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PREVIEW

TRUTH-VALUE GAPS, ONTOLOGICAL COMMITMENTS, AND INCOMMENSURABILITY

Xinli Wang, Ph.D.

University of Connecticut, 1999

According to the accepted translation-failure interpretation, the problem of incommensurability involves the nature of the meaning-referential relation between scientific languages. The incommensurability thesis is that some competing scientific languages are mutually untranslatable due to the radical variance of meaning or/and reference of the terms they employ. I argue that this interpretation faces many difficulties and cannot give us a tenable, coherent, and integrated notion of incommensurability. It has to be rejected.

On the basis of two case studies, I find that the confrontations between many classical incommensurable languages are not confrontations between two untranslatable languages with different distribution of truth values, but rather the confrontations between incompatible fundamental presuppositions at the ontological level. We can always identify a truth-value gap between two incommensurable languages. Such a truth-value gap indicates a communication breakdown between the two language communities on the one hand, and is caused by the incompatible fundamental presuppositions underlying them on the other.

I thereby identify the truth-value functional relationship between sentences, instead of the meaning-referential relationship between terms, as the dominant semantic relation between two incommensurable languages. According to my presuppositional interpretation of incommensurability, the real secret of incommensurability lies in the

ontological setup of two competing presuppositional languages. When two presuppositional languages with incompatible factual commitments encounter with each other, the confrontation leads to a truth-value gap, and consequently a communication breakdown between them. Formally put, two scientific languages are incommensurable when core sentences of one language, which have truth values when considered within its own context, lack truth values when considered within the context of the other due to an ontological gap between them.

The presuppositional interpretation makes many significant contributions to the discussion of the issue of incommensurability and the related metaphysical and epistemological issues: (a) It confirms the existence of the phenomenon of incommensurability and makes it metaphysically and epistemologically significant. (b) It establishes the tenability and integrity of the notion of incommensurability. (c) It avoids many alleged unattractive epistemological and metaphysical consequences of the translation-failure interpretation.

PREVIEW

**TRUTH-VALUE GAPS, ONTOLOGICAL COMMITMENTS, AND
INCOMMENSURABILITY**

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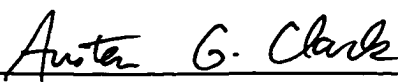
TRUTH-VALUE GAPS, ONTOLOGICAL COMMITMENTS, AND
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Chapter One

Introduction

1.1 The Current Research Status

Incommensurability is a notion that for Thomas Kuhn and Paul Feyerabend emerged from attempts to understand some out-of-date scientific texts in their researches around 1950s. Like any other historian of sciences, for lack of an alternative at the beginning of studying, they had been trying to understand these texts as they would if the texts had occurred in contemporary discourse which they were familiar with. Approaching these texts in terms of their current scientific language, Kuhn and Feyerabend characteristically encountered passages that make no sense to them. That is an experience Kuhn had repeatedly whether his subject was an Aristotle, a Newton, A Volta, a Bohr, or a Planck. More significantly, they found that apparently nonsensical passages encountered in an old scientific text cannot be simply taken as evidence of the author's confused or mistaken beliefs, nor as evidence of the interpreter's personal limitation of knowledge or lack of skills of interpretation. It seems to involve some deep semantic obstruction between two different discourses.¹

Guided by these personal experience, Kuhn and Feyerabend found out further that when two successive competing (comprehensive) scientific theories, such as Newtonian Mechanics and Aristotelian Mechanics, are separated by a so-called "scientific revolution," the proponents of the two theories would inevitably talk past one another when attempting to resolve their disagreements.² They were struck by the fact that when rival (comprehensive) scientific theories or paradigms--more general, rival cultures (Rorty), traditions (Gadamer), worldviews (Feyerabend), forms of life (Wittgenstein), or frameworks--clash, we can from time to time identify a communication breakdown between their advocates. Many assertions made in one body of discourse are unintelligible to those utilizing the other rival one.

To illustrate such a communication breakdown between the advocates of two successive scientific theories and to explore the presumably deep semantic obstruction between them, Kuhn and Feyerabend borrowed the term "incommensurability" from mathematics to describe such a phenomenon. In its original mathematical use "incommensurability" means "no common measure." By coining this term, Kuhn and Feyerabend initially meant to express their deep intuition that a communication breakdown between the advocates of two competing (comprehensive) scientific theories is due to lack of some common language into which both theories can be formulated; for the existence of a common language is necessary for successful communication between the advocates of the two theories.³

Kuhn had spent more than 30 years to conceptualize, clarify, and refine the notion of incommensurability, and to argue for his celebrated thesis that the phenomenon of incommensurability, i.e., communication breakdowns, does exist and cases of it abound not only in the history of science but also in the history of rational thought in general. The problem of incommensurability has caught the attention of the past three decades because of its significant implications for some central problems in the philosophy of science and other related areas, such as the philosophy of language, epistemology, and metaphysics.

No one issue has dominated the landscape of contemporary philosophy of science as has the problem of incommensurability. In fact, any philosopher who takes more than a fleeting interest in the development of science, rational thought, and knowledge must at some stage confront the issue of incommensurability in one or other of its many manifestations.⁴ Among them, the problem of theory-comparison, the problem of scientific rationality, the problem of scientific progress, and the issue of scientific realism / anti-realism are some important issues which are supposed to be connected with the problem of incommensurability. It has been widely held that whatever the origins and intentions of Kuhn and Feyerabend's doctrine, it is plain that the thesis of incommensurability has problemized the debate on processes of theory-comparison and theory choice, and has

accordingly threatened to undermine our image of science as a rational, realistic, and progressive enterprise. Consequently, Kuhn and Feyerabend gave fresh respectability to irrationalistic, subjective, and relativistic views about science and knowledge.

Besides, the influence of the problem of incommensurability has reached far beyond the professional circle of the philosophy of science. Practitioners with a relativistic bent in numerous fields, such as sociology, anthropology and ethnography, psychology, education, political science, and linguistics, have been busy discovering similar phenomena in their fields. Through its popularization, the notion of incommensurability has been put on the cultural map, and even becomes the weekly glosses in many professional circles. Because of the above two reasons, the notion of incommensurability has been one of the most revolutionary and influential notions in recent philosophical investigation. This is why the issue of incommensurability is still very much alive today.

Along with its significant impact on the philosophy of science and other related areas, the notion of incommensurability is one of the most intriguing ideas in recent philosophy. On the one hand, the topic has been so popularized that in the circle of the philosophy of science "the doctrine of incommensurability needs no introduction."⁵ On the other hand, however, the notion of incommensurability is the most controversial, most often abused notion in contemporary philosophy of science. Although philosophers, in the past 35 years, approached it from different directions and presented many historically erudite and conceptually fine grained analyses of it, "we do not have any clear theoretical conception of what incommensurability is."⁶

The fact that the notion of incommensurability has not been subjected to a satisfactory conceptual clarification explains why hardly any significant progress has been made in the study of the issue of incommensurability for the past.⁷ A comment made by Feyerabend 20 years ago can still be used to describe the current research situation of incommensurability. "Apparently, everyone who enters the morass of this problem (referring to the problem of incommensurability--author) comes up with mud on his

head."⁸ Kuhn and Feyerabend, two pioneers opening this uncultivated land, are not an exception either. It seems to me that philosophical discussion involving the notion of incommensurability, no matter whether for or against it, tends to come to a dead lock, and is hard to evaluate and often fallacious.

There is a danger that, as D. Pearce pointed out 10 years ago, through popularization and abuse, the term "incommensurable" will become long in the tooth and the thesis will lose its original bite. This danger has occurred. The danger mainly comes from two directions. On the one side, on the basis of some misconceptions of incommensurability, such as incommensurability as untranslatability, the thesis degenerates into a trivial platitude. According to this notion, almost any kind of conceptual difference or conflict amounts to a case of incommensurability. On the other side, the problem of incommensurability turns out to be a pseudo-problem if incommensurability equals or is reduced to incomparability. The following comment, made by Pearce in the late 80's, gives us a vivid description of the present research situation on the issue of incommensurability.

These days the virulence of the commensurability debates has faded, but it has left its marks on the shape of scientific philosophy and on science itself. Many philosophers currently pay lip service to 'the problem of incommensurability' by insisting on how seriously they take it; only to dismiss it subsequently in a few dipped phrases as being 'settled' and 'solved' (Pearce 1987, p. 2).

There are many reasons responsible for this slow progress made in the investigation of incommensurability. I would like to mention the following two major reasons: incommensurability as a complex historical-anthropological phenomenon which manifests itself in many facets and ramifications; the failure of the standard interpretation of incommensurability. The first issue will be discussed in the following two sections. The second issue is the topic of chapter two.

1.2 Many Faces of Incommensurability

It is commonly held that part of the blame for the vagueness of the notion of incom-

measurability lies with Kuhn himself. Kuhn's notion of incommensurability has often been misinterpreted and abused, partly due to Kuhn's terminological confusion and his constant change of the expression of the notion, partly because many commentators have simply misunderstood Kuhn's point. Kuhn has to clarify himself again and again since the publication of his *structure*. In my opinion, there is a deeper reason responsible for this. When Kuhn and Feyerabend coined the term "incommensurable" to describe the communication breakdowns which they encountered in the study of the history of sciences, they had nothing so precise in mind. For them, the notion of incommensurability is just a suitable language metaphor to reveal their deep insight gained in these researches.⁹

The vagueness of the explanation of incommensurability is partially due to the fact that we are dealing with a complex historical-anthropological phenomenon, whose roots are deep in the basic mechanisms of cultures, forms of life, languages, and social institutions. Generally speaking, incommensurability has its natural home primarily in five disciplinary settings: (a) in intellectual history, in general, to contrast widely divergent perspectives of understanding different *Weitanschauungen*; in the history of sciences, in particular, to contrast and understand the conceptually distant explanatory frameworks (such as Galenic and modern biochemical medicine); (b) in descriptive sociology to contrast kinship systems or other such mechanisms for categorizations and explanation of human affairs;¹⁰ (c) in anthropology to contrast and understand totally different modes of justification;¹¹ (d) in linguistic study to contrast different categorization systems which create "pattern resistance" to widely divergent points of views;¹² (e) in philosophical epistemology to contrast fundamentally diverse perspectives--which start with conceptually disparate presuppositions--of treating explanatory issues. The phenomenon of incommensurability has been and will continue to be rediscovered and enhanced in different disciplinary settings. It is not exaggerated to say that any philosopher, sociologist, anthropologist, or linguist who takes a comprehensive-historical stand toward the development of rational knowledge and human society would encounter the

phenomenon of incommensurability in one way or another at some stage. In Kuhn's words, "incommensurability has to be an essential component of any historical, developmental, or evolutionary view of scientific knowledge" (Kuhn 1991, p. 3).

Feyerabend explicitly made an analogy between the clarification of the notion of incommensurability and an anthropological discovery. The term "incommensurability" is nothing but a "terminology for describing certain historical-anthropological phenomena which are only imperfectly understood rather than defining properties of logical systems that are specified in detail" (Feyerabend 1978, p. 269). Just like an anthropologist trying to break into an unknown tribe, he/she must hold back his/her eagerness for instant clarity and logical perfection. He/She should not try to make a concept clearer than what is suggested by the available material. He/She must keep his/her key notions vague and incomplete until more information is collected. Feyerabend assumes that the anthropological method is appropriate for studying the phenomenon of incommensurability. Here, lack of clarity of the notion of incommensurability indicates the scarcity of right information rather than the vagueness of the logical intuitions of it. Therefore, "the vagueness of the explanation reflects the incompleteness and complexity of the material and invites articulation by further research" (Feyerabend 1978, p. 270). Feyerabend has even gone so far as to register doubt that, in its present stage of development, the incommensurability thesis is capable in principle of being given the kind of precise formulation that would serve to satisfy 'analytic' philosophers.

In a similar way, Kuhn clearly realizes that his attempts to describe the central conception of incommensurability were extremely crude. In his own words, "Efforts to understand and refine it have been my primary and increasingly obsessive concern for thirty years" (Kuhn 1993, p. 315).

As a complex historical-anthropological phenomenon, the problem of incommensurability manifests itself in many facets and ramifications. The issue of incommensurability in fact is a set of problems which comprises three interrelated problems: (a) the

nature of incommensurability, (b) the sources of incommensurability, and (c) the epistemological and metaphysical implications or consequences of incommensurability. My experience in reading and discussion has been that those either sympathetic or apathetic to the issue of incommensurability often confuse these three problems.

The general question, "What is incommensurability?" is ambiguous and incomplete. It can be understood as a question either about the nature or about the sources of incommensurability. For clarity, the question should be divided into two separate questions. First, "What is *the essential nature* of incommensurability?" The answers will take the format, "incommensurability as ...," for example, incommensurability as untranslatability, incommensurability as incomparability, or incommensurability as communication breakdowns. Second, "What are the real sources of incommensurability?" The answers will take the format, "incommensurability due to" The common alleged sources of incommensurability are, to mention only a few: incommensurability due to radical meaning and / or reference variance, incommensurability due to value, standard, or problem change, or incommensurability due to lexical structure change.

If we consider the alleged consequences brought about by the thesis of incommensurability, as we have mentioned above, the problem of incommensurability consists of a group of interrelated issues: logical compatibility and semantic comparability between scientific theories, language translation and interpretation, sense and reference of the terms of scientific theories, categorization and taxonomization of scientific language, justification and validity of scientific theories, scientific rationality and progress, value judgment and evaluation criteria, absolutism and relativism, and scientific realism and anti-realism, etc..

Much more importantly, the notion of incommensurability is a multiple-dimension concept which involves at least two different dimensions: the normative dimension and the semantic dimension. Accordingly, the concept can be approached from at least two perspectives corresponding to each dimension, which I will call the normative perspective

and the semantic perspective. According to the semantic perspective, the problem of incommensurability has to do with the nature of *a certain kind* of semantic relation between the languages employed by competing scientific theories. Incommensurability can be characterized as a lack of a certain kind of semantic contact between the languages of two competing theories due to changes in either the semantic values (meaning or reference) of the non-logical constituents of sentences or the semantic values (factual meaning, truth values, or truth-value status) of sentences themselves in these languages. Because of the lack of a certain desirable semantic contact, proponents of incommensurable theories inevitably talk past one another when attempting to resolve their disagreements. I will call the incommensurability identified in the semantic dimension *semantic incommensurability* later. By contrast, according to the normative perspective, the problem of incommensurability has something to do with the nature of non-semantic relations between two competing theories, such as standards of adequacy, problem-field, or cognitive perceptions associated with each theory. So the rise of incommensurability can be attributed to the lack of a certain kind of normative contact between two competing scientific theories due to changes in their normative expectations. I will call the incommensurability located in the normative dimension *normative incommensurability*.

According to the semantic perspective, the communication breakdown in the case of incommensurability can and should be attributed to the lack of *a certain kind* of desirable semantic relationship (semantic contact) between the languages employed by two competing scientific theories due to changes of *a certain desirable semantic value(s)* of certain kind of components (sentences themselves or their constituents) of the languages in question. This seems not to be in controversy within the framework of the semantic perspective. But the controversy arises with *what kind of semantic relation* is supposed to be the determinant semantic relation between the languages of two incommensurable theories. To see this, we need to identify different kinds of carriers of semantic values

and, accordingly, different semantic values associated with these carriers. First of all, the carriers of semantic values could be some non-logical constituents of a sentence, such as terms—either singular terms including proper names and definite descriptions or general terms including natural kind terms (water, gold) and concept terms (mass, force)—and predicates. For example, in a Ptolemaic sentence,

(P) The sun, the largest planet, revolves about the earth, a star,

"the sun" and "the earth" are proper names; "star" and "planet" are general terms; "the largest planet" is a definite description; "revolves about" and "is a star" are two-place or one-place predicates. On the other hand, the carrier of semantic values could be a sentence as a whole, for instance, sentence P. Secondly, different semantic values are accordingly associated with different kinds of carriers. For a term of a sentence (say, "the earth" or "planet"), we can talk about its meaning or reference; for a predicate (say, "is a star"), we can talk about its extension. By contrast, if we take a sentence as a whole as the carrier of semantic values, we can speak of the meaning and *factual meaning*, truth values (Frege's reference of a sentence) and *truth-value status* of the sentence.¹³ For example, the factual meaning of sentence P consists in its truth conditions. P is either true or false from the point of view of Ptolemaic astronomy. But P is neither true nor false from the point of view of Copernican astronomy.¹⁴

Corresponding to the two different kinds of carriers of semantic values and the semantic values associated with them, there are at least two kinds of semantic relations which could be identified as the determinant semantic relation between the languages of two competing scientific theories in the case of incommensurability. One can focus on parts of sentences and their associated semantic values. In this way, *the meaning-referential relation* between the languages of two competing scientific theories would be the determinant semantic relation in the case of incommensurability. By contrast, one can focus on sentences as a whole and their associated semantic values. Then *the truth-value functional relation*¹⁵ would be the determinant semantic relation between the languages

of two competing languages.

Corresponding to which kind of semantic relations is identified as the determinant relation, there are two possible ways, within the semantic perspective, to characterize the problem of incommensurability. According to *the presuppositional interpretation of incommensurability*, which I will present and defend, the carriers of semantic values in the case of incommensurability are the sentences of the languages of two rival scientific theories. The semantic values which concern us are factual meanings and truth-value status of sentences in question. So it is the truth-value functional relationship between two competing languages that counts as the determinant semantic relationship in the case of incommensurability. To say that two scientific theories are incommensurable is to say that there is a truth-value gap between the languages employed by the theories, which is signified by a communication breakdown between their proponents. And such an occurrence of a truth-value gap is in turn due to incompatible ontological commitments underlying the two languages. By contrast, according to the accepted *translation-failure interpretation of incommensurability*, terms are the semantic carriers in the case of incommensurability. Accordingly, the semantic values which play the central role in the incommensurable cases are the meaning or/and reference of terms in question. So it is the meaning-referential relationship between the languages of two competing scientific theories that should be identified as the determinant semantic relationship in the case of incommensurability. To say that two scientific theories are incommensurable is to say that the languages of the two theories are mutually untranslatable. And the failure of mutual translation in turn is due to the absence of meaning-referential continuity because of the radical variance of meaning or/and reference.

I will argue in chapter two that the accepted interpretation is not an effective way to clarify the concept of incommensurability, but is rather misleading. As a substitute for it, I will present and defend the presuppositional interpretation of incommensurability in the remaining chapters. But before we move on, I need to consider in the next section the