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Abstract

Naturalized Approaches to Theory Ladenness: Evidence from Cognitive Psychology,
History, and the Ecological Validity Argument.

Hanson (1958) and Kuhn (1962) made strong psychological claims in favor of the theory ladenness of scientific observations. This paper adopts a naturalized approach to Philosophy of Science and uses evidence from Cognitive Psychology and from the History of Science to examine these issues. The analysis and evaluation of the evidence suggests that:

(1) The theory-ladenness debate has focused too narrowly on the topic of visual perception and needs to be expanded to include the role of theory in a much broader range of psychological processes, e.g., attention, interpretation, memory, and communication.

(2) The evidence across the psychological processes involved in carrying out science show that all of these processes are theory-laden. Examination of the details of the appropriate experiments shows that theory can serve either to facilitate or inhibit the successful operation of these psychological processes. As applied to science this suggests that top-down processes are a

two-edged sword. When a theory is inconsistent with aspects of the world it slows the work of the scientists who hold it, but when it is consistent with aspects of the world it facilitates their work.

(3) The literature on perception in Cognitive Psychology that was used in this paper focused on experimental paradigms in which individuals report qualitatively different phenomenal experiences thus reducing or eliminating arguments by opponents of the theory-laden view that the effects are due to conceptual interpretation. The evidence supports Hanson and Kuhn in showing that perception is theory-laden, but strong theory-laden effects only tend to occur when the perceptual information is ambiguous, degraded, or otherwise requires a difficult perceptual judgment.

(4) The data fit well within a top-down/bottom-up approach which assumes that perceptual processes are the result of the interaction of top-down theory-based information and bottom-up information from the world. The evidence from Cognitive Psychology and from the History of Science requires an approach that allows for strong top-down effects, but the important role of bottom-up processes from the world reduce or eliminate the concern that the existence of top-down effects necessarily leads to epistemological relativity.

(5) An attempt is made to deal with the issue of the conscious/unconscious nature of theory in different psychological processes. In addition the difficult problem of how theory is related to belief is touched on.

(6) Finally, an argument is developed based on the need for ecological validity in the types of naturalistic data used in philosophical arguments. Fodor developed a modularity view of the mind as a way to defeat the theory-laden arguments and guard against epistemological relativity. The modularity approach assumes that there is a point in the visual processes that is not

cognitively penetrable. However, for the issues of the Philosophy of Science that we are interested in we do not need to be concerned about intermediate stages in the perceptual process that occur on the time scale of hundreds of milliseconds. We are only interested in those processes that the scientist actually uses in doing science (e.g., what the scientist perceives, attends to, remembers, etc.) and the evidence clearly shows that those processes are theory-laden. Thus the arguments from modularity are of little or no interest for the important philosophical issues involving theory-ladenness.