Propensities and Possibilities

Abstract: This paper is a reply to a recent *Metaphysica* paper advocating an 'unrestricted actualism' which lets the actual world include unrealised possible outcomes of propensities. I argue that the actual world can accommodate propensity theories of chance without including unrealised possibilities.

Propensities and Possibilities

The paper by Stenwall, Persson and Sahlin (2018) – hereafter SPS – is about the ontology of propensity theories of 'objective uncertainties', i.e. of chances. It says that on these theories 'the being of a propensity involves the existence of possible outcomes … [that] are never actualised' (SPS p.2). Thus, in their example, even if an atom of radium 266, with a 50/50 chance of decaying in 1600 years, does not decay in that time, '*the possibility of it decaying still exists*' (their italics).

SPS see two problems with this alleged implication of propensity theories. The first is posed by its ascription of chances to possibly non-actual outcomes like a radium atom's decaying in a certain time. This problem, SPS agree, can be solved by holding, as Mellor (1999 pp.22–3) does, that chances are properties, not of the possible outcomes they're ascribed to, but of the 'chance set-ups that determine the chance-distribution over the set of possible outcomes' (SPS p.3). This is not an *ad hoc* stipulation, peculiar to chance: many monadic predicates apply to things, not because *they* have the properties which make those predicates apply to them, but because other things do. 'Famous', for example, applies to people, not because they have a corresponding property, but because they are sufficiently widely known to other people. That is why non-actual people like Sherlock Holmes can be made actually famous by being known to enough actual people. It is also why a non-actual decay of a radium atom can have an actual chance: the propensity which entails that chance is a property of an actual atom.

The second problem SPS say propensity theorists face is that (a) 'relations necessitate the existence of their relata' and (b) propensities 'enfold within themselves a relation to a distinct entity, a possible outcome, which may … not exist'. (SPS p.3). To this problem SPS reject two solutions. One is that a radioactive atom lacks 'the propensity to decay when it is not actually decaying',

which I agree is absurd, since it removes the whole point of postulating propensities. The other is that the existence of propensities 'depends on what exists in other equally real possible worlds', a solution that commits propensity theories to a modal realism which I also agree those theories need not entail. So I too reject these solutions to SPS's second problem.

But I also reject SPS's own solution to that problem, a solution which takes 'all possible outcomes … to be denizens of the actual world'. SPS evade the contradiction this solution seems to entail by saying that if a radium atom doesn't decay, the alternative is 'is not a decaying of the [atom], but merely such that it possibly is a decaying of the [atom]': a thesis that requires the actual world to contain unrealised as well as realised possibilities.

I disagree. Actuality need not include unrealised possibilities to accommodate actual propensities and the chances they entail. A radium atom r's chance $ch(\mathrm{D}t)$ of decaying in a time interval t need not relate r to the possible outcome $\mathrm{D}t$, as we can see by comparing it with $cr(\mathrm{D}t)$, my credence, i.e. probabilistic degree of belief, in $\mathrm{D}t$. Now whether my beliefs, and *a fortiori* my credences, relate me to anything at all is a notoriously moot point (Mcgrath and Frank 2018), precisely because what they seem to relate me to, in this case $\mathrm{D}t$, may not exist. That is why most of those who think beliefs *are* relations take my credence $cr(\mathrm{D}t)$ to relate me, not to the possibly non-existent $\mathrm{D}t$, but to the *proposition* '$\mathrm{D}t$': an entity which, whatever propositions are, will exist whether it is true or false.

Credences are not chances, of course, but whatever my $cr(\mathrm{D}t)$ is a credence *in*, $ch(\mathrm{D}t)$ is a chance *of*. That this is so is uncontentious, being presupposed for example by such links between chances and credences as David Lewis's (1980 p. 87) 'principal principle', and Mellor's (2005 p. 85) 'chances-as-evidence' principle which, in this case ,says that if all I know about r's prospects of decaying in time t is that $ch(\mathrm{D}t)$, its chance of doing so, is p, then my credence in that outcome, $cr(\mathrm{D}t)$, should also be p.

It follows that $ch(\mathrm{D}t)$, r's chance of decaying in time t, will, if it *is* a relation, relate r to the same entity that $cr(\mathrm{D})$, my credence in r's decay, relates me to: a *relatum* which, for all that SPS have shown, may as well be the proposition '$\mathrm{D}t$' as the possibly non-actual fact or event $\mathrm{D}t$. This being so, then because the relata, if any, of the chances that propensities entail need not include any unrealised possibilities, propensity theories of chance need not force actualists to include those possibilities in their actual world. Whether that world can contain propositions, the more credible alternative relata of chances and credences, is of course another question, as is the prior question of

whether chances and credences *are* relations: questions whose answers are quite independent of the truth or falsity of propensity theories of chance.

References

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