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## Powers, Causation and Probability

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If we are realists about powers, this should also affect how we understand causation, modality and probability. In Mumford and Anjum (2011) a dispositional theory of causation is presented in which a cause is something that tends towards its effect without guaranteeing it. A main idea on this account is that powers bring with them an irreducible modality of dispositionality. It is a tendency towards a particular outcome, but one that can be counteracted by other tendencies. This is a modality that is short of necessity but more than pure contingency. Arguably, dispositionality is the modality that is needed for causation, agency, intentionality, normativity and free will.

In this paper we show how causal dispositionalism leads us to reject the assumption that causation is linked to robust correlations, or constant conjunction, or cause and effect. We also reject that causation can be conceptually linked to probability raising or difference making. This has consequences for how we think of probability.

Accepting real powers we should favour propensity theory over frequentism. While the traditional Humean theories sit well with frequentism, causal dispositionalism gives support to singularism about causation and individual propensities. Our theory differs from other propensity theories, such as Popper 1990 (*A World of Propensities*) and Mellor 1974 (*The Matter of Chance*), since their notion of causation is more Humean in nature. While they take causation to be a matter of all or nothing, they are committed to saying that causation happens when the probability of the effect reaches 1. On our account, the probability of the effect will never be 1, since tendencies are short of necessity. An alternative is to say that all causation is probabilistic, so that the effect occurs with a probability  $>0$  and  $<1$ . But this makes all causation irreducibly chancy. In contrast to these options we offer a distinction between probabilistic and non-probabilistic powers, which enables us to distinguish between chancy and non-chancy causal set-ups.

With this ontological framework, we have a better starting point to deal with issues of determinism vs indeterminism, free will and compatibilism, agency and modality and moral responsibility.