's no one to blame, we tend to ignore the risks – e.g., radon gas in basements. "The deaths it inflicts [41,000 per year between the U.S. and Europe] are solitary and quiet and no one is responsible. … **the same people whose knees shook when they thought about … nuclear waste dumps rated radon – which has undoubtedly killed more people than nuclear waste ever could – a very low risk.** … **the absence of outrage is the reason that natural risks feel so much less threatening than man-made dangers**.">

"**The Good-Bad Rule also makes language critical.**" Calling ground beef "75% lean" versus "25% fat" produced very different judgments. Same was true of framing using the terms "chances of survival" versus "chances of dying" when talking about cancer treatments. Same for framing a public health intervention in terms of "lives saved" or "lives lost." <**Framing emotional issues via language choices**>

p. 79 – "**The vividness of <the> language <used> is also critical.**" "Dying of cancer" versus "very gruesome and intensely painful, as the cancer eats away at the internal organs of the body" – profoundly effected what students were willing to pay for insurance. The words used in describing the choices were far more impactful than the actual statistics. "Feeling trumped numbers. It usually does."

p. 80 – "… **the most vivid form of communication is the photographic image** …" "They increase the perception of risk."

Example of wording regarding risk of release of a psych patient being violent: "20 percent" risk had a much smaller impact than "20 out of a hundred," because "**20% is "hollow, abstract, a mere statistic**" while "**20 out of every 100" is very concrete and real – it invites you to see a person**.

"**People in the business of public opinion are only too aware of the influence that seemingly minor linguistic changes can have**."

p. 82 – "**This focus on certainty helps explain our unfortunate tendency to think of safety in back-and-white terms – something is either safe or unsafe – when, in reality, safety is almost always a shade of gray.**

"And all of this is true when there's no fear, anger, or hope involved. Toss in a strong emotion and people can easily become – to use a term coined by Cass Sunstein – 'probability blind.' The feeling simply sweeps the numbers away." Example: One-third of people would worry about a 1:10 million risk of getting cancer from exposure to a chemical. "**The irony is that**

probability blindness is itself dangerous. It can easily lead people to overreact to risks and do something stupid like abandoning air travel because terrorists hijack 4 planes."

The Good-Bad Rule can result in things like "It's worth it if even one life is saved" – a truly dumb response, from a rational perspective – the same money could save many, many more lives if applied in other areas that have higher leverage.

p. 83 – Discusses "wealthier is healthier," using example of building codes for earthquake risks. Stronger buildings mean fewer deaths in an earthquake, but they cost lots more. The problem: If economic costs are too high, they can take more lives than they save … and the public often demands action on a risk without giving the slightest consideration of the costs of that action, in money or lives. Example: mitigation of asbestos in public schools in New York City.

p. 84 – Conclusions:

- "… experts are wrong to think they can ease fears about a risk simply by 'getting the facts out.'"
- Good-Bad Rule + Rule of Typical Things: "… makes us vulnerable to scary scenarios." (like Saddam Hussein possibly seeking nuclear weapons)
- It's the emotions, stupid! Gut trumps Head. Emotions trump numbers.

pp. 87–100 – Chapter 5 – The story of the silicon breast implant debacle

Basic structure: In 1982, an Australian report described 3 Asian women who received silicon breast implants, who also had connective tissue disorders (silicon injections and breast implants were a common event, across 30 years, prior to that time). Over time, medical articles and news stories reported an increasing number of the same sorts of cases. In 1990, Connie Chung on CBS TV news program *Face to Face* featured several women telling stories of "pain, suffering, and loss" from connective tissue disorders, which they blamed on their silicon breast implants <classic *post hoc, ergo propter hoc*>. Similar sensationalized stories flooded the media, Congressional hearings were held, national talking heads like Ralph Nader and prominent feminists all weighed in calling implants "sexual mutilation". Most blame focused on the FDA for allowing silicone implants to be used. In 1992, FDA asks manufacturers for evidence of safety within 90 days, which they could produce with such a short timeline. Dow Corning – main manufacturer – lost their first lawsuit in San Francisco ($7.34 million). In April 1992, FDA bans implants until evidence can be generated, while (correctly) reassuring women that there is no evidence of a link. The legal floodgates open. In 1994, manufacturers establish a $4.25 billion class-action settlement fund (of which ~$1 billion went to the lawyers), turning "implant lawsuits into a veritable industry." About 360,000 women – roughly half of all women with implants – submit claims for reimbursement, with roughly half of those (the 360,000) claiming connective tissue disorders. Patients didn't need to prove causation. Lawyers established "medical mill" clinics, specializing in these cases alone, to produce documentation of conditions attributed to silicone implants. Given the massive numbers, Dow Corning was forced to file for bankruptcy and the settlement collapsed. Later that same year, researchers at Mayo published an article in NEJM demonstrating that there is no causal link between silicone breast implants and connective tissue disorders, showing that the link between silicon breast implants and

connective tissue disorder was a simple, non-causal, association. More studies followed, with similar results. In 1999, an IOM evidence review could find "no evidence that these women are ill because of their implants." (p. 100) In June 2004, Dow Corning emerged from 9 years of bankruptcy. In November 2006, FDA lifted its ban on silicone breast implants (p. 101). NEJM's Marcia Angell authored *Science on Trial: The Clash Between Medical Science and the Law in the Breast Implant Case*, documenting the whole thing. She notes that "What we saw in the courtroom and in much of the media were judgments based on anecdote and speculation." Angell notes that, by random chance alone, there would have been at least 10,000 women who had both (p. 92).

The chapter then uses this case study to raise a series of interesting facts and principles:

p. 89 – in surveys, people rated breast implants as "high risk." Only cigarette smoking was seen as having higher risk.

pp. 91–93 – talks in detail about the dominance of storytelling over statistics/numbers, with lots of examples. Notes that stories are part of social bonding (compares to nit grooming among great apes). Links to evolutionary success: Stories are a key form of learning; and "can also be a valuable form of rehearsal."

p. 92 – large numbers seemed to make the connection true: "there were so many, it seemed so obviously true that implants cause disease. It *felt* true. Gut said so. Cokie Roberts on *ABC Nightline* states that "There are thousands and thousands of women who have breast implants and complain of terrible pain. Can they all be wrong?"

pp. 93–95 – Gut can't handle numbers. Documents basic innumeracy among humans, with solid examples – e.g., AIDS stats vs Rock Hudson public announcement that he had the disease. For example, rats and dolphins have simple concepts of number, addition, and subtraction, up to about the number 4 (give or take). Humans are better, but not by much. Numbers don't have the power to make us feel. In fact, including numbers appears to reduce the impact of a good, single person, story (p. 94).

p. 95 – "Statistical concepts may be even less influential than numbers."

p. 95 – regression to the mean: Cites Kahneman regarding Israeli flight instructors, who reached incorrect conclusion that criticism works better than praise, because following praise for a great landing, performance usually gets worse while following criticism for a bad landing, performance usually gets better.

p. 96 – unrecognized, natural sample bias, that humans typically don't recognize. Provides examples, then links back to actual breast implant case study.

pp. 97 – 99 – random clustering: humans regularly detect "patterns" in random data when there are none (cancer cases, murder, flooding, lottery tickets, etc.).

p. 99 – "In a series of 4 studies, a team of psychologists led by Ellen Peters … examined whether numeracy makes any difference to the mistakes Gut tends to make. It did, in a big way." <so statistical training and practice really helps>

p. 101 – When the FDA removed the ban in implants in 2006, "Anti-implant activists were furious. They remain certain that silicone breast implants are deadly, and it seems nothing can convince them otherwise."

pp. 102–124 – Chapter 6 – The Herd Senses Danger – shows that people tend to go with the herd, even when they can clearly see that the group consensus is wrong. Other people with whom we interact have a huge impact on how we perceive risk, right or wrong

p. 102-3 – cites a series of psych trials. In 1953, (Crutchfield) subjects were placed in a group and given an empirical question. Even when they could clearly and directly see the group was wrong, 30% of people went with the group's answer. Asch (1950s) used a different setting, and showed the 75% of "test subjects abandoned their own judgment and went with the group at least once" across multiple tests.

<This study used a 4 wrong vs 1 test subject (80% pressure) design. Probably should add Gladwell's recent Revenge of the Tipping Point book, which showed that people started to settle on a single consistent answer when about 20% of the group start to use it.>

p. 103 – "We are social animals and what others think matters deeply to us. … But even when the other people involved are strangers, even when we are anonymous, even when dissenting will cost us nothing, we want to agree with the group.

p. 104 – "And that's when the answer is instantly clear and inarguably true." As answers become even a little ambiguous or complex, the effect expands. When there was no clear right answer, "79% of participants did not guess or otherwise struggle to come up with their own answer. **They simply went with what the group said**."

Context of these studies in the 1950s: "Social scientists wanted to understand why nations succumbed to mass movements, and in that context <fascism as a recent experience> it was chilling to see how easy it is to make people deny what they see with their own eyes."

The text suggests several explanations for this behavior:

- Evolutionary perspective – "Individual survival depended on the group working together, and cooperation is much more likely if people share a desire to agree."

- Pooling of information and shared experience – "One person knows only what he knows, but thirty people can draw on the knowledge and experience of thirty … The group may be wrong, of course. … But still, other things being equal, it's often best to follow the herd."

  Notes that in today's much more complex world, this gets even worse. There's so much going on, at such a high degree of complexity and specialized knowledge, we have no choice but to accept expert opinion and group consensus for much of what we accept and believe.

p. 105-6 – "Another solution is to turn to intermediaries – those who are not experts themselves but claim to understand the science. But makes the case that many of these self-styled intermediaries are highly biased, and heavily select the "science" they present.

Real problem: This results in cynicism, which destroys trust. But in these circumstances, "trust is vital." Argues that there IS real truth out there.

p. 107 – Notes that in American discourse, "trust is disappearing fast." In this setting, Gut takes over – distrusting any authority, people simply reject anything that disagrees with their preferred opinion. Cites examples of this happening on a wide scale: vaccination, nuclear waste disposal, etc.

"Fortunately, we have not entirely abandoned trust, and experts can still have great influence on public opinion, particularly when they <scientists> manage to forge a consensus among themselves." … But "scientists can find themselves resoundingly ignored when their views go against strong public feelings." … "the American Physical Society – an association of physicists – easily convinced the public that cold fusion didn't work, but it had no impact when it issued a positive report on the safety of high-level nuclear waste disposal."

p. 108 – **Summary: "We remain a species powerfully influenced by the unconscious mind and its tools – particularly the Example Rule, the Good-Bad Rule, and the Rule of Typical Things. We also remain social animals who care about what other people think. And if we aren't sure whether we should worry about this risk or that, whether other people are worried makes a huge difference."**

p. 109 – There is evidence that the <u>importance of a question *substantially increases* human tendencies to go with the group view</u>. Gives examples of research studies that show this. **When judgments are (1) difficult and (2) important, "people are most likely to conform to the views of the group and feel confident that they are right to do so."**

p. 110 – Defines and discusses **confirmation bias**: Once we have formed a view, we embrace information that supports that view will ignoring, rejecting, or harshly scrutinizing information that casts doubt on it.

p. 111 – notes that, when deciding whether a particular rule is in play, it works far better to try things that would contradict the rule, than trials that support the rule. But humans almost never use that approach! **We seek confirmation, not disconfirmation.**

p. 112 – **" … seeking to confirm our beliefs comes naturally, while it feels strange and counterintuitive to look for evidence that contradicts our beliefs."**

Peter Wason first coined the term "confirmation bias." Sir Francis Bacon, over 300 years earlier: "the human understanding when it has once adopted an opinion (either as being a received opinion or as be agreeable to itself) draws all things else to support and agree with it. And though there be a greater number and weight of instances to be found on the other side, yet these it either neglects and despises, or else by some distinction sets aside and

rejects; in order that by this great and pernicious predetermination the authority of its former conclusions may remain inviolate …"

p. 113 – **"The power of confirmation bias should not be underestimated."** It will steadily strengthen the original belief, as confirming experiences are accepted and contradictory experiences ignored, subjected to higher levels of scrutiny, or flatly rejected.

fMRI studies suggest that this may be hardwired into the human brain. Also notes that the source of the belief doesn't matter – even if it's just a belief taken up because the rest of the "herd" appears to believe it.

Defines ***group polarization***: When a group of like-minded people get together to discuss an issue, they tend to reach conclusions more extreme than the initial average view of the individuals in the group. The dynamic is always the same; it doesn't matter what subject the group is discussing. **When like-minded people get together and talk, their existing views tend to become more extreme.** The text then discusses factors that may drive / account for this behavior.

p. 115 – Group polarization tends to consolidate and magnify views, whether they are right or wrong. **"So Alan convinces Betty, and that persuades Carl, which then settles it for Deborah. Biased screening of information begins and opinions steadily strengthen. Organizations are formed, information exchanged. Views become more extreme. And before you know it, as Cass Sunstein wrote, there are hundreds, thousands, or millions of people who are convinced they are threatened by some new mortal peril. Sometimes they are right. … But they can also be very wrong."**

"The media obviously play a key role in getting waves started and keeping them rolling …" with further explication of this effect. Thus, silicone breast implant were a huge issue in the U.S. and Canada, but caused hardly a ripple in Europe. Also, as concern about some risk rises, the media produce more reports on it, which drives the Example Rule.

p. 116 – "So far we've **identified two sources** – aside from rational calculation – that can shape our judgments about risk. There's the **unconscious mind – Gut** – and the tools it uses, particularly the Example Rule and the Good-Bad Rule. And there are **the people around us**, whose opinions we naturally tend to conform to." **There's a third source: Culture**.

<the next few pages give examples of culture shaping shared perceptions of good vs bad (sun tanning; use of EtOH) and hence risk. This clearly links to the idea of the "overstory" in Gladwell's *Revenge of the Tipping Point* = zeitgeist>

p. 121 – links the idea of "culture" to that of different, identifiable **worldviews**. Different worldviews are associated with consistent patterns of risk perceptions (world views identified: individualist, egalitarian, hierarchist, and communitarian). Of course, worldviews are largely generated by the culture within which a person is raised then exists, especially when people clump up with others who share a similar worldview. Within this setting, "once an opinion is forms, information is screened to suit." Worldviews exist within

cultures, with the result that people in a different culture, even though they have the same basic worldview, will have different patterns of perceived risk.

In other words, **different types of personalities – individualist vs. egalitarian vs. hierarchist vs. communitarian – perceive risk very differently.**

p. 123 – **"Kahn feels this is the strongest evidence yet that we unconsciously screen information about risk to suit our most basic beliefs about the organization of society."** (the 4 worldviews listed above)

At this point, the book shifts from laying out basic theoretical principles to giving specific examples of how those principles play through across a modern society.

p. 125-154 – Chapter 7 – Fear Inc. – what happens when capitalism meets fear

This chapter describes 3 major areas where people use fear to advance their own personal interests: (1) the security industry; (2) health, with a special emphasis on big pharma; and (3) politics.

pp. 125-7 – <u>The security industry</u>. Lots of products – area protection (yards, patios, home entry, etc.), air and water protection, personal defense (weapons of all sorts), LOTS of cameras, facial recognition, personal ID shredders, training, monitoring, you name it. "Not that anything like that has ever happened, but you never know."

Uses ads that play directly on fear. Emphasizes predators.

pp. 127-8 – analyzes these approaches in terms of what we've established so far in terms of Gut and the key Rules, versus Mind.

p. 129 – <u>Germs. Pills that "are absolutely essential for long life." Disease mongering.</u>

pp. 131-2 – Australians Roy Moynihan and David Henry (*Selling Sickness: How the World's Biggest Pharmaceutical Companies Are Turning Us All Into Patients*): "many of the so-called disease awareness campaigns that inform contemporary understanding of illness – whether as citizens, journalists, academics or policymakers – are underwritten by the marketing departments of large drug companies rather than by organizations with a primary interest in public health. And it is no secret that those same marketing departments contract advertising agencies with expertise in 'condition branding,' whose skills include 'fostering the creation' of new medical disorders and dysfunctions."

"This is much bigger than advertising. It is about nothing less than shifting the line between healthy and diseased, both in consumers' perceptions and in medical practice itself.

p. 133 – Medicalizing every problem. Analysis at Dartmouth Medical School. Proposed new thresholds of diagnosis of a list of chronic diseases (e.g., HTN). 87.5 million currently "healthy" Americans would suddenly be "diseased," reaching about ¾ of all Americans.

"The rhetoric surrounding disease mongering suggests that it will promote health, but the effect is in fact the opposite." Relies on the "pathologizing" normal biological and social variation or "on the portrayal of the presence of risk factors for disease as a disease state in itself." E.g., hypercholesterolemia is a risk factor, not a disease in and of itself, as compared to all the other more important things (e.g., exercise) that have an even greater impact on IHD (and actual disease).

<this links to the idea of intermediate outcomes versus end outcomes. For example, I take an anticholesterol drug – atorvastatin – to reduce my blood cholesterol levels. An effective dose of a statin will reduce risks associated with high cholesterol levels by about 30%. But that depends on where you start. For example, a person with a 10-year risk of a major cholesterol related heart event (i.e., heart attack) of 20%, will see that risk drop to about 14% -- a fairly significant drop of 6 percentage points. But some with a baseline risk of about 6%, like me, will see it go down to about 4%. That's only a 2 percentage point drop. It is possible to calculate, across a large group of people with the same risk as me, how much average benefit each person would get. I once calculated that taking atorvastatin for about 40 years, at a true cost of about $4 per month = just under $2,000, plus some time and trouble, would extend my life by about 2 weeks.>

p. 134 – "Using the fear of death to promote sales." Ads emphasize emotions – people losing control of their lives, and using medicines to regain control.

p. 136 – there is good evidence that security companies and big pharma actually studied newly emerging knowledge around Gut/Mind and how they function, then carefully built and tested marketing strategies built around that knowledge.

Same was true for the tobacco industry. They were 20 years ahead of the academic curve on this knowledge.

p. 138 – **"We are safer and healthier than ever and yet we are more worried about injury, disease, and death than ever. Why? In part, it's because there are few opportunities to make money from convincing people they are, in fact, safer and healthier than ever – but there are huge profits to made by promoting fear. 'Unreasoning fear,' as Roosevelt called it, may be bad for those who experience it and society at large, but it's wonderful for shareholders. The opportunities for growth are limitless."**

<u>Politics</u>

H.L. Mencken, 1920: "the whole aim of practical politics is to keep the populace alarmed (and hence clamorous to be led to safety) by menacing it with a series of hobgoblins, all of them imaginary."

p. 139 – **These beliefs that promote fear (pushed out by security companies, doctors and pharmaceutical companies, and politicians) are often sincere.**

"… in most cases those promoting fear are sincere, for the simple reason that humans are compulsive rationalizers. People like to see themselves as being basically good, and so admitting that they are promoting fear in others in order to advance their <own> interests sets up a nasty cognitive dissonance: I know I'm basically a nice person; what I'm doing is awful and wrong. Those are two thoughts that do not sit comfortably in the same head and the solution is rationalization: Suburban house wives really are at risk if they don't buy my home alarm, and I'm doing them a service by telling them so. **Self-interest and sincere belief seldom part company**."

"the marketing of fear for political advantage has become so ubiquitous that the phrase "the politics of fear" is almost a cliché." The text then reviews studies of the role of fear and emotion in political campaign ads.

p. 141 – "It is 'the get 'em sick, get' em well' advertising concept, in which advertisers try to create anxieties and then reassure people they have the solution."

p. 142 – "It isn't the less informed who are likely to be influenced by fear-drive <political> advertising. It is the more informed."

p. 143 – The sound track and visual imagery complete override what is said or written in an ad. It's pretty entirely an emotional response, rather than a cognitive response.

pp. 144-5 – **Activists, nongovernmental organizations, and charities use exactly the same methods to promote their viewpoints – they actively market fear.** Tells the story of a campaign by the Grocery Foundation in Canada to raise money to fight child hunger, based on highly questionable data (leading to a campaign that said "one in five Canadian children lives with hunger," but having no support for that statistic. It then tracks similar campaigns in the U.S. It then tracks a similar Canadian campaign on cancer, plus one in the U.S. – with similar sorts of shenanigans, around using sunscreen to prevent skin cancer death despite a lack of evidence that melanoma can be controlled with sun screen (and American Cancer Society ads surreptitiously bought by Neutrogena, a major sun screen manufacturer).

p. 147 – "All this is done with the best of intentions. There really are hungry children. Sun exposure really does cause cancer. It may seem pedantic to demand accurate information in messages about such serious problems. Surely what matters is raising awareness and getting action.

"That attitude is all too common and the result is a parade of half-truths, quarter-truths, and sort-of0truths."

<Brent's idea of the potentially damaging effect of using outrage to get engagement. It tends to drive classic in-group / out-group thinking, and lead to atrocities.>

"Sins of omission are far more common than active deceit in fear marketing, but out-and-out lies do occasionally come to light." The book then gives examples of this happening. One leads to the following:

p. 148 – "Pound's "high impact quotations" <totally made up, with an intent to have an impact> are one solution to a problem faced by every activist, NGO, charity, and consultant with a cause. To get the public's support, people must hear their message. But people are deluged with images, words, noise and pleas for their attention, most of which is ignored. <there's just too much of it> In that information maelstrom, how do you get people to stop, hear, and think about what you have to say?"

Notes that, in many countries, governments' public information groups are massive and well-funded. "Practitioners call it 'social marketing.'" "Vivid, frightening images abound in social marketing for the same reason that home-alarm companies show criminals kicking in suburban doors: They get attention, stir feelings, and form lasting memories – making Gut sit up and take notice – and they are far more likely to influence behavior …" You have to "shock them and get their attention."

p. 149 – video news releases, where some company or agency prepares a finished video product that TV stations can easily use in their news reporting. This makes it very cheap and easy for the TV station to use. Usually, the fact that these came from a group with a vested interest never gets mentioned.

p. 150 – One technique for getting noticed <by media> is the sort camera-friendly stunt pioneered by Greenpeace – hang a banner from a bridge of climb a nuclear plant's cooling tower. Celebrities also help.

The book then goes on to track other examples of grossly distorting statistics, not supplying comparables, and not showing true sources of funding. **It extends it to scientists who move into advocacy / activist roles as opposed to sources of expert, balanced analysis.**

p. 151-2 – examines these approaches applied to climate change

"Some organizations certainly *try* to strike a balance between accuracy and effectiveness. A common way to do this is to prepare an informed, responsible, balanced report – and then publicize it with a simplistic and frightening press release." Then cites a good example regarding cancer, where the press release is extremely alarmist, even though the core message is actually positive (there will be more cancer because people are living longer).

p. 153 – "If press-release hype stayed in press releases, none of this would matter. But it doesn't, and this does matter. But most people, including reporters, read only the press release. This can directly drive the news cycle, capturing the media.

pp. 155-181 – Chapter 8 – All the Fear That's Fit to Print – a look at fear-mongering in the news media

If it bleeds, it leads. Media often focuses on extreme and misleading stories that, while true, don't reflect underlying reality and grossly distort empiric reality.

p. 159 – "The power of images to drive risk perception is particularly important in light of the media's proven bias in covering causes of death. … media give disproportionate coverage to dramatic, violent, and catastrophic causes of death – precisely the sorts of risks that lend themselves to vivid, disturbing images …" This leads to widely inaccurate estimates of risk among the general population. The text goes on to give several solid examples of this happening, broadly.

p. 160 – "… every newspaper and broadcast can be turned into a parade of improbable tragedy. Remove all professional restraints – that is, the desire to portray reality as it actually is – and you get the freak show that has taken over much of media: 'The main who was tied up, stabbed several times during sex, and watched as the woman he was with drank his blood is speaking only to ABC15!' announced the KNVX anchorman in Phoenix, Arizona."

"The skewed images of mortality presented by the media have two effects. As we saw earlier, it fills our memories with examples of dramatic causes of death while providing few examples of mundane killers – and so when Gut use the Example Rule, it will tend to overestimate the risk of dramatic causes of death while underestimating others. It also showers the audience with emotional images that drive risk perceptions via the Good-Bad Rule – pushing Gut even further in the same direction. As a result, it's entirely predictable that people would tend to overestimate the risk of dramatic deaths caused by murder, fir, and car crashes while underestimating such undramatic killers as asthma, diabetes, and heart disease. And that's what researchers consistently find."

p. 161 – **"Another <media> is failing to ask the question that is essential to understanding any risk: How *likely* is it?"**

Telling me that something *could* happen actually tells me very little. The usual problem is that media reporting tells *how many*, often using personal stories, but nearly never gives the underlying population data so I can estimate *how likely*.

pp. 162-4 – **calls out the fact that articles nearly never give comparative risks <proportional hazard models>; and gives examples to show that the common act of reporting relative rats is grossly distorting**.

p. 165 – **"Why do journalists so often provide information about risks that is misleading and unduly frightening? The standard explanation for media hype is plain old self-interest. Like corporations, politicians, and activists the media profit from fear."**

Then discusses why these problems with media are getting worse with time.

p. 167 – "For the most part, reporters, editors, and producers do not r=misrepresent and exaggerate risks because they calculate that this is the best way to boost revenues and please their corporate masters. They do it because information that grabs and holds readers grabs and holds reporters. They do it because they are human." 'Human beings have an innate desire to be told and to tell dramatic stories,' wrote Sean Collins, a senior producer with National Public Radio." <the Rule of Rescue, yet once again>

p. 168 – "In journalism schools today. Students are told there is a list of qualities that make a story newsworthy, a list that varies … but that always includes novelty, conflict, impact, and that beguiling and amorphous stuff known as human interest. <and stories always trump statistics> "So … what appears in the media – and what doesn't – can be explained by the instinct for storytelling."

p. 169 – the "death-per-news-story" ratio – the number of people who have to die from a given condition merit a story in the news. It required 8,571 deaths from smoking for each story on the BBC about smoking, but only 0.33 deaths from vCJD (mad cow disease) per BBC story.

p. 170 – The role of ongoing narratives (over stories) "An ongoing narrative is also highly valued because a story that fits an existing storyline is strengthened by that larger story." In one example, "Even the smallest story could be reported … because it didn't have to stand on its own strengths. … if the bigger narrative is considered important or compelling, not story is too small to run." The converse is true too – if a story is part of a larger narrative, or worse, if it contradicts a larger narrative, then it is far less likely to run. Uses the example of a fictional book called *The Hot Zone*, around the Ebola virus, which became a best seller and led to "endless stories" about "emerging virus threats." At the same time, a coup led to civil war in the Congo and central Africa (where Ebola emerged) and 3 million or more died, but the developed world hardly noticed. "The war fit no existing narrative …"

The text goes on to give several more examples of this, around nuclear waste leaks, domestic terrorism, a domestic suicide bomber, and a series of others.

p. 172 – Goes on to link in the **vividness** of the associated language (catchy, emotion-laden labels), and that bad news generally does better than good news. Media "accentuate the negative and eliminate the positive." Lots of examples – illicit drug prices, cancer rates, medical risks.

p. 174 – "As unfortunate as this bias may be, it is just as understandable as the tendency to prefer emotional stories over accurate data. 'We don't like bad news,' … 'but we need it. We need to know about it in case it's coming our way. Herd of deer in the meadow, heads down, grazing peacefully. Then *woof woof* – wild dogs in the woods. Heads up, ears forward. Prepare to flee!' It's a primitive instinct. … It's the way we are wired, reporter and reader alike."

"For a reporter, the natural bias for bad news is compounded by the difficulty of relating good news in the form of personal stories."

P, 175 – **"And this is just to speak of the *news* media. The bias in favor of sensational storytelling is all the more true in the *entertainment* media, because in show business there is not ethic of accuracy …"** Followed by lots of examples.

"It's the information equivalent of junk food, and like junk food, consuming it in large quantities may have consequences. When we watch this stuff, Head knows it's just a show … but Gut doesn't know any of that. Gut knows only that it is seeing vivid incidents

and feeling strong emotions and these things satisfy the Example Rule and the Good-Bad Rule."

p. 176 – Moral panics. "The media <news and entertainment> reflect society's fear, but in doing so, the media generate more fear, and that gets reflected back again. This process goes on all the time but sometimes – particularly when other cultural concerns are involved – it gathers force and produces the strange eruptions sociologists call a **moral panic**. Goes on to illustrate this with the idea of **road rage**. They bloom, then disappear. "When panics pass, they are simply forgotten …" Usually there is no empiric evidence that suggest the phenomenon that generated the panic every really existed. A moral panic often generates an ongoing 'over story' narrative, which results in lots of reporting of minor incidents.

p. 178 – "It takes more than the media and the public to create that loop, however. It also takes people and institutions with an interest in pumping up the fear, and there were plenty of those involved in the manufacture of the road-rage crisis … The term 'road rage' and the alleged epidemic 'were quickly popularized by lobbying groups, politicians, opportunistic therapists, publicity-seeking safety agencies and the U.S. Department of Transportation.' Others saw a good thing and tried to appropriate it – spawning 'air rage,' 'office rage,' and 'black rage.' … With road rage established as something that 'everyone knows' is real, the media applied little or no scrutiny to frightening numbers spouted by self-interested parties. 'Temper Cited as Cause of 28,000 Road Deaths a Year' read a headline in the New York Times after the head of the National Highway Transportation Safety Administration (NHTSA) – a political appointee whose profile grew in lockstep with the prominence of the issue – claimed that two-thirds of fatalities 'can be attributed to behavior associated with aggressive driving.' This became the terrifying factoid that gave the imprimatur of statistics to all the scary anecdotes. But a … NTHSA spokeperson, <when asked to explain>, said 'We don't have hard numbers but aggressive driving is almost everything …' With such a tenuous link to reality, the road-rage scare was not likely to survive the arrival of a major new story, and a presidential sex scandal and impeachment was certainly that. … the feedback loop was broken and the road-rage crisis vanished." A later assessment concluded that there was no empiric basis to believe that there had been a dramatic increase in aggressive driving and road rage.

The text goes on to recount a similar moral panic around shark attacks.

p. 180 – **"Storytelling may be natural. It may also be enlightening. But there are many ways in which it is a lousy tool for understanding the world we live in and what really threatens us. Anecdotes aren't data … no matter how moving they may be or how they pile up."**

Media stories are a major reason Gut so often gives us terrible advice.

pp. 182-217 – Chapter 9 – Crime and Perception

pp. 182-9 – A case study of pedophiles, predators, and child abduction, built on the principles developed above, with a heavy call out of media-driven moral panics, in detail (what should a child do if locked in a car trunk?). Gives the actual related risks in the U.S., Canada, and the UK., along with comparative risks (swimming pools, auto accidents, etc.) to children.

p. 187 – **defines *de minimis*** – "a risk so small it can be treated as if it were zero." "Sometimes as big as 1 in 10,000," but usually even smaller than that.

<Frank Drebin Naked Gun at the scene of a major heist – opening that electronic lock by chance was 1 in 100 million – "but it could have happened, right?">

p. 192 – "**So the media image of crime is upside down. The crimes that are by far the most common are ignored, while the rarest crimes get by far the most attention.**" This is then reflected in the risks that people perceive in their lives.

p. 193 – "**If the news media turn the reality of crime upside down, the entertainment media turn it upside down and shake it till coins drop from its pockets.**" "Ordinarily, we speak of *news* and *entertainment* as the two separate categories that make up media. But in the case of crime, there is the third category of true crime, in which the cases are real but the ethos of quality journalism does not apply." Some of true crime focuses on amusing the audience (e.g., the TV drama *Cops*) while others focus on the overdramatized reality: *Tears of Rage, No Mercy*, and *Public Enemies*.

p. 194 – **as a result of how media reports crime, most people have no idea of actual crime rates (real risks); and "Another consistent finding is pessimism. Crime is getting worse. Always.**" In direct contradiction of actual crime rate statistics, most people believe crime rates are increasing. Crime is seen as increasing *in the nation*, but falling *locally*

p. 196 – "The big question is whether the excessively grim and frightening image of crime that so many people have courtesy of the media translates into fear of crime. Sociologists have wrestled with this for decades. For the most part, they have proved there is an important correlation: **The more you read and watch, the more you fear**. … A steady diet of vivid, violent images allows Gut – using the Example Rule – to conclude the danger is high. And crime stories are drenched with powerful, awful emotions that will – thanks to the Good-Bad Rule – strengthen Gut's sense that this is a serious threat."

p. 197 – **"We live in an environment saturated with media offering stories of abduction, rape, and murder, of cruelty and innocence savaged, of loss and lingering sorrow."**

Links crime to human storytelling. Gossip about crime is a very addictive subject for storytelling.

p. 198 – "What's particularly intriguing about our interest in crime stories is how most such stories are obviously lacking in any objective importance, and how little that matters to those who follow them."

"As with all stories of loss, emotions are essential to crime stories, but the emotions crime stirs are often more potent and of a different quality. That's because they conjure not only sorrow, but anger." <the idea of outrage> But **"justice and safety are two separate issues."** The text relates interesting psychological research that teases out this issue. Crime, because of the anger / justice tie in, gets far more prominent emphasis.

p. 201 – "We feel more in response to violent crime than property crime. We feel more in response to murder than a punch in the nose. We feel more in response to the murder of a little girl than a young man. And **truth be told, we feel more for victims we can personally**

relate to than those on the far side of racial and class lines. The media's image of crime may turn reality upside down, but it is a very accurate reflection of our feelings." <links back to the foundational idea of in-group / out-group>

p. 202-214 – **adds in the political element**, how politicians uses crime as a political weapon. Lots of examples, across and within political parties, including intra-party uses that then escalate to the national stage. Biggest political gain comes from "More cops and tougher sentences." Links this all back to the core theories, developed above, regarding fear. Throws in special flavors of crime, like sex offenders. (p. 204) **"Press conferences in which politicians are flanked by grieving parents are a standard feature of this brand of political marketing. And legislation named for children who died in under circumstances that are both exceptionally awful and exceptionally rare – something that would have been considered unspeakably distasteful in another era – has become routine."** Shares outlandish, false, statistics that are aired to produce fear and outrage around sex offenses, then the real – and very, very much lower – statistics.

p. 206 – "The politicization of crime, and the "get tough" spirit that goes along with it, is far more advance in the United States than elsewhere, but … it is showing up elsewhere in the Western world." "zero tolerance," "truth in sentencing," "adult time for adult crime"

p. 207 – "**Politicians are far from alone in marketing crime** …" **Police** do it too, to enhance their budgets. **Government agencies** are another source of hype. **Unions** that represent prison employees. **Security consultants**. **School principals and staffs** (school shooter coverage in the news media is a classic example of the principles laid out here). Lots of specific examples in each category, along with the actual statistics. (p. 212) Despite all this, "Kids are far safer inside school walls than outside …" – again, with the real background statistics. "students' risk of being murdered in school was *de minimis* …"

p. 213 – "**When we succumb to wildly improbable fears, there are consequences**. Lock all the doors and treat every visitor as a potential homicidal maniac ... cutting ties to the community. Research around "zero tolerance" discipline showed it "can actually increase bad behavior and also lead to higher drop-out rates." Lots of follow on examples.

p. 214-7 – makes the case, using data, that crime rates – including murder – are dramatically lower than they were in times past. Deaths from war are down too. We're much safer, but also much more worried / fearful – all because of the hype laid out here.

pp. 218-245 – Chapter 10 – The Chemistry of Fear

Extends the whole argument, in all its parts, to fears regarding chemicals in the environment, food, water, and our own bodies. Links it all to fear of cancer.

p. 220 – 1962 = Rachel Carson's *Silent Spring*. Main focus on DDT and birds, but also called out cancer with misleading statistics. "Cancer" became a major fear word that emerged as other sources of death declined. In 1896, smallpox, lockjaw (tetanus), consumption (tuberculosis), hydrophobia (rabies), rail accidents, being burned alive, hit by lightening, diphtheria, leprosy, and pneumonia all ranked higher than cancer. A main reason cancer

emerged, beyond the fact that it's often a slow, hard way to die, was that all those other risks declined so precipitously and that people lived longer. There were increases in cancer rates, but it was driven almost exclusively by lung cancer = tobacco use – which Carson didn't mention. She believed that it was the chemicals added to cigarettes that led to cancer, not the tobacco itself.

<Silent Spring was a major overstory shift [Gladwell's *Revenge of the Tipping Point*]>

p. 225 – Occupation-based exposure to chemicals and pollutants accounts for about 4% of all cancers. Only about 2% result from exposure to "man-made and naturally occurring environmental pollutants." Notes that quite a number of these are naturally occurring. "of all dietary pesticides people eat, 99.99% are natural," while half of all chemicals tested – synthetic and natural" cause cancer in high-dose lab experiments. One knowledgeable expert asserts that less than 1% of all cancers result from synthetic chemicals.

p. 226 – … they believe that synthetic "chemicals are a major cause – some would say *the* major cause – of cancer. The interesting question is why? When there is such widespread scientific agreement, why do people persist in believing the opposite?" Higginson: **"I think that many people had a gut feeling that pollution ought to cause cancer."**

Paracelsus: "All substances are poisons; there is none that is not a poison. The right dose differentiates a poison from a remedy." "**Poison is in the dose.**" That's the way that toxicologists see it. "Consume even very lethal substances in a sufficiently tiny proportion and no harm will come of it."

p. 227 – Toxicologists "said they do *not* try to avoid chemicals in their daily lives, they are *not* bothered by the presence of trace contaminants, and they do *not* agree that any exposure to a carcinogen means that the person exposed is likely to get cancer."

Attempts to link the typical fear reaction back to the challenges faced by our ancient ancestors, facing poisons and infectious disease in the environment – "ancient aversion to contamination."

Example of astronomers noting that earth would pass through the tail of Haley's Comet, which contained cyanide. Resulted in panics, suicides, hoarding of oxygen bottles, etc.

p. 228 – " **… today we have technology that can dissect the components of drinking water to level of one part per billion – equivalent to a grain of sugar in an Olympic-size swimming pool – while even finer tests can drill down to the level of parts per *trillion*."**

p. 229 – describes how labs test for carcinogenicity, which involves giving massively high doses of chemicals to lab animals. **"Half of everything tested is a carcinogen in high-dose tests."**

Notes (again) that over half of all "carcinogens" found in this way, are natural – but Gut doesn't react to them the same way as it does to "man made."

Plus, do the bodies of mice and rats react to these chemicals the same way that human bodies would? Gives examples where it was unique to rats.

p. 230 – talks about limitations of epidemiologic studies for determining (causal) carcinogenicity. Uses example <obviously historically anchored> of the linkage between tattoos and crime. There is a strong association between having a tattoo and being a criminal. Do the tattoos cause crime?

To Gut, things labelled "natural" are safe (Good) – even for true, massive carcinogens like charcoal briquettes (cites an ad for charcoal, as being "natural"). "Man-made" and "chemical" are Bad.

p. 231 – cites that fact that media plays its usual misleading role, with examples. Adds in the role of self-serving politics / politicians.

p. 232 – "**Lichter and Rothman argue that the media's picture of cancer is the result of paying too little attention to cancer researchers and far too much to environmentalists."**

Lots of examples of environmental groups getting personal gain by scaring the public with stories of chemicals and cancer, taking advantage of media's predictable overreaction. Many examples of activists and the media using badly presented statistics (including use of relative rates and changes in underlying measurement methods over time, and the effects of [imperfect] screening programs) to misinform, mislead, and cause fear.

p. 239 – **the Precautionary Principle: " … until more is known, the sensible thing to do is err on the side of caution by banning or restricting suspected chemicals. Better safe then sorry, after all."** "Politicians and activists like to talk about the precautionary principle as if it were a simple and sensible direction to err on the side of caution. But there's nothing simple about it. Nor is it all that sensible." Follows with specifics and examples – like chlorine, which has well-established cancer risks, in drinking water. When eliminated in one South American community, it resulted in a major cholera epidemic. (also associated with typhoid fever)

p. 240 – revisits the dangers of naturally-occurring chemicals, with details and examples.

p. 241 – revisits **the story of DDT** (see Silent Spring). " … the first large-scale use of DDT occurred in October, 1943, when typhus – a disease spread by infected mites, fleas, and lice – broke out in newly liberated Naples, Italy. Traditional health measures didn't work, so 1.3 million people were sprayed with the pesticide. At a stroke, the epidemic was wiped out – the first time in history that a typhus outbreak had been stopped in winter. At the end of the war, DDT was widely used to prevent typhus epidemics among prisoners, refugees, and concentration-camp inmates. <he doesn't mention that typhus has probably killed more humans, across human history, than any other infectious agent, including the bubonic plague / Black Death> It also greatly reduced malaria, another true human scourge. Gardner then reviews the now well-established dangers of DDT to birds, the fact that many insect vectors developed resistance to DDT, and that we have alternatives.

All of this is to demonstrate that the Precautionary Principle is not a useful tool. Why do people still demand it? "The answer is simple: We pay close attention to some risks while

ignoring others, which … causes the dilemma of choosing *between* risks to vanish. Lots of examples follow, where wisdom demands that we balance competing risks.

p. 243 – **"With the culture having defined *chemical* to mean man-made chemical, and *man-made chemical* as dangerous, it is all but inevitable that our worries about chemical pollution will be out of all proportion to the real risks involved**." Confirmation bias is also at work.

p. 243-5 – **Gardner lays out what is necessary to make things actually work:**

1) **Healthy respect for the scientific process,** even though it takes time and effort, making mistakes then correcting them along the way.
2) **Accept that risk is inevitable.** It's a matter of balancing competing risks, rather than avoiding all risks.
3) **Understand that regulating risk is a complicated business**, that pretty much always involves tradeoffs, and often without perfect knowledge.
4) **Watch out for the Precautionary Principle** – it's a trap.

Unfortunately, there are lots of activists, politicians, and corporations who are not nearly as interested in pursuing rational risk regulation as they are in scaring people. After all, there are donations, votes, and sales to be had. Even more unfortunately, Gut will often side with the alarmists.

Bruce Ames: " … By most estimates, more than half of all cancers in the developed world could be prevented with nothing more than lifestyle changes ranging from exercise to weight control and, of course, not smoking. Whatever the precise risk of cancer posed by synthetic chemicals in the environment, it is a housefly next to an elephant."

pp. 246-288 – Chapter 11 – Terrified of Terrorism

Applies exactly the same treatment to fears around terrorism – 9/11, anthrax, etc. – tracing it back to the same set of culprits: Politicians and the media, heterodyning off one another. This is the most extreme argument for this sort of consistent behavior that the book contains, leading to things like the war in Iraq.

p. 248 – defines "optimism bias" – the tendency to see ourselves in a more positive light than we see the rest of population.

p. 249-x – lots of actual risks (at least back in 2007:

9/11:	1 in	93,000
Motor vehicle accidents:	1 in	6,498
Auto/pedestrian death:	1 in	48.548
Drowning:	1 in	87,976
Lightening (lifetime)	1 in	79,746
Venomous plant/animal (lifetime)	1 in	39,873

	Drowning in a bathtub (lifetime)	1 in	11,289	
	Committing suicide (lifetime)	1 in	119	
	Dying in a car crash (lifetime)	1 in	84	
p. 251	Death from a terrorist act (lifetime)	1 in	10,000 to	1 in 1 million

Risks from terrorism are *de minimus*

Others cited as annual death rates in U.S.:

Suffocated in bed	497
Accidental electrocution	396
Drowned in swimming pools	515
Riding a motorcycle	
Radon gas (basements) exposure	

p. 252 – **addresses weapons of mass destruction**. Main point: **They are exceptionally difficult for any group smaller than a government to prepare or execute**. (p. 254) "The demands <to acquire or create, then deploy WMDs> are so high that they 'appear, at least for now, to be beyond the reach not only of the vast majority of existent terrorist organizations but also of many established nation-states.'"

p. 254-6 – **example of the Aum Shinrikyo group in Japan**. Extremely well funded – as much as $1 billion, Able to recruit talented scientists. Worldwide reach – offices in Japan, Australia, Germany, Russia, and New York City. Attempted to develop nuclear weapons, but failed completely. Tried botulism toxin x2 – deployed in Japan, but no one got sick. Tried anthrax, also didn't work. "In all, Aum made 9 attempts to inflict mass death with two of the most feared bioterrorism weapons. They killed no one." So, switched to chemical weapons and nerve agents: mustard gas, sodium cyanide, VX, and sarin. Wanted to kill millions – mass death – but pretty much failed. Extensive nighttime sarin attack in Matsumoto, Japan, killed 7 and seriously injured 140. Attack on Tokyo's notoriously crowded subway system (5 separate attackers w 11 bags of sarin, releasing 159 ounces of sarin, killed 12, 5 critically injured, 37 severely injured, 984 w moderate symptoms.

"Aum's experience suggests – however counter-intuitively or contrary to popular belief – the significant technological difficulties faced by any non-state entity in attempting to weaponized and disseminate chemical and biological weapons effectively. … Aum scientists, socially and physically isolated and ruled by an increasingly paranoid leader, became divorced from reality and unable to make sound judgments."

p. 259 – **Panic is rare**. The idea that a successful terrorist attack will unleash a widespread panic in the population, leading to collapse of the civil order, is "based on a long-discredited myth: Decades of extensive research on how people behave in emergencies has consistently found that panic is quite rare. 'Even when people confront what they consider to be the worst case, they organize themselves to provide succor and salvation to their friends, and even to complete strangers.'"

p. 260 – **Very nice summary of the terrorist threat**: First, 9/11 was a dramatic deviation from what terrorism usually entails. Second, even including the toll of 9/11, international

terrorism poses an infinitesimal risk to the life of any individual American or any other resident of a Western country. Third, even if there were a long series of attacks in the United States, each on the scale of 9/11, the risk to any one American would still be much smaller than other risks people routinely shrug off. Fourth, outside of the Middle East and South Asia, the rate of international terrorist attacks has been falling for about a decade and a half. Fifth, it is very hard for terrorists to get their hands on, much less deploy, chemical, biological, or – especially – nuclear weapons, and even if they did overcome the many barriers between them and a successful attack, the toll would very likely be a small fraction of what we see in our nightmares. Sixth, even if terrorists succeeded in launch a truly catastrophic attack with a death tool many times that of 9/1 – such as detonating a nuclear bomb – the risk to any one person would still be small and the United States would remain the most prosperous and powerful nation in history.

p. 261- -- the book then details how politicians (particularly the George Bush administration) and the media used this for their own political and other gains.

p. 262 – "The failure of the administration to put the risk in perspective was total. The president never said that, as serious as terrorism is, it does not pose a significant risk to any one person. He never said, 'Calm down.' He never said, "You've got a better chance of being killed by lightning." Neither did any other major politician, Republican or Democrat. In June 2007, New York Mayor Michael Bloomberg came close. 'There are a lot of threats to you in the world,' he told the NYTimes. He rattled off a few, including heart attacks and lightning strikes. 'You can't sit there and worry about everything. Get a life!' … Only John McCain specifically instructed Americans to pay attention to <the actual risks>: 'Get on the damn elevator! Fly on the damn plane! Calculate the odds of being harmed by a terrorist! It's still about as likely as being swept out to sea by a tidal wave.'"

pp. 263-281 – catalogues how politicians used the resulting fear for their own ends (higher approval ratings), including the Wars in Afghanistan and Iraq, aided and abetted by the media.

p. 282 – notes that the primary aim of a terrorist attack is to provoke terror, and how this response played directly into that. "The framing of the attack as global war also ensured bin Laden would get the reaction he sought. The invasion of Afghanistan was supported worldwide, and if the administration had stopped there, bin Laden would have been disappointed. But a modest intervention in a backwater like Afghanistan hardly seemed fitting for the Third World War. And so it was on to Iraq – an invasion that seemed to confirm the Islamists' portrayal of America as a crusader nation bent on destroying Islam. … George W. Bush delivered overreaction on a scale that is the stuff of terrorist fantasies.

p. 283 – links all of this back to the core theory, as presented above: "In fighting terrorism, we have to recognize that terrorism is psychological tactic. Terrorists seek to terrify. Controlling fear should play as large a role in the struggle against terrorists as do the prevention of attacks and the arrest of plotters. We must, as Brian Michael put it, 'attack the terror, not just the terrorists.' … Attacking terror means, first, avoiding statements that paint the threat as something greater than it is. … Attacking the terror also means putting the risk of terrorism in perspective by supplying the statistics that politicians and the media have ignored. It would mean dropping the talk of fighting a Third World War." <see

following examples in text, of real threats – don't make the terrorists seem bigger than they really are.>

p. 284 – gives example of U.K.'s Tony Blair correctly responding (see above) to the terrorist attack of July 7, 2005, when suicide bombers struck London's subway trains and a bus, killing 56 people.

pp. 289- 304 – Chapter 12 – There's Never Been a Better Time to Be Alive

p. 289-90 – tells of a Canadian farm family in 1902 – the Mordens – that lost 6 children in a single wintertime bout of fever (diphtheria). Their neighbors the Ashtons lost 2 children to the fever.

"Cotton Mather, the Puritan minister in late seventeenth century New England, named one of his daughters Abigail. She died. So he gave the same name to the next daughter to be born. She too died. So he named a third daughter Abigail. She survived to adulthood but died giving birth. In all, Cotton Mather – a well-to-do man in a prosperous society – lost 13 children to worms, diarrhea, smallpox, accidents, and other causes. 'A dead child is a sign no more surprising than a broken pitcher or blasted flower,' he said in a sermon … 'The dying of a child is like the tearing of a limb from us,' wrote Increase Mather, Cotton's father.

p. 291 – "In 1878, the four-year-old granddaughter of Queen Victoria contracted diphtheria and passed it on to her mother, the queen's daughter. Queen Victoria was wealthy and powerful beyond compare and yet she could do nothing. Both daughter and granddaughter died.

"A vaccine created in 1923 all but eradicated the disease across the developed world and drastically reduced its toll elsewhere."

"The triumph over diphtheria is only one of a long line of victories that created the world we live in." … "the development of sewage disposal systems may have saved more lives than any other invention in history."

"In 1725, the average baby born in what was to become the United States had a life expectancy of 50 years. … <that> was actually quite high relative to England – where it was a miserable 32 years – and most other places and times. And it was creeping up. By 1800, it had reached 56 years. But then it slipped back, thanks in part to the growth of urban slums. By 1850, is was a mere 43 years. Once again, however, it started inching up. In 1900, it stood at 48 years."

p. 292 – (has citations for all of this, in the EndNotes) "The biggest factor in this spectacular change was the decline in deaths among children. In 1900, almost 20 percent of all children born in the United States – one in five – died before they were five years old; by 1960, that had fallen to 3%; by 2002, it was 0.8%."

p. 293 – “Anyone who has spent an afternoon in a Victorian cemetery knows that gratitude, not fear, should be the defining feeling of our age. And yet it is fear that defines us. We worry. We cringe. It seems the less we have to fear, the more we fear.”

p. 294 – a primary reason: The “omnipresent marketing of fear … Politicians, corporations, activists and nongovernmental organizations want votes, sales, donations, support, and membership …

“The media <and entertainment industry> are among those that profit in marketing fear – nothing gives a boost to circulation and ratings like a good panic – but the media also promote unreasonable fear for subtler and more compelling reasons. The most profound is the simple human love of stories and storytelling. … It has to be about people and emotions, not numbers and reason. … This isn’t a failing of the media so much as it is a reflection of the hardwiring of a human brain …”

“So why is it that so many of the safest humans in history are scared of their own shadows? There are 3 basic components at work: the brain, the media, and the many individuals and organizations with an interest in stoking fears. Wire these 3 components together in a loop and we have the circuitry of fear.”

p. 295 – Here find Gardner’s prescription for dealing with that problem, in the follow-on pages, are exactly what one would expect from the principles laid out above, with many, many more examples.

He goes on to review many examples of “experts” who predict pending doom.

p. 301 – “In a 2005 book called Expert Political Judgment, Philip Tetlock … presented the results of a 20-year project that involved … tracking the predictions of 284 political scientists, economists, journalists, and others whose work involved ‘commenting or offering advice on political or economic trends.’ In all, Tetlock checked the accuracy of 82,361 predictions and found the experts’ record was so poor they would have been beaten by random guesses. Tetlock also found, just as Baruch Fischhoff had earlier, that when experts were asked after the fact to recall their predictions and how confident they were, they remembered themselves being more accurate and more certain than they actually were. (Unlike the Israeli students Fischhoff surveyed, however, experts often got defensive when they were told this.)

Gardner’s point: We shouldn’t necessarily trust the purveyors of pending doom. He goes on to give a series of examples, like *Silent Spring*, that got it entirely wrong – plus books on famine, population bomb, Y2K bug, ‘near inevitable environmental and social collapses, threats arising from scientific advances’ … all with lots of follow-on media hype and amplification.

<Remember – fear sells.>

PEARLS BEFORE SWINE BY STEPHAN PASTIS