Research & Analysis Bootcamp for Emergency Managers

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Transparency Disclaimer: This slide deck includes some AI generated images.

Does this statement resonate with you?

As an emergency manager I am part of the responder community.

What about this one?

As an emergency manager I am part of the knowledge worker community.

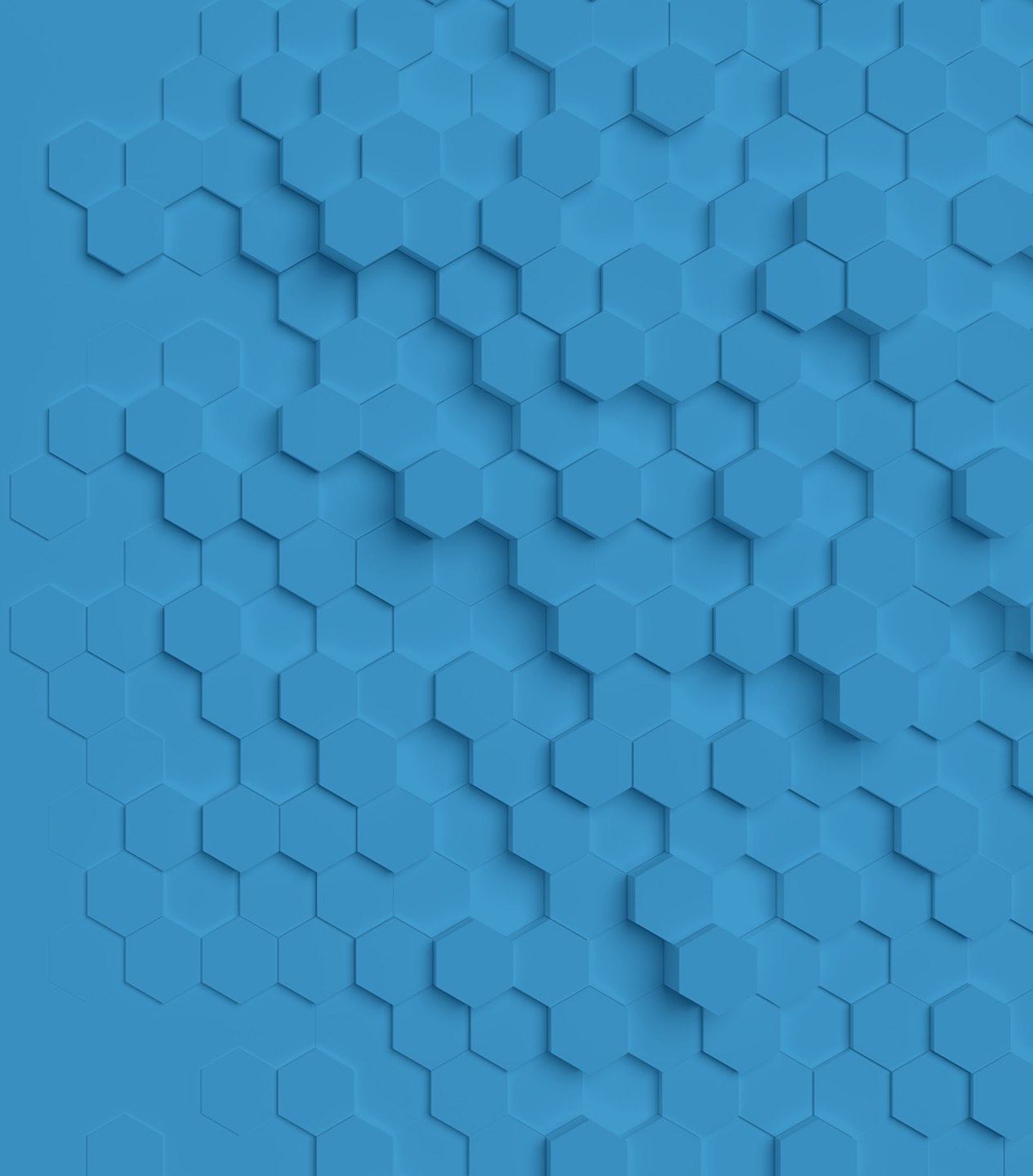
Emergency managers generally are
knowledge workers first, responders second,
and most training programs focus
almost exclusively on the second half.

Session Roadmap

1. Changing Information Landscape
2. Fundamentals of Research & Information Analysis
3. Information Sources + Tips & Tricks

We will take a 15 min break partway through.

THE CHANGING INFORMATION LANDSCAPE



How Information Has Changed

- **Volume**: More signal. More noise.
- **Velocity**: Speed outruns accuracy
- **Variety**: More sources. More platforms.
- **Veracity**: Harder to trust. Easier to fake.

What's “New” in the Ecosystem

- Sensor and Automated Data
- Changing Nature of News Media
- Social Media and Open-Source Intelligence
- AI Generated Content

The Information-Rich, Analysis-Poor Problem

The central paradox of modern EM information management:

the more data available, the greater the noise, and the harder it often is to make sense of it.

“More major intelligence failures have been caused by failures of analysis than by failures of intelligence collection.”

- Richards J. Heuer, Jr., author of Psychology of Intelligence Analysis

The Information-Rich, Analysis-Poor Problem

A lack of systematic analysis processes tend to lead to:

- Missing baseline changes
- Overlooked connections
- Confirmation bias at scale
- Reactive mode

FUNDAMENTALS OF RESEARCH & INFORMATION ANALYSIS

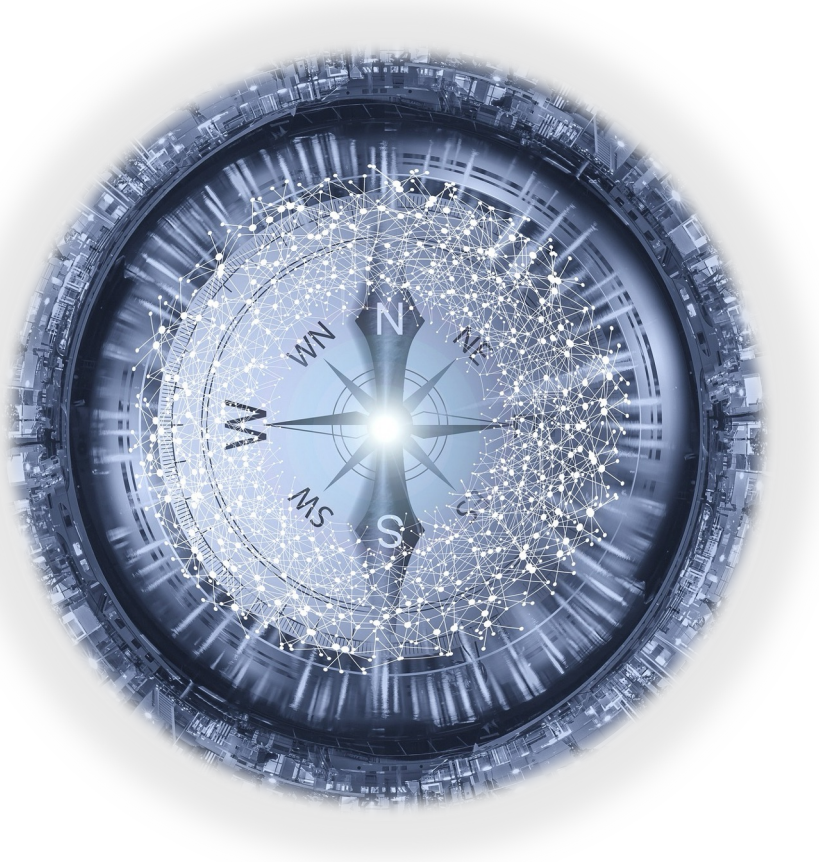
Framing the Right Questions

The right answer to the wrong question
is more dangerous than the
wrong answer to the right question.

Framing the Right Questions

This is the step most consistently skipped under time pressure, and the one most likely to lead to poor outcomes.

Question Drivers



- What decision is this supporting?
- What degree of precision is needed?
- What are associated keywords (or phrases), including those others might use?

Assumption Testing

Ask: 'If this assumption is wrong, how does it change my conclusion(s)?'

Ask: If I am assuming A because of B, what else could account for A that I may not be considering?

Group Exercise

Let’s frame a “question”.

Documenting Sources and Reasoning

Write things down.

This:

- exposes gaps
- allows others to follow along
- serves as a reminder in the future of what lead to what.

Expert Intuition: When It Works and When It Doesn't

Usually reliable when:

- Environment is stable and rule-governed enough to have created reliable patterns.
- Expert has received clear, timely feedback over many repetitions.
- Situation matches a pattern the expert has genuinely encountered before.

Expert Intuition: When It Works and When It Doesn't

Least reliable in:

- Novel event types (new hazard profiles, cascading infrastructure failures).
- Ambiguous or rapidly changing situations where early pattern-matching locks onto the wrong frame.
- High-stakes, high-pressure environments where the costs of being wrong are highest.

Expert Intuition: When It Works and When It Doesn't

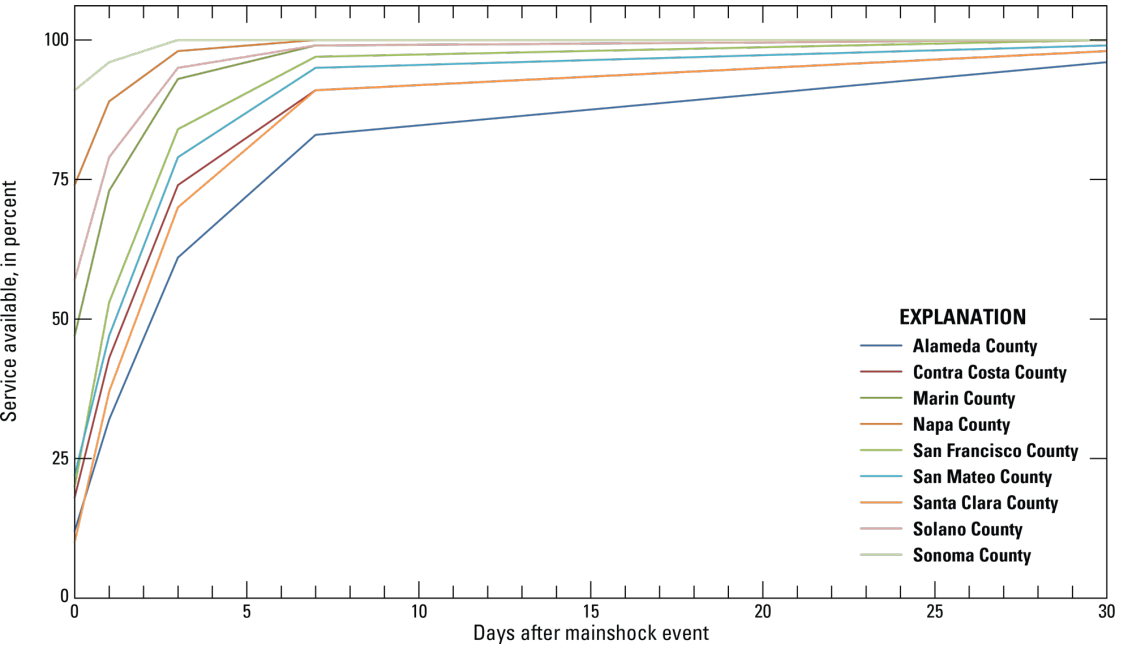
Expert intuition is a valuable starting point.

It is not a substitute for structured analysis,
especially when the situation is
novel or the stakes are high.

FUNDAMENTALS:

Analysis Pitfalls to Watchout For

“Hidden” Assumptions Behind Calculations



HayWired Scenario – Power Restoration: Overall Bay Area remaining without power, by the end of the first week 6% of households, end of the first month less than 2%, after three months 0.1% of households will potentially still be without power.

Assumption noted in footnotes: *Power service outages are assumed to be dependent on the functionality (or lack thereof) of the region’s substations.*

Influence of Source Materials

“Mudslides could occur along with debris flows, especially in areas impacted by wildfires like the Creek and the Ferguson Fires in California, which has large burn areas”

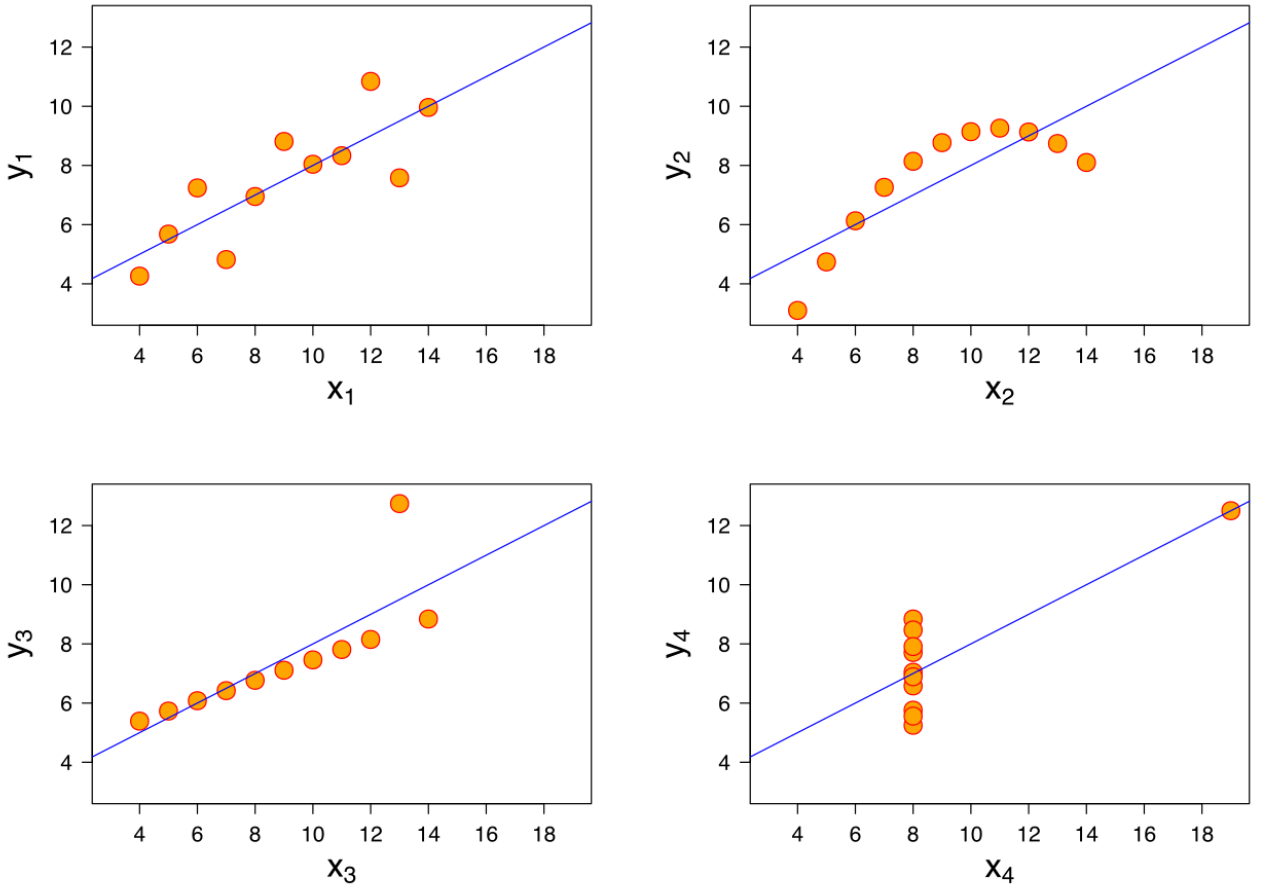
October 2021 Bomb Cyclone Intel Report from 3rd Party Under Considerations for Resilience Practitioners

Numbers Masking Context

Anscombe's Quartet shows that only looking at numbers can mask a lot of variations

These graphs have essentially the same:

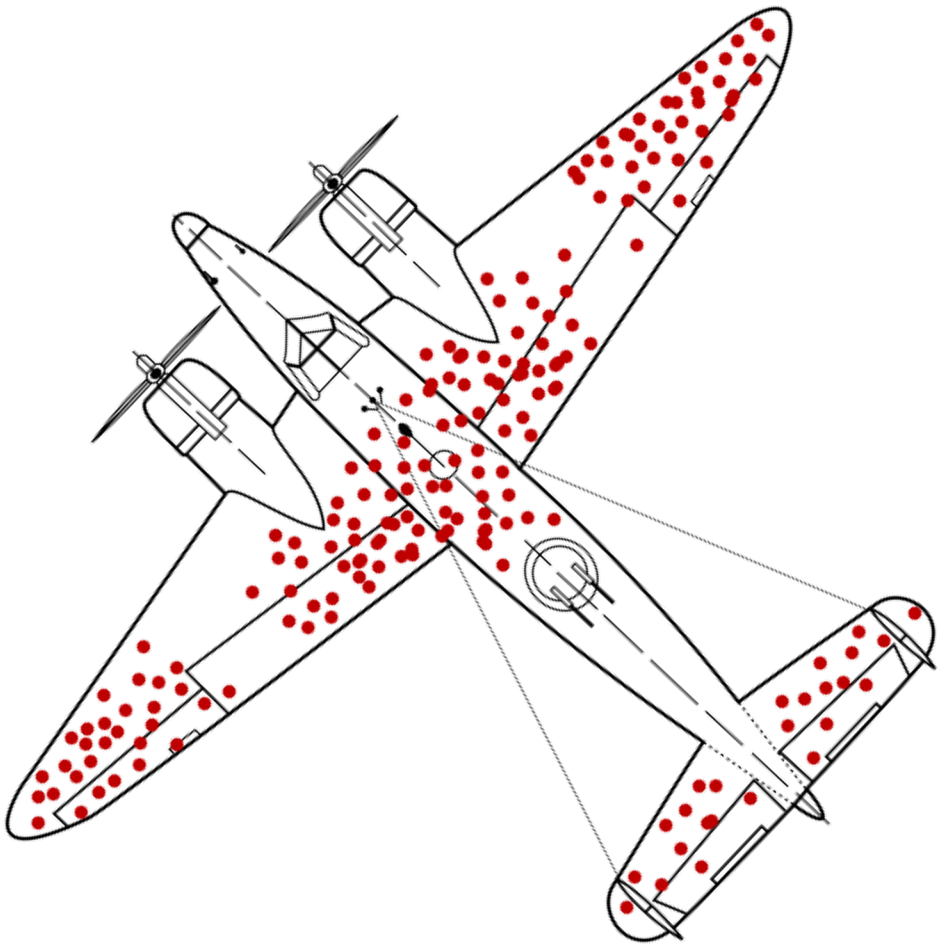
- mean of x and y (9 and 7.5)
- sample variances of x and y (11 and 4.125 ±0.003)
- correlations between x and y (0.816, same to 3 decimal places)



Charts created by Francis J. Anscombe, 1973

Survivorship Bias

The data sets we use are often already “pre-filtered” and can skew the results.



Data Confidence

A measure of certainty regarding observations and calculations of data.

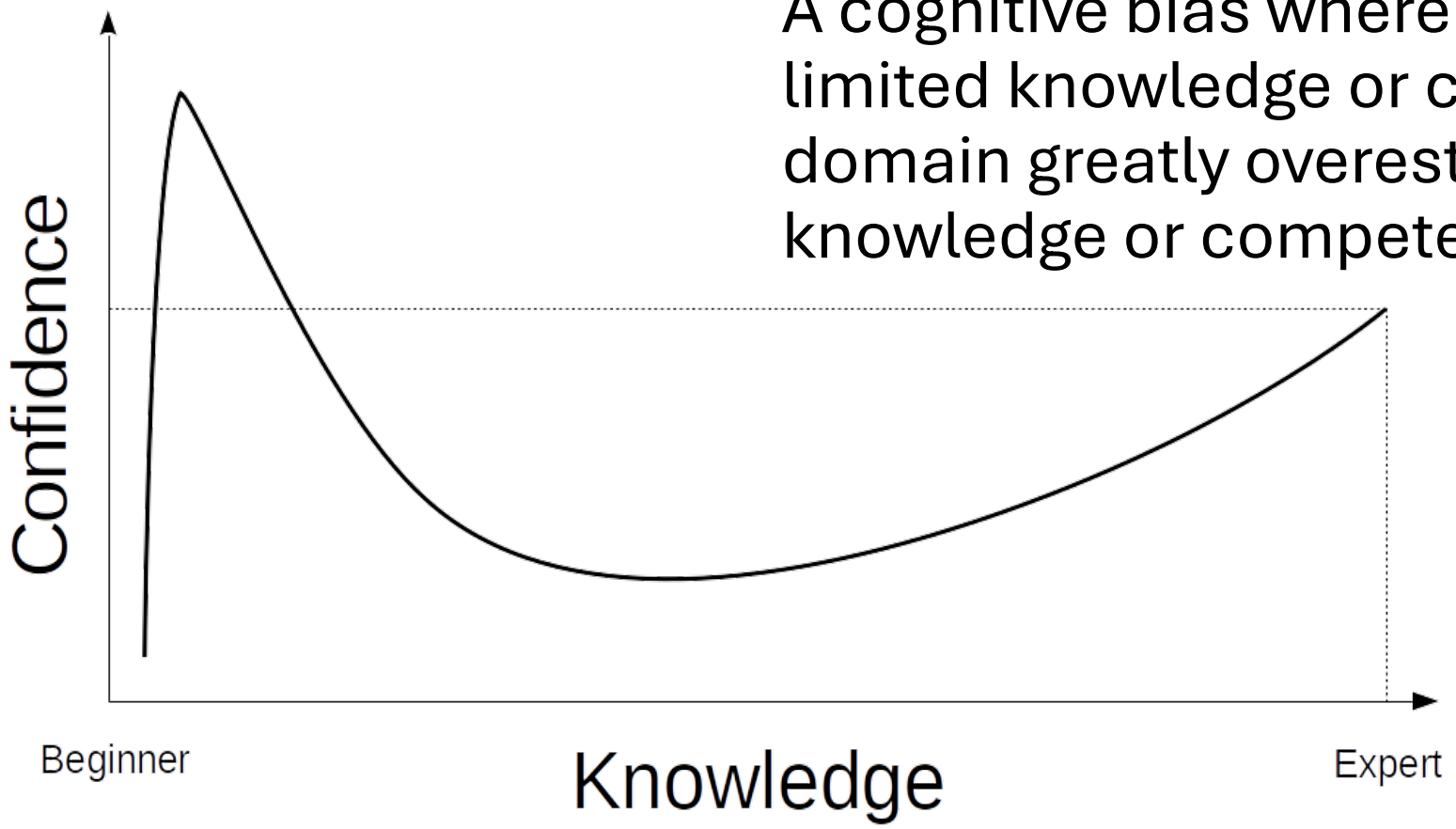
Variant	Region	Trending	Time Periods		
			Weighted Estimates (95% Confidence Interval)		NowCasts (95% Confidence Interval)
			Nov 23 – Dec 20	Dec 21 – Jan 17	Jan 18 – Feb 14
XFG	US		57% (55-60%)	46%* (43-49%)	29% (7 – 65%)
	R9		68% (63-73%)	65% (60-70%)	Not available
NB.1.8.1	US		8%* (6-9%)	7%* (6-9%)	21% (0-89%)
	R9		6% (4-10%)	9%* (7-13%)	Not available
XFG.2.5.1	US		2%* (2-3%)	4%* (3-6%)	16% (8-28%)
	R9		0%* (0-2%)	0%* (0-2%)	Not available

29% (CI: 7-65%)

* Estimate is less reliable based on one or more violations of NCHS data presentation standards for proportions

Source: COVID-19 Variant Prevalence as shown on the CDC Data Tracker on March 3, 2026;
excerpt of information shared in the California Resiliency Alliance's Infectious Disease Brief that day.

Dunning-Kruger Effect



A cognitive bias where individuals with limited knowledge or competence in a domain greatly overestimate their own knowledge or competence.

Some Other Pitfalls to Watchout For:

- **CONFIRMATION BIAS**: Seeking out information that confirms what you already believe while discounting contradictory evidence.
- **ANCHORING**: Over-weighting the first piece of information received.
- **AVAILABILITY HEURISTIC**: Overestimating the likelihood of outcomes that are easily remembered, often because they are dramatic or recent.

Some Other Pitfalls to Watchout For:

- **GROUPTHINK**: Premature consensus in teams, especially under time pressure or in hierarchical environments.

- **SCOPE INSENSITIVITY**: Difficulty distinguishing between events of different magnitudes. The analytical and resource implications of 500 vs. 5,000 affected individuals require genuinely different treatment.

- **THE NARRATIVE TRAP**: Constructing a coherent story from available information and then treating the story as the analysis. A plausible narrative is not evidence of accuracy.

FUNDAMENTALS:

DATA AND INFORMATION SOURCES OVERVIEW

Types of Sources

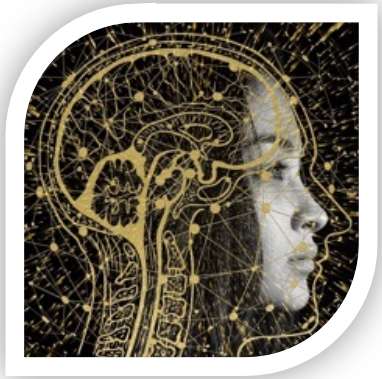
Primary	Secondary	Tertiary
Original, unprocessed information directly from the source, including field reports, sensor data, and eyewitness accounts. *This can be context dependent – at times a secondary or tertiary source can become a primary*	Synthesis, analysis, or reporting of primary sources. e.g. Synthesized Expert Analysis Professional & Trade Analysis Analytical Journalism Event Reporting	Raw Opinion and Commentary

Types of Sources

- **AUTHORITATIVE SOURCES:** Official sources with legal or institutional responsibility for the information they publish.

- **SYNTHETIC SOURCES:** Machine-generated datasets produced by AI or modeling systems to simulate real-world conditions, often used when actual observed data is unavailable, legally restricted, or insufficient in volume for planning purposes.

AI in the Information Ecosystem



False Narratives & Deep Fakes

Iterative Change

Synthetic Data

Noise

Disconnected Data

...

BREAK

(~ 15 Minute)

INFORMATION SOURCES

Advanced Search Operators

Operator	What It Does	Example
“ ”	**Exact match**: Finds the specific phrase in that exact order.	“emergency management in California”
-	Exclude terms: Removes results containing a specific word.	ICS -“industrial control system”
site:	**Limit to website**: Only shows results from a specific domain.	site:.gov site:.ca.gov
filetype:	**Specific format**: Finds only PDFs, Docx, or other file types.	“emergency management in California” filetype:pdf
before: / after:	**Date range**: Finds content from a specific time period. (YYYY-MM-DD)	Wildfires before:2020-01-01

Transition to web browser for information sources.

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