



The cloud of uncertainty in clinical reasoning

Giuseppe Parisi

Why uncertainty?



Uncertainty creeps into medical practice through every pore.

(Eddy 1984)

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Medicine as a fight against uncertainty

- *Uncertainty creeps into medical practice through every pore. Whether a physician is defining a disease, making a diagnosis, selecting a procedure, observing outcomes, assessing probabilities, assigning preferences, or putting it all together, he is walking on very slippery terrain. It is difficult for nonphysicians, and for many physicians, to appreciate how complex these tasks are, how poorly we understand them, and how easy it is for honest people to come to different conclusions.*
- (Eddy 1984)

uncertainty

uncertainty *noun*



OPAL W

/ʌn'sɜːtnti/

/ʌn'sɜːrtnti/

(plural **uncertainties**)

uncertainty as a subjective,
cognitive experience of people

1 ★ [uncountable] the state of being uncertain

- *There is considerable uncertainty about the company's future.*
- *He had an air of uncertainty about him.*

+ Extra Examples

+ Oxford Collocations Dictionary

Uncertainty as
A property of things

Questions about grammar and vocabulary?



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2 ★ [countable] something that you cannot be sure about; a situation that makes you not be or feel certain

- *life's uncertainties*

Uncertainty as a subjective experience 1

- conceptualization of uncertainty as a subjective, cognitive experience of people
- lack of knowledge about some aspect of reality
- Subjective consciousness or awareness of one's lack of knowledge
- UNCERTAINTY is metacognition
- Subjective perception of ignorance



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Uncertainty as a subjective experience 2

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subjective perception of ignorance that is experienced by patients and health professionals in differing ways and degrees, motivates action, and elicits a variety of psychological responses:

- feelings of doubt
- perceptions of indefiniteness
- Indeterminacy
- Unreliability
- Anxiety
-

.....and subsequent actions in order to avoid uncertainty (**ambiguity aversion phenomenon**)

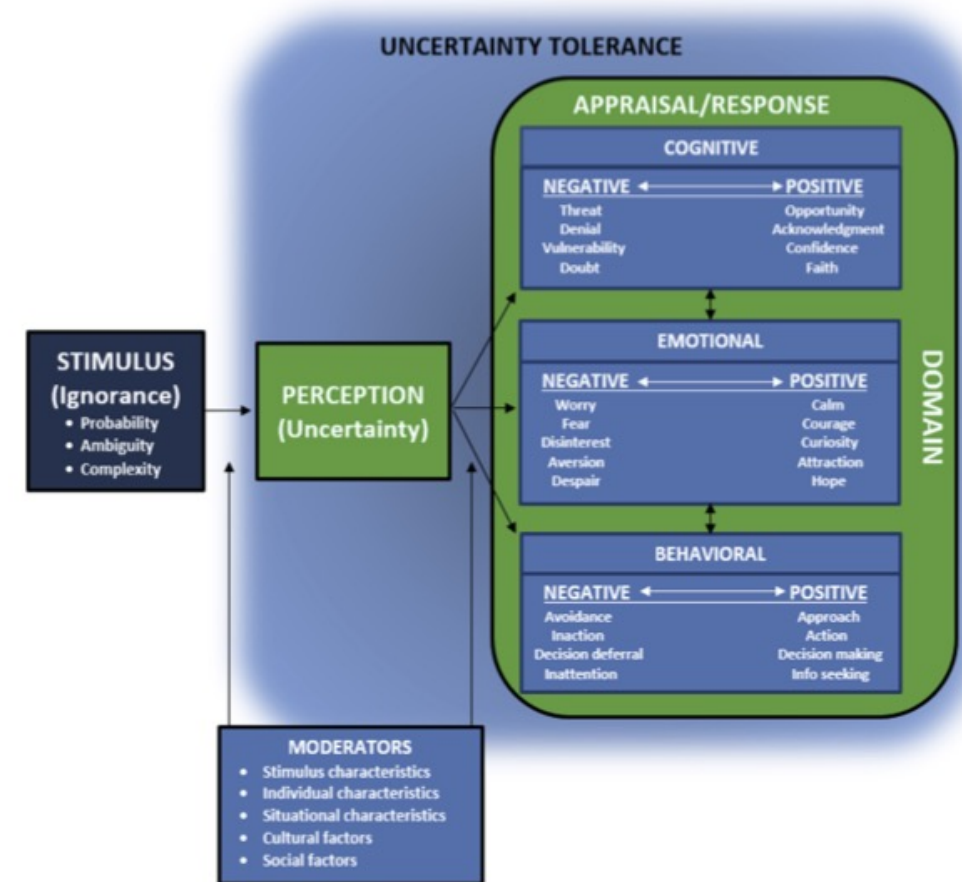


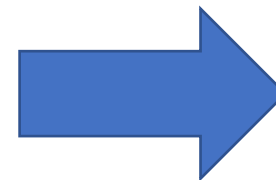
Fig. 2. Integrative model of uncertainty tolerance. Adapted from Han et al. (2011).

Ambiguity aversion: when?

- People respond differently to probabilities that are known
 - —in which the uncertainty pertains to the indeterminacy of future outcomes and is expressed in terms of numeric probability estimates—
- as opposed to unknown,
 - in which case discrete probability estimates are impossible or difficult to assign.



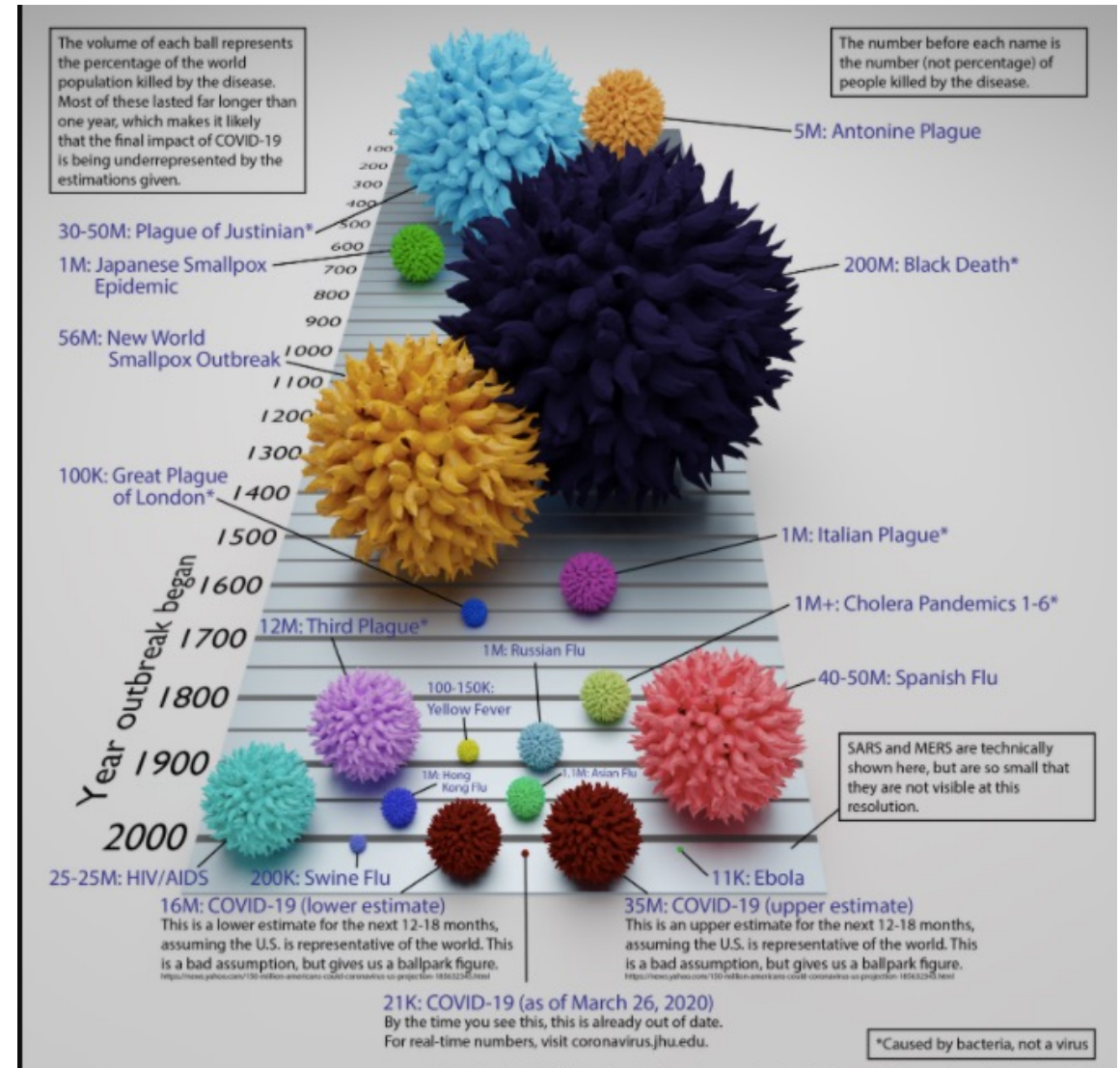
“ambiguity,” Ellsberg (1961) second-order, epistemic uncertainty regarding the “reliability, credibility, or adequacy” of existing risk information



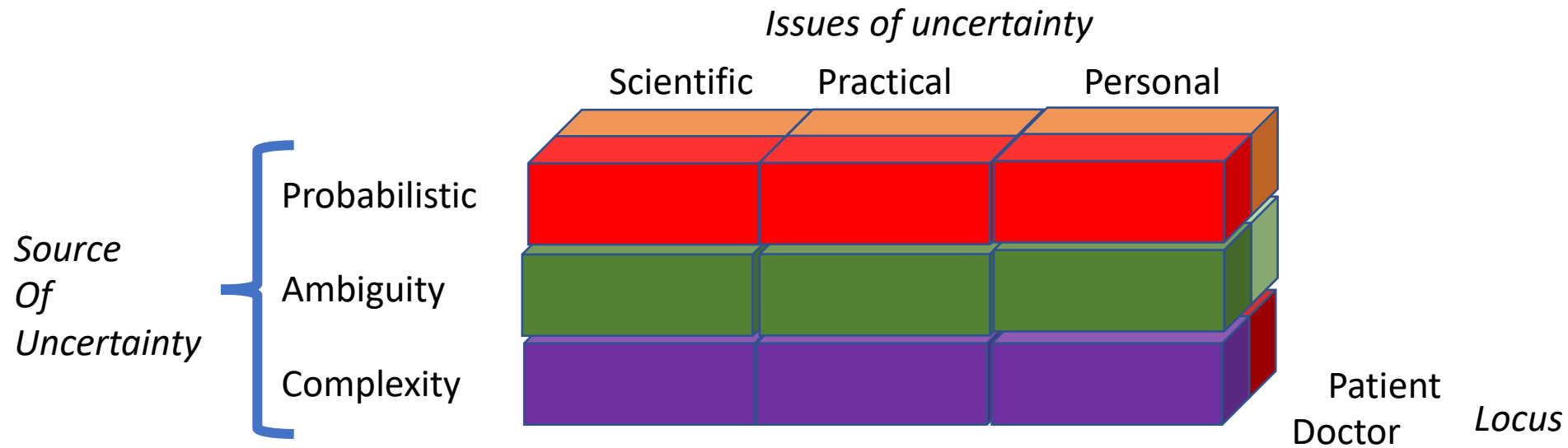
Ambiguity aversion

Are we able to predict future events?

Definition	Knowledge
certainty	deterministic knowledge
risk	complete probabilistic knowledge
uncertainty	partial probabilistic knowledge
ignorance	no probabilistic knowledge



A heuristik framework to handle uncertainty



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Varieties of uncertainty in health care: a conceptual taxonomy

Paul K.J. Han, MD, MA, MPH¹, William M.P. Klein, PhD², and Neeraj K. Arora, PhD²
¹Center for Outcomes Research and Evaluation, Maine Medical Center, Portland, ME
²Division of Cancer Control and Population Sciences, National Cancer Institute, Bethesda, MD

Abstract

Uncertainty is a pervasive and important problem that has attracted increasing attention in health care, given the growing emphasis on evidence-based medicine, shared decision making, and patient-centered care. However, our understanding of this problem is limited, due in part to the absence of a unified, coherent concept of uncertainty. There are multiple meanings and varieties of uncertainty in health care, which are not often distinguished or acknowledged although each may have unique effects or warrant different courses of action. The literature on uncertainty in health care is thus fragmented, and existing insights have been incompletely translated to clinical practice. In this paper we attempt to address this problem by synthesizing diverse theoretical and empirical literature from the fields of communication, decision science, engineering, health services research, and psychology, and developing a new integrative conceptual taxonomy of uncertainty. We propose a three-dimensional taxonomy that characterizes uncertainty in health care according to its fundamental sources, issues, and locus. We show how this new taxonomy facilitates an organized approach to the problem of uncertainty in health care by clarifying its nature and prognosis, and suggesting appropriate strategies for its analysis and management.

Uncertainty creeps into medical practice through every pore. Whether a physician is defining a disease, making a diagnosis, selecting a procedure, observing outcomes, assessing probabilities, assigning preferences, or putting it all together, he is walking on very slippery terrain. It is difficult for nonphysicians, and for many physicians, to appreciate how complex these tasks are, how poorly we understand them, and how easy it is for honest people to come to different conclusions.
 —David Eddy¹

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Risk and uncertainty

Partial probabilistic knowledge

Most situations in the real world can be represented by a risk core enveloped in an uncertainty cloud

