# Tools of Toys? On Specific Challenges for Modeling and the Epistemology of Models and Computer Simulations in the Social Sciences

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## Abstract

Mathematical models are a well established tool in most natural sciences. Although models have been neglected by the philosophy of science for a long time, their epistemological status as a link between theory and reality is now fairly well understood. However, regarding the epistemological status of mathematical models in the social sciences, there still exists a considerable unclarity. In my paper I argue that this results from specific challenges that mathematical models and especially computer simulations face in the social sciences. The most important difference between the social sciences and the natural sciences with respect to modeling is that in the social sciences powerful and well confirmed background theories (like Newtonian mechanics, quantum mechanics or the theory of relativity in physics) do not exist in the social sciences. Therefore, an epistemology of models that is formed on the role model of physics may not be appropriate for the social sciences. I discuss the challenges that modeling faces in the social sciences and point out their epistemological consequences. The most important consequences are that greater emphasis must be placed on empirical validation than on theoretical validation and that the relevance of purely theoretical simulations is strongly limited.



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