

Lecture 8: Luck.

David Aldous

September 28, 2017

In the context of everyday minor events – just catching or just missing an elevator – we talk about *good luck* or *bad luck* and everyone understands what we mean.

Luck is probability taken personally. Chip Denman.

But when someone asks

Do you believe in luck?

it's much less clear what they mean.

This lecture is partly about our **perception** of luck, outside the mundane “everyday minor events” context.

At an opposite extreme is *luck as superstition* about the effect of specific actions, such as

- actions that one might do deliberately (blowing out all the candles of a birthday cake)
- or accidentally (breaking a mirror)
- or that happen near you (black cat)
- or even by abstract associations (the number 13);
- or possession of talismanic objects (a lucky horseshoe).

Here I have used American examples but all cultures have their own superstitions. What makes such beliefs be superstition, of course, is that one can't point to any causal connection between these actions and future events. And aside from "future events", believing that past bad luck was caused by a hex would be another superstition.

Few educated people would admit to believing in “luck as superstition”.
But one can ask a somewhat different question

*do you ever take decisions on the basis (in part) of feeling
lucky?*

People often answer “yes, sometimes”.

Here is an example from the “psychology” Lecture later. That lecture describes several experiments you can try on your friends!

Set-up. Take a bingo game, in which you can draw at random from balls numbered 1 - 75, or similar randomization device. Take 5 tokens (or Monopoly money etc).

Procedure. Tell participant you will draw balls one by one; each time, the participant has to bet 1 token on whether the next ball drawn will be a higher or lower number than the last ball drawn. After doing 5 such bets, tell participant “there will be one final bet, but this time you can choose either to bet 1 token, or to bet all your tokens”. Finally, ask participant what was their strategy for which way to bet, and how did they decide at the final stage whether to bet all their tokens or just 1.

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Results. Before the final bet, almost everyone does the rational strategy – if the last number is less than 37 they bet the next will be larger. What we’re interested in is their rationale for **how much** to bet at the last stage. A surprising number of people invoke some notion of **luck** – “I was ahead, so didn’t want to press my luck by betting everything at the last stage”.

Conclusion. Even when “primed” to think rationally, people often revert to thinking about chance in terms of “luck”.

The Big Question

I would like to compose a lecture on the theme

in some given aspects of human affairs, what are the relative contributions of skill and chance to success?

based on quantitative data. Of course the usual word for “chance contributing to success” is *luck*. There is a lot of verbal discussion of this question (maybe 2000 years of Philosophy) but not much data, so I’ll give only a few slides on that theme. Then we turn to the psychology of luck.

A genre of books about business success describes the careers of highly successful individuals with the aim of explaining their success, and the implicit logic of such books is

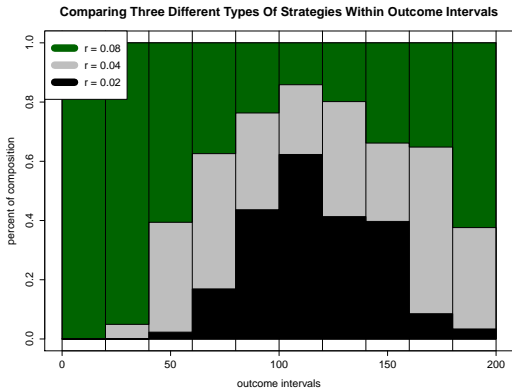
- most highly successful people have attribute A
- most other people do not have attribute A
- therefore attribute A is a major factor in being highly successful.

Aside from the usual “correlation is not causation” issue, this argument assumes all outcomes outside “highly successful” are equivalent. The following (very hypothetical) scenario illustrates what might happen if we subdivide those outcomes. Out of 100 people

	highly successful	average	highly unsuccessful
A	6	0	9
not A	3	80	2

A typical “rationally risk averse” person might prefer not-A, even though 2/3 of the highly successful people are A. Here “risk” does not mean “dangers” as in the “Risk to Individuals” lecture, but means economic risk – an enterprise failing – as in the Stock Market lecture.

A slightly less arbitrary scenario comes from the discussion of the Kelly criterion for stock market investing, as gambling on a favorable game. The figure shows a finite-time simulation with three types of investors: $r = 0.04$ is the Kelly strategy, $r = 0.02$ is the conservative half-Kelly strategy, and $r = 0.08$ is the “insanely aggressive” double-Kelly strategy. [sketch on board]. The figure is not a conventional histogram; instead, within each vertical strip of similar outcomes, it shows the proportions of each type amongst investors with that range of outcome.



The message from this line of thought is that, for individuals who are otherwise similar, those who turn out to be highly successful will tend to be those who

(a) have chosen, consciously or as an aspect of personality, to take risks, ranging from the “calculated risks” of a “rational economic agent” to the more extravagant risks of one who metaphorically seeks to conquer the world,

and (b) who have been lucky (moderately lucky for the former, extremely lucky for the latter).

Here are two books on this Big Question – how to assess the relative contributions of skill and chance in (the career aspect of) human life.

The main message of Malcolm Gladwell's 2008 bestseller *Outliers* (without serious attempt at statistical support) is that the time, place and socio-economic status of one's birth, the surrounding culture, and luck, rather than pure individual merit, play more of a role in success than we might suppose.

In the 2009 book *Dance with Chance*, Spyros Makridakis et al. write

*Hard work, determination, education and experience should count for a great deal [as regards professional success]. But, again the data available suggests that luck is almost entirely responsible for **which** hard working, determined, educated and experienced people make it in life.*

My own view of such books:

1. Emphasizing that success is not wholly determined by individual talent is accurate.
2. But talking about luck (with the implication of pure chance – roll of the die) without relation to conscious risk-taking is misleading. Two people may encounter the same “chance” opportunity, but only one might be prepared and willing to take advantage of it.

Chance favors the prepared mind. (Louis Pasteur).

Project: what is the statistical data (not individual anecdotes) behind any of these assertions about the relative contributions of skill and luck to success?

Here is another **Project that I would really like someone to do**, on the theme of the difficulty of separating skill from luck. Write code to create the following game to be played online. [all numbers adjustable].

25 investment funds, names like A, B, ..., Y.

Model annual returns as independent Normal, mean = 5%, S.D. = 20%, except one fund (identity not known to player) has mean = 9%.

Annual “market return” = average of that year’s fund returns, plus 1%

Challenge to player: can you beat the market by finding the “good” fund?

Initial screen shows previous 3 years returns [and other stats?]

-2	-1	0	fund	your %
7.3 %	-11.8 %	14.4%	A	—
-2.2 %	15.8 %	18.9%	B	—
15.2 %	-2.8 %	8.9%	C	—
15.2 %	5.0 %	7.9%	D	—
3.3%	15.5%	8.0%	market	
		100	market port.	
		100	your port.	

Player specifies what percentage of portfolio to put in each fund.

Player specifies what percentage of portfolio to put in each fund, for the coming year.

-2	-1	0	fund	your %
7.3 %	-11.8 %	14.4%	A	—
-2.2 %	15.8 %	18.9%	B	15%
15.2 %	-2.8 %	8.9%	C	—
15.2 %	5.0 %	7.9%	D	10%
3.3%	15.5%	8.0%	market	
		100	market port.	
		100	your port.	

Then simulate year 1.

Simulate year 1.

-2	-1	0	1	fund	last %	next %
7.3 %	-11.8 %	14.4%	22.1%	A	—	—
-2.2 %	15.8 %	18.9%	4.6%	B	15%	—
15.2 %	-2.8 %	8.9%	14.0%	C	—	—
15.2 %	5.0 %	7.9%	8.1%	D	10%	—
3.3%	15.5%	8.0%	12.4%	market		
		100	112.4	market port.		
		100	106.6	your port.		

Player specifies what percentage of portfolio to put in each fund for next year.

Then simulate year 2. Continue for 15 years.

Did the player beat the market?

Strategies for player?

- Choose 1 fund at random, keep for all 15 years – chance $\approx 1/25$ to beat market.
- Invest 100% in best-so-far fund each year – still unlikely (I guess) to beat market.
- Best strategy (I guess) is to split portfolio across a decreasing number of best-so-far funds.

But (I guess) even with best strategy you are unlikely to beat the market.

Conclusion of project (I guess). The one fund manager has “skill”; the others have varying performances, but just “by luck”. But it is very hard for you to determine the difference.

The rest of the lecture is accounts of what people in different academic disciplines or occupations have written about *luck*. **Possible course project?**

In lecture 1 I showed an extensive list of hypothetical examples from the book *Luck*, by the philosopher Nicholas Rescher.

[show]

Based on his (mostly “major”) examples, he suggests the following taxonomy.

- Windfalls or wind thefts
- Unforeseeable lost or gained opportunities
- Accidents
- Narrow escapes or flukish victimizations
- Coincidences (e.g. "being in the wrong place at the wrong time")
- Consequence-laden mistakes in identification or classification
- Fortuitous encounters
- Welcome or unwelcome anomalies (in generally predictable matters).

On first reading this list I was skeptical – the categories are somewhat vague and overlapping, and were based on hypothetical examples – but I now suspect they would actually do well on real examples, at least after adding two more categories:

- Other people's actions (when you have little influence on them) having (un)favorable consequences for you
- Once-in-a-lifetime deliberate risk-taking that works out well or badly.

Course project: Find a large collection of real-world instances perceived by people as luck (as in lecture 1: blogs, twitter etc) and see whether this categorization seems feasible and helpful.

Our basic notion of (*good/bad*) *luck*:

the outcome of a chance event is favorable/unfavorable to the individual under consideration

is rather broad and bland. Can we bracket the concept by specifying a “core notion” of luck? Consider the following 4 characteristics of an event.

- it involves chance, in the particular senses of *unpredictable* and *outside the control* of the individual;
- it is unlikely;
- it has a noticeable impact on the individual;
- it is an event that happens at a particular time (rather than an ongoing “state of affairs”).

To me, these characteristics define the core concept of luck, in that almost any event with all 4 characteristics would be regarded as luck.

A 2004 paper *The psychology and philosophy of luck* by D. Pritchard and M. Smith provides a useful overview of some of academic literature. But I am not impressed by their own attempt to capture the core notion of luck, which is

- If an outcome is lucky, then it is an outcome that is significant to the agent concerned.
- If an outcome is lucky then it is an outcome which occurs in the actual world but which does not occur in most of the nearest possible worlds to the actual world (worlds which most resemble the actual world).

The former is fine. The latter seems a rather confused way to say “unlikely, even conditional on knowing everything not closely affecting the outcome”. Replacing the usual “conditional probability” formulation, implicit in any real-world discussion of chance, with a “possible worlds” story is merely distracting.

The Belief in Good Luck Scale

The title is from a 1997 psychology paper by Peter R. Darke and Jonathan L. Freedman (much of what follows is direct quotes). They are interested in the spectrum between

- the view that luck is a somewhat stable characteristic that consistently favors some people but not others and is especially likely to favor oneself
- the rational view of luck as random and unreliable.

They devise a set of questions – do you agree or disagree with statements such as

- Luck plays an important part in everyone's life.
- Some people are consistently lucky, and others are consistently unlucky.
- Luck is nothing more than random chance.
- I consistently have good luck.

The answers are used to assign each volunteer subject a numerical value on a BIGL scale. Now other psychologists have previously invented questions to place subjects on a scale for other traits, such as

optimism, self-esteem, desire for control, achievement motivation, and satisfaction with life,

which are familiar, and a less familiar one “locus of control” explained below. So one can compare the subjects’ numerical values on different traits. One might imagine that BIGL was correlated with, for instance, optimism. The authors’ conclusion is that BIGL appears to be uncorrelated with all of these traits except “locus of control”, defined as

the extent to which events are generally thought to be determined by external factors. such as luck and powerful others, rather than internal factors, such as skill and effort.

The point is that one end of a personality spectrum is the view

- luck plays a relatively small role in events in general, and in one's own life too

and the other end is the view

- luck plays a relatively large role in events in general – sometimes positive and sometimes negative – and also plays a relatively large role in one's own life, but mostly positive.

Here we have returned to the Big Question I stated earlier

in some given aspects of human affairs, what are the relative contributions of skill and chance to success?

but here they studied people's **beliefs** about this question, not what is actually true.

Repeating my previous comments on the Big Question

1. Emphasizing that success is not wholly determined by individual talent is accurate.
2. But talking about luck (with the implication of pure chance – roll of the die) without relation to conscious risk-taking is misleading.

Luck as seizing opportunity. Recall the quote

Chance favors the prepared mind. *Louis Pasteur.*

This reminds us that the word “chance” is often used to mean *opportunity*. Looking for discussion of the idea of maximizing your future opportunity leads one, alas, into a jungle of “how to succeed in business” and pop-psych self-help books,.

Perhaps most relevant to us is the 2003 book *The Luck Factor* by psychologist Richard Wiseman, based upon interviews with several hundred people who self-describe as being extremely lucky or unlucky. (Note the distinction from the BIGL study based on more representative volunteers but based on their answers to questions, not their personal life experience). He expresses his conclusions as the following four principles (and twelve subprinciples, not copied).

- Lucky people create, notice and act upon the chance opportunities in their lives.
- Lucky people make successful decisions by using their intuition and gut feelings.
- Lucky people's expectations about the future help them fulfill their dreams and ambitions.
- Lucky people are able to transform their bad luck into good fortune.

This seems eminently reasonable. Though my critique is that, starting with people who see life in terms of luck and asking them questions about luck, it is not surprising that one ends with answers in terms of luck. But if one started out to write a book on the topic “how adopting a positive attitude towards life will help lead to success” and tried to formulate a list of maxims, then surely such a list would include similar items but without much explicit mention of luck – one would just talk about “positive attitude”.

Anyway, it is interesting to contrast this psychologist's advice with the more “philosophical” advice by Rescher:

- Be realistic in judgements (evaluate the probabilities and utilities as objectively as you can)
- Be realistic in expectations (there is only so much one can do)
- Be prudently adventuresome (don't be so risk-averse as to lose out on opportunities)
- Be cautiously optimistic.

We could look for what people have written about the role of chance/luck in different occupations. Just out of curiosity, here are 3 paragraphs from the 2008 U.S. Army Field Manual.

Aside. Because you guys wasted some percent of your teenage years on first-person shooter video games, to you *army* means men in uniforms firing big guns. But when you are old and wise like me, *army* means a giant bureaucracy, so what you're going to see is something written by a committee.

paragraph 1-79. Uncertainty, chance, and friction have always characterized warfare. On land, they are commonplace. Many factors inherent in land combat combine to complicate the situation. These include

- Adverse weather.
- Chaos and confusion of battle.
- Complexity.
- Lack of accurate intelligence.
- Errors in understanding or planning.
- Fatigue.
- Misunderstanding among multinational partners.
- An adaptive and lethal enemy.
- Difficult terrain.
- Personality clashes.
- Civilian population.

paragraph 1-80. Chance further complicates land operations. Things such as weather and other unforeseen events are beyond the control of a commander. For example, in December 1989, an ice storm at Fort Bragg, North Carolina, delayed deployment of some elements of the force invading Panama in Operation Just Cause. In addition to chance occurrences, enemy commanders have their own objectives and time schedules. These often lead to unforeseen encounters. Both enemy and friendly actions often produce unintended consequences, further complicating a situation, but they may lead to opportunities as well.

paragraph 1-81. Several factors can reduce the effects of uncertainty, chance, and friction. Good leadership, flexible organizations, and dependable technology can lessen uncertainty. Timely, accurate intelligence may reduce the factors affected by chance. And a simple plan combined with continuous coordination might moderate the effects of friction. However, even when operations are going well, commanders make decisions based on incomplete, inaccurate, and contradictory information under adverse conditions. Determination is one means of overcoming friction; experience is another. High morale, sound organization, an effective command and control system, and well-practiced drills all help forces overcome adversity. Uncertainty, chance, and friction also affect the enemy, so commanders should look forward and exploit all opportunities. Understanding the operational environment, effective decisions, and flexibility in spite of adversity are essential to achieving tactical, operational, and strategic success.

Returning to our Big Question

in some given aspects of human affairs, what are the relative contributions of skill and chance to success?

the Field Manual is at least trying to list the possible ways that chance may affect success, in the military context.

To see a conceptual difficulty in studying the Big Question, consider team sports (for which we have lots of data). Suppose we agree that team A has 64% chance to beat team B. This might arise in

- a sport in which skill plays the major role and luck only a small role; but the skills of A and B are only slightly different.
- a sport in which luck plays the major role and skill only a small role; but the skills of A and B are more substantially different.

And there's no statistical way to distinguish these possibilities. So, paradoxically, the Question is not easier to answer in explicitly competitive aspects of life.

Project. The Wikipedia article *Luck* seems rather disorganized – can you improve it?