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How to do things with thoughts: A normative theory of thought experiments

ABSTRACT. Counterfactual reasoning can play a role in theory change and choice, and since Mach (1905/1976) coined the term, we call such counterfactual reasoning "thought experimentation". At face value, most thought experiments have a destructive function, i.e., they prove a targeted theory wrong. Because it reveals what factive, conceptual and evaluational thought experiments have in common,[1] Sören Hägggqvist (1996) has provided a *fruitful* regimentation of thought-experimental arguments to this effect. However, what Hägqvist's regimentation, and for that matter, almost all contemporary accounts leave out is the related constructive function of thought experiments.[2] By virtue of pinpointing a specific problem for the targeted theory, even the most obvious and straightforward counterexample, *directs* the thought experimenter to resolve the difficulty in a certain way. Taking clues from Kuhn (1964), I argue that, on the descriptive level, this dual function of thought experiments should be analyzed in terms of the problem-solving process which contemporary cognitive linguists call "incongruity-resolution".[3] Moreover, inspired and informed by Nersessian (1998) and Byrne (2005), I show that both incongruities and their resolution can be most fruitfully understood in terms of mental models.
Subsequently, I show that thought experiments do not only have a dual function, but also a dual nature, or, evading the difficulties associated with talk of natures, at least a dual structure: they are both experiments and arguments. As a result, *successful* thought experiments do meet two sets of criteria, i.e., those for successful experiments and those for sound arguments. Stretching the analogy between "ordinary experiments" and thought experiments until it breaks (Gooding 1993; Sorensen 1991; Tiles 1993), I rely on my incongruity-resolution approach, to pinpoint and solve the problems associated with turning the methodology of experiments into a methodology of thought experiments.

References

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[1] The distinction between factive, conceptual and evaluational thought experiments is both introduced and qualified by Gendler (2000).
[2] According to Brown (1991), only some thought experiments in physics are at once destructive and constructive. He calls such thought experiments "platonic" and argues that the knowledge they recruit is in some significant sense *a priori*.
[3] See, e.g., Coulson (2001).