



# Kuhn's Theory of Incommensurability: A Special Reference to Theory of Meaning

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## Abstract

*The Structure of Scientific Revolution* (1962) by Thomas Kuhn challenged the traditional understanding of science and philosophy of science. Central to his notion of incommensurability are the ideas of meaning variance and lexicon, and the impossibility of the translation of terms across different theories. It is closely related to the linguistic analysis of scientific language. This paper analyses the notion of scientific language in the context of incommensurability with a special reference to the theory of meaning. This paper shows how Kuhn's theory of incommensurability can be applied to linguistics to overcome the problems that arise due to similar lexical terms and argues that Kuhn's epistemological analysis of incommensurability, particularly the challenge of understanding the process of symbolization in scientific theories, when applied to linguistics, can revolutionize the discipline itself which fills the existing knowledge gap.

**Keywords:** paradigm shift, incommensurability, theory of meaning, ontological commitment

## 1. Introduction

Kuhn was a dominant figure in the twentieth-century philosophy of science. His thoughts altered the terms of philosophical debate and challenged traditional conceptions of philosophy and

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philosophy of science. Without Kuhn it is possible to make sense of linguistics, but I have filled a gap by showing that the discipline which focuses mostly on the idea of 'Language' can use his philosophy to explain its own institutional dilemmas. Incommensurable ideas correlate with incommensurable vocabularies, and different paradigms speak different languages. The irony is that linguists, who are so adept at analysing the languages of others, have missed an interesting aspect of their own languages, and the subsequent communication difficulties which these have engendered.

### **1.1 Incommensurability and Language**

Literally, incommensurability means the impossibility or unavailability of a common system of measure. The concept of incommensurability, presented by Kuhn and Paul Feyerabend (though differently), suggested that the meaning of theoretical terms differed in various applications or iterations of scientific theories, thereby rendering the evaluation or comparison of these 'incommensurable' theories problematic. The causal theory of meaning was applied to natural kinds within the philosophy of language as one of several ways to address the problem of meaning or, in related yet somewhat specialized variations, the problem of referent determination and the problem of meaning change.

The doctrine of incommensurability(#), as a consequence assumes that each theory determines a unique scientific language. It is useful to begin with a brief discussion of the logical empiricist tradition and the historicist relation to it, and to see how the denial that theories rest on a neutral observation base motivates the thesis that meaning is theory-laden. What the proponents of the logical empiricist tradition have maintained amounts to this. Scientific theories are parasitic on an independent, pre-theoretical, observation language. The justification of the statements belonging to the observation language is carried out in complete independence from the theoretical considerations. Moreover, they are justified by a direct semantic relation to the situations that they describe. However, theoretical claims lack such a relation because their connection with reality is mediated by the observation sentences which serve as their Justification. Given that

interpretation, one must find the primary place of both meaning and truth in the observation language alone. For it is only in the observation of language, that the link between language and reality is secured.

We find in Kuhn a strong argument in favour of such an assimilation. Scientific concepts are always learned in a context which includes, applicational procedures, inferential moves and problem-solving techniques; and that context is strictly delimited by theory. For Kuhn,

Verbal definitions like Boyle's have little scientific content when considered by themselves. They are not full logical specifications of meaning (if there are such), but more nearly pedagogic aids. The scientific concepts to which they point gain full significance only when related, within a text or other systematic presentation, to other scientific concepts, to manipulative procedures, and to paradigm applications. It follows that concepts like that of an element can scarcely be invented independent of context. Furthermore, given the context, they rarely require invention because they are already at hand (Kuhn, 1970, p. 141).

Therefore, meaning is fully determined intra-theoretically. Hence, the language of a theory is unhindered by the extra-theoretical residue that comes under the purview of the theory. Following this view, a theory's inferential structure cannot be identified with the transformation rules of the syntax of its language. Hence, alternatives to that theory will be strictly incoherent. The language of a theory is so structured that, when we use it, it is impossible to say anything irrelevant to or incompatible with the theory's ontological commitment(\$).

The philosophy of language that underlies the doctrine of incommensurability of competing theories apparently results from mistaking Wittgenstein's maxim that "the meaning is the use." It explains that the meaning of a theoretical expression is to be determined by the exhaustive specification of its syntactic and semantic roles. However, these roles cannot be determined

extensionally by the natural linguistic behaviour of the sign representing a theoretical concept; the sign has different meanings in the context of different theories which would be obscured if its role were so specified in a language capable of encompassing alternative theories. As meaning is believed to be theory-specific, what constitutes a single-use is determined by the theory in whose expression a term occurs. For, that theory determines the formation of rules, inferential connections and criteria of application of the language to which the term belongs.

Thus, the logistical structure of a theory is identified with the syntax of the only language in which the theory is properly expressed. That makes both the theory and its associated language static. If any change is brought about in a theory, it transforms the language appropriate to its expression. It then renders the new version literally incommensurable with its predecessor. It follows that there is no language available for the description of theory growth and development. Consequently, it is impossible to identify a series of articulations (Kuhn upholds theory of incommensurability articulation) as versions of the same theory.

Changes in background knowledge affect the identity of theory as well. If the statements of background knowledge are to enter into theoretical deductions, they must belong to the same language as the theoretical premises with which they are conjoined. Thus if the structure or content of these statements are altered, then they constitute modifications of the theory's language as well. Since the form of that language is determined by the theory, it is impossible to modify the language without changing the theory. It follows, on this account that change in theory, can be brought about by changes in belief, remote from the axioms and theorems belonging to the logistical system of the theory proper. It also follows that it is impossible to identify distinct logistical systems as alternative formalizations of a single theory. Subsequently, a theory is identified by reference to its formalism and the theories embedded in different formalisms are ipso facto distinct.

## 2. Incommensurability and the Theory of Meaning

The problem of meaning change presented a challenge in the determination of a referent either at different points in time or for (different) generalizations that shared the same referent. The problem of incommensurability, presented both by Kuhn and by Paul Feyerabend in slightly different forms, suggested that the meaning of theoretical terms differed in various applications or iterations of scientific theories, thereby rendering the evaluation or comparison of these “incommensurable” theories problematic. Yet the conclusions drawn by Kuhn and Feyerabend – that the evaluation or comparison of incommensurable generalizations must be conducted on the basis of something other than logical or linguistic analysis – seemed to challenge the very foundations of established views of rationality. For scholars who were loath to give up this established position, incommensurability needed to be explained and the problem of meaning change that it presented needed to be addressed. Feyerabend proposed that their concerns might be addressed through reliance on aesthetic judgments and evaluation of the form (but not the content) of scientific theories. Kuhn sought to defend his views against the charges of irrationality lodged by Feyerabend and other philosophers of science by proposing that the problem of meaning change highlighted the operation of “good reasons” for theory choice, even in the cases of incommensurability. Yet as we will see, the differences between exemplars of the “good reasons” identified by Kuhn and the aesthetic judgments of Feyerabend were not as substantive as either of the two scholars suggested.

Although Kuhn's conception of incommensurability changed throughout the course of his research, it remained at the center of the issues that he investigated. In *Structure*, incommensurability was used to characterize the non-cumulative break between successive scientific traditions and was described as a gestalt switch or change in scientists' “ways of seeing” the world. Following the publication of *Structure*, Kuhn refined the conception, linking it to issues and investigations in the philosophy of language:

When writing the book on revolutions, I described them as episodes in which the meanings of certain scientific terms changed, and I suggested that the result was an incommensurability of viewpoints and a partial breakdown of communication between the proponents of different theories. I have since recognized that “meaning change” recognizes a problem rather than an isolable phenomenon, and I am now persuaded, largely by the work of Quine, that the problems of incommensurability and partial communication should be treated in another way. Proponents of different theories (or different paradigms, in the broader sense of the term), speak different languages - languages expressing different cognitive commitments, suitable for different worlds. Their abilities to grasp each other’s viewpoints are therefore inevitably limited by the imperfections of the processes of translation and of reference determination. Those issues are currently the ones that concern me most, and I hope before long to have more to say about them. ( Kuhn, 1977, xxii - i)

In these initial refinements of the notion of incommensurability, Kuhn thus began to characterize it in terms of the problem of meaning. In particular, he characterized it as a problem of partial communication that could be explained by recourse to the philosophical processes involved in translation and reference determination.

In considering Kuhn’s extension of his investigations to issues and approaches in the philosophy of language, it is important to note his interest not only in language itself but also in the language-nature link and its relation to exemplars:

. . . in learning [a specialized] language, as they must to participate in their community’s work, new members acquire a set of cognitive commitments that are not, in principle, fully analyzable within that language itself. Such commitments are a consequence of the ways in which the terms, phrases, and sentences of the language

are applied to nature, and it is its relevance to the language nature link that makes the original narrower sense of "paradigm" [i.e., construct paradigm or exemplary problem solution] so important (Kuhn, 1977, xxii).

To the extent, then, that Kuhn sought to examine the problem of incommensurability within the context of philosophy of language and the problem of meaning, he was interested not simply in changes of language but, more precisely, in changes of the language-nature link. (^)Such changes were, he proposed, integrally linked with the knowledge gained from exemplars.

### 3. The "Double-Faced Character" of Scientific Language

In "What Are Scientific Revolutions?" (1987/2000), Kuhn proposed that "the central character of scientific revolutions is that they alter the knowledge of nature that is intrinsic to the language itself and thus prior to anything quite describable as description or generalization, scientific or everyday" (Kuhn, 1987/2000, p. 32). Following a detailed study of the revolutions prompted by Newton (mechanics), Volta (electronic battery) and Planck (quantum theory), he offered a refined conception of meaning change, first as a change in the way that referents are determined and then, more specifically, as a change in "several of the taxonomic categories prerequisite to scientific descriptions and generalizations" (Kuhn, 1987/2000, p. 30). Noting that his views were still developing, he proposed that,

...roughly speaking, the distinctive character of revolutionary change in language is that it alters not only the criteria by which terms attach to nature but also, massively, the set of objects or situations to which those terms attach. What had been paradigmatic examples of motion for Aristotle - acorn to oak or sickness to health - were not motions at all for Newton. In the transition, a natural family ceased to be natural; its members were redistributed among preexisting sets;

and only one of them continued to bear the old name.  
(Kuhn, 1987/2000, p . 29-30)

Revolutionary change in language thus involves not only a change in criteria but also a change in the underlying taxonomic structure by which a particular “natural family” is determined. As such, the changes that occur thus are not simply linguistic or logical but, more fundamentally, taxonomic. In this respect, “language” itself is not “simply” linguistic or logical but is linked with a particular taxonomy in some (as yet undetermined) way.

Emphasizing that the redistribution of objects and situations among taxonomic categories is a redistribution among multiple, inter-defined categories, he concluded that “this sort of alteration is necessarily holistic” (Kuhn, 1987/2000, p. 30). Furthermore, he proposed that the holistic nature of the change is,

. . . rooted in the nature of language, for the criteria relevant to categorization are ipso facto the criteria that attach the names of those categories to the world. Language is a coinage with two faces, one looking outward to the world, the other inward to the world’s reflection in the referential structure of the language. ( Kuhn, 1987/2000, p. 30)

In making this assertion, Kuhn posited language as establishing a connection between the determination of a referent and a particular referential structure.

Examining this connection from the opposing perspective – how to determine a referential structure (as opposed to a particular referent) – Kuhn noted that the changes of meaning that occur with scientific revolutions are typically accompanied by changes of model, metaphor or analogy. Furthermore, he suggested that these “metaphor-like juxtapositions” are “central to the process by which scientific and other language is acquired:”

When the exhibit of examples is part of the process of learning terms like “motion,” “cell,” or “energy element,” what is acquired is knowledge of language



and of the world together. On the one hand, the student learns what these terms mean, what features are relevant for attaching them to nature, what things cannot be said of them on pain of self-contradiction, and so on. On the other hand, the student learns what categories of things populate the world, what their salient features are, and something about the behavior that is and is not permitted of them. In much of language learning these two sorts of knowledge – knowledge of words and knowledge of nature – are acquired together, not really two sorts of knowledge at all, but two faces of the single coinage that a language provides. (Kuhn, 1987/2000, p. 31)

Once again, we encounter the “double-faced character” of scientific language, this time from the perspective of language learning and implicitly, the development of a referential structure.

Kuhn proposed that this reappearance provided “an appropriate terminus” for his paper, providing no further elaboration of either the distinctive character of “scientific language” or the basis on which its “double face” may be established (or changed). Given the subject of scientific revolutions, Kuhn's neglect of a detailed investigation of the dual-nature of scientific language and the basis for establishing (or changing) its dual aspects may have been appropriate; however, it was unfortunate from the perspective of the development of his broader theory. Focusing solely on the changes that occurred with revolutions, he stated simply,

If I am right, the central characteristic of scientific revolutions is that they alter the knowledge of nature that is intrinsic to the language itself and that is thus prior to anything quite describable as generalization, scientific or every day. (Kuhn, 1987/2000, p. 31-2)

As we will see, the double-faced character of scientific language served as an important focal point for Kuhn's subsequent investigations. It provided a basis from which he extended established approaches to the problem of meaning change (i.e.,

changes in the criteria used for reference determination) to consider the problem of incommensurability (i.e., changes in the underlying referential structure).

#### **4. Incommensurability and the Idea of a Conceptual Scheme**

In characterizing his views on incommensurability as concerned with words and with lexical taxonomy, Kuhn noted that a more refined characterization would extend to concepts, rather than words: (Kuhn 1991)

What I have been calling a lexical taxonomy might, that is, better be called a conceptual scheme, where the “very notion” of a conceptual scheme is not that of a set of beliefs but of a particular operating mode of a mental module prerequisite to having beliefs, a mode that at once supplies and bounds the set of beliefs it is possible to conceive. Some such taxonomic module I take to be prelinguistic and possessed by animals. Presumably it evolved originally for the sensory, most obviously for the visual, system. In the book I shall give reasons for supposing that it developed from a still more fundamental mechanism which enables individual living organisms to reidentify other substances by tracing their spatio-temporal trajectories. (Kuhn, 1991/2000, p. 94)

In this reference to Donald Davidson’s essay, “The Very Idea of a Conceptual Scheme” (1974), Kuhn rejected Davidson’s characterization of his position as relying upon a set of beliefs, and proposed instead “a particular operating mode of a mental module prerequisite to having beliefs.” While Kuhn’s response can hardly be considered to be a clarification of his position, it merits further consideration given the widespread influence of the views articulated in Davidson’s paper; Kuhn’s insistent rejection of Davidson’s attempts to undercut incommensurability; and the clear importance of the proposal to Kuhn’s (developing) position.

Kuhn introduced the statements above by proposing that the “lexical taxonomy” might more appropriately be called a

conceptual scheme. In this respect, we recall his clarification in "Possible Worlds" that his interest in the lexicon, terms and statements reflected a concern with "conceptual or intentional categories more generally, e.g., with those which may be reasonably attributed to animals or to the perceptual system" (Kuhn, 1986/2000). This position was clarified further through Kuhn's later response to Hacking and the expansion of his considerations from natural kinds to "kinds and kind terms in general" (Kuhn 1990/2000, p. 229). Later in that essay, Kuhn summarized his position regarding the role of kind terms in the lexicon:

Kind terms supply the categories prerequisite to description of and generalization about the world. If two communities differ in their conceptual vocabularies, their members will describe the world differently and make different generalizations about it. Sometimes such differences can be resolved by importing the concepts of one into the conceptual vocabulary of the other. But if the terms to be imported are kind terms that overlap kind terms already in place, no importation is possible, at least no importation which allows both terms to retain their meaning, their projectibility, their status as kind terms. Some of the kinds that populate the worlds of the two communities are then irreconcilably different, and the difference is no longer between descriptions but between the populations described. (Kuhn, 1990-2000, p. 233)

This passage is particularly important because it presents Kuhn's argument against Davidson's proposal that incommensurability can be addressed by the addition of terms: if the imported (kind) terms overlap kind terms that are already in place, that importation will draw into question the status of both sets of terms as kind terms.

On this account, it is central to the processes involved in a community's description of and generalization about the world that the terms (of the lexicon, lexical taxonomy, or conceptual

scheme) whereby the world is described or characterized are kind terms. These are not simply sets of beliefs. Nor are they simply markers or labels attached to a collection of individuals by an original, historical act of dubbing. They are the kind terms of the community. Collectively, they form the basis for communication among the members of the community and in some respects, for their shared activities. They are the means by which the community describes and generalizes its world. Even further, they are the prerequisite to such description and generalization.

Yet, according to Kuhn, kind terms do not correspond to an objective, mind-independent world. They can – and sometimes do – change. When they do, the world that they describe and generalize changes as well. As kind terms, however, their change must be of a special sort. The change cannot simply be linguistic but must be interrelated with a change in knowledge of the world, that is, a change in its kinds. In response to Davidson, Kuhn insisted that it may not be appropriate to expand the vocabulary of kind terms in order to distinguish between two kinds previously identified by the same kind term. Whether conceived as a mental module, conceptual scheme, lexicon or lexical taxonomy, kind terms are interrelated with other kind terms in ways that both support and constrain their use. Introducing a new kind term – particularly if it overlaps an existing kind term – may disrupt these relationships in ways that threaten the integrity of the overall conceptual scheme. Understanding changes in kind terms thus requires understanding the relationships that they share with other kind terms. It requires understanding the conceptual or lexical-taxonomic structure within which they are placed and the sets of beliefs that are supplied by and bound within that structure.

## **5. Incommensurability and the Possibility of Enrichment**

In outlining Davidson's position, Kuhn noted, that Davidson recognized Quine's radical translator as a language learner and agreed that "what he has learned cannot in its entirety be translated into the language he brought from home" (Ibid.). In these respects, then, Davidson and Kuhn would agree. Their difference lay, Kuhn proposed, in how this untranslatability may be resolved:

. . . Davidson supposes, as I do not, that having come to understand how the presently understandable terms function in the newly acquired language, the language learner can enrich his native language by adding the missing words to it. Enrichment would then have eliminated incommensurability. (Kuhn, 1999, p. 35)

Davidson's position thus would seem to undercut incommensurability and the associated changes of language, meaning, and lexical or conceptual structure that it implies. It thus presents an important challenge to Kuhn's views.

In considering the implications of Davidson's challenge, Kuhn articulated a question that had been central to his project for quite some time:

. . . if Davidsonian enrichment were possible, that enriched language would project two incompatible images of the same areas of the same world, a consequence that would endanger the community which used it. That is what I take to be the case, but to make the position plausible one must show how a language can embody knowledge of nature at all. (Kuhn, 1999, p. 35)

Kuhn addressed this question by reconsidering both the processes involved in learning Newtonian mechanics and the cognitive status of the acquired terms and laws:

There are . . . various different routes which the learning process may traverse, but all of them involve positing the validity of one or more universal generalizations ordinarily described as laws of nature. . . For present purposes the details of the route do not matter. What is crucial, however, is that the acquisition of conceptual vocabulary requires giving to some laws of nature a definitional role that makes their cognitive status like that of Kant's synthetic a priori. As other laws are discovered with the aid of those initially

posited, they too inherit that cognitive status. Though none of them could exist in the absence of experience (whence synthetic a priori rather than a priori alone), their experiential and their definitional content are inseparably merged. It is laws that do or could enter the language acquisition process in that way that language thereafter projects back upon the world. (Kuhn, 1999, 35-6)

The processes involved in learning the Newtonian lexicon indicate that language can “embody nature” through the interrelationships that are established between acquired terms and laws and the exemplary situations that are required for their acquisition. The laws that are thereby established are both definitional and legislative. As such, Kuhn proposed they have a cognitive status like that of Kant’s synthetic a priori. In comparing Kuhn’s statements with his earlier discussion of how the Newtonian lexicon is acquired, it seems that the cognitive status of synthetic a priori should be attributed not simply to the laws but to the interrelated set of Newtonian terms and laws. As Kuhn pointed out in the detailed examination provided in “Possible Worlds,” the specific epistemic status of the various Newtonian laws will vary, depending upon whether they are learned using the conception (and exemplars) of “inertial mass” or “gravitational mass:” “[o]n the first route the second law enters stipulatively, the law of gravitation empirically. On the second, their epistemic status is reversed. In each case one, but only one, of the laws is, so to speak, built into the lexicon” (Kuhn, 1986/2000). Even if we attribute the status of synthetic a priori to both laws, it seems important to preserve some recognition of their relation to each other and the epistemic implications of the alternative paths by which they may be acquired.

As a result of the cognitive status of laws of nature (and those terms, laws, and examples that are associated with them), a change in the law will necessarily be accompanied by a change in the corresponding set of terms and examples. Thus, the transition from Newtonian to Einsteinian physics entailed not only a change in laws of nature but also a (subtle yet consequential) change in the

associated terms and examples (Kuhn, 1986/2000). While the terms of one law may be learned and distinguished from those of another, an Einsteinian vocabulary cannot be "enriched" with a Newtonian vocabulary because the underlying terms, laws, and examples of each view form an interrelated set that cannot withstand dramatic readjustments. In such cases, Davidson's proposal that enrichment eliminates incommensurability is not viable because enrichment is not possible within the constraints established by the lexical structure or conceptual scheme (i.e., the interrelated set of terms, laws, and examples) that characterizes either view.

While these considerations suggest that we may reject Davidson's position and assert the possibility of incommensurability in the case of natural laws, the scope of these claims must still be determined. We must also specify more clearly the basis on which two laws (or representatives of other potential cases) may be said to be "incommensurable." In his "Remarks," cited above, Kuhn considered kind terms that are acquired with natural laws and proposed that the constraints deriving from the interrelation of their terms and laws eliminated the possibility of enrichment in cases of untranslatability. In considering the basis for incommensurability, we might narrow this scope to encompass only those natural laws whose acquired terms overlap in some respects yet differ in others. Two laws may be untranslatable yet not necessarily possess overlapping terms, in which case enrichment would not threaten the interrelations established by either law.

On the other hand, we must also consider whether kind terms other than natural laws may present the possibility of incommensurability. In "Afterwords," Kuhn distinguished "nomic," or exceptionless, generalizations (i.e., natural laws) from the more common, "normic" generalizations (e.g., "liquid" or "solid"), which admit exceptions and are learned in contrast sets. While the discussions above suggest that changes in nomic generalizations, or natural laws will result in incommensurability, this is not necessarily the case for changes in normic generalizations. Enrichment might be possible in the second case because normic generalizations are acquired and structurally

interrelated as contrasting terms that admit of exceptions. Situations thus may arise in which an untranslatable, “contrasting” kind term can be introduced into a different conceptual scheme without harm to the structure of other, contrasting terms. On the other hand, because these are kind terms that embody knowledge of nature, there may well be some limits to the exceptions that they would admit, suggesting that incommensurability remains a possibility.

From these considerations, we can more clearly examine the basis for incommensurability. First, we must revise Kuhn’s earlier characterization of incommensurability as untranslatability to specify that it is untranslatability without the possibility of enrichment. Secondly, we must understand enrichment to be limited with respect to kind terms whose referents overlap in areas that do not admit of exception. We are left, then, with a much narrower conception of incommensurability as applicable to:

1. Alternative sets of natural laws whose acquired terms differ yet overlap with respect to some portion of the law; and
2. Alternative sets of contrasting kind terms whose terms differ, yet overlap in ways that do not admit of (proposed) exceptions.

In these cases, a change in the generalization or in the acquired kind terms will result in incommensurability. Enrichment will not be possible within the context of either generalization, given the distinctive and overlapping interrelations between each of the generalizations and their acquired terms.

Although this conception of incommensurability is narrower than the one(s) that Kuhn articulated previously, it is also more precise. As such, it provides a clear indication of the types of change that result in incommensurability, namely, changes in the underlying structures of the natural laws and kind terms that are used in descriptions and generalizations about the world. It indicates a particular type of change in kind terms that is accompanied by a change in the associated referents. As thus conceived, incommensurability indicates a structural change in our knowledge of nature that is not only linguistic but also substantive.



## 6. Conclusion

The issues discussed in this article, regarding the underlying philosophical commitments of linguistics, the nature of linguistic explanation, and the social and institutional history of language, continue to be discussed, and give rise to lively debate and disagreement. The Kuhnian or otherwise nature of linguistics, is a source of fascination for both linguists and philosophers. A recent publication, *Chomskyan Revolutions* edited by Douglas Kibbee, brings together a large number of the more recent contributions, and the debate shows little sign of receding. The consequences of this article are, I hope, for those whose work involves familiarity or contact with both paradigms and incommensurability to see them in a new light. What sometimes looks like entrenched disagreement, or plain bloody-mindedness, might in fact be incommensurable concepts obscured by identical vocabulary.

## End Notes

(#) - The problem of incommensurability, presented both by Kuhn and by Paul Feyerabend in slightly different forms, suggested that the meaning of theoretical terms differed in various applications or iterations of scientific theories, thereby rendering the evaluation or comparison of these "incommensurable" theories problematic. Yet the conclusions drawn by Kuhn and Feyerabend 'that evaluation or comparison of incommensurable generalizations must be conducted on the basis of something other than logical or linguistic analysis seemed to challenge the very foundations of established views of rationality. For scholars who were loath to give up this established position, incommensurability needed to be explained and the problem of meaning change that it presented needed to be addressed.

(\$) - By 'ontologically committed' I mean that each theory has its own subject-matter and that different theories depict different world-pictures. A theory encompasses its own unique language to express that commitment.

(^) - Kuhn's application of the causal theory of reference through multiple acts of dubbing is similar to this consideration of the role of exemplars in establishing the language-nature link and the incommensurability that results from changes in the language-nature link

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