FUTURES GLOSSARY

Probability

English

1. Futures definition

Probability is a future state that exists between the extremes of complete certainty and complete uncertainty: the future one bets their entire life savings on, and the future one thinks will never happen—with a multitude of possibilities in between and around, each of which can be defined as *prob(e)able futures*. Probability is something statistically likely to happen and frequently carries a mathematical meaning, which suggests a quantifiable outcome that can be calculated, analysed, and predicted with a degree of certainty.

2. General definitions

Generally, probability is based on measuring how often an event occurs under specific conditions and predicting similar outcomes that might arise under the same circumstances (Kinemann, 2012; Merriam-Webster, n.d.-e). If multiple outcomes are possible, the most likely one is deemed probable. Such probabilistic judgments of outcomes are frequently based on tangible data that serve as indicators (Macchi et al., 2022, p. 1358).

In mathematics and statistics, probability similarly refers to the analysis of random phenomena and is often associated with numerical data, intervals, and a specific likelihood of an event occurring. This likelihood is expressed on a scale from zero (no chance at all) to one (total certainty) and is inherently linked to odds (Encyclopedia Britannica, n.d.).

At the same time, one's accumulated knowledge about a specific subject affects predictions of outcomes. As a result, probability is defined by certain limits of knowledge.

3. Etymology

Probability originates from the Latin *probabilitatem* or *probabilitas*, meaning credible or reasonably sensible. The term is derived from Cicero's *probabilism,* which was applied to an opinion that was plausible or widely approved (Franklin, 2015, p. 116).

The English term dates back to *probabilite*, which is something that is “likely to be realized, giving the appearance of truth or the quality of being probable" (Oxford English Dictionary, n.d.). This form of the term combines *prob(e)*, suggesting trial or testing, with *-ability*, highlighting the capacity to assess potential outcomes. This assessment capacity implies that probability is more than a number on the scale between zero and one. Rather, probability is a process in which practitioners assess *prob(e)able* scenarios rather than certainties.

The Italian *probabilità* is also directly connected to the Latin *probabilĭtas.* Like Cicero's *probabilism, the word primarily* describes the credibility of an opinion or argument but can also refer (in a more philosophical sense) to moral respectability. The related Italian verb *provare* means to test, to demonstrate, or to approve, reinforcing the connection to the English *prob(e)ability* (Treccani, n.d.).

In German, the term *Wahrscheinlichkeit*, can similarly be split into two terms with *wahr* meaning truth and *schein* meaning appearance, impression, or semblance (DWDS – Digitales Wörterbuch der deutschen Sprache, n.d.), which parallels the English interpretation of probability as having the "appearance of truth." The German term suggests an intersection of truth and appearance, portraying probability as a state between a truth-like quality and a never-certainty of appearance.

The Arabic verb *hamala* (to carry or to bear) leads to the form *iḥtimāl*, which denotes the act of taking on or being subject to something that might happen (Almaany, n.d.). While the English notion of probability often points to statistical likelihood, the Arabic *iḥtimāl* is closer to a subjective, internalized sense of possibility, which may explain why the word is sometimes seen as less deterministic or numeric in everyday usage than the term in English (Almaany, n.d.).

In Persian, the ancient term *bakht* (بخت) was used to express uncertainty about the future, chance or unpredictability, originating from Avestan and Middle Persian and referring to an invisible force shaping one's destiny. The modern term *ehtemal* (احتمال), derived from the Arabic iḥtimāl, initially meant tolerance, assumption, or possibility and later evolved into the more technical and scientific meaning of probability, particularly with the adoption of Western sciences in the nineteenth century (Dehkhoda, A-A. n. d.).

4. Field of terms

Several synonyms for probability can be found in English. *Likelihood*, of German origin, is the most commonly encountered synonym and describes an event having the chance to happen (Cambridge Dictionary, n.d.-b). The term possibly dates back to the Old Norse, *likligr*, giving something the appearance of truth or fact. Depending on a notion of chance, likelihood more accurately reflects the mathematical definition of

probability as an event that is commonly believed to be something that is almost anticipated to happen (The Britannica Dictionary, n.d.-c).

Chance "implies randomness, an opportunity to do something, the possibility that something will happen, or the way that events happen when they are not planned or controlled by people" (The Britannica Dictionary, n.d.-a). The terms likelihood and chance link to probability in two ways: each one points to the possibility of an event while also suggesting that outcomes may not be perfectly predictable.

Feasibility can be interpreted as "the possibility that something can be made, done, or achieved, or is reasonable." The word dates back to the Anglo-French *faisible*, as "something possible, that may be done" and the Latin *facere* "to make, do, or perform" (Cambridge Dictionary, n.d.-a). The connection to probability is found by combining the notion about "something possible that can be done" and "something that is reasonable," especially in the sense of likelihood.

Moving beyond mathematical interpretations, terms like *prediction* and *prognosis* also relate to probability. Linguistically *prediction* can be defined as "a statement about what will happen or might happen in the future," (The Britannica Dictionary, n.d.-d) while *prognosis* describes "a judgment about what is going to happen in the future" (Merriam-Webster, n.d.-f; The Britannica Dictionary, n.d.-e). The distinction in definition between these terms is small but present: *prediction* roams the land of might and will, while *prognosis* steps into relative certainty. Linguistically, this distinction is rooted in the terms' prefixes. *The prefix pro-* essentially provides *prognosis* with the implication of beforehand knowledge of the outcome of a situation and could therefore be linked to *expectation*, as a belief that something is going to happen or will happen (The Britannica Dictionary, n.d.-b). *Prediction*, meanwhile, dates back to Latin *praedictiō*, which derived from the verb *praedicere*. The term has a focus on the Latin prefix *prea-*, meaning to see or foretell something before the occurrence happens, which implies a state of more uncertainty.

Plausibility, as "the quality of seeming likely to be true, or possible to believe" (Cambridge Dictionary, n.d.-c), provides a notion that something is "superficially fair, reasonable or appearing worthy of belief, but often deceptively so" (Merriam-Webster, n.d.-c). This definition connects to the English and German etymology of probability as something having a truth-like appearance.

While related, *impossibility* and *certainty* are too far removed terminologically to be considered synonyms for probability, as they represent the binary fixed points on a scale from zero to one. While *impossibility* describes "the quality or state of being impossible" (Merriam-Webster, n.d.-b), *certainty* describes "the quality or state of being certain, especially on the basis of evidence" (Merriam-Webster, n.d.-a). Both terms can be linked to *uncertainty*, as "the quality or state of being uncertain, which reflects contexts where probabilities may be undefined" (Merriam-Webster, n.d.-g) as another notion existing on the zero to one scale.

This domain of the undefined also links the “relationship between possibility and probability, [...] for what is probable must preliminarily be possible” (Dubois & Prade, 2022, p. 1066). *Possible*, in this sense, “implies that a thing may certainly exist or occur given the proper conditions” (Merriam-Webster, n.d.-d).

5. Theoretical foundations

Robert Rosen and Mihai Nadin both explore the term probability and its connections to the term possibility in *Anticipatory Systems* (Rosen, 2012). For Rosen, one central aspect is that anticipation is a “model of itself, which unfolds in faster than real time, [...] driven by both probability realizations and possibility projections” (Nadin, 2012, p.xxxiv). Possibility, then, becomes a guiding choice fed by imagination. In turn, probability is the degree of surprise or expectation when an imagined happening is examined regarding its possibility.

Following Aloisius Louie’s work on *Mathematical Biology*, which is connected to Rosen's and Nadin's work in the fields of *Relational Biology* and *Anticipation*, one notion about probability and possibility stands out: "The predictive model in an anticipatory system must not be equivocated to any kind of ‘certainty’ (even probabilistically) about the future” (Louie, 2019, p. 21). Louie’s notion of the anticipatory predictive model is transferable to the idea of a scale of probability, which would exist as a number between zero (no chance) and one, which would leave out the idea of certainty.

Meanwhile, in the work of the cultural scientist, Arjun Appadurai (Appadurai, 2013) and what he calls *the ethics of probability* and *the ethics of possibility*, the connections between and importance of both terms on the scale become clearer. Appadurai articulates the idea that humans are embracing agency in shaping the future, emphasizing that the future is not predetermined but a product of social construction and human action. In other words: futures can be more driven by imagination and the possible than by destiny, fate, or a set chance. Appadurai’s *ethics of possibility* highlight the importance of understanding how people imagine, anticipate, and actively participate in creating the future. On the other hand, Appadurai’s definition of the *ethics of probability*, oriented around risk reduction, relies on statistical projections, thereby creating futures that are also driven by data-based probabilities (Appadurai, 2013, p. 295; Poli, 2017, p. 29). Both types of ethics are intertwined, as there is no probable without considering what is also possible and often no possible can exist without a sense of probability that something can be done or achieved.

Both probability, as the future one bets on, and possibility, as futures wildly imagined, are encountered in Riel Miller's work. In *Transforming the Future: Anticipation in the 21st Century* (2018), Miller makes an important distinction about the ways in which humans use the future and explores uses of the future in the form of the *Futures Literacy Framework (FLF)*.

In the first chapter, "Sensing and making-sense of Futures Literacy: Towards a Futures Literacy Framework (FLF)", Miller goes back to Heidegger's 1962 concept about *being* versus *beings*. Heidegger describes *being* not

as an entity but rather a condition of possibility in which anything might occur. Being is the overarching reality or "is-ness" that makes existence possible. *Beings*, on the other hand, are individual things, entities, or objects that exist. Like a tree or a chair, beings have a particular way of *being*, which is to say they have an ontologically specific set of characteristics and properties. Miller here creates a bridge, a state which, in his consideration, contains different kinds of explicit anticipation. Specifically, Miller draws a line that differentiates between *anticipation-for-the-future (AfF)* and *anticipation-for-emergence (AfE)*. He defines the being of AfF as a goal in the sense of a planned or desired future. "There are many beings of this kind of future, ranging from when you take an umbrella to be prepared if it rains to planning to climb Mount Everest." In contrast, the being of AfE for Miller represent a non-future, which is "[...] a disposable construct, a throwaway non-goal that need not be constrained by probability or desirability" (Miller, 2018, p. 20).

Probability, as pertaining to something planned and preparable, could be associated with Miller's *AfF*, while Heidegger's *beings* could function as occurrences, objects, and entities with specific sets of characteristics and properties that enable calculated, analysed, and predicted outcomes with a degree of certainty. Heidegger's *being,* on the other hand, is actually defined as the *possibility* that anything can *be,* making room by association for the phenomenon of emergence.

What becomes clear is that probability and possibility are tied together by a bond that is forged by likelihood and imagination. Both terms contain a degree of agency and certainty, implying that events or thoughts will or might be translated into reality, making room for emergence and novelty.

6. Use in practice

The exploration of probable futures is a built-in phase in Futures Literacy Laboratories (FLLs), particularly for assessing futures that provide a relatively realistic impression and therefore feel somewhat accessible for participants.

A probable future in this case is any single future that is more likely than some other futures. This exploration of probable futures is done to convey a sense of what different futures feel like; to identify general patterns, developments or trends; and then invite novelty beyond the probable futures imagined (Helm, 2006). By doing this, participants are further invited to explore their long-held assumptions as a form of prediction about the future (Poli, 2017, p. 193).

Creating futures that roam outside the world of probability is key to Futures Literacy Laboratories and Futures Literacy. Miller writes, "Futures Literacy enabled us to conceive and implement a process that allowed stakeholders to enlarge their images of the future beyond expected futures. Being able to propose visions not constrained by efforts to ensure high levels of probability created space for conversations that made explicit and invented futures and provided a different way of looking at the present" (2018, p. 175).

In conclusion, probability and possibility are two linguistically connected terms and concepts, but a distinction between the two has been shown to be necessary for futures work. To that end, probability is generally perceived as something statistically likely to happen, while possibility holds more space for imagination, vision, and dreams. While the discussion might appear to be an exercise in semantics, this distinction of terms likely holds an important value in facilitating individual and collective thinking in Futures Studies.

Terminologist: Sandra Schwarzmann

This English text is the original entry for this term. No LLM model has been used in the generation of this entry.

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