

Logic, Argumentation & Reasoning 20

Nicholas Rescher

Luck Theory

A Philosophical Introduction to the
Mathematics of Luck

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to the Mathematics of Luck

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Nicholas Rescher
University of Pittsburgh
Pittsburgh, PA, USA

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For Bas van Fraassen
Philosopher par excellence

Preface

One may well ask: Where in the taxonomy of branches of knowledge does the theory of luck belong? Is it to philosophy—and if so, to metaphysics or epistemology or ethics—or is it to some branch of applied mathematics such as economics or decision theory, or is it a matter of psychology and personality study? The answer is simple: it belongs to none but is entangled with all. It is as interdisciplinary a branch of investigation and inquiry as there is or can be. Clearly no single book can do justice to the subject. All that is attempted here is to lay the groundwork for the mensurational and mathematical approach to the comprehension of luck which affords otherwise unavailable. The aim is to inject clarity and precision into our understanding of these issues. But unless we can see time and again that calculation harmonizes with intuition, the validating of our proceedings remains in doubt. Fortunately, however, we shall find that all is well in this regard.

Overall, the academic study of luck has three main branches:

- *The philosophy of luck.* This project was addressed in my book, *Luck: The Brilliant Randomness of Everyday Life* (New York: Farrar-Straus-Giroux, 1995; reprinted in 2000 by the University of Pittsburgh Press). Further discussion and references to the vast literature can be found in Ian M. Church and Robert J. Hartman (eds.), *The Routledge Handbook of the Philosophy of Luck* (New York and London: Routledge, 2019).
- *The psychology of luck.* This project is addressed in N. N. Taleb, *Fooled by Randomness: The Hidden Role of Chance in Life* (New York: Random House, 2004). (See also the preceding entry.)
- *The mathematics of luck.* This heretofore undealt-with project of developing a metric approach to luck is the topic of this book.

For further details regarding the extensive literature on luck, see the Bibliography at the end of this book.

The English term “luck” covers a good deal of territory. There is *stochastic* luck of matters governed by chance issue in success or failure: playing dice, hitting the jackpot, or striking oil. This is at issue when we say small things as: “He had good luck at the races” or “He thanked his lucky stars for having succeeded.” However, there is also the *existential* (or *constitutive*) luck of being treated well by fate and fortune. This is at issue when we say such things as: “She has the good luck of being born to wealthy parents” or “He had the bad luck of coming of age just in time to be caught up in the wartime draft.” It is the former, chance-outcome version of luck that will be at the forefront of the present deliberations.

In analyzing chancy situations, luck and risk play different yet complementary roles. Luck dominates in the region outside the range of expectation. Risks, by contrast, prevail in the negative sector of this range. And both stand in contrast to the hopefully anticipant positivity.

As the Bibliography at the book’s end shows, recent years have seen numerous informative studies of the psychology of luck beliefs and believers.¹ The result findings indicate such conclusions as that the young tend to feel luckier than the old, and that young female students tend to feel luckier than young males. However, such psychological and sociological considerations are irrelevant to the present range of concerns, which are addressed not to the extent to which people *feel* lucky, but rather to the assessment of the extent to which they can objectively be deemed actually to be so.

In its stochastic aspect, luck is a matter of the yields and likelihoods of the possible outcomes of chancy situations. Accordingly, both value theory and probability theory are inextricably involved in the theory of luck. Both of these pivotal factors—both yields and probabilities—can be assessed either via personal and subjective judgments or via the objective and impersonal proceedings at issue in rational decision theory.

Luck theory aims at a formularization of the conception whose appropriateness is attested by the fact that virtually all consequences of the theory are intuitively acceptable and that, conversely, virtually all intuitively acceptable features of luck can be verified in the theory.² It aims at an adequation that harmonizes formalism and informal understanding. In the end, the theory should make good a claim to providing for a mathematically precise systematization of an informal and pre-systematic conception.

I am grateful to Estelle Burriss for her conscientious help in preparing this book for the press.

Notes

1. Davies 1997 is a typical instance of a paper on belief in luck. (References of this format relate to the Bibliography.)
2. In the present context, “virtually all” comes to “all save some few explicable exceptions.”

Pittsburgh, PA, USA
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Nicholas Rescher

Philosophical Prologue (Fortune, Fate, and Chance)

We live in a world where our aims and goals, our “best laid plans,” and indeed our very lives are at the mercy of fortuitous chance and inscrutable contingency. In such a world, where we propose and fate disposes, where the outcomes of all too many of our actions depend on “circumstances beyond our control,” luck is destined to play a leading role in the human drama.³

The role of chance in human affairs was once the topic of extensive discussion and intensive debate among philosophers. In Hellenistic Greece, theorists debated tirelessly about the role of *eimarmenê*, the unfathomable fate that remorselessly ruled the affairs of the men and gods alike, regardless of their wishes and actions. The Church fathers struggled mightily to combat the siren appeal of the ideas of chance and destiny—those superstition-inviting potencies. (Saint Augustine detested the very word *fate*.) The issue of good or bad fortune, along with the related question of the extent to which we can control our destinies in this world, came to prominence again in the Renaissance, when scholars brooded once again about the issues of human destiny raised by Cicero and Augustine. Calvinism kept many a theologian and philosophers awake at night. And the topic undoubtedly has a long and lively future before it, since it is certain that, as long as human life continues, luck will play a prominent part in its affairs.

Luck as an English word is a creature of the fifteenth century and derives from the Middle High German *gelücke* (modern German *Glück*), which (somewhat unfortunately) means both happiness and good fortune, conditions which, given human fecklessness, are certainly not necessarily identical. Virtually from its origin, the term has been applied particularly to good or ill results in gambling, games of skill, and chancy ventures in general!⁴

It is useful for the range of present deliberations to have (what several European languages do not make available!) a single word to mean “good or bad fortune acquired unwittingly, by accident or chance.” In English, “luck” does this job quite well; in other languages, we have to do the best we can.⁵ For luck fares rather mixedly in European languages. The Greek *tuchê* is too much on the side of haphazard. In Latin, *fortuna* comes close to its meaning, with the right mixture of

chance (*casus*) and benefit. But the German suffers from the unfortunate equivocation that *Glück* means not only luck (*fortuna*) but also happiness (*Felicitas*). The French “chance” (from the Latin *cadere*, meaning how matters fall out—“how the dice fall”) is a fairly close equivalent of luck, however. And the Spanish *suerte* is also pretty much on target.

On the other side of the coin, several languages have a convenient one-word expression for “a piece of bad luck” (French *malchance*, German *Pech*)—a most useful resource considering the nature of things, which English unaccountably lacks. (Despite its promising etymology, misfortune is not quite the same, since it embraces any sort of mishap, not merely those due to unpredictable accident or chance but also those due to one’s own folly or to the malignity of others.) And it may be emblematic of something larger that no European language seems to have a one-word expression for “a piece of good luck.”

Luck is not a causal force or function in nature; indeed it is not a natural phenomenon at all. Rather it is a humanly contained conception imposed by us on occurrences to make the course of events easier to describe and understand. (In this regard, it is like degrees of latitude or days of the week.)

* * *

Luck requires a potential beneficiary/malefiary—someone who has an interest in the matter. So understood, someone is lucky (or unlucky) when they are the beneficiary (or malefiary) of a fortuitous development. As such, good or bad luck can take very different forms, some standard versions being:

- *Finder’s luck*: stumbling upon a treasure trove
- *Gambler’s luck*: succeeding or failing in some sort of gamble
- *Guesser’s luck*: inadvertently hitting on the right answer (e.g., in a spelling bee)
- “*Dumb*” *luck* (good or bad): being in the right (or wrong) place at the right (or wrong) time: e.g., stumbling out of the way just as the bullet comes by, and similar “narrow escapes”

Each such mode of luck has characteristic features of its own, so that none is totally typical of the entire range. However, the present deliberations will focus on gambler’s luck, both because it is the most familiar form of the phenomenon and because it best admits of quantitative analysis. Luck requires chance. When a development eliminates all your superior risk from a competition you are lucky that this has occurred. But your examining is now no longer something that occurs by luck. A chancy outcome that is lucky may not be beneficial or particularly welcome when it qualifies only because all alternatives are worse. And even the best-possible outcome will not necessarily be lucky—specifically when all the alternatives have the same yield.

* * *

It is instructive to consider some of the ways and means of luck in various areas of human endeavor. For luck takes many forms and is able to adjust its coloration, chameleon-like, to the background of various settings.

- (1) *Luck in Games.* Success or failure in situations of competition and conflict often hinges on matters of fortuitous happenstance. Even in conflicts of skill rather than chance—especially in sporting and gaming competitions—luck plays an enormous role. A player’s momentary distraction here or accidental slip-up there can open up the opportunity to add a decisive point to the score. When the opposing team’s star player happens “to have an off day,” our team may win the point that gains the championship. It is precisely because interesting games are those between evenly matched teams, where victory is not a foregone conclusion owing to an imbalance of skill, that the role of chance eventuations—and thus of luck—is so prominent in professional sport. And it is an easy step from sport to the more serious conflicts at issue with luck in warfare.
- (2) *Luck in Warfare.* There is enormous scope for luck in warfare. An accidentally intercepted message may betray plans and intentions to the enemy, and a tactical maneuver gone wrong through a fluke may create a decisive opportunity for the opponent in battle. The fog of unknowing that covers the battlefield opens doors beyond number for the entry of luck. And in war, timing is everything. It was a piece of very bad luck indeed for Robert E. Lee at Gettysburg that Gen. J. E. B. Stuart decided to take his cavalry off raiding instead of providing scouting cover for the invading Confederate army. It was a piece of very good luck indeed for the Americans at Yorktown that the British under Cornwallis made their foray before the French fleet under De Grasse had to return to its winter station.

A mode of warfare somewhat different from the military is the political. Here, too, there is ample scope for luck, as, for example, with luck in elections.

- (3) *Luck in Elections.* The democratic electoral process obviously affords enormous scope for the operation of luck. A candidate’s ill-timed flu can re-open large questions about his state of health at an awkward time. Bad weather on election day may favor a liberal candidate by keeping the more conservative elderly voters at home. In the 1890–1930 era, Democratic candidates did not have much of a chance in US presidential elections, but Teddy Roosevelt’s Bull Moose split of the Republican party in 1912 created a crack wide enough to let Woodrow Wilson slip through. One of the cardinal reasons why “A week is a long time in politics” (as the saying goes) is that fortuitous developments here have the prospect of engendering a lot of elbow room for luck.
- (4) *Luck in Search and Research.* Be it in prospecting or in scientific investigations, many search processes have a hit-and-miss aspect that allows substantial room for the operation of luck. Scientific discoveries are often made not on the basis of some well-contrived plan of investigation but through some stroke of sheer luck—a phenomenon common enough that a specific name has sprung up for it, such discoveries being said to be made “by serendipity.”⁶ This occurs in science when investigators come upon answers to questions or solutions to