

Visionary Risk & Resiliency Leadership:

Anticipatory Foresight for Risk and Resiliency

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Lipscomb University

DRJ Spring 2020 World Conference
A Clear Vision of Risk & Resiliency
GENERAL SESSION 6

Coronado Springs Resort, Walt Disney World
Reedy Creek Improvement District, FL
Wednesday, March 18, 2020
10:45 a.m. – 11:45 a.m.

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Risk and Resiliency Decisions? Decisions?



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Decision Framing

“Framing” a problem in many ways shapes how we make decisions, what we decide, and why we make decisions in the first place.

Finding better solutions for complex challenges may be the goal but “mis-framing” problems too often leads to finding less than better answers and decisions.



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Reframing Decision Making

Too often we frame or think of crisis decision making as a process of developing and applying “expertise” skills learning – such as tasks performed during surgery, playing an instrument, cabinetmaking or plumbing – in which one performs better with more practice and experience.

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Reframing Decision Making

But *pipes and fittings*, even with surprises discovered, don't actively compete against or evolve in such a way that this time the fitting which worked previously is suddenly incompatible or simply the wrong choice.

Risk & resiliency leadership must be framed as an inherently adaptative process – because the variance makes every situation unique and dynamic.



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Reframing Visionary Decision- Making Processes

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Mistaking Hindsight as Foresight

One common tendency is to confuse
foresight with hindsight.

Too often believing that if they have been successful (even if due to chance, good fortune or luck) that they will be so again – if they do the same things in the same ways.

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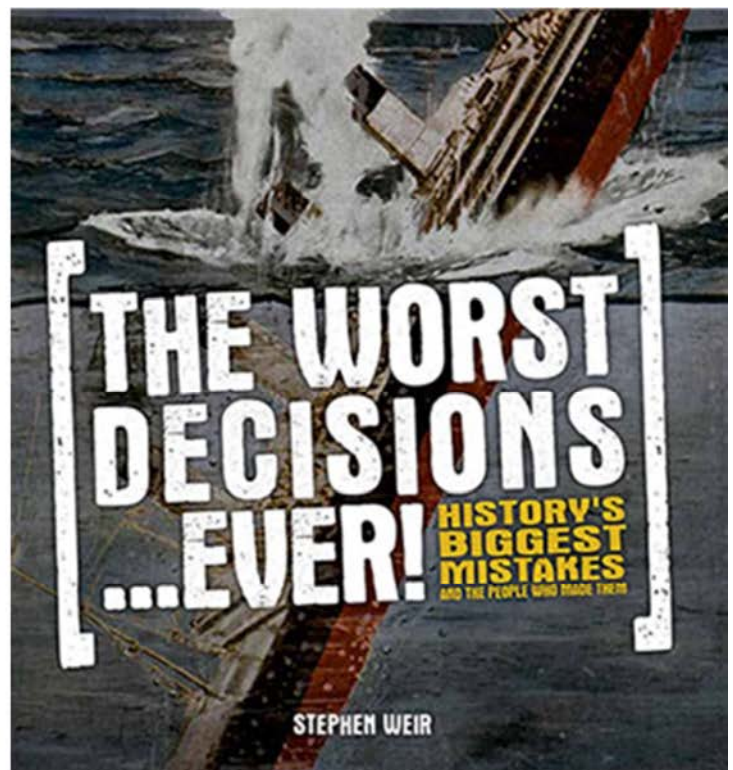
Lack of Scanning Vision

Failing to foresee consequences!

It is difficult (impossible) to perceive or take into account all of the relevant decision and consequence elements.

Not “seeing” all the factors, situations or implications can make it very difficult to forecast or predict consequences.

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**Past Performance is
No Guarantee of Future
Performance.**

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A more powerful predictor of good decision making is adaptive performance decision making – adapting to the unique situation, recognize variations and have a good grasp of the relevant factors in the next crisis.

**Visionary
Forecasting**



However doing this successfully requires accurate forecasts of future consequences for events - as well as the intended (and unintended) effects of our decision actions.

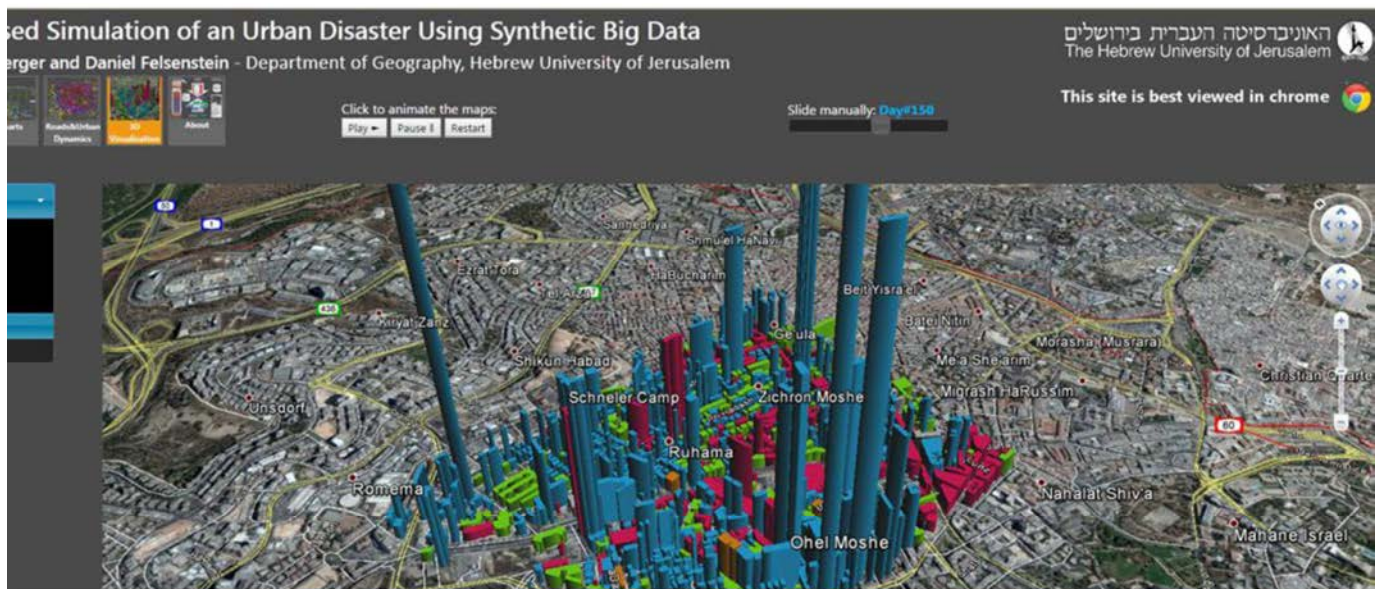
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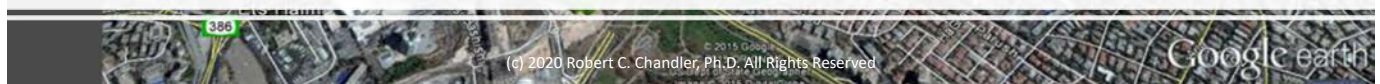
It is Difficult to Accurately Forecast Forward

- Visionary predicting or forecasting forward with accuracy is difficult for humans:
 - What will make me happy in life?
 - What career should I choose?
 - How (in what) should I invest for the coming decade?
 - Will I still like this new tattoo after I "sober up?"
 - Should I eat another jelly doughnut?

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Forecasting for Risk, Crisis and Disaster Contexts is Also Complicated



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It is Difficult to Accurately Predict Earthquakes



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Earthquakes tend to occur in locations along well-known seismic fault zones.

For places with a high rate of historic activity, the chances that an earthquake will occur in a future period (years, decade, centuries, etc.) can be quite high.

Anticipating an earthquake

Seismologists at UC Berkeley have created an earthquake early warning system similar to one being used in Japan that can send out warnings of earthquakes to your computer or mobile device seconds to minutes in advance. Here's how the system works:

- 1 When an earthquake occurs, it sends out three different wave types: P-waves, S-waves, and surface waves. The P-wave is the fastest and travels the farthest.
- 2 Sensors detect the P-wave and immediately transmit data to an earthquake analysis center where the location and size of the quake are determined. The P-wave and S-waves are the wave types that mark the start of potential damage from shaking. They follow the P-wave.
- 3 An alert from the analysis center is immediately transmitted to your computer or mobile phone. Using GPS coordinates, the system calculates the arrival time of the shaking.

Why is it so Difficult to Predict Earthquakes?

Actually, longer range prediction models of earthquake probability in specific geographic area are actually fairly accurate.

However, if the very same models are used to calculate the chance of an earthquake occurring in a specific area (e.g. southern California) *within the next week*, the prediction accuracy odds drop dramatically (usually in the 0.02% prediction accuracy range).

Surface wave

Sensors

Earthquake analysis center

There are 400 sensors positioned throughout California approximately

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Why is it so Difficult to Predict Earthquakes?

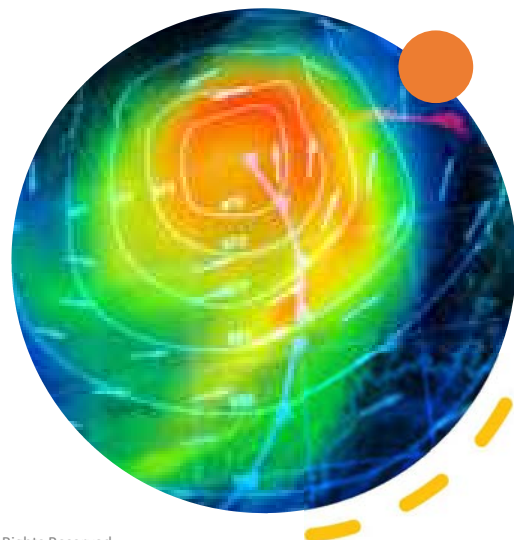
- Reliable predictions require identifying the precursors – various kinds of relevant signals in the earth that indicates an earthquake is on the way. These signals have to be unique forewarnings, they have to be consistent, they have to be identified, recognized and understand – and the decision-making process must take these factors into account in a timely and practical process.
- As of now, seismologists have failed to identify the master list those key precursors with high certainty – if they even exist - nor have they determined how to interpret them consistently.
- And.....predicting earthquakes is one of the easier of the forecasting problems.



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It is Difficult to Predict the Weather

- First, to give credit where credit is due: Weather forecasters have improved their game significantly over the last century.
- The “*three-day forecasts*” they deliver today are significantly more accurate than the “*one-day forecasts*” they delivered as recently as just 20 years ago.
- They're also much better equipped to provide advanced warnings of severe weather, for example - doubling the lead times for tornado warnings and giving people an extra 40 minutes to escape flash floods.

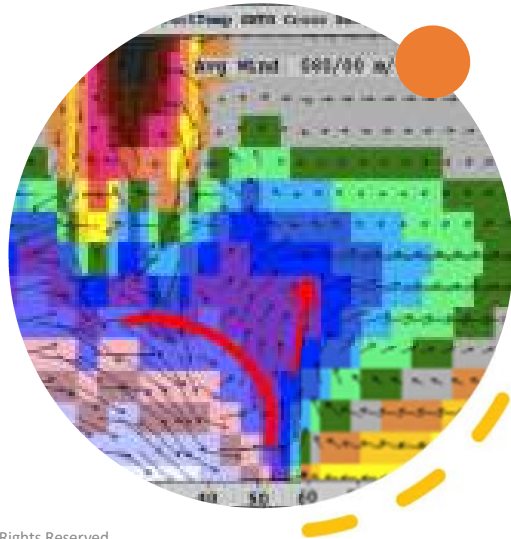


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Why is so Difficult to Predict the Weather?

Furthermore, **Short-term** weather forecasts (say, for today or tomorrow morning) are reasonably accurate (most of the time).

They aren't perfect, of course, but the vast majority of them are reasonably close to what actually does occur.

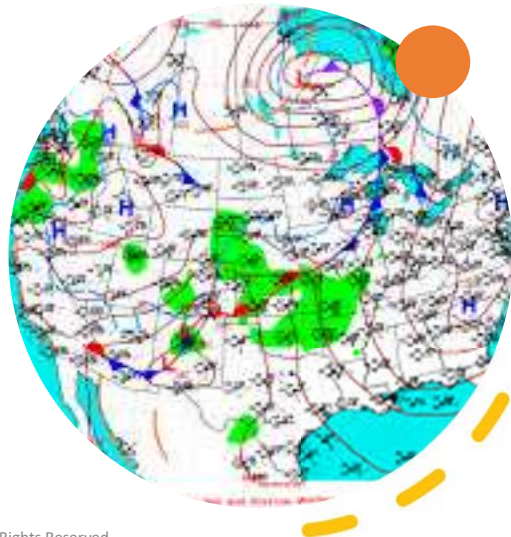


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Weather Results from a *Nonlinear Dynamical System*

However, forecast accuracy declines as the forecast time period extends farther into the future; a forecast for **today** is more likely to be accurate than a forecast made today for a **week in the future**.

Forecast accuracy *decreases with time* because the atmosphere is an example of a nonlinear dynamical system - with time, any errors (even very small ones) grow rapidly with time, so that at some point, the forecasts are no more accurate than forecasts made with the local climatological values for that location and date.



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Weather Results from a *Nonlinear Dynamical System*

At that forecast accuracy convergence point, the short-term forecasts are said to have "**no skill**" compared to climatology forecasts **skill**.

The length of time over which forecasts show **skill** varies from day to day, but generally the **skill** in forecasts nears zero % accuracy after between 7-10 days forward.

When you see someone issuing 10-day forecasts, you should be aware that such forecasts have very little **skill**, if any, that far into the future beyond what you would expect (*on the average*) for that date and location.

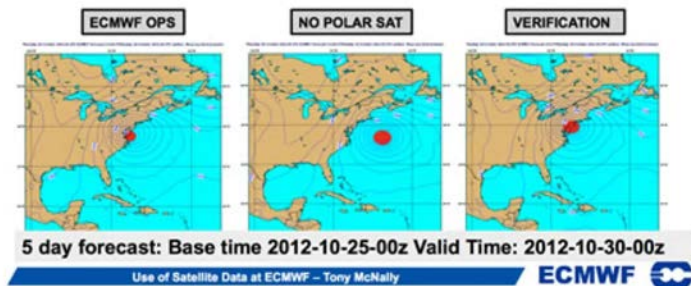


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Why is so Difficult to Predict the Weather?

Forecast skill **without** polar satellites ?

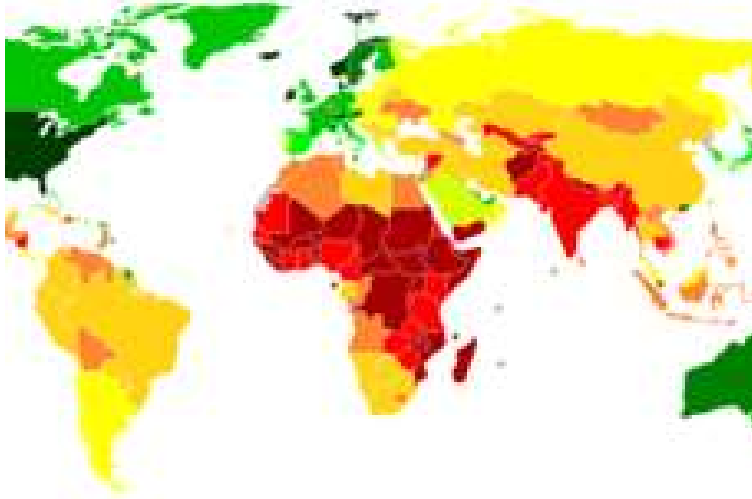
Forecasts of Mean Sea Level Pressure, **5 days in advance** of the 30th October 2012 for the landfall of **Hurricane Sandy**. Forecasts from an assimilation system **with no polar satellites** fails to predict the correct landfall of the storm that caused widespread damage and loss of life to the US east coast.



The margin of error in the prediction occurs for several variables including that the predictive model is either lacking all the relevant data to make a more accurate prediction, or there was something unknown variable in the simulation that overlooked as a relevant factor in the forecast estimate.

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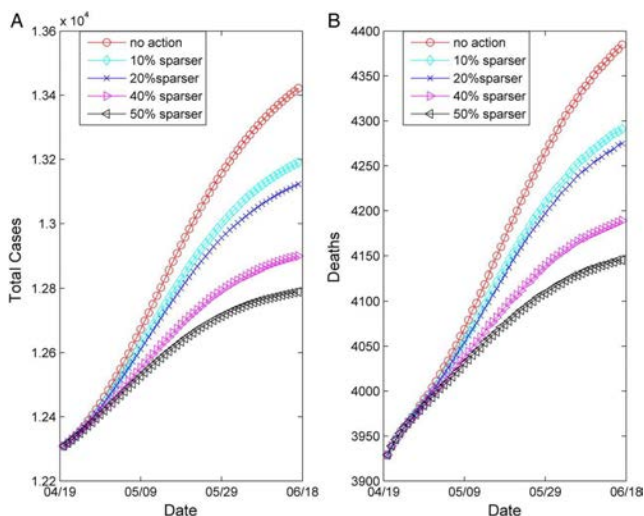
Epidemic Forecasting is Even More Complicated Compared with Weather Forecasting



Mathematical models, such as those that forecast the spread of epidemics or predict the weather, must overcome the challenges of integrating incomplete and inaccurate data in computer simulations, estimating the probability of multiple possible scenarios, incorporating changes in human behavior and/or the pathogen, and environmental factors.

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Epidemic Forecasting is More Difficult Compared with Weather Forecasting

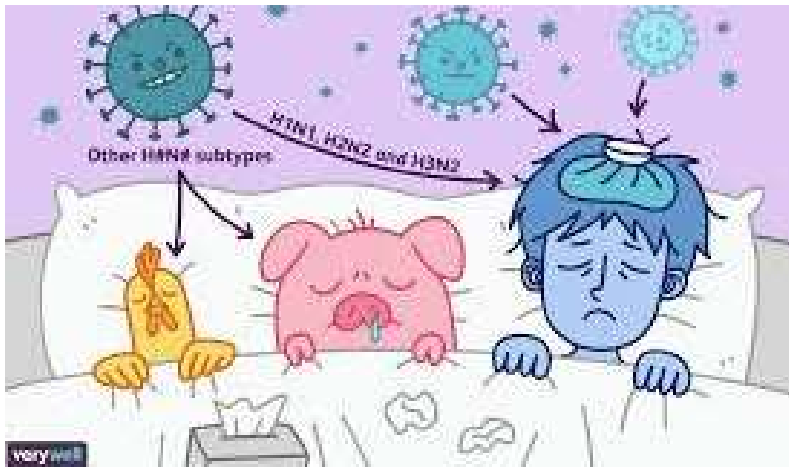


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In the past 3 decades, the weather forecasting community has made significant advances in data collection, assimilating heterogeneous data streams into models and communicating the uncertainty of their predictions to the general public.

Epidemic modelers are struggling with these same issues in forecasting the spread of emerging diseases, such as Zika virus infection and Ebola virus disease.

While weather models rely on physical systems, data from satellites, and weather stations, epidemic models rely on human interactions, multiple data sources such as clinical surveillance and Internet data, and environmental or biological factors that can change the pathogen dynamics.



Forecasting the Annual Seasonal Flu Virus Strains, Timing, Contagion Peaks, and Severity-Intensity Is A Complex Task

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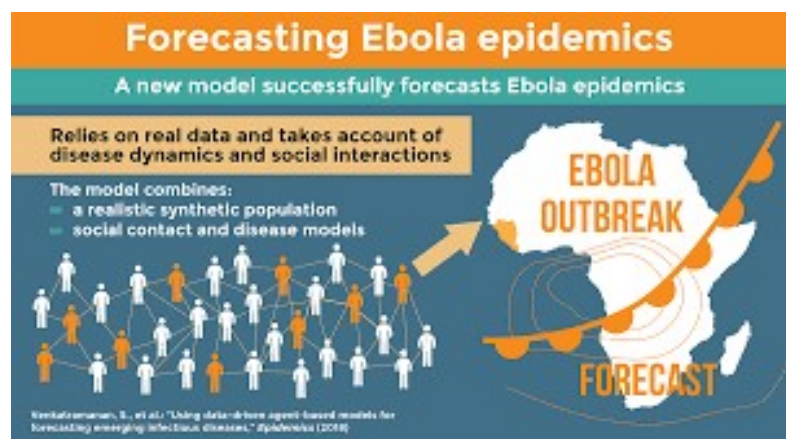
Variables in the forecast calculation include the following:

- determining what types of influenza are emerging; which specific virus strain(s) will be dominant in a given season;
- the magnitude and emergence timing (which varies from season to season);
 - R-0 rates;
- differences in how each virus affects demographic groups differently;
 - viral mutations of the strains;
- rapidity of development/availability of a vaccine for immunization of a strain;
- the decision whether to include a vaccine for a strain in the annual compound vaccine;
- human behavior factors, mitigation compliance (e.g. immunization, social distances, hygiene compliance, etc.);
 - weather;
- residual immunity for those previously exposed to the same or similar viral strains.

Epidemic Forecasting is Messier Than Weather Forecasting

We describe some of similarities and differences between these fields and how the epidemic modeling community is rising to the challenges posed by forecasting to help anticipate and guide the mitigation of epidemics.

We recognize that some of the fundamental differences between these fields, including roles of human behavior, viral mutation, environment, weather patterns, etc. make disease forecasting even more challenging than weather forecasting.



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Crisis Consequence Forecasting is Also Challenging!



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- Nonlinear Dynamical System
- Limited (Changing) Information
- Dynamic Situation Factors
- Emerging Risk Threats (Technology)
- Malevolence (Crime and Terrorism)
- Unpredictable Human Response Behaviors
- Human Decision-Making Breakdowns



Recognizing Typical Visionary Blind Spots

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We Don't Know What We Don't Know

We assess the probability of events and consequences by information that is available to us.

That can be a problem when there is a large amount of information that isn't available – and we aren't always aware of its absence from our knowing.



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We Don't Know What We Don't Know

Decision Making in the absence of all relevant information is fundamentally problematic.

Talking to Strangers



Malcolm Gladwell

#1 NEW YORK TIMES bestselling author of *OUTLIERS*
and host of the podcast *REVISIONIST HISTORY*

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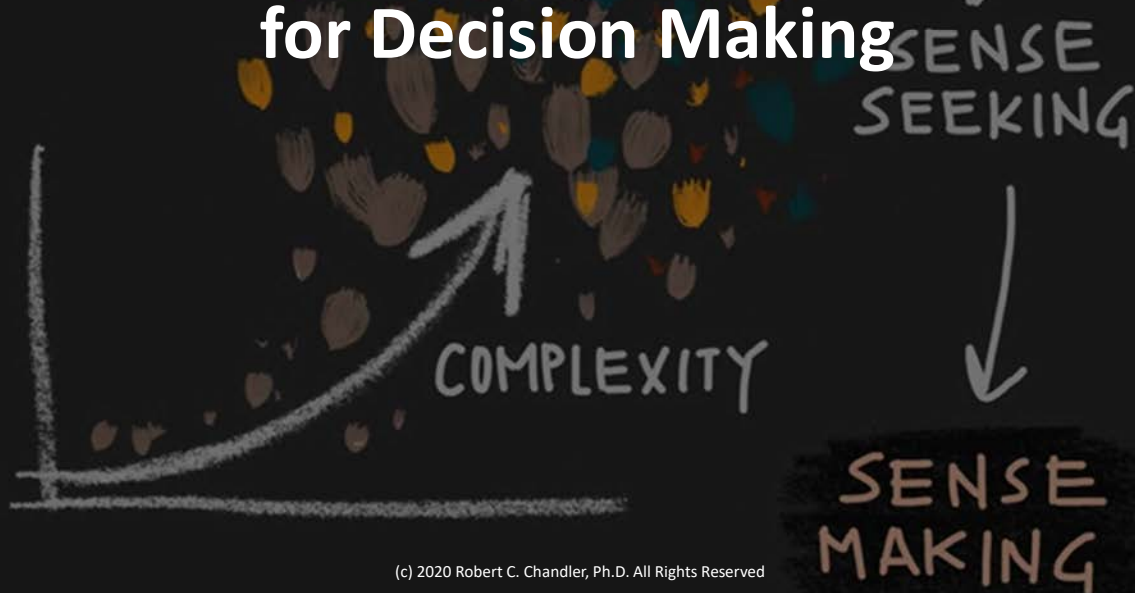
Decision Mis-Framing

“Mis-Framing” often occurs
in a process of
“simplification” or over-
simplification of complex
factors and inaccurate
forecast of
results/consequences



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Process of Simplification of Complexity for Decision Making



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Oversimplification

Focusing on Only One or a Few Key Factors rather than recognizing all of the relevant variables

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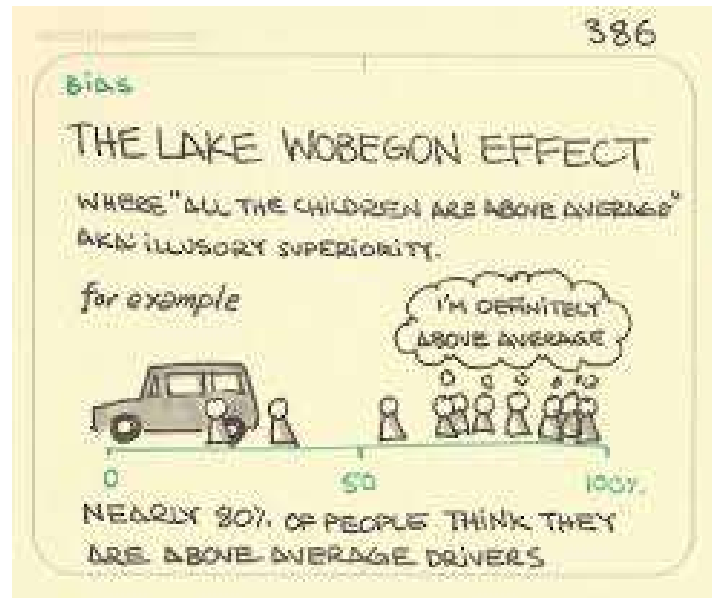
Overconfidence in Decision Making Ability

The overconfidence bias effect is a well-established bias in which a person's subjective confidence in their judgements is reliably greater than the objective accuracy of those judgements, especially when confidence is relatively high.

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Over-Confidence

Surveys of Crisis managers when asked if they are “**above-average**” “**average**” or “**below-average**” in crisis management decision making found that self-ratings are, in part, contingent on two factors – **most recent experience(s)** (e.g. success or failure) and their perception of whether **making crisis decisions is relatively easy or difficult**.

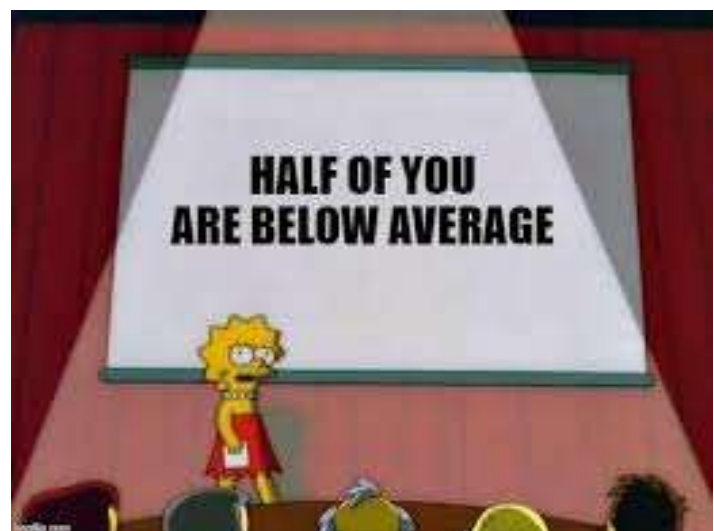


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The Curse of Over-Confidence

Those with “successful” most recent experience – nearly **90%** rated themselves as “**above-average**” crisis decision makers.

Those with “unsuccessful” most recent experience – nearly **70%** rated themselves as “**above-average**” crisis decision makers.



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Over-Confidence & Recognizing Complexity



Among those who think that making crisis decisions is **relatively easy or straightforward** - more than **90%** rated themselves as **"above-average."**

Among those who think that making crisis decisions is **relatively difficult or complicated** - only about **50%** rated themselves as **"above-average."**

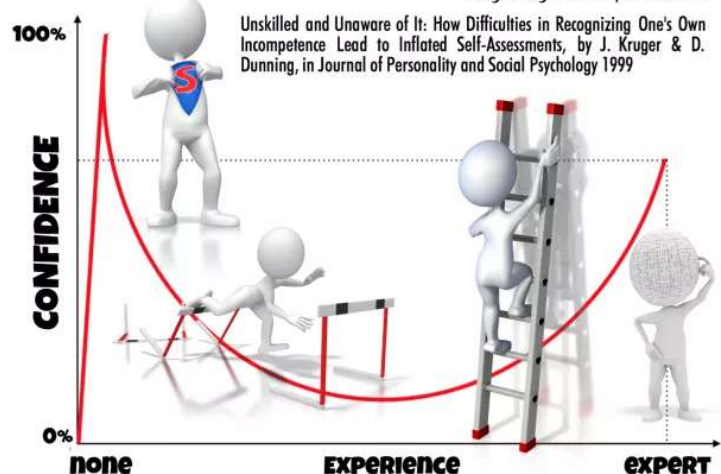
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Common
Decision
Breakdowns

**Dunning-Kruger Effect
(DKE)**

THE DUNNING-KRUGER EFFECT

Designed by @YLMSSportScience

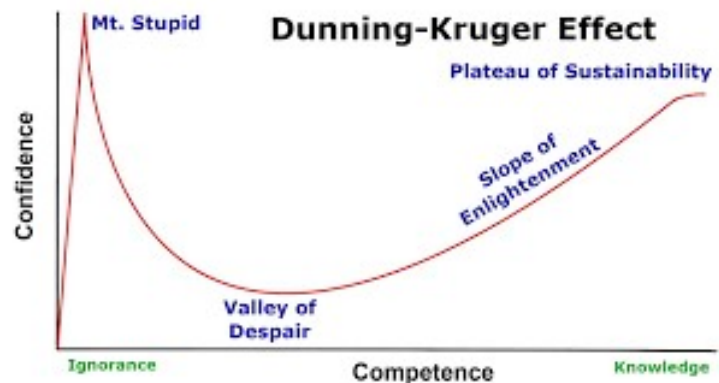


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Dunning-Kruger Effect is a cognitive bias whereby people who are incompetent at something are unable to recognize their own incompetence.

Dunning-Kruger Effect (DKE)

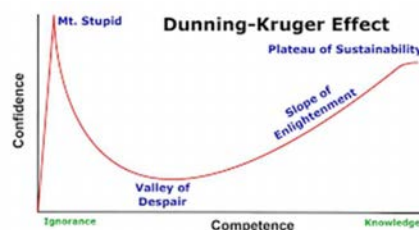


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DKE is a cognitive bias in which people assess their cognitive ability as greater than it is.

It is related to the cognitive bias of illusory superiority and comes from the inability of people to recognize their own lack of ability.

Dunning-Kruger Effect



Assessment of personal competence in relation to a topic depending on experience and actual knowledge.

The less competent tend to over-estimate their level of competence.

As experience/competence increases the self-ratings of competence **decrease** (not increase).

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Developing Visionary Risk and Resiliency Leadership

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Visualizing Forward

It helps to know what's ahead of you – and to anticipate what might happen next!



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How far can you see ahead?

Superforecasting

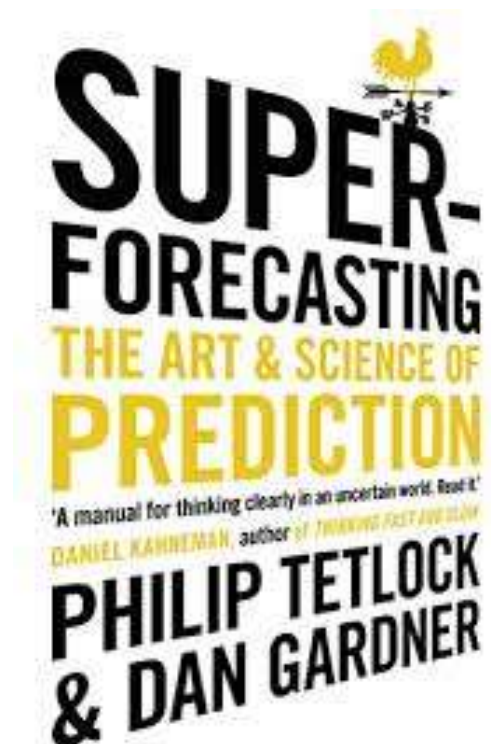
Dr. Philip Tetlock has researched consequence prediction and offers us the Superforecasting concept.

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Superforecasting

- In a landmark series of research studies undertaken between 1984 and 2004, Professor Philip Tetlock showed that the average expert's ability to make accurate predictions about the future was only slightly better than a layperson using random guesswork.
- In his book *Superforecasting: The Art & Science of Prediction*, co-authored with Dan Gardner, Tetlock identifies how you can improve your ability to predict the future and become a superforecaster.

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A black and white photograph of a chimpanzee's face and upper body. The chimpanzee is looking slightly to the left with a neutral expression. It is holding a dart in its right hand, which is visible in the foreground. The background is a plain, light color.

Superforecasting: The Funny Joke

(The one about the dart throwing chimpanzee)

The joke goes like this: A researcher gathered a big group of experts – academics, pundits, and the like – to make thousands of predictions about multiple issues. Time passed, and when the researcher checked the accuracy of the predictions, he found that the average expert did as well as random guessing. Except that finding is not the punchline because ‘*random guessing*’ isn’t funny*.

*The punchline is about dart throwing chimpanzees. Because it’s the chimpanzees that make this funny.

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Superforecasting

- Tetlock studied 284 “*experts*” who he asked to make more than 27,000 forecast predictions based on provided data on specific variables over a 21-year research span.
- These expert forecasters had excellent credentials, including more than a dozen years of relevant experience and also many had advanced academic degrees—most of these were postgraduate training.

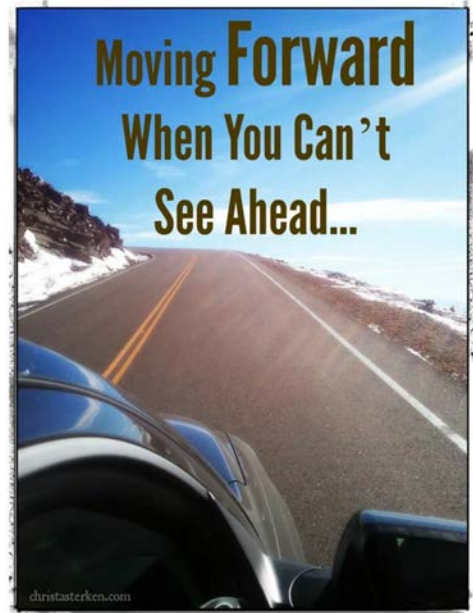


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Superforecasting

Tetlock's major research project has shown that there are some people with real, demonstrable predicting foresight.

These are people who have an extraordinary ability to make predictions with a degree of accuracy significantly greater than the average.



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The Bad News and the Good News

Below the headline of expert ineffectiveness were some more subtle findings. One was an inverse correlation between fame and accuracy.

While famous experts had among the worst records of prediction, they demonstrated "skill at telling a compelling story." To gain fame it helps to tell "tight, simple, clear stories that grab and hold audiences."

The experts are often wrong but are never in doubt!



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The Bad News and the Good News

- Another result, which is related to the first, was that what mattered in the quality of predictions was less what the expert thought and more how he or she thought.
 - Tetlock categorized his experts as foxes or hedgehogs based on a famous essay on thinking styles by the philosopher Isaiah Berlin.
 - Foxes know a little about a lot of things, and hedgehogs know one big thing.
- Foxes did better than the dart-throwing chimp, and hedgehogs did worse. We'll talk about foxes a little bit more in a few minutes.



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Superforecasting

Tetlock realized that his research showed that the average expert had done little better at predicting specific futures, there were actually two statistically distinguishable groups of experts: the first failed to do better than the chimp (and often worse) but the second beat the chimp (though not by a wide margin).



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Superforecasting

So why did one group do better than the other? It wasn't whether they had PhDs, years of experience, specialized training or even access to classified information.

Nor was it what they thought – whether they were optimists or pessimists; risk takers or risk averse; etc.

The critical factor was how they thought.

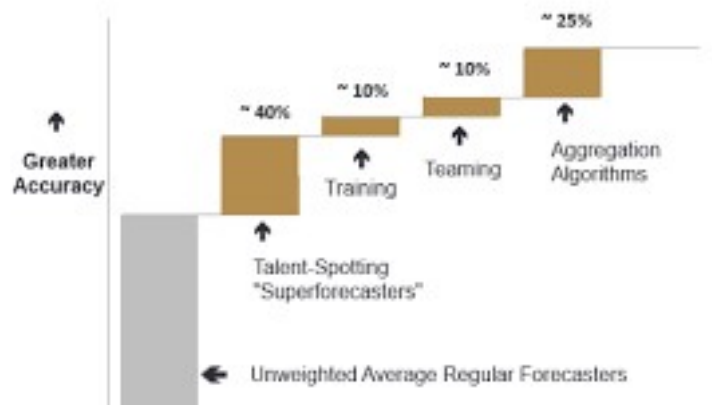
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Good Judgement Project

This finding led Tetlock to develop his second major piece of research: the **Good Judgement Project**, which commenced in 2011 in association with IARPA (part of the Office of the Director of National Intelligence in the US), who were interested to know whether ordinary people, without access to highly classified intelligence information, could make better forecasts about geopolitical events than professional analysts supported by a multi-billion dollar apparatus.

It turned out that they could: the top forecasters in the Good Judgement Project were 30% better than intelligence officers with access to actual classified information, and 60% better than the average.



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The Hedgehog and the Fox

Tetlock Offers A
Comparative Model to
Illustrate
SuperForecasting



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Isaiah Berlin

The Hedgehog
and the Fox

With a foreword by
Michael Ignatieff

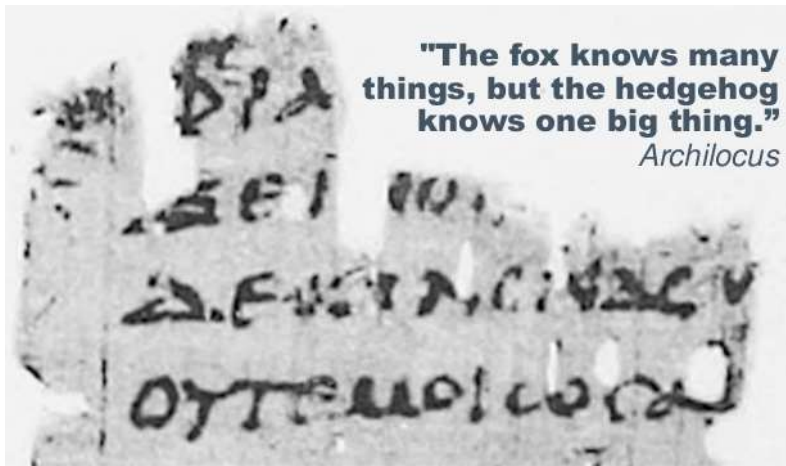
Edited by Henry Hardy

The Hedgehog and the Fox

*The fox knows many things, but the
hedgehog knows one big thing.*

The Hedgehog & The Fox: An Essay on Tolstoy's View of History
by Isaiah Berlin

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"The fox knows many things, but the hedgehog knows one big thing."
Archilocus

Visionary Foresight Prowess

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The "Hedgehog" - One Big Idea/Core Frame

- Certitude
- Reductionist framing – simplify complex problems into clear cut choices
- Confident – self assured
- More dogmatic and slow to change their minds

The "Fox" - Flexible Pragmatics/Diverse Information Gathers

- Possibilities
- Probabilities
- Flexible and adaptive
- More readily change their minds

The "Fox" is the better Forecaster

Fox Super Forecasting

- The fox is "full spectrum" – draws on many sources, adaptive and is the better superforecaster!
- – Dr. Philip Tetlock

Fox Superforecasters tend to be open to new experiences, recognize changes in the situation, and can innovative and adapt to succeed.

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Are you a fox or a hedgehog?



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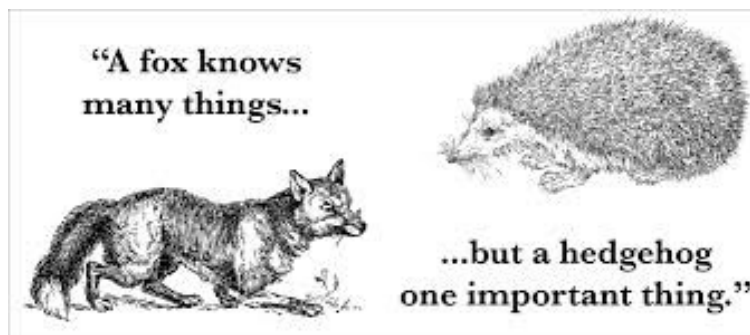
Inspired by Isiah Berlin's thinking, Tetlock dubbed the Big Idea experts '**hedgehogs**' and the more eclectic experts '**foxes**.'

Foxes beat hedgehogs, and not just by playing it safe with mediocre probabilities, but with calibration and resolution.

Foxes have real foresight, hedgehogs don't – they just see things one way and just follow the plan without adjustments.

In fact, in the EPJ research studies, when hedgehogs made forecasts on the subject, they knew the most about (their own specialties) – **their accuracy actually declined!**

Are you a fox or a hedgehog?



Those who displayed poorer superforecasting skills tended to organize their thinking around *Big Ideas*.

They sought to squeeze complex problems into the preferred oversimplistic cause-effect templates.

They were usually confident and likely to declare things 'impossible' or 'certain'. **Committed to their conclusions, they were reluctant to change their minds even when their predictions had clearly failed.**

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Are you a fox or a hedgehog?

The foxes group consisted of more pragmatic experts.

They gathered as much information from as many sources as they could.

They talked about possibilities and probabilities, not certainties.

They readily admitted when they were wrong and changed their minds.



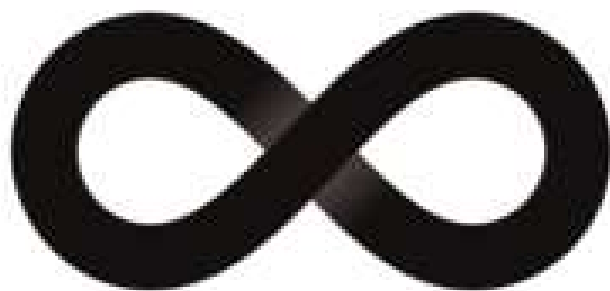
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Summary of Fox Superforecasting Skills

- **Philosophic Outlook**
 - **Cautious:** Nothing is certain
 - **Humble:** Reality is infinitely complex
 - **Nondeterministic:** What happens is not meant to be and does not have to happen
- **Abilities and Thinking Styles**
 - **Actively open-minded:** Beliefs are hypotheses to be tested, not treasures to be protected
 - **Intelligent and knowledgeable, with a “need for cognition”:** Intellectually curious, enjoy puzzles and mental challenges
 - **Reflective:** Introspective and self-critical
 - **Numerate:** Comfortable with numbers
- **Methods of Forecasting**
 - **Pragmatic:** Not wedded to any idea or agenda
 - **Analytical:** Capable of stepping back from the tip-of-your-nose perspective and considering other views
 - **Dragonfly-eyed:** Value diverse views and synthesize them into your own
 - **Probabilistic:** Judge using many grades of maybe
 - **Thoughtful updaters:** When facts change, they change their minds
 - **Good intuitive psychologists:** Aware of the value of checking thinking for cognitive and emotional biases
- **Work Ethic**
 - **A growth mindset:** Believe it's possible to get better
 - **Grit:** Determined to keep at it however long it takes

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Perpetual Beta



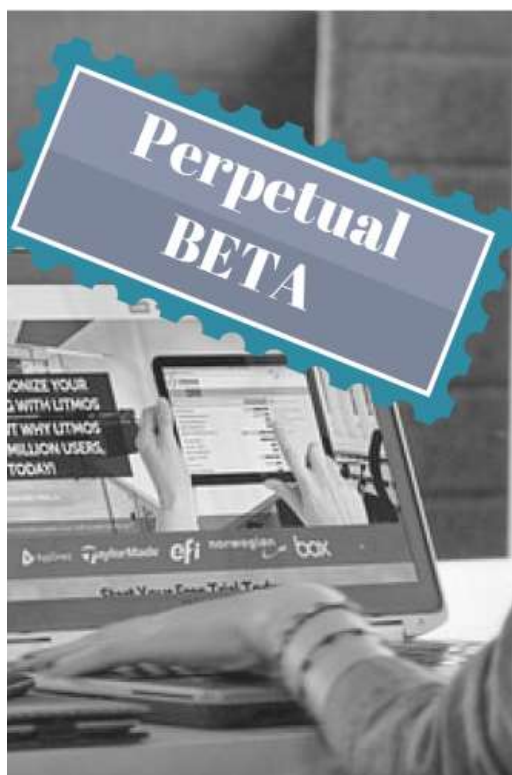
PERPETUAL BETA

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Evolution has seen to it that humans are hardwired to hate uncertainty. The antidote to uncertainty is accurate forward prediction forecasting.

Our ancestor's ability to predict the whereabouts of the local tiger (so as to avoid being eaten) or a woolly mammoth (so as to be able to hunt, kill and eat it) significantly increased their chances of survival.

Whatever the situation, the bio-chemical reaction in our brains has not changed for millions of years: sending messages from our neo-cortex, uncertainty about the future generates a strong threat or alert response in our brain's limbic system, leaving us with a distinct feeling of unease.



Perpetual Beta

In an effort to counter uncertainty, we try to predict the future.

Whilst humans may not, in general, be very good at that task, Superforecasting does at least do an excellent job in helping us to improve. And while there are a variety of skillsets that will help, Tetlock and Gardner identify one factor that will most likely help you to become a superforecaster:

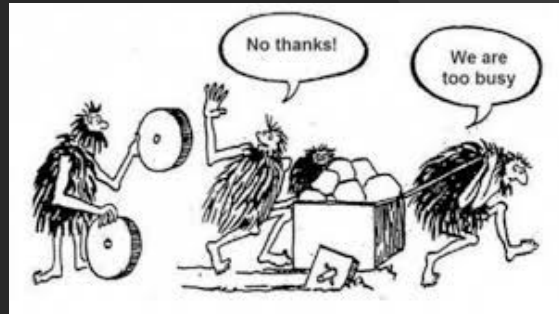
The strongest predictor of rising into the ranks of superforecasters is **perpetual beta** – the degree to which one is committed to belief updating and self-improvement. It is roughly three times as powerful a predictor as its closest rival, intelligence.

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So What are the Sources of Superforecasting?

Tetlock found four drivers behind successful superforecasting:

- **Find the right people.** You get a 10-15% boost from screening forecasters on fluid intelligence and active open-mindedness.
- **Manage interaction.** You get a 10-20% enhancement by allowing the forecasters to work collaboratively in teams or competitively in prediction markets.
- **Train effectively.** Superforecasting skills workshops and cognitive debiasing exercises lift results by 10%.
- **Overweight elite forecasters or extremize estimates.** Results improve by 15-30% if you give more weight to better forecasters and/or make forecasts more extreme to compensate for the conservatism of forecasts.



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Summary

Superforecasting shows that visionary prediction may not be beyond reach after all.

The ***Good Judgment Project***, part of the forecasting tournament sponsored by the U.S. intelligence community, revealed that some forecasters are not only good but consistently good visionary forecasters.

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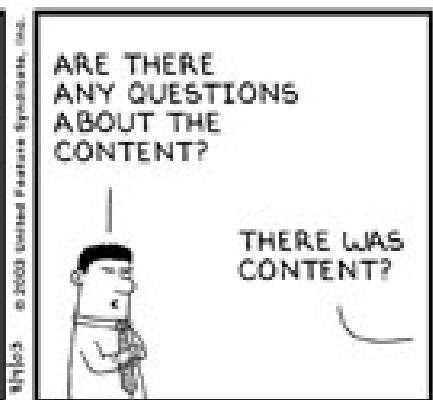
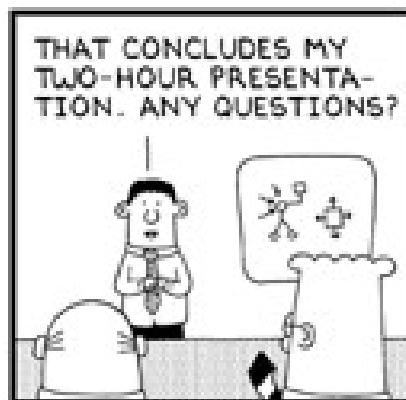
Summary

- ✓ Visionary Forecasting skills exist.
- ✓ Visionary Forecasting skills can be learned, developed and cultivated.
- ✓ Visionary Forecasting skills can be taught – training should be a priority.
- ✓ Visionary Forecasting skills can improve dramatically improve risk and resiliency leadership
- ✓ Visionary Forecasting skills can enhance decision making effectiveness and crisis management success.



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Questions?



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Dr. Bob Chandler

Dr Chandler is a Tennessee based, internationally recognized, expert on topics related to critical incidents, disasters, crisis and emergencies. He is also a consultant and trainer assisting schools and school districts as well as administrators, faculty and staff with all aspects of crisis and consequence management services. He holds an academic appointment as Professor at Lipscomb University (Nashville, TN) and oversees the graduate and professional programs in communication.

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