Developmental explanation

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Abstract

Individual development can be described as a series of changes in a system's causal capacities over time. Explaining development involves showing how characteristics of later developmental stages are caused by the manifestation of the system's developmental capacities in the past. This presupposes an account of how these capacities depend on the properties of the system's components at each stage – an explanation by appeal to constitution.
I outline similarities and differences between causal and constitutive explanation, and investigate how the two-aspect structure of developmental explanation can give rise to problems in interpreting evidence. Since causal and constitutive explanations have slightly different evidence-conditions, careful specification of what aspect of the developmental process one intends to explain is needed to assess what kind of evidence is called for.

I then discuss the reductionism debate concerning explaining development. Explicating the structure of developmental explanation removes ambiguity about what kind of information is requested for when explaining aspects of developmental phenomena. When explaining a specific developmental capacity, the explanation naturally flows bottom-up, following the constitutive dependence of system's capacity from its components. To answer how the system came to have a certain constitution at a certain stage, one must account for how the system's earlier developmental capacities acted to produce the structures of interest. This requires citing factors beyond the constitution of the system, such as interactions between the system and its environment. Whether a "reductionistic", bottom-up explanation suffices to explain a developing system therefore depends on the specification of the explanation-seeking question.

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