
Causal Selection versus Causal Parity: Relevant Counterfactuals and Biologically Normal Interventions

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Abstract

Ken Waters and Jim Woodward have argued that the causal role of DNA and mRNA in gene expression can be explicated in terms of causal specificity (in Waters's case in combination with his notion of actual difference-making cause). In this paper I argue that causal specificity and actual difference-making causes are not sufficient to demarcate the causal role of genes from that of other components of the protein synthesis machinery, in particular tRNA and aminoacyl tRNA-synthase. Thus, these conceptual resources do not suffice to argue against the causal parity thesis defended by proponents of Developmental Systems Theory. But I show that there exist conceptual resources that are sufficient for this task. All we need to do is to augment the interventionist theory of causation (also used by Woodward and Waters) by the concept of a biologically normal intervention, which defines a special class of relevant counterfactual conditionals. On my account, DNA and mRNA stand out from the causal field of a cell as the causally most specific potential difference-making causes of protein sequence that are realizable by biologically normal interventions.

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