

Explanations in Logic

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Abstract

To explain phenomena in the world, to answer the question “why” rather than the question “what”, is one of the central human activities and one of the main goals of rational inquiry. Causal explanations have been dominant in this field, occupying interest and attention at least from 1940’s (see e.g. see [1], [7]). However, in the last decade philosophers have become receptive to another type of explanation, called *non-causal* or *conceptual explanations* (e.g. see [2], [3]). Conceptual explanations do not derive their explanatory power from a network of causal relations, but rather from a network of conceptual relations. Mathematical explanations – that is, mathematical proofs that explain the theorem they prove – are an emblematic example of conceptual explanations. Whilst many have argued that logic has little to contribute to the study of causal explanation (e.g. see [6]), conceptual explanations are *prime facie* a natural object for logical analysis. The main aim of the talk is to propose an account of the logical structure of conceptual explanations. We will do so by using the resources of proof theory and by introducing the novel notion of *formal explanation* (e.g. see [4], [5]). The results we provide not only shed light on conceptual explanations themselves, but also on the role that logic and logical tools might play in the burgeoning field of inquiry concerning explanation.

Keywords: Complexity, derivations, explanations, proofs.

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