

Galileo and the Indispensability of Scientific Thought Experiments

The contrast between the persuasive power/demonstrative force of:

An argument

A thought experiments

The target view (Norton's view): The elimination thesis: The thought experiment is just a sound argument with explicit premises (with no reference to imaginary particulars) dressed up in heuristically appealing clothing

Two Interpretations of the Elimination Thesis

- The weaker interpretation --> **The dispensability thesis**

Any good scientific thought experiment can be replaced without loss of demonstrative force with non-thought-experimental arguments.

- The stronger Interpretation --> **The Derivability thesis**

the positive argument: T.E. are arguments because their analysis and appraisal involves explicit argumentative reconstruction

the negative argument: T.E. are arguments because there is nothing else for them to be

Gendler's Objective in Chapter 1

- * She argues that the *dispensability thesis* is false
- * Then she shows that even if it turns out that an argumentative reconstruction captures the strength of a T.E., the *derivativity thesis* (the deeper methodological claim) is false

The First Objective

Case Study: Galileo's thought experiment

The standard reconstruction of The T.E.:

- Natural speed is mediative.
- Weight is additive
- Therefore, Natural speed is not directly proportional to weight

For the Aristotelian there are four ways out when confronted with the argumentative reconstructions

Those ways cannot be blocked unless one is committed to a metaphysical view which are not available to Galileo

The First Objective, Part 2

Changing the background assumptions people have about the physical world (their background commitments) is a high price to pay in order to come to new beliefs about the physical properties.

This can be avoided by using thought experiments, but not by using an argument.

In this sense thought experiments are indispensable

The Second Objective

Two ways in which the derivability thesis can be formulated:

- **the positive argument:** thought experiments are arguments *because* their “analysis and appraisal” involves explicit argumentative reconstruction
- **the negative argument:** thought experiments are arguments *because* there is nothing else for them to be

The Second Objective, part 1

- Failure of the positive thesis: it does not get what is most interesting about T.E.

What is interesting about a T.E. is that it involves *an act of introspection* that brings to light inarticulated and implausible tacit beliefs.

The issue of Novelty: The way in which the Aristotelian has come to believe something *new*

The Issue of Novelty

The Aristotelian's post-thought-experiment belief is *new* in the sense that it involves “the sudden realization of the conceptual possibility of a certain sort of physical property” --> radical shift in our representation of the physical world

This is due to the T.E.'s ability to direct the reader's attention to inadequacies in her conceptual scheme that she herself recognizes immediately as soon as they are pointed out to her.

Second Objective, Part 2

- Failure of the negative thesis: availability of alternative justifications in addition to argumentational justifications

2- The issue of Justification: The way in which the Aristotelian has come to believe something *justified*

The Issue of Justification

A T.E. Challenges our current representation of the physical world by inviting us to imagine two feature that are *constantly conjoined* in our representation to be separate.

The justificatory force of a T.E. is comparable with the justificatory force of **analogical reasoning**

In both, conclusions are based on particular cases without appeal to general absolute principles.

The Issue of Justification

The justificatory power of a T.E. Consists in the *constructive participation* of the reader. The reader *performs* an experiment in thought.

So, it involves a kind of performative act which reveals a kind of practical (as opposed to theoretical) knowledge

Common in moral reasoning: we use our imaginary judgements as fixed points for our moral theories

That we realize we have certain beliefs in the course of a T.E. Is *prima facie* warrant to think that they are true

The Issue of Justification

Why would we think that our pre-theoretical beliefs are reliable?

Mach's explanation: we have a sort of inarticulated *knowledge of the world* which is not organized under any theoretical framework. A T.E. (but not an argument) gives us access to that knowledge.

This inarticulated knowledge is our tacit practical conceptual commitments

Discussion Questions

The dilemma of relativism/essentialism:
In what sense can we say that our practical commitments reveal to us what is essential and what is inessential to the question at issue? (the pragmatist flavor of the former seems to be in conflict with the essentialist flavor of the latter)