

Chapter Abstracts and Keywords

Chapter 1: Meta-philosophical Preliminaries

Keywords: philosophical methodology, descriptive adequacy, normativity, biological practice

Abstract: Chapter 1 serves to disclose the meta-philosophical assumptions that underlie my analysis of explanatory reduction. This includes explicating (and justifying) the aim of my analysis, the philosophical methodology by which I develop my account, and the criteria of adequacy that I accept. I will characterize my own account as being descriptive and bottom-up but critical, as being as universal as possible and as specific as necessary, as being normative in a certain way but not in another, and as being potentially useful for science.

Chapter 2: Drawing Lessons from the Previous Debate

Keywords: reductionism, epistemic reduction, ontological reduction, theory reduction

Abstract: Chapter 2 presents the crucial lessons one should learn from the previous debate about reduction(ism) in the philosophy of biology. These lessons are: First, before you discuss whether reductionism or antireductionism is true you should seek to understand what reduction is. Second, if you seek to understand what reduction in actual biological practice is, you should be aware of the fact that epistemic issues rather than ontological issues are the ones that matter most. Third, before you discuss epistemic reduction(ism) you need to specify which kind of epistemic reduction you are talking about, that is, whether the target of your analysis is theory reduction, methodological reduction, or explanatory reduction. Fourth, it is time to move beyond the limitations of Nagel's classical model of theory reduction and, instead, to seek after a model of epistemic reduction, which is more adequate with respect to biological practice.

Chapter 3: Two Perspectives on Explanatory Reduction

Keywords: explanatory reduction, Darwinian reductionism, reductive explanation

Abstract: In Chapter 3 I critically discuss the two perspectives on explanatory reduction that have been proposed in the philosophy of biology so far, namely Rosenberg's thesis that explanatory reduction is a relation between a higher-level and a lower-level explanation of the same phenomenon and Sarkar's, Hüttemann's, and Love's approach to focus on individual reductive explanations. The result of my critical examination will be that Rosenberg's

perspective on explanatory reduction in biology has several shortcomings and that, even though Sarkar's, Hüttemann's, and Love's encounters objections, too, it seems to be the more promising path to run.

Chapter 4: A Closer Look at Biological Explanations

Keywords: biological explanation, ontic account, explanatory reductionism, pragmatic account, level of explanation

Abstract: Chapter 4 serves two purposes: It specifies which understanding of 'ontic' underlies characterizing my account of explanatory reduction as ontic and it clarifies how questions about explanation are related to questions about explanatory reduction. I show that discussions about accounts of reduction are independent from questions about explanation but that debates about explanatory reductionism, in fact, boil down to specific questions about explanation, namely, to questions about the adequacy of higher- and lower-level explanations. How one answers these questions depends on one's stance on the pragmatics of explanation. I develop a refined version of van Fraassen's pragmatic account of explanation that clarifies in which sense the adequacy of explanation is far from subjective or exclusively determined by pragmatic factors.

Chapter 5: The Ontic Account of Explanatory Reduction

Keywords: biological part, level of organization, internal, part in isolation, ontic account

Abstract: In Chapter 5, I develop an ontic account of explanatory reduction in biology by analyzing paradigmatic and important examples of reductive (and non-reductive) explanations and discussions about reductionism from biological practice. I start with briefly specifying two concepts that occupy center stage in my account: the concept of a biological part (or of a part-whole relation) and the concept of levels of organization. On the basis of these conceptual clarifications I then answer the central question of my book, namely what are the characteristics that determine whether a biological explanation is reductive or not. The main result of my analysis of biological practice will be that reductive explanations in biology possess three features (two of which are necessary conditions, one of which is only a typical feature that most reductive explanations exhibit): they display a lower-level character, focus on factors that are internal to the biological object of interest, and describe the biological parts of this object only as parts in isolation.