HOME, HOME ON THE RANGE: THE ADVANTAGE OF GENERALISTS OVER SPECIALISTS
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A well-schooled generalist will outshine a specialist at a cocktail party, with an ability to thoughtfully contribute to conversations on any topic. But does that skill translate to better problem solving in all disciplines? That was the question David Epstein set out to answer in *Range: Why Generalists Triumph in a Specialized World*. And, as advisors, we should be particularly interested in the answer as it pertains to the discipline of investing.

Everybody likes to be told they’re wonderful. I read Epstein’s *Range* with more than my usual enthusiasm. I’m a generalist, also called a polymath by those who love them and a dilettante by those who disdain them. I wanted to find out how my mile-wide, inch-deep knowledge of so many subjects is useful in life and admirable as a character trait.

What I got was a web of fascinating anecdotes, woven together by the theme I just stated, without a unifying theory or new way of looking at the world — which is what readers of quality popular-science books seek. *Range* is an easy, fun read. But, having placed itself in the big-think genre with a provocative one-word title alongside Geoffrey West’s *Scale*, Jared Diamond’s *Collapse*, and James Gleick’s *Chaos*, Epstein’s book does not measure up.

ON GENES, FAT CELLS, AND MUSCULAR ABNORMALITIES
Some of the anecdotes are truly impressive. Jill Viles, a teenage girl in Iowa afflicted with muscular dystrophy, found a genetic link between herself and an Olympic athlete in Canada, Priscilla Lopes-Schleip, with the *opposite* symptoms (muscular hypertrophy — big muscles — instead of dystrophy or wasting). What they had in common was a shortage of fat cells on their limbs, caused by a genetic defect. They had opposite symptoms because the defect was located at a slightly different place in the two women’s lamin-A gene. The discovery was a startling display of intuition by Viles, an untrained “generalist.”

But is Viles really a generalist, or a self-educated hyperspecialist on her own disorder, understandably obsessed since childhood with finding an explanation and possibly a treatment for her condition — and better informed on the topic than all but the most specialized neurologists? I’d go with this latter explanation. It often pays to be a generalist, but not in this case highlighted by Epstein.

By the way, there’s a happy ending. Viles is now 44, happily married, and has a son who does not carry the defective gene.

THE WICKED AND THE KIND
In Epstein’s formulation, a *kind* learning environment is one in which intense study, repeated practice, and diligence are rewarded because the environment does not change much over time. “Golf, chess, classical-music performance, firefighting, and
anesthesiology” are said to be kind learning environments.1 The only one with which I have any familiarity is music, but he’s right: when you practice a piece of classical music, you get better and better at it. The music doesn’t mutate while you’re mastering it, and audiences expect technical proficiency, not creativity; the composer provided the creativity.

I don’t agree with him on firefighting, where conditions change in an instant and every building or forest is different; and anesthesiologists also need to adapt quickly to unexpected troubles. But the basic idea is sound: some environments can be mastered through diligence, the “ten thousand hours” of practice that Malcolm Gladwell, in Outliers (another one-word, big-think title), said was needed for extraordinary achievement.

Most learning environments, however, are wicked, says Epstein. These favor adaptable generalists. In a wicked environment, what you learn in one place or time period does not apply in the next one and may actually hurt you. Business management, investing, the sciences, and the humanities are such environments. A writer who only studies the craft of writing and does not live an interesting life will have little to say. A jazz (not classical) musician who plays a song the same way every time will be unexciting.

Closer to home, investment trends have swerved from value to growth to international to hedge funds to indexing and private equity in a couple of decades. A business can mutate a half dozen times in its lifetime: IBM started out as an analogue calculator company, then a typewriter company, then a mainframe computer company, then a microcomputer company, now a technical services company. Only a generalist or, in this case because it took more than a century, a series of generalists could manage such wrenching transitions.

Isaiah Berlin, channeling the ancient Greek philosopher Archilocus, captured this distinction more poetically, categorizing people as foxes or hedgehogs: Foxes know many things, but hedgehogs know one big thing.

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Ilana Redstone, an author affiliated with the Heterodox Academy, captured this distinction beautifully (while admitting that it oversimplifies):

...Philip Tetlock, a professor at UC Berkeley, used this framework to examine the ability of “experts” to predict outcomes. Among other things (including an inverse relationship between fame and accuracy), he found that although hedgehogs were often quite persuasive in their language — perhaps in part due to the strength of their convictions — foxes tended to be much better forecasters.

There were several reasons for this: foxes possessed intellectual humility. More importantly, they were willing to update their beliefs when presented with new evidence. This contrasts with the hedgehogs, who would sometimes stretch their overarching narrative beyond any range for which it was originally intended, and more doggedly stick by their initial understanding of the world.

Of course, most — maybe all — significant accomplishment is achieved by those who are a cross between fox and hedgehog. As Epstein acknowledges, it takes both general knowledge and developed specific skills to do anything hard. Fox to hedgehog is a continuum.

THE BATTLE HYMN OF TIGER’S FATHER
You knew immediately whom I was talking about, didn’t you? Tiger Woods is one of the most famous people in the world, and he has never really done anything other than hit a ball into a tin cup a quarter mile away. There are other great golfers. But, for a long period, he was so much better than any of the others that a noted champion said Tiger was playing “a different game” from the one the speaker had mastered.

Can you imagine if a baseball player emerged who was so much better than other top players that, say, Alex Rodriguez would describe the new player as not playing baseball but a different game? Of course you can’t. That’s because the rewards for excellence in professional sports are so large, and the competition so tough, that the highest achievers cluster together, having similar records.

But Tiger stood out from a hypercompetitive crowd in exactly the way you wouldn’t expect.

Epstein, a sports writer by background, observes that the young Tiger didn’t want to do anything but play golf. At the age of three, “the boy shot 48, eleven over par, at a nine-hole course in California.”

2 https://heterodoxacademy.org/prepare-students-foxes/
3 Babe Ruth hit 60 homers in a season, the all-time record for decades. The much less well-known Jimmie Foxx and Hank Greenberg, playing in roughly the same era against similar pitching, both hit 58.
4 A par 37 nine-hole course is a difficult course, not one designed for children or beginners.
boy as allow the boy to pull him relentlessly. The elder Woods was responding to an intensely felt and completely unanticipated need and did the best he could.

**THE LAID-BACK EUROPEAN UPBRINGING OF ANOTHER CHAMPION**

The Woods story, however, is an intentional misdirection. Epstein wants to *dispel* the notion that grit, single-minded focus, and 10,000 (or many more) hours are the sure path to reward. He immediately segues into a contrasting tale that suggests the grit theory is probably wrong, and cites the great tennis player Roger Federer as an example.

It was obvious to Federer’s Swiss parents at an early age that he was athletic, but he didn’t focus on any one sport. “As a boy, he played squash...[and] dabbled in skiing, swimming, wrestling, and skateboarding,” Epstein writes. “He played basketball, handball, tennis, table tennis, badminton over his neighbor’s fence, and soccer at school... Rather than pushy, a *Sports Illustrated* writer would observe that his parents were, if anything, ‘pully’,” urging him to “stop taking tennis so seriously” as he got older.

When the two men met for the first time in 2006, both at the peak of their respective games, Federer was a bit baffled by Woods. “I’ve never spoken with anybody who was so familiar with the feeling of being invincible,” Federer recalls. “Even as a kid his goal was to break the record for winning the most majors. I was just dreaming of just once meeting Boris Becker or being able to play at Wimbledon.”

Unlike Woods, Federer experienced what Epstein calls a “sampling period” wherein a young person (or, I guess, an older one) can try on various roles in life and figure out what they’re good at, what is financially or spiritually rewarding, and so forth. Federer also sounds like a much better-adjusted human being than Woods.

Epstein sums up the tale of Roger versus Tiger by noting that many generalists have done well in the world, often outside their initial fields of interest:

> [S]ome of the people whose work I deeply admired from afar — from Duke Ellington (who shunned music lessons to focus on drawing and baseball) to Maryam Mirzakhani (who dreamed of becoming a novelist and instead became the first woman to win math’s most famous prize, the Fields Medal) — seemed to have more Roger than Tiger in their development stories.

And, as Epstein notes, Charles Darwin started out on a path to become a medical doctor and then a preacher. Vincent van Gogh pursued a haphazard assortment of careers before settling on painting, “inspir[ing],” writes Epstein, “a widespread devotion that no artist, perhaps no person, has equaled.”

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5 I’d quarrel with that: Shakespeare and Beethoven have adherents who are just as passionate; I am one. But van Gogh’s art speaks to almost everyone, and is just as fresh now as it was in 1890, when he died.
**THE TRAGIC CASE OF THE FAILED O-rings**

Epstein uses the Challenger disaster of 1986, in which the space shuttle exploded after the rubber O-rings used to join sections of the booster rocket failed, to illustrate the severity of the errors caused by overspecialization. The explosion killed all seven crew members, including two civilians.

The weather in Florida, where the launch was to take place, was unusually cold — about 40 degrees Fahrenheit — and NASA and Morton Thiokol engineers were concerned that the O-rings might fail. (Morton Thiokol was the manufacturer of the booster rocket.) After much debate, both teams gave the fatal go-ahead to launch the rocket, basing their recommendation on an analysis of previous O-ring problems, illustrated in Exhibit 1:

**EXHIBIT 1**
**PREVIOUS O-RING DISTRESS INCIDENTS GRAPHED AGAINST AMBIENT (OUTDOOR) TEMPERATURE: PROBLEMATIC LAUNCHES ONLY**

In the exhibit, there is almost no correlation between temperature and O-ring distress, although you could visually fit a slight negative relation (cold being worse than normal or hot temperatures) if you wanted to hang your hat on so few data points. The engineers who gave the go-ahead relied on this sparse data set.

What information was missing? Clearly, with hindsight, it was the launches that did not have an O-ring problem, as shown in Exhibit 2, which includes all launches, problematic and trouble-free:

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6 Source: Ranney, Gipsie. Undated. “Blind Spots in Learning and Inference.” *The Systems Thinker* (online), https://thesystemsthinker.com/%EF%BB%BFblind-spots-in-learning-and-inference/. In Epstein’s book, the data are deliberately misrepresented as engine failures in race cars, for the purpose of teaching students about risk management, but he later reveals that they are data on O-ring distress (both erosion, which has never been fatal, and gas “blow-by,” which destroyed the Challenger) on the space shuttle. Here, for clarity, I use the properly labeled data from Ranney.
EXHIBIT 2

PREVIOUS O-RING DISTRESS INCIDENTS GRAPHED AGAINST AMBIENT (OUTDOOR) TEMPERATURE: ALL LAUNCHES

Exhibit 2 makes it painfully and tragically obvious that there is a correlation between temperature and O-ring distress: all of the launches at temperatures over 76, and all but one at temperatures over 69, were problem-free. All of the launches at temperatures below 64 were problematic. Launching at 40 degrees should have been out of the question.

While Epstein does not specifically blame the problem on overspecialization, the context in which he presents the case study makes it seem that way. In my view, though, the conflict was not between specialists and generalists at all — quite a few specialist engineers called for caution and were outvoted — but between sober analysis and the do-or-die culture of the organization.

Yale professor Edward Tufte, a statistician, graphic artist, and sculptor, presented the exact same analysis in his magnificent Visual Explanations, a 22-year-old book that is known to everyone who deals with data. It is not an obscure work — it is an acknowledged classic that, along with its three companion volumes, did present a new way of looking the world, the thesis being that the beauty and efficiency with which data are portrayed graphically are critical to affecting outcomes, including life-and-death ones. While the data are public information and anyone can write about them, Epstein should have acknowledged Tufte’s role, especially given that Tufte testified in Congressional investigations of the Challenger disaster.

THE MOST IMPORTANT EQUATION IN THE WORLD

If you’re deciphering the architecture of the universe, or building a nuclear power plant, then E=MC² is pretty darned important. But if you’re trying to make decisions with

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7 Source: Same as Exhibit 1.
limited information, then the most important equation in the world is Bayes’ theorem, set forth by Reverend Thomas Bayes in 1763:

\[ P(A|B) = \frac{P(B|A) \cdot P(A)}{P(B)} \]

where \(A\) and \(B\) are events and \(P()\) means probability.

In English, the probability of event \(A\) occurring, conditional on event \(B\) occurring, equals the probability of event \(B\) occurring conditional on \(A\), multiplied by the ratio of the probabilities of the two events.

Still mystified? So are most people. Epstein gives a helpful example. Consider a physician making a diagnosis. The disease for which the doctor is testing is present in 1 of 1,000 patients, and the test has a 5% false positive rate. Assuming you know nothing about the patient’s symptoms, what is the likelihood that a patient who tests positive for the disease does, in fact, have the disease?

“The correct answer is that there is about a 2 percent chance,” Epstein writes. He continues,

Only a quarter of the physicians and physicians-in-training got it right. The most common answer was 95%... In a sample of 10,000 people, 10 have the disease and get a true positive result; 5%, or 500, will get a false positive; [so] out of 510 people who test positive, only 10, or 1.96%, are actually sick.

This is a straightforward application of Bayes’ theorem. I’ll skip the step where we fit the problem to the equation; Epstein’s numerical explanation is good enough. The interesting part is that the missing information for the doctors who got it wrong — the base rate of 1 in 1,000 — was right in front of their face. It was just missing from their mind, from their field of view. And it was the key to getting an answer that is even close to being right.

*Repeat after me, “What is the base rate?” If you train yourself to ask this question when trying to figure out the probability of something happening, you’ll be way ahead of the game. “The base rate,” of course, means “the probability of that event happening in the absence of any other information.”*

Most people learn Bayes’ theorem at some point in their business education, or in math or statistics class or maybe in the social sciences. But very few fully appreciate what it means. That may be because the professor teaches the principle in terms of “priors” (which sound like silly preconceived notions) and “Bayesian adjustments” to the priors, based on “updated” information. But the prior, the base rate, is the most important piece of information. That’s what the professors leave out.

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9 The work, *An Essay towards solving a Problem in the Doctrine of Chances*, was posthumous. Bayes died in 1761.
If *Range* does nothing else, it is valuable in that it hammers this point into the reader’s head. How often do O-rings fail, out of all trials at all temperatures, not just in cold weather? What is the likelihood that the patient is sick, both before and after getting the knowledge that the diagnostic test is positive?

This is how generalists think, suggests Epstein. But properly trained specialists think this way too, if they are any good. The O-ring disaster and the misdiagnosed patient represent failures of both general and specialized education, and cannot be attributed to too much narrow knowledge.

**Recommendations for Readers**

When I finished *Range*, I felt that I had read a psychology book. (The chapter title, “Flirting With Your Possible Selves,” is a tipoff.) *Range* is a suite of compelling narratives, linked by a common thread — generalists outperform in unkind learning environments, which are the conditions most of us face — but it does not present a new theory or way of looking at the world.

That is not so much a criticism — if Epstein doesn’t have a new theory, it’s just as well he didn’t make up a pretend one — as an unfair comparison with the greatest popular science books, which do open the reader’s eyes to a new view of nature and mankind. This one does not measure up by that lofty standard. But it’s still good summer reading, and serves as a welcome encouragement to generalists who have lost status and opportunity in an age that reveres technical expertise. History majors, take heart!

And Epstein is right that the most successful people will be those whose knowledge is what he calls “T-shaped” — both broad and deep — or, even better, M-shaped (broad in many areas and deep in a few adjacent ones). These shapes support the idea that general and specialized knowledge are both important. You don’t need to go back to the age of Leonardo da Vinci to excel as a jack-of-all-trades and master of at least one.

**Advice for Investors**

Robert Hagstrom, author of the top-selling book, *The Warren Buffett Way*, wrote that investing is “the last liberal art,” the last refuge of the generalist. In his book with that title, Hagstrom recalled a talk by Charlie Munger, Mr. Buffett’s sideman:

Rather than discussing the stock market, he intended to talk about “stock picking as a subdivision of the art of worldly wisdom.” …[H]e challenged the students to broaden their vision of the market, of finance, and of economics in general; to see them…as part of a larger body of knowledge…that…also incorporates psychology, engineering, mathematics, physics, and the humanities…[E]ach discipline entwines with, and in the process strengthens, every other.

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10 Although, mystifyingly, Epstein never refers to Bayes by name or uses the words “Bayes’ Theorem.”

By integrating all these disciplines, Hagstrom concluded, the student of markets can create “a latticework of mental models” that helps him or her better negotiate an often hostile terrain.

In the same spirit, Gary Hoover, the polymathic businessman and business historian who founded Bookstop,\(^\text{12}\) wrote a book called *The Art of Enterprise*, which described entrepreneurship as “applied social science.”\(^\text{13}\) Business management and investing had better be undertaken by people with at least a little of the generalist in them, because they operate in an environment as wicked as one is likely to encounter.

In the investment field, we are often told to pay attention to alphas, betas, standard deviations, and correlations — the language of specialized expertise. I’ve argued elsewhere that such knowledge is important.\(^\text{14}\) But investors also face the challenges of bull runs and bear raids, snake oil salesmen, black swans, and red herrings (a quasi-sarcastic term for private equity documents that promise boundless riches that rarely materialize). Are investors operating in a zoo?

Yes — the human zoo, with all the frailties that human beings have displayed since the beginning of time. To navigate this often unkind environment, one must be a zoologist, or, as we call students of the human zoo, generalists or humanists. First and foremost, we must understand the past and its endless variations on a few themes, notably greed, fear, and ignorance.

But we must also understand the upside, or we could not in good conscience be investors. We must observe that living conditions have been improving for at least two centuries and are likely to keep doing so for many more. Business men and women, scientists, engineers, artists and writers, and many others have contributed immensely to this Great Enrichment.\(^\text{15}\) By investing wisely, one can participate in its continuance.

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\(^{12}\) The first book superstore (founded 1982), which was acquired by B. Dalton and later sold to Barnes & Noble, thus forming the basis for Barnes & Noble Superstores.


\(^{15}\) Deirdre McCloskey’s term (from *The Bourgeois Virtues*, University of Chicago Press, 2006), echoed in my forthcoming book (*Fewer, Richer, Greener*, Wiley, late 2019, [http://www.fewerrichergreener.com](http://www.fewerrichergreener.com)). McCloskey is one of the greatest generalists in economics, having held at the same time appointments in six departments at the University of Illinois at Chicago: economics, history, English, communication, philosophy, and classics. (In the last two, she was an adjunct.)