

‘Causa efficiens’ vs. ‘Causa finalis’: functional explanations in biology

Biology differs from most sciences in its particular way of dealing with the term ‘function’. On the one hand, questions like ‘What is the function of a trait?’ seem to be perfectly legitimate, realizing that (most) biologists acknowledge that “*function is a concept that to this day remains indispensable to biology*” (Keller, 2010: 19). On the other hand functional explanations, along with intentional explanations, generally have one main disadvantage in common: they are teleological or seem to invoke a ‘causa finalis’. As a consequence, they are not in line with scientific practice of explaining causality in terms of a ‘causa efficiens’. Moreover, they are untestable (Hempel, 1965) and often tend to lead to storytelling in evolutionary biology (Gould and Lewontin, 1979; Buller, 2005), rather than to a sound scientific approach. As a reaction, efforts were made to demystify and/or naturalize functional explanations in biology. Two opposite approaches are generally distinguished: historical and a-historical accounts of function. Historical approaches contain views such as Wright’s account of functions (Wright), proper function theory (Millikan, 1989), and the etiological approach (Perlman, 2010; Buller, 1999). Examples of a-historical accounts are systemic approach (Cummins, 1975), goal contribution approach (Nagel, 1961; Boorse, 1976) and life chances approach (Bigelow and Pargetter, 1987; Wimsatt, 1972). Both historical and a-historical approaches meet a number of problems. To top it all, attempts to unify (Kitcher, 1993; Walsh, 1996), purify (Cummins & Roth, 2010) and instantiate (Griffiths, 1993) have only increased the amount of theories on functional explanations, making it even more difficult to maintain a clear view on the matter and the problems surrounding it. Attempts to introduce a pluralistic account, such as Wouters (2005), have tried to identify ways in which the term function is used in connection with the study of living organisms; trying to grasp how biologists appeal to function. Although promising, his account is lacking to certain extents, such as his central focus on intuitions as a guideline for function debate. In this paper, attempts are made to reconcile or combine the advantages of the accounts mentioned, avoiding the problems (e.g. function/malfunction distinction, promiscuity of function-objection, causal asymmetry, function-setting history) these accounts are faced with.

This paper contributes to the causality/explanation (in biology) debate in at least three ways: First off, a comprehensive overview of the existing accounts and approaches to functional explanation in biology will be given, which is missing in the literature, rendering some contemporary discussions superfluous. Secondly, a bottom-up framework able to deal with functional explanation in scientific practice will be presented, guided by answers to central questions, such as ‘Are we to choose between accounts?’ and ‘Are the proposed accounts incompatible and/or excluding?’. Thirdly, in view of the topic of the conference, special attention will be given to the teleological character of functional explanation, addressing the scientific merits and/or pitfalls of causality-debate in terms of ‘causa finalis’.

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