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# The genetic and the morphogenetic approach in evo-devo: rethinking evolutionary causality

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## Abstract

Evo-devo is often reduced to the comparative study of the developmental genetic machinery of different species. However, other authors in evo-devo have denied that either developmental biology or evo-devo can be reduced to the investigation of regulatory genes. What I call the ‘morphogenetic approach’ attempts instead to unravel the mechanisms of pattern formation and to understand how these mechanisms generate morphological variation. In this presentation, I will compare the genetic and the morphogenetic approaches to evo-devo in the light on the contemporary philosophical debate on causation. I claim that the morphogenetic approach to evolution challenges reductionism in a way that has been poorly explored in philosophy of biology, which mostly revolves around the notion of ‘factor’. For example, proponents of Developmental Systems Theory have argued that development and inheritance cannot be reduced to genetic factors, but that other non-genetic (cytoplasmic or environmental) resources need to be equally incorporated in evolutionary explanations. I argue that the morphogenetic approach challenges reductionism in a very different way, by focusing on mechanisms corresponding to different levels of organisation rather than factors.

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