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Assessing and Communicating Uncertainty Effectively in a Rapidly Changing World

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What is intelligence?
Why does something as esoteric as uncertainty matter?

- Scowcroft (2009): The aim of intelligence is to reduce uncertainty in the mind of the decision-maker.

- Friedman & Zeckhauser (2012): The aim of intelligence is to accurately characterize uncertainty for the decision-maker.

- Decision-makers must weigh the uncertainties and decide on weighty issues such as whether or not to go to war. Failure to accurately assess uncertainties and communicate them with high fidelity to decision makers can lead to costly errors.

How intelligence grapples with uncertainty

- In terms of assessment, it has staked its bet on an untested set of semi-structured techniques that are believed to be better than nothing. This is the essence of “analytic tradecraft”

- In terms of dissemination, it has attempted to tame the unruliness of language by creating curated sets of uncertainty terms that are given stipulated meanings.

- The road to hell is paved with good intentions.

Origins of the “modern” approach

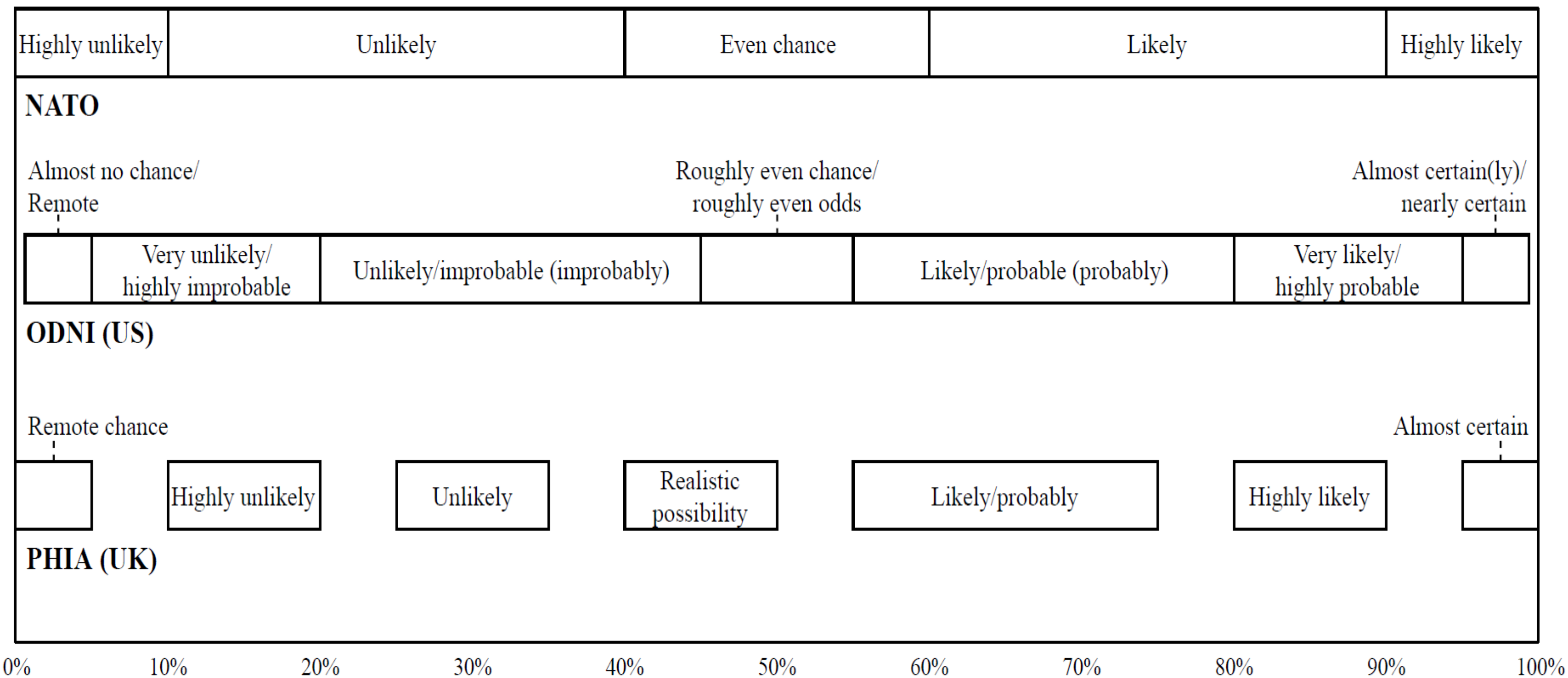
- Sherman Kent and the 1951 National Intelligence Estimate on Yugoslavia and prospects for Soviet aggression.

- Asked, what is a “distinct possibility”?

Kent-Foster standard

100% Certainty		
The General Area of Possibility		
93%	give or take about 6%	Almost certain
75%	give or take about 12%	Probable
50%	give or take about 10%	Chances about even
30%	give or take about 10%	Probably not
7%	give or take about 5%	Almost certainly not
0% Impossibility		

Fast forward to 2019



The more things change, the more they stay the same!

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What’s the problem? Some big problems…

- 1) The assumption that the meaning of verbal probabilities can be set with a Kent-style standard has been disproven.

- Compliance rates are low, even when receivers are reminded of the numerical ranges that are supposed to set meaning (Budescu et al., 2012, 2014; Wintle, 2019)

- The interpretation of verbal probabilities is context dependent (Harris & Corner, 2011; Mandel, 2015; Wallsten et al., 1986), meaning even the same individuals interpret terms differently in different situations.

What's the problem? Some big problems…

- 2) Verbal probabilities don't just convey probability—they are typically interpreted as implicit recommendations for or against action (e.g., Teigen & Brun, 1999).

- Accordingly, they are used strategically to influence belief, preference, and choice (Piercey, 2009), and can undermine the policy neutrality that the IC is supposed to exercise.

What's the problem? Some big problems…

- 3) Verbal probabilities are not only imprecise (which is okay), they are vague or ambiguous (which isn't okay). They vary greatly in their fuzziness or "spread" (Ho et al., 2015).

- The IC has tried to set the boundaries on that fuzziness by arbitrarily imposing numeric range equivalents on the terms.

- This is itself dangerous because those ranges can easily be mistaken by decision-makers as credible intervals—lower and upper bounds on the substantive probability estimate—rather than what they actually represent (futile attempts to tame language).

- Descriptions of standards, such as the US's "What we mean when we say…" only make such (mis)interpretations more likely.

What’s the problem? Some big problems…

- 4) The curated lists in Kent-style standards force analysts to give coarse estimates—usually no more than 7 levels of probability, yet it is now well documented that imposing coarseness on probabilistic forecasts substantially reduces accuracy (for an overview, see Friedman, 2019).

- It does so across the skill spectrum, but hits the most talented analysts hardest, thus enforcing a culture of mediocrity and waters down the signal value of intelligence for decision makers.

- It also precludes all sensitivity at the extremes: most standards fail to distinguish a 1/10 chance from anything smaller, as if 1/10 and 1/1,000,000 are invariably unimportant differences.

What’s the problem? Some big problems…

- 5) Curated lists of probability terms do not support even the most basic computations.

- If the world is “increasingly complex” (an IC cliché), then surely it calls for complex models of world events and these, as surely, have multiple necessarily conditions and interactive effects that must be estimated to have a fair reading. How do you estimate the conjunctive probability of a threat when the constituent parts are “likely”, “remote chance”, “realistic possibility,” etc.? It can’t be done without converting the terms into numbers.

- The risks posed and opportunity costs borne by sacrificing computational ability should boggle the mind, especially as the fog of war thickens in new domains such as cyber and non-munitions targeting, with their requirements for capturing hard-to-pin-down second and higher-order effects.

If the solution is a no-brainer (use numeric probabilities instead), why no change?

- Numeric probabilities are:
  - Unambiguous and clear (not fuzzy)
  - Can be precise (70%) or imprecise (60% to 80%)
  - Principally convey probability, not recommendation
  - Aren't context dependent and are cross-culturally stable
  - Support granular assessments
  - Support the full range of computation from simple to complex.

Viable hypotheses

- Institutional isomorphism (DiMaggio & Powell, 1983)
- "Intuitive politicians" protecting their interests (Tetlock, 2002)
- Statistical illiteracy and the ignorance hypothesis (Gigerenzer et al., 2007)

Some evidence for the ignorance hypothesis

- Probabilities can't be quantified if they're not based on "science"—otherwise, they convey a false sense of precision.
- The crispness of numbers can promote unwarranted risk taking by decision-makers (Friedman et al., 2018).
- Quantified probabilities can't be imprecise (also false)
- Decision-makers won't like numeric probabilities—unsupported by several studies showing that receivers prefer numbers to words (e.g., Brun & Teigen, 1988; Erev & Cohen, 1990; Wallsten et al., 1993).
- Decision makers never want anything more precise than a few levels of probability—e.g., they never care to distinguish 1 in 10 from one in a million (this is either false or, worse, true)

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