Ch.5—The empirical content of promotion

What is the empirical content of the claim that events of type C are useful for bringing about an event of type E?

> We believe in causation because of the following kind of phenomena. We note that in situations when someone throws a rock at a calm unfrozen lake, a splash reliably occurs. We also note that in situations that are similar except that no one throws a rock at the lake, a splash reliably does not occur. This seems to indicate that the rock is making a difference as to whether a splash occurs. What's more, the basic structure of this example generalizes to all possible circumstances across all possible events. (169)

"<u>The promotion experiment</u>"

> 1. Identify or create a zillion separate instances of the initial conditions, each selected randomly from the members of C using its built-in probability distribution.
>
> 2 Identify or create another zillion separate instances of the initial conditions, each selected randomly from the members of ~C using its built-in probability distribution.
>
> 3. Observe whether *E* happens in each separate run of the experiment.
>
> 4. Define $f_C(E)$ as the fraction of C-runs where E occurs and $f_{\sim C}(E)$ as the fraction of ~C-runs where E occurs.
>
> 5. The observed value O is defined as $f_C(E) - f_{\sim C}(E)$. (169)

Claim: typically, O is the degree of prob-influence of *C* on *E*. The goal is to explain why. For consider (P):

> (P) Smoking causes cancer.

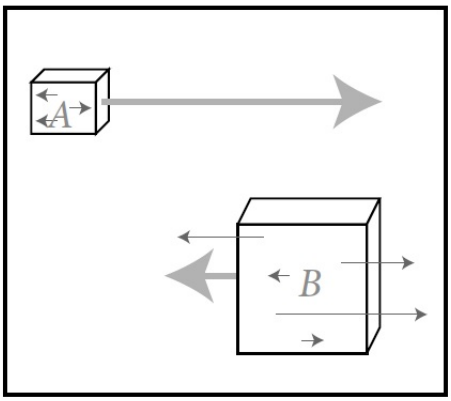
When asserting (P), we are not (consciously) picking out potential elementary particle configurations and their likely consequences. So Kutach's fundamental causal relation does not by definition match our observed macro-frequencies.

>> <u>insensitivity considerations</u>: "whatever set of principles vindicate the practice of abstracting away from fundamental reality without needing to do so in too precise a manner" (171).

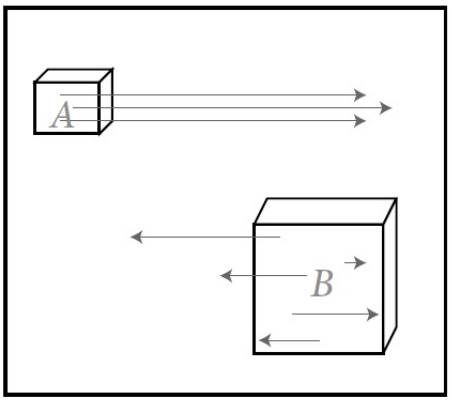
<u>Promotion vs prob-influence</u>

Macrolevel causal connections are useful (i.e. the promotion experiment tends to give us the prob-influence of *C* on *E*) because our insensitivity considerations are such that the small differences in the way we pick out *C* and *E* do not make the dependence disappear: e.g. the macroscopic motion of a released rock is largely insensitive to its microconditions. (There are also cases when the macroscopic facts are extremely sensitive to the microconditions, and yet we are still safe in being imprecise about how we contextualize events, p.173.)

Basic story:



thermal energy of the particles relative to the net motion of *A* and *B*, respectively (plus the mechanical energy of the blocks)



thermal energy of the particles relative to the total system (the "sum" of *A* and *B*)

Two fundamentally arbitrary choices in promotion cases: course-graining, selecting a contrast + (fundamentally aribtrary?) insensitivity.

> I will mostly resort to bracketing the insensitivity considerations as one component of my overall account of causation and deferring to experts the task of spelling out the resources needed to make adequate sense of why some probability distributions are better than others. (173)

> My theory, by isolating the fundamental causation-like aspects of reality, has stripped away many of the irrelevant features of macroscopic causation like its asymmetry in order to isolate a purified conception of mechanism and production that operates universally. (201)

Problem cases

Unexplitable prob-influence

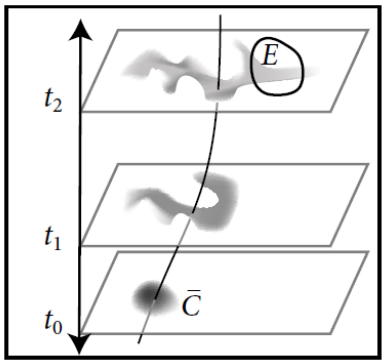
Suppose that voodoo dolls, if made of wax of containing slightly heavier quarks than the ones found on Earth, actually work. Then abusing a voodoo doll promotes the death of one's adversaries if we coarse-grain broadly across all possible voodoo dolls but it does not if we coarse-grain narrowly, using only the quark masses that are typical on Earth. (original example is in terms of silver coins and roses, 189)

Bizarre evolutions

"Bizarre evolutions are possible situations where things behave radically different from the way they normally do, e.g. when objects spontaneously leap into the air, or where food ingredients spontaneously assemble themselves into an elaborate dessert."

The evolution of E from C is bizarre $=_{df}$

$P_C(E)$ is fantastically close to zero (180)



phase space representing
contextualized events

Future-bizarre vs. past-bizarre (future-typical vs. past-typical) events: bizarre (typical) with respect to an earlier vs. later event.

Example of a future-bizarre series: a random scarecrow never misses (182f).

> In order to vindicate the claim that smoking causes (promotes) cancer, we need [...] (i) a suitably large set of acceptable contextualizations of smoking that fix a fantastically low probability for bizarre evolutions toward the future and (ii) a suitably small set of unacceptable contextualizations of smoking that fix a non-negligible probability for bizarre evolutions toward the future. Those resources will in turn justify the acceptability of certain kinds of probability distributions for use in contextualizing events with the desired result that the magnitude of an event's prob-influence is not terribly sensitive to minor jiggling of the "good" probability distributions. (183)

Problem: most actual events are past-bizarre (even though future-typical). ("The asymmetry of bizarre coincidences.")

> To make a long story short, the standard diagnosis of what is faulty with this inferential procedure is that it is unable to generate the fact that the distant past was in some sort of state such that entropy increased toward the future of that state. Exactly how to incorporate this fact into our overall conception of reality is controversial. [...] Whatever ultimately explains the asymmetry of entropy will almost surely explain the asymmetry of bizarre coincidences as well. (185)

<u>Further examples of prob-influence without promotion</u>

Nuclear spin-echo, p.190.

Or consider the following scenario (modified from the example on p.191f). Suppose that it is fact that in 2050, a comet will destroy the Earth. Consider attempts at promoting the absence of this effect: we develop comet-destroying rockets, we install an early warning system etc. Yet whatever we do, our efforts will fail: there will always remain a tiny probability of a comet's destroying the Earth, and, given that the future is fixed, that tiny probability will be cashed out.

> Normally, if the observed frequencies do not match what we think the fixed probabilities are, we have reason to revise our judgments about the fixed probabilities. [...] But when there is a mismatch, there is often another promoter that does match the empirical data and is not contrived in an ad hoc manner. In cases where we have a good understanding of what is responsible for the mismatch, we can continue to maintain our belief in the fundamental laws and that *C* promotes *E*. (192)

What explains promotion?

Why does promotion exist at all and why is it so prevalent? — Explaining this requires explaining (i) why spacetime exists, (ii) how fundamental constants affect nomically possible structures, (iii) why there are macroscopic objects, (iv) why agents and agency exists. (197)

Applications

Causal asymmetry: coming up in Ch.7.

Simpson's paradox

	Admitted	
	Males	**Females**
English	20%	25%
Philosophy	8%	9%
Total	14%	9.6%

At the college level, being female inhibits admittance. At the department level, it promotes admittance. This seems like a problem for Kutach: if ordinary causation is prob-influence, then we'll end up in contradiction.

Solution 1: Treat the college-level phenomenon as non-causal.

Solution 2 (Kutach's own): There are two different kinds of promotion here:

(1) If we fix gender, and randomly select a major (based on the distribution that obtains for that gender), then a female has less chance of being admitted (to the college) than the analogous male (because most girls apply to the major where the acceptance rate for girls is lower and hence it is harder for them to get in).

(2) If we fix a major and randomly select a gender, then a female has more chance of being admitted (to that specific major) than a male.

Causation: Prob-influence or production?

> Philosophers often like to distinguish a productive notion of causation that contrasts with a difference-making notion. [...] My account accommodates notions of process and production as part of the fundamental causation-like relations. [...] [It] allows us to treat all causation as operating through a single productive mechanism, the fundamental dynamical laws, while also allowing for multiple ways to abstract away from this universal mechanism to better capture phenomena of interest to more limited domains like botany.. (199, 202)