

INCOMMENSURABILITY OF KNOWLEDGE: THEORIES AND VALUES

Paul Hoyningen-Huene

Center for Philosophy and Ethics of Science, University of Hanover, Germany

Peter Schaber

Philosophical Seminar, University of Zurich, Switzerland

Keywords: Incommensurability of theories, theory comparison, scientific revolutions, semantic incommensurability, methodological incommensurability, incommensurability of values, theoretical and practical incomparability, ranking of options

Contents

1. Introduction
2. Incommensurability of Theories
 - 2.1 What Does the Incommensurability of Theories Concern?
 - 2.2 Semantic Incommensurability
 - 2.3 Methodological Incommensurability
3. Incommensurability of Values
 - 3.1 Incommensurability of Values: the Different Meanings
 - 3.2 Arguments in Favor of Rough Equality and Incomparability
 - 3.3 Objections
 - 3.4 Theoretical and Practical Incomparability
 - 3.5 Practical Consequences
- Glossary
- Acknowledgments
- Bibliography
- Biographical Sketches

Summary

The paper discusses the topic of incommensurability, which may arise in various forms in trans-disciplinary research. Incommensurability has been discussed extensively in the philosophy of science and in practical philosophy. In the philosophy of science, the incommensurability of competing theories poses problems for the comparative evaluation of their merits. In practical philosophy, the incommensurability of values poses problems of the ranking of options or items.

1. Introduction

By addressing crucial issues for sustainable development, trans-disciplinary research has to tackle incommensurability. To explain complex underlying processes, it is necessary to combine theoretical concepts from different disciplines (see *Transformations of Social and Ecological Issues into Trans-Disciplinary Research*). Furthermore in the assessment of processes and strategies, conflicting values of

different kinds often come into play (see *Methods for Sustainability Assessment*). There are still very few efforts to address a philosophical analysis of the problems that arise in combining theories from different disciplines and in decisions between conflicting values in the field of trans-disciplinary research (see *Methodology of Trans-Disciplinary Research*). However, incommensurability has been a topic of debate in philosophy. We present this debate, which could be a starting point for addressing these problems in trans-disciplinary research. Incommensurability of theories has been discussed in the philosophy of science whereas incommensurability of values has been discussed in practical philosophy. As these two areas are fairly unrelated, we will discuss them in turn.

2. Incommensurability of Theories

2.1 What Does the Incommensurability of Theories Concern?

Incommensurability of theories became a topic in the philosophy of science in 1962. It has turned out to be an extra-ordinarily difficult and controversial concept. Two authors in two highly influential publications introduced it. Paul Feyerabend published his long article *Explanation, Reduction, and Empiricism* and Thomas S. Kuhn published his celebrated book *The Structure of Scientific Revolutions*. Although these authors did not fully agree about the meaning of the term incommensurability, the differences in their notions of incommensurability are rather subtle. They play no significant role in the present context and are thus omitted.

Incommensurability is a notion that is primarily used in the context of discussions of the development of the basic natural sciences. In these developments, sometimes fundamental theories, which had provided the basis for much scientific work, are replaced by new theories. These events are usually called “scientific revolutions”. An example from the history of astronomy is the replacement of the geocentric theory of the planets by the heliocentric theory; from the history of chemistry, the replacement of the phlogiston theory by the oxygen theory; or from the history of physics, the replacement of classical mechanics by quantum mechanics.

It is a historical fact that such replacements involved extended controversies within the scientific communities. Given our contemporary perspective according to which the later theories are indeed empirically and also usually conceptually vastly superior to their predecessors, this is indeed surprising. Why did it take the relevant communities so long to realize the superiority of the revolutionary new theories? How could so much controversy arise about cases that look fairly clear-cut to us? Why are there always scientists who were never convinced by the new theories? Is dogmatism on the part of the defenders of an old theory sufficient to explain these extended periods of theory choice? Or is it necessary to admit, in addition to psychological factors such as dogmatism, epistemologically more respectable factors in order to explain the characteristic features of theory change?

These questions point to the necessity of reconsidering the problem of how theory change takes place in the natural sciences. The natural conception is perhaps that theory

choice consists of a point-by-point comparison of the empirical predictions of the respective theories. In this case, the theories would be commensurable in the sense that there is a common measure by which to compare the theories; namely, the set of predictions made by the theories. The theory that gets more predictions right is the better one. However, if theories were commensurable in this sense, it is difficult to explain why theory choice in the actual history of science is such an extended and controversial affair. There are two aspects of theory choice that explain why it is more complicated than the simple picture just given. These aspects deviate from the idea of a common measure with which to evaluate competing theories comparatively. They are thus the two main aspects of theory incommensurability, and they are often called semantic incommensurability and methodological incommensurability. We will discuss them in turn.

-
-
-

TO ACCESS ALL THE 15 PAGES OF THIS CHAPTER,
Visit: <http://www.eolss.net/Eolss-sampleAllChapter.aspx>

Bibliography

Chang R. ed. (1997). *Incommensurability, Incomparability, and Practical Reason*. Cambridge: Harvard University Press. [The book contains important contributions to the debate on the incommensurability of values.]

Griffin J. (1986). *Well-Being: its Meaning, Measurement, and Moral Importance*. Oxford: Oxford University Press. [Distinguishes different meanings of the concept of incommensurability of values.]

Hoyningen-Huene P. (1993). *Reconstructing Scientific Revolutions. Thomas S. Kuhn's Philosophy of Science*. Chicago: University of Chicago Press. [A comprehensive reconstruction of Thomas S. Kuhn's philosophy of science.]

Hoyningen-Huene P. and Sankey H. eds. (2001). *Incommensurability and Related Matters*. Dordrecht: Kluwer. [A collection of articles on various aspects of incommensurability in the philosophy of science.]

Kuhn T. S. (1962). *The Structure of Scientific Revolutions*. Chicago: University of Chicago Press. [A classic book in which incommensurability was introduced.]

Raz J. (1986). *The Morality of Freedom*. Oxford: Oxford University Press. [Introduces the concept of constitutive incommensurabilities.]

Sankey H. (1994). *The Incommensurability Thesis*. Aldershot: Avebury. [A comprehensive discussion of incommensurability in a realist framework.]

Biographical Sketches

Paul Hoyningen-Huene was born in 1946. Education at the University of Munich, Imperial College London, and the University of Zurich. Diploma in theoretical physics, Munich 1971; PhD in theoretical physics, Zurich 1975. At the University of Zurich, 1972–1976 research assistant for theoretical physics,

1975–1980 for philosophy. 1976–1994, part-time lecturer for philosophy at the University of Zurich, 1980–1998 also at the University of Berne. 1984–1985 Visiting Scholar at M.I.T., with Prof. Thomas S. Kuhn; 1987–1988 senior visiting fellow at the Center for Philosophy of Science, Pittsburgh. 1989–1990 senior research associate for environmental sciences at the ETH Zurich. 1990–1997 professor for history and philosophy of science at the University of Konstanz, Germany. From 1997 Professor and director of the Center for Philosophy and Ethics of Science at the University of Hanover, Germany. His main research areas: dynamics of scientific theory change, especially in Kuhn and Feyerabend; reduction and emergence; ethics of science; meta-ethics; philosophy of logics, of physics, of biology, of history, and of psychology.

Peter Schaber was born in 1958. Education at the University of Zurich. PhD in Philosophy 1987. 1984–1987 research assistant for philosophy at the University of Zurich. 1988/89 Research worker at the University of Oxford, Keble College. 1989/90 Research worker at the University College of London. 1991 research assistant at the ETH Zurich. 1992–1996 research assistant at the University of Zurich for philosophy. 1996 Visiting Scholar at the University of St. Andrews, Scotland. From 1996 assistant professor in philosophy at the University of Zurich. 1998–2000 guest professor at the Center for Philosophy and Ethics of Science at the University of Hanover. 2000–2001 guest professor at the University of Gottingen. His main research areas: meta-ethics, normative ethics, applied ethics, political philosophy, and philosophy of action.