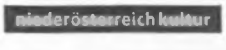
Reduktion und Elimination in Philosophie und den Wissenschaften

Beiträge des 31. Internationalen
Wittgenstein Symposiums
10. – 16. August 2008
Kirchberg am Wechsel

Band XVI

Herausgeber
Alexander Hieke
Hannes Leitgeb



Gedruckt mit Unterstützung der
Abteilung Kultur und Wissenschaft
des Amtes der NÖ Landesregierung

Kirchberg am Wechsel, 2008
Österreichische Ludwig Wittgenstein Gesellschaft

Reduction and Elimination in Philosophy and the Sciences

Papers of the 31st International
Wittgenstein Symposium
August 10 – 16, 2008
Kirchberg am Wechsel

Volume XVI

Editors
Alexander Hieke
Hannes Leitgeb

Printed in cooperation with the
Department for Culture and Science
of the Province of Lower Austria

Kirchberg am Wechsel, 2008
Austrian Ludwig Wittgenstein Society

The Place of Theory Reduction in the Models of Interdisciplinary Relations

Uwe Voigt, Bamberg, Germany

1. Introduction: Why Theory Reduction is Not Yet Considered in Connection with Interdisciplinary Relations – And What can Be Done About It

In the first place, this approach has to deal with the question why interdisciplinarity is not a topic for the philosophy of science. The answer to this question could be, according to Wittgenstein, that a certain picture has taken hold of the philosophers of science, or even a whole bulk of such pictures. These pictures obviously are implicit models about the way sciences do relate. The implicitness of these models prohibits their philosophical reflection. Hence, the best philosophy of science can do in this case is to make them explicit.

One way to make them explicit is demonstrating the fundamental decisions which lead to the different models. So it can be shown how they differ from one another and how they make up more or less similar "families". It can also be shown where the place of theory reduction in the according "family tree" can be found and which branches of this tree are cut off if one chooses theory reduction. The purpose of this paper is not to evaluate the different decisions in a conclusive manner but simply to name them and to list their advantages and their disadvantages.

2. A Model of the Models of Interdisciplinary Relations

By tracing the basic decisions that bring about models of interdisciplinary relations, a kind of "model of models" of these relations is constituted. The most basic decision within such a model is whether there are irreducibly many disciplines or not. Only if we answer this question positively, we face the problem of interdisciplinary relations in a strict sense, because only then there are – and forever will be – different disciplines which can relate. But do they really relate? This is the next basic decision to be made.

If we go for a "No", we reach the realm of what can be called pluralist models. According to these models, there are many disciplines, at least many types of disciplines, but there are no relations between them. This is the classic "solution" to the problem of interdisciplinarity which prevailed until the second half of the 20th century, e.g. as the separation between the "hard" sciences and the disciplines of the humanities. Such models succeed in describing the demarcation between disciplines, but they do this at the price of an equivocal concept of science. They are also, from their very foundations, unable to explain the real cooperation which is going on between disciplines of different types (Fauser 2003).

If we say, yes, there are relations between different disciplines, we choose contact models. The next question is then: What kind of contact is there between the different disciplines? How is this contact mediated? In the literature, three alternatives can be found: Contact is mediated either by common objects or by common methods or by cooperation. Accordingly, we can distinguish between object-contact models, method-contact models and cooperation-contact models.

Object-contact models are the "classical" model of interdisciplinary relations. It implies that different disciplines are linked by identical objects to which every single discipline has its own access, mediated by its own method. The contact which is supposed to be mediated this way can come about in two different forms: a hierarchical form in which one central discipline has a privileged access to the objects in question, as physics does in the model of a non-reductive naturalism (Schurz 2006, 38); or a non-hierarchical form in which the several disciplines form a cluster around their objects (Mc Cormick 2003). In both cases, object-contact models are hard to integrate into a post-Kuhnian philosophy of science which takes it for granted that science, at last in some cases, does not access but create its objects so that objects are not prior to disciplines and therefore cannot guarantee interdisciplinary contact.

Method-contact models have been popular in the second half of the 20th century when there was hope for one method to bring together all disciplines. This method was conceived of as a formal one describing dynamic structures; it was (and still is) called "cybernetics", "theory of systems" and the like. Again, there is a hierarchical (Schneider 1966) and a non-hierarchical (Meister/ Lettkemann 2004) variation of such models, depending on the decision whether there is one central discipline providing all others with its method or whether there are independent but coordinated developments of the same method in different disciplines. Again, these models run contrary to an insight of current philosophy of science: Feyerabend's remark that methods are not of huge importance for science and that it would not be desirable to give them such an importance (Feyerabend 1983).

Cooperation-contact models are a very young – and promising – brand of contact-models. They even have been developed as an alternative to models of interdisciplinarity as such (Gläser et al. 2004), but only because of the – unnecessary – assumption that these models are limited to the types discussed above. According to cooperation-contact models, interdisciplinary relations are brought about just by the cooperation between scientists from different disciplines. This cooperation is not based on common objects or common methods but precedes their discovery or creation and development. Since cooperation does not start with common criteria, it cannot be conceived of as hierarchical. Rather, it is an action which implies mutual recognition – notwithstanding the fact that, as a human action, it is also coined by political, social and other conditions (Bordieu 1988; Münch 2007). Cooperation-contact models have the advantage of working without the presuppositions found in object- and method-contact models. They also fit in with the trend to understand science as action (Gläser et al. 2004). Obviously, they have little normative power. In contrast to their "object" and "method" colleagues, they do not say how disciplines are supposed to relate, but this can turn out to be a strenghth rather than a weakness.

So far we have examined the "Yes"-branch of the model of models of interdisciplinary relations. But if we have to consider theory reduction, it obviously is to be found on the other side. The basic decision to be made, then, is that there are not irreducibly many disciplines. If we decide this way, we do not face a problem of interdisciplinary relations but rather the problem how to make the pseudo-problem of interdisciplinary go away by making all disciplines collapse into only one. So we are on the side of models which can be named as "monist".

The advantage of monist models is that they guarantee – or at least claim to guarantee – a single, univocal concept of science, based on the promised unity of science. At the same time, such models somehow have to deal with the (in their view apparent) plurality of disciplines which even is increasing evermore (Poser 2001, 279-287). Hence, monist models are challenged by the question: If there is only one discipline, can the single members of the apparent plurality of disciplines be in some way identified with that one and only discipline? The answer "No" leads to eliminative models, because given monist presuppositions non-identity with the one and only discipline just means being no scientific discipline at all. To eliminate here means to demonstrate that the kind of objects with which a pseudo-discipline claims to deal simply do not exist and that therefore the terminology used by that pseudo-discipline is meaningless. This strategy can be – and has been – successful in single cases, as e.g. in the elimination of astrology from the realm of the sciences. The recent relevant discussion is focusing on the question whether disciplines of cognitive science can be eliminated in favor of neurobiology and in the final analysis of physics (e.g., as a classical attempt, Churchland 1986). As an overall strategy for tackling the problem of interdisciplinarity it is not very popular, though, because it flies in the face of the intuition that there are many disciplines which at least have a partial and temporal justification (Charpa 1996, 96).

Therefore the most promising answer in the monist branch seems to be "Yes": At least some members of the apparent plurality of disciplines can be identified with the one and only discipline and, through this identification, are also justified. This is the strategy of theory reduction which, as such, but without this context, is well researched in the philosophy of science. Theory reduction can come along in various kinds, depending on which discipline one takes to be the goal of reduction. In our time, the most popular version is physicalist theory reduction (Wilson 1998); but there also is its sociological counterpart (Luhmann 1990), and the list could be continued. The final goal here, too, as in elimination always is to end up with just one scientific discipline, but before the goal is reached, the different existing disciplines at least can be tolerated since their differences from the one and only science are only apparent ones. Reductive models face similar problems as eliminative ones: They also do not seem to do justice to the given plurality of disciplines (Margolis 1987; Rosenberg 1994). Nevertheless, this plurality is just a fact and facts can change. The hard problem of theory reduction, in my view, seems to lie elsewhere, and can be found by a look at the whole model of models of interdisciplinary relations.

3. The Hard Problem of Theory Reduction

The hard problem of theory reduction can be seen in its contrast to the cooperation-contact models which are the most important plural models: Contact-models, as has been shown, imply mutual recognition between the cooperating disciplines. This recognition is withdrawn by monist models. Eliminative models do so immediately, which makes them so little attractive. Reductive models are more cautious in this respect, they even promise to give a special discipline the dignity of the one and only discipline in the way of identification. But this identification is a one-way affair. The identity of the goal-discipline of reduction is supposed to be unchanging and well-known; the identity of the discipline which is to be reduced just is an apparent one; it has been falsely taken to be something apart from the one and only science. So, in the recognition of a theory which is to be reduced, the goal-theory of reduction simply recognizes itself in a disguise which soon is to be removed. However, as Hegel has shown throughout his *Phenomenology of Spirit*, recognition from its very concept always must be mutual; it presupposes two parties recognizing one another. This problem is getting even harder as we tend to take for real only what science tells us to be real (Quine 1979). So, if there is only one scientific discipline, no one can recognize it as such, neither from the outside – for only science has the authority to do so – nor from the inside – for there can be no mutuality here. The hard problem of theory reduction, at least as a global strategy facing the problem of interdisciplinarity, therefore is: If it is successful, it leads to a situation in which the supposed one and only discipline can get no recognition at all. Hence, contact models, and especially cooperation-contact models do not only seem to be a better description of the reality of science in our days; they also seem to be a better way to deal with interdisciplinarity without endangering the whole concept of science as such.

Literature

Bourdieu, Pierre 1988: Homo academicus, Frankfurt am Main

Carrier, Martin 2006: Wissenschaftstheorie zur Einführung. Hamburg

Chalmers, Alan F. ^{5}2001: Wege der Wissenschaft. Einführung in die Wissenschaftstheorie. Berlin etc.

Charpa Ulrich 1996: Grundprobleme der Wissenschaftsphilosophie. Paderborn etc.

Churchland, Paul M. 1986: Neurophilosophy. Toward a Unified Science of the Mind-Brain. Cambridge, Mass. etc.

Hacking, Ian 1996: Einführung in die Philosophie der Naturwissenschaften. Stuttgart

Fauser, Markus 2003: Einführung in die Kulturwissenschaft. Darmstadt

Feyerabend, Paul 1983: Wider den Methodenzwang. Frankfurt am Main

Gläser, Jochen et al.: "Einleitung: Heterogene Kooperation", in: Jörg Strübing et al. (eds.), Kooperation im Niemandsland. Neue Perspektiven auf Zusammenarbeit in Wissenschaft und Technik, Opladen 2004, pp. 7-24

Luhmann, Niklas 1990: Die Wissenschaft der Gesellschaft. Frankfurt am Main

Margolis, Joseph 1987: The Persistence of Reality. Science Without Unity. Reconciling the Human and Natural Sciences. Oxford-New York

Mc Cormick, Michael 2003: "Rats, Communication, and the Plague: Toward an Ecological History", The Journal of Interdisciplinary History 34/1, 1-25

Meister, Martin / Lettkemann, Eric 2004: "Vom Flugabwehrgeschütz zum niedlichen Roboter. Zum Wandel des Kooperation stiftenden Universalismus der Kybernetik", in: Jörg Strübing et al. (eds.), Kooperation im Niemandsland. Neue Perspektiven auf Zusammenarbeit in Wissenschaft und Technik, Opladen 2004, pp. 105-135

Münch, Richard 2007: Die akademische Elite. Zur sozialen Konstruktion wissenschaftlicher Exzellenz, Frankfurt am Main

Poser, Hans 2001: Wissenschaftstheorie. Eine philosophische Einführung. Stuttgart

Quine, Willard van Orman 1979: Von einem logischen Standpunkt. Frankfurt etc.

Rosenberg, Alexander 1994: Instrumental Biology or the Disunity of Science. Chicago-London

Schneider, Peter K. 1966: Die Begründung der Wissenschaften durch Philosophie und Kybernetik. Idee, Umriß und Grundprinzip einer axiomatischen Strukturtheorie Stuttgart etc.

Schurz, Gerd 2006: Einführung in die Wissenschaftstheorie. Darmstadt

Wilson, Edward O. 1998: Die Einheit des Wissens. Berlin