

1. Can scientific realism be reconciled with the view that even the best scientific theories are revised and replaced by new ones with fundamentally different ontologies?
2. Explain the difference between Mayo's notion of severe testing with error statistical methodology and Popper's falsifiability.
3. Does the failure of reductionism imply disunity of science?
4. Must scientific explanations be causal?
5. If models incorporate idealizations, then can they really help us understand the natural world?
6. Is the rejection of the value-free ideal a threat to the autonomy of the sciences?
7. Explain and assess the view that crucial experiments in science are impossible.
8. What is meant by the "experimenters' regress"? Can it be avoided?
9. Explain how Wimsatt understands the concepts of robustness and robustness analysis in "Robustness, Reliability and Overdetermination" (1981). Provide an example of a type of robustness analysis in science that illustrates what its function is.
10. In what sense is Structural Realism meant to be the "best of both worlds"? Does it succeed in its aim?
11. Argue for or against the following claim: "The laws of our best theories are all *ceteris paribus* laws." (You should begin by defining *ceteris paribus* laws.)
12. Explain the "Humean" conception of scientific laws. Does it do justice to the concept of law as it is used in science? Why or why not?
13. What is the problem of underdetermination and do you agree that it challenges the notion of a crucial experiment?
14. Can robust results across various experimental settings solve the experimenter's regress?

15. Assess the following claim: From an epistemic viewpoint, simulations are equivalent to experiments?
16. Does the use of approximations and idealizations in science imply anti-realism?
17. Can non-epistemic values contribute to scientific progress?
18. Would the unity of science hypothesis still stand if all that science has to offer are local ceteris paribus lawlike principles?
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1. Explain and assess one account of the nature of probabilities in the Everett / Many Worlds Interpretation.
2. Evaluate the following claim: "A moving rod contracts because of how it is made up and not because of the nature of its spatio-temporal environment."
3. Critically discuss the following claim, in light of recent literature on the philosophy of spacetime: "A spacetime theory postulates the existence of an unobservable object (spacetime) in order to explain observable phenomena (relative motions)."
4. In some of the literature on the foundations of statistical mechanics, one finds the claim that, though the Gibbsian framework may be useful for certain purposes, for foundational discussions the Boltzmannian approach should be taken as more fundamental. Explain and critically assess this claim.
5. Discuss and evaluate an important argument for realism concerning the quantum state,

3. Is the existence of "narcissistic" or "egocentric" perceptual systems a challenge to Representational Theory of Mind/Computational Theory of Mind? Why or why not?
  4. What is the HPC view of natural kinds and what verdict does it give on whether mental disorders are natural kinds?
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  6. Ian Hacking claims that mental disorders are subject to "looping effects". What are "looping effects" and what are the purported implications of such effects for "kind" status of mental disorders?
  7. Are mental disorders natural kinds? If they are not natural kinds, what kinds of kinds are they and why?
  8. What is the nature of explanation in psychology and how does it differ from explanation in neuroscience?
  9. Can psychology and neuroscience be unified? Why or why not?
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1. 1. Preformationism is an historical doctrine in embryology said to have been superseded by the discovery of DNA. Yet some scientists and philosophers claim that preformationist thinking still pervades the study of genetics and development. Describe and evaluate these arguments and the evidence supporting them.

Scientists are increasingly using machine learning tools to make predictions and draw inferences from large data sets. Yet these results are often characterized as “opaque” due to the complexity of the resulting algorithms. What, if anything, does the opacity of ML methods imply regarding what they can contribute to scientific inquiry? (It may be helpful to draw a contrast between theory- or model-based reasoning.)

What do successes of deep learning methods suggest regarding how it is possible to “learn” concepts or abstract categories from a large data set? (Note that this is only a how-possibly question, and does not regard how such learning could be implemented in human brains.)

In a brand-new article\* in *Sociological Theory*, Jan Fuhse appears to want to drag us back to the Vienna Circle fights when he says, “We cannot know the real features of the social world, only what our theoretical perspectives make us see. ... Theories should be assessed not for their ontologies but for what they allow us to see and how they connect to empirical observations.” This statement seems to put into question not only the proper relationship between concepts, theories, and realities, but to dismiss the importance of even thinking about the proper relationship between sociological conceptions of “the social world” and the world itself.

Q. Write an answer integrating authors from the reading list that establishes your position regarding the constructivist claims that Fuhse makes — in other words, *does, can, or should sociological theory care about the propriety of its ontological claims about the world?* In your response, anticipate the critiques of the opposing side and be sure to show where the Vienna Circle fits in all of this.

\*Note: You are not expected to go read this article. Rather, use this as a starting point for your discussion.

Q. Develop an argument that addresses this conundrum that links methodology and epistemology by bringing together the texts from the culture and cognition and philosophy of social science sections of your reading list.