

Seeds of Thought

Cognitive Science Meets Investment Management

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Why the World Appears More Uncertain

In Image 1¹, you will see the counties in the lowest decile of the kidney cancer distribution. As soon as we see an image like this, our brains immediately set about the task of explaining why it is that the healthy counties appear to be mainly rural. Perhaps it is a result of breathing in unpolluted air, consumption of fresh food delivered straight from the farm to the table, or maybe it's the availability of clean water delivered by tranquil streams. As it turns out, the explanation has nothing to do with the environment or lifestyle, but I'll come back to this in a moment.

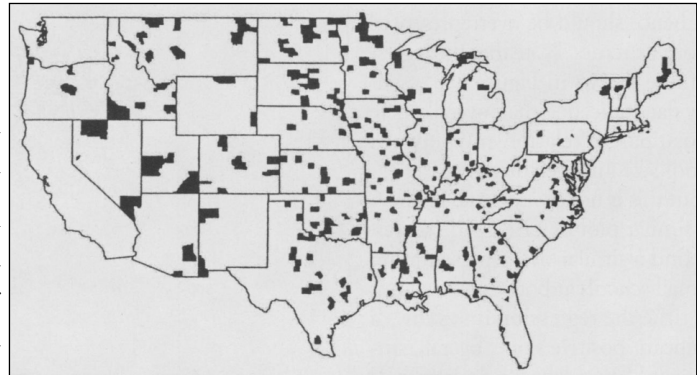
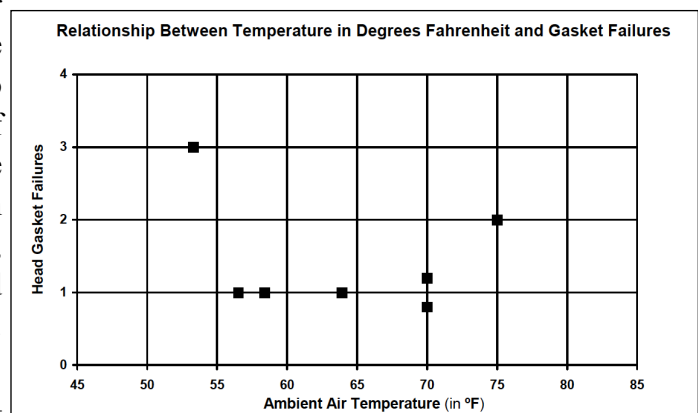


Image 1: Counties with the lowest 10% age-standardized death rates for cancer of the kidney/ureter for US males, 1980-89.

A young auto racing team has had a phenomenal year, finishing in the top five in 12 of the 15 races it completed. Unfortunately, the car failed to finish due to a blown engine in the other 7 outings. A decision needs to be made whether or not to enter the final race of the season on this particularly cold morning. Several major sponsors have taken notice of their performance and the team is on the cusp of moving from struggling upstart to a power player with significant financial resources. If they finish in the top 5 again today, they will certainly hit the tipping point to success. However, another blown engine will likely send them back to square one, or worse. Their engine mechanic, a true “grease monkey” believes the problem has something to do with ambient air temperature, but the chief mechanic, an engineer, disagrees. As proof, he provides the air temperature for each race in which they experienced a blown gasket, highlighting the fact that the problems occurred across a full range of temperatures (see Figure 1²). More on their decision in a bit.

Baseball has just entered the postseason, that moment when the 30 teams that have been competing to win the World Series are reduced to the top 8.



¹ [The Phi Delta Kappan, Vol. 88, No. 4 \(Dec., 2006\), pp. 300-303](#)

² <http://heller.brandeis.edu/executive-education/maine-2012/may/pdfs/BHLP-102-READING-Carter-A.pdf>

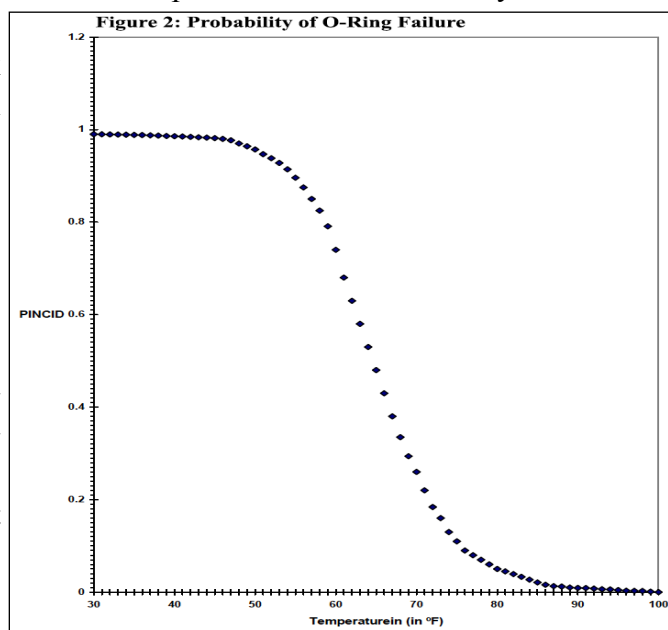
It's also the time when experts begin making predictions. As it is with all sports, the experts place great emphasis on momentum, particularly recent momentum. As an example, here is how one article on SBNation.com begins. "Rule No. 1 of predicting the postseason: Pick a very strong team. The Blue Jays are rolling. They have the best team, clearly." It isn't just the "experts" though. We all do it. For instance, if you were attempting to predict the outcome of the very next at-bat for a major league baseball player, which of the following do you believe would offer the most predictive value?

1. His batting average over the last five plate appearances
2. His batting average over the last five games
3. His batting average over the last month
4. His batting average over the season so far
5. His batting average over the previous two seasons

If you're like most people, you would order the predictive power exactly as it is above. However when Moskowitz and Wertheim³ studied all MLB hitters over an entire decade, it was the batting average of the previous two seasons that offered the most predictive value. In fact, if you wanted to order the list above from most valuable to least in predicting the outcome of a batter's next time at the plate, you'd need to flip it completely. Interestingly, they found the same results when applied to the NBA, NFL, NHL and European Football.

Let's return back to the question facing the owners of that auto racing team. Unfortunately, because the chief mechanic had framed the data in a narrow way, the key decision makers hadn't thought to ask the simple, but important follow up question, "What were the temperatures when the engine did not fail?" Had they done so, they would have quickly discovered that temperature was indeed a key factor in the failures. Truth is, the story of the racing team as presented here is a fictitious one, created by Jack Brittain and Sim Sitkin as a case study for decision making. However, the data provided and the decision of "Go" or "No Go" was a very real one faced by the engineers at NASA ahead of the launch of the space shuttle, Challenger. Unfortunately for all involved, because the problem was initially framed very narrowly, some rather informative data, the kind that surely would have resulted in a "No Go" decision on that cold morning (see Figure 2), was missed.

This is such a powerful story, because it shows that even the smartest among us are vulnerable to poorly framed problems resulting in all the difficulties that come with overvaluing small sample sets. Truth is, the annals of history are littered with similar mistakes by equally intelligent, educated and successful individuals, which is why it shouldn't be hard to believe that this same mistake is made on a regular basis by professional investors, including the most successful ones.



³ [Scorecasting: The Hidden Influences Behind How Sports Are Played and Games Are Won](#)

Let's return to where we started this edition, by contemplating why it is that rural living results in lower incidents of kidney cancer, but first, some additional information before we get too deep in the creation of an intelligent sounding narrative. Image 2 shows the counties in the *top* decile of the kidney cancer distribution. Once again, rural areas dominate. If you had been presented with this image first, you would likely have jumped to the conclusion that the high rates might be due to higher poverty rates, limited access to proper medical care, greater propensity for smoking and drinking alcohol, or perhaps diets that tend to be higher in fats.

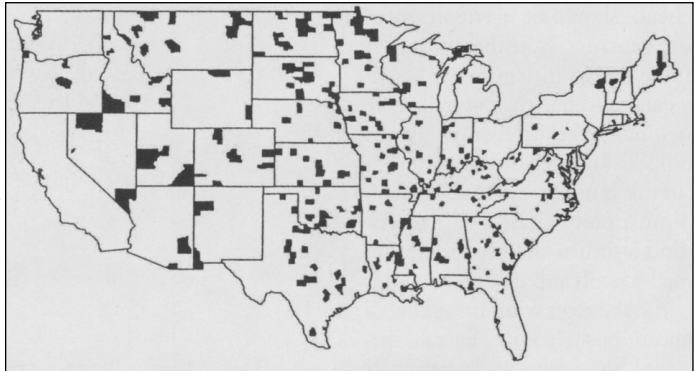


Image 2: Counties with the highest 10% age-standardized death rates for cancer of the kidney/ureter for US males, 1980-89.

The truth is, there is no valid narrative that can accurately explain the phenomenon. It is merely a function of studying a small sample set, but rather than chalk it up to the random, highly variable nature of small sample sets, we intuitively set about the task of generating a story that can explain it. Unfortunately for us, regardless of what we desire, small towns represent small sample sets and small sample sets typically exhibit greater variability and so tend to be overrepresented in the tails, both of them. It really is that simple.

Back in 1984, a little known paper⁴ was written by Robert Abelson of Yale University where he proved mathematically that the percentage of variance in any single batting performance for major league baseball players explained by skill is less than one third of 1%. The author's hypothesis, which led to the proof was that "many games are decided by freaky and unpredictable events such as windblown fly balls, runners slipping in patches of mud, baseballs bouncing oddly off outfield walls, field goal attempts hitting the goalpost, and so on... The ordinary mechanics of skilled actions such as hitting a baseball are so sensitive that the difference between a home run swing and a swing producing a pop up is so tiny as to be unpredictable, thus requiring it to be considered in largely chance terms." While proving that skill played a minuscule role in an individual swing and at-bat, he did acknowledge that over sufficiently lengthy periods, skill was indeed a significant factor.

Considering the high degree of variability and uncertainty inherent in very short term results, not to mention the volumes of research proving that small sample sets are more volatile, less predictable and less informative, it should make you question the decision making ability of portfolio managers, CIO's and asset allocators who, in the face of turmoil and uncertainty, actually *shorten* their investment horizon. Although it appeals to our intuition and therefore *feels* right, focusing on progressively shorter term price action in order to gain greater control of your p&l volatility is quite simply, irrational.

By shortening your time horizon, allowing both short-term price action and every individual data point, including non-farm payrolls, to drive your investment decisions, you are in fact increasing the influence of noise over signal, randomness over predictability, and injecting volatility into both your thought process, and results. Ironically, as more and more investors and their money managers attempt to reduce volatility and increase their sense of control by becoming hyper focused on what has just happened, their

⁴ [A Variance Explanation Paradox: When a Little is a Lot by Robert P. Abelson, Yale University](#)

decisions become more sensitive to noise and their results more volatile. With this behavior having become so pervasive, it's no wonder markets appear more volatile and less predictable these days. When you shift your focus away from the big picture, where trends are far more apparent and explicable, it's only natural that the world would appear to be less certain, more volatile.

The truth is, we can't actually explain every tick in the S&P 500 or weekly move in wheat. In the scheme of things, these are little more than random events. When we continuously attempt to create seemingly coherent narratives to explain what are essentially random events, we will naturally experience more moments when our expectations are proven wrong than when we weren't so myopic. Rather than accept responsibility for the mistake, we tend to place blame externally, which in this case leads to the explanation that the world no longer makes sense, that it is more volatile and uncertain. But, if we step back a bit, pull those charts back, consider what the really big forces are that are truly driving global economics and financial markets, we can see that the world hasn't actually become more uncertain. The uncertainty is merely a function of how the problem is being framed, which is leading to poor decisions, lower returns and greater volatility, en masse. When that occurs, risk parameters tend to be tightened up even more, thereby exacerbating the problem, which is where we find ourselves today.

About the Author

For nearly three decades, Stephen Duneier has applied cognitive science to investment and business management. The result has been 20.3% average annualized returns with near zero correlation to any major index, the development of a billion dollar hedge fund, the turnaround of numerous institutional trading businesses and career best returns for experienced portfolio managers who have adopted his methodologies.

Mr. Duneier teaches Decision Analysis in the College of Engineering at the University of California Santa Barbara.

Through Bija Advisors' publications and consulting practice, he helps portfolio managers and business leaders improve performance by applying proven decision-making skills to their own processes.

As a speaker, Stephen has delivered informative and inspirational talks to audiences around the world for more than 20 years on topics including global macro economic themes, how cognitive science can improve performance and the keys to living a more deliberate life. Each is delivered via highly entertaining stories that inevitably lead to further conversation, and ultimately, better results.

Stephen Duneier was formerly Global Head of Currency Option Trading at Bank of America and Managing Director of Emerging Markets at AIG International. His artwork has been featured in international publications and on television programs around the world, and is represented by the world renowned gallery, Sullivan Goss. He received his master's degree in finance and economics from New York University's Stern School of Business.

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