

## Semantic Incommensurability and Alethic Relativism

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### Abstract

According to the thesis of semantic incommensurability, scientific development entails a meaning change in some basic terms deployed by scientific theories (such as ‘mass’ or ‘planet’) over the course of scientific revolutions. The traditional objections to this thesis concern reference continuity and translation. In this paper I will analyze the latter question: at first, I will argue that meaning change does not imply conceptual-scheme relativism or radical untranslatability. From this viewpoint, the incommensurability thesis is not relativist, since it does not deny the possibility of translation *per se*, but only of a word-by-word translation which keeps truth-value attributions unchanged across successive paradigms. Therefore, in the second part, I will argue that incommensurability implies a kind of relativism about truth. That is because, as Ian Hacking pointed out, the possibility to attribute truth-values to empirical propositions depends on the lexical structure in which we are testing them. According to Kuhn, truth (understood as correspondence between theory and reality) cannot be considered the general aim of science, since research traditions need paradigms, that is to say “grammatical structures,” which are neither true nor false. This kind of alethic relativism is different from the context-dependence of truth, since it does not question the objectivity, absoluteness or immutability of truth, but, rather, the possibility to express every propositional content in any language.

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### 1. Introduction

According to the thesis of semantic incommensurability, the meaning of scientific terms changes as a consequence of scientific revolutions. In the received view, this idea is a kind of conceptual scheme relativism which has been faced by means of the cross-theoretical concepts of reference and translation. Basically, semantic incommensurability claims that the meaning of a word depends on the “theoretical environment” in which the word is embedded and therefore meaning varies with theoretical context. This idea leads to conceptual scheme relativism in so far as the vocabulary of a scientific theory could fail to express the propositions of the rival theories and therefore competing theories cannot be directly compared.

On the one hand, the proponents of the referential objection (for example Putnam 1975, pp. 215-271) claim that meaning change is not a problem for scientific progress, since co-

referentiality is a sufficient condition for theory comparison. On the other hand, the proponents of the translational response (for example Davidson 1984 and Putnam 1981, pp. 114-115) think that the idea of untranslatable languages does not make sense. In this paper I will focus on the latter question, claiming that semantic incommensurability does not imply that scientific theories are radically untranslatable conceptual schemes. At first, I will show that, although incommensurability involves the concept of untranslatability, it is not a kind of relativism questioning the possibility of communication and rational discussion between rival scientific communities. I will then argue that the target of semantic incommensurability is the relation between truth and science; roughly, its main claim is that some propositions which are true-or-false in the lexicon of a theory are meaningless in the lexicon of the rival theories. Finally, I will explain how this claim is different from standard alethic relativism.

## **2. Semantic Incommensurability: what kind of Relativism?**

Thomas Kuhn has discussed and clarified the thesis of semantic incommensurability in all his works following *The Structure of Scientific Revolutions*<sup>1</sup>. In *The Structure* he presented semantic incommensurability claiming that, over the course of scientific revolutions, while a new paradigm may embrace and incorporate many concepts of the old theory, “within the new paradigm, old terms, concepts and experiments fall into new relationship one with the other” (Kuhn 1970a, p. 149). Kuhn analyzed the transition from Newtonian mechanics to Einstein’s theory of relativity and concluded that scientific revolutions entail a meaning change in the most basic terms deployed by the rival theories: “this need to change the meaning of established and familiar concepts is central to the revolutionary impact of Einstein’s theory” (Kuhn 1970a, p. 102). For example, Newtonian mass is conserved while Einsteinian mass is convertible with energy; consequently, Kuhn stated that “the physical referents of these Einsteinian concepts are by no means identical with those of the Newtonian

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<sup>1</sup> For a short introduction to the problem of semantic incommensurability see Sankey, Hoyningen-Huene (2001b), pp. ix-xiii. For a reconstruction of the historical evolution of Kuhn’s reflection about incommensurability see Hoyningen-Huene 1990 and Sankey 1993.

concepts that bear the same name”<sup>2</sup> (Kuhn 1970a, p. 102). He linked the question of the determination of the experimental field of the theory (the reference of the theory) to the difficulties faced by scientists who try to translate a rival scientific theory. A neutral observation language which allows us to express the empirical statements of both theories is not available, so the problem is: how can we establish whether rival theories affirm or deny the same content?

In the received view, semantic incommensurability is a kind of conceptual scheme relativism (CSR) which entails untranslatability across paradigms and the irrationality of scientific revolutions. The impossibility to fully translate the lexicon of a theory is not only a significant obstacle to theory comparison and choice, but, on this view, also to mutual understanding between human beings. Therefore, semantic incommensurability is considered equivalent to the following claim:

(CSR): each paradigm is a conceptual scheme (at least partially) untranslatable from the lexica of the other conceptual schemes. The truth-value of scientific propositions is not a matter of relation between theory and reality, but, rather, a question about the internal coherence of our system of beliefs.

In response to this, Putnam has written that

The incommensurability thesis is the thesis that terms used in another culture, say, the term ‘temperature’ as used by a seventeenth-century scientist, cannot be equated in meaning or reference with any terms or expressions we possess. As Kuhn puts it, scientists with different paradigms inhabit ‘different worlds’. [...] The rejoinder this time is that if this thesis were really true then we could not translate other

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<sup>2</sup> In this paper I will not analyze the problem of the referential continuity and I will focus on the problems of translation. For the referential response to the incommensurability thesis see Scheffler 1967, Putnam 1975, Kripke 1980. Kuhn’s reply to the Kripke-Putnam argument makes evident that, as I will argue further below, the problem of referential change is dependent on the untranslatability problem and especially on the impossibility to preserve truth value relationships in translation (Kuhn 1989/2000, pp. 78-85 and 1990).

languages — or even past stages of our own language — at all. And if we cannot interpret organisms' noises at all, then we have no grounds for regarding them as thinkers, speakers, or even persons. In short, if Feyerabend (and Kuhn at his most incommensurable) were right, then members of other cultures, including seventeenth-century scientists, would be conceptualizable by us only as animals producing responses to stimuli (including noises that curiously resemble English or Italian). To tell us that Galileo had 'incommensurable' notions and then to go on to describe them at length is totally incoherent. (Putnam 1981, pp. 114-115)

I will briefly summarize two clarifications to reply to this kind of criticism<sup>3</sup>. At first, Putnam's argument takes for granted that untranslatability involves language as a whole. On the contrary, Kuhn argued that semantic incommensurability is always a local event, i.e. it involves only specific "pieces" of language and not language as a whole:

Most of the terms common to the two theories function the same way in both; their meanings, whatever those may be, are preserved; their translation is simply homophonic. Only for a small subgroup of (usually interdefined) terms and for sentences containing them do problems of translatability arise. (Kuhn 1983/2000, p. 36)

In its latest development, incommensurability is a modest thesis about small groups of interdefined terms which are usually introduced by means of the fundamental equations of the theory. For example, Newtonian 'force' and 'mass' are untranslatable in the Aristotelian lexicon because they are learned together by means of the second law of motion, which is not applicable to Aristotle's mechanics: "the interrelated terms in some local part of the web of language must be learned or relearned together and then laid down on nature whole. They cannot simply be rendered individually by translation" (Kuhn 1970b/1970a, p. 44).

Moreover, in his argument, Putnam affirmed that hypothetical untranslatable languages could not be interpreted at all. This inference assumes that interpreting a language means translating the words and sentences of such a language into the respective words and sentences of another language. On the contrary, Kuhn rejected the claim that translation is equivalent to

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<sup>3</sup> For a complete reply to the translational objections to incommensurability see Sankey 1994, pp. 102-137.

interpretation<sup>4</sup>. Kuhn used a concept of translation different to the ordinary one. Translation strictly construed consists in the systematic substitution of a set of words and sentences for the respective words and sentences of another language; therefore, a translator should understand both languages. Instead, interpretation can be compared to Quine's concept of radical translation (see Quine 1960), i.e. a situation where the object-language is totally unknown: Quine's radical translator is not a translator, but rather an interpreter who is learning a new language. The interpreter can succeed in understanding the unknown language and fail in technically translating it at the same time: "acquiring a new language is not the same as translating from it into one's own. Success with the first does not imply success with the second" (Kuhn 1983/2000, p. 39). Ordinary translation is always possible, but it necessarily implies compromises, difficulties, meaning shifts, neologisms and so on. This is the relation between incommensurability and untranslatability: translation strictly construed is impossible, while, *pace* Putnam, interpretation is always obtainable. So, the thesis of semantic incommensurability should be distinguished from the thesis of untranslatability:

*Untranslatability Thesis:* Scientific theories are conceptual schemes mutually untranslatable; each scientific community does not understand the work and the claims of the rival communities.

*Incommensurability Thesis:* Since the meaning of some small set of scientific terms changes over the course of scientific revolutions, scientists are not able to fully translate the lexicon of the rival theories in order to make possible a point-by-point comparison between the theories.

Since the thesis of semantic incommensurability is not a radically relativist claim, in the following section I will explain what kind of problems are related to the concept of semantic incommensurability. I will argue that, although untranslatability does not entail conceptual-

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<sup>4</sup> For the relevance of this distinction in the latest development of Kuhn's incommensurability thesis see Chen 1997.

scheme relativism, it involves a kind of relativism about truth. This kind of relativism is consistent with Kuhn's rejection of epistemological and conceptual relativism. But Kuhn himself said that, as regards the concept of truth, we can consider him a relativist: "one scientific theory is not as good as another for doing what scientists normally do. In that sense I am not a relativist. But there are reasons why I get called one, and they relate to the contexts in which I am wary about applying the label 'truth'" (Kuhn 1970c/2000, p. 160). Semantic incommensurability does not deny the very possibility of translation, but a technical translation which keeps truth value attributions unchanged across successive scientific theories. In the following section I will clarify this kind of alethic relativism.

### **3. Truth and Incommensurability**

In the previous section, I have said that many critics argued that semantic incommensurability implies conceptual relativism, viz., that every theory is a conceptual scheme untranslatable from the lexicon of other theories. On the contrary, I think that incommensurability is deeply linked to Kuhn's skepticism about truth:<sup>5</sup> incommensurability deals with the impossibility of preserving truth value relationships when we translate from the lexicon of the old theory to the new lexicon. As we have seen, for Kuhn, inter-theoretical translation entails a loss or modification in the truth values of the statements of the old theory. Kuhn is very clear on this problem: the impossibility to translate (strictly speaking or word-by-word and sentence-by-sentence translation) involves many problems about the preservation of the truth values. In fact, translation, strictly speaking, is problematic just because it should preserve the truth value relations: "it is a quasi-mechanical activity governed in full by a manual which specifies, as a function of context, which string in one language may, *salva veritate*, be substituted for a given string in the other" (Kuhn 1989/2000, p. 60).

According to Kuhn, it is possible to fully understand an untranslatable scientific theory (i.e. what the interpreter does); on the contrary, semantic incommensurability refers to the

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<sup>5</sup> For Kuhn's criticism of the concept of truth see Bird 2000, pp. 209-266.

impossibility of preservation of the relationships between the fundamental terms of the symbolic generalizations of the respective theories. In such a sense, translation cannot be complete as it implies compromises and meaning changes, and the alteration in truth values happens as a consequences of these changes:

The preservation of truth values when translating scientific prose is very nearly as delicate a task as the preservation of resonance and emotional tone in the translation of literature. Neither can be fully achieved; even responsible approximation requires the greatest tact and taste. In the scientific case, these generalizations apply, not only to passages that make explicit use of theory, but also and more significantly to those their authors took to be merely descriptive. (Kuhn 1989/2000, p. 62)

In Newtonian mechanics, terms like “force”, “mass” (and so on) are acquired together through the second law of motion and the experimental situations associated with it. The introduction of such terms, for example, in Einstein’s mechanics entails many problems, since Newton’s second law of motion does not work in the new context (Kuhn 1983/2000, p. 44). Consequently, the translation (strictly construed) from the Newtonian lexicon to the theory of relativity causes internal, language-dependent contradictions in the truth-value relationship linked, for example, to the different meanings of the term ‘mass’: “enriching the Newtonian conceptual vocabulary with Aristotelian terms (or vice versa) would build contradictions about observable phenomena *into language itself*” (Kuhn 1999, p. 36). Some Newtonian terms have not counterparts in Aristotle's theory (for example the term ‘mass’ does not exist); and, if they can be approximately translated, they are often related to different and inconsistent theoretical principles and laws (for example the idea that all moving bodies are subjected to a force). Therefore, since the relation between the mathematical core of Newton's classical mechanics and the theoretical structure of Aristotle's mechanics generates contradictions, the truth-values of the sentences deploying terms such as mass, force and acceleration change during translation. The significance of this remark becomes clear when we consider Kuhn’s reply to the referential critics to incommensurability: the causal theory of reference.

Discussing Putnam's thought experiment of the Twin Earth (Putnam 1975, pp. 223-235), Kuhn does not focus on the supposed referential continuity. But, rather, he is interested in the consequences of the introduction of new information about water in the context of our old lexicon. The only information about our knowledge that we could deduce from the fact that our H<sub>2</sub>O and Putnam's XYZ are the same substance is that something is badly wrong with our chemical theory:

The terms 'XYZ' and 'H<sub>2</sub>O' are drawn from modern chemical theory, and that theory is incompatible with the existence of a substance with properties very nearly the same as water but described by an elaborate chemical formula. Such a substance would, among other things, be too heavy to evaporate at normal terrestrial temperatures. Its discovery would present the same problems as the simultaneous violation of Newton's second law and the law of gravity described in the last section. It would, that is, demonstrate the presence of fundamental errors in the chemical theory which gives meanings to compound names like H<sub>2</sub>O and the unabbreviated form of 'XYZ'. Within the lexicon of modern chemistry, a world containing both our earth and Putnam's Twin Earth is lexically possible, but the composite statement that describes it is necessarily false. Only with a differently structured lexicon, one shaped to describe a very different sort of world, could one, without contradiction, describe the behavior of XYZ at all, and in that lexicon 'H<sub>2</sub>O' might no longer refer to what we call 'water'. (Kuhn 1989/2000, pp. 80-81)<sup>6</sup>

It is important to understand Kuhn's approach to the problems of translation here. The question of referential change (which is essential from Putnam's point of view) is, according to Kuhn, only a byproduct of the influence exercised by the structure of scientific (chemical) lexicon on our possible knowledge of nature. The origin of this trouble is Kuhn's theory of the structure of and the access to the possible worlds of science. In fact, according to Kuhn, every paradigm provides a structure for the possibility of experience: "insofar as the structure of the world can be experienced and the experience communicated, it is constrained by the structure of the lexicon of the community which inhabits it" (Kuhn 1991/2000, p. 101). This idea is a Kantian legacy of which Kuhn is aware:

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<sup>6</sup> See also Kuhn 1989/2000, pp. 81-82.

My structured lexicon resembles Kant's a priori when the latter is taken in its second, relativized sense. Both are constitutive of *possible experience* of the world, but neither dictates what that experience must be. Rather they are constitutive of the infinite range of possible experiences that might conceivably occur in the actual world to which they give access. Which of these conceivable experiences occurs in that actual world is something that must be learned, both from everyday experience and from the more systematic and refined experience that characterizes scientific practice. (Kuhn 1993/2000, p. 245)

Obviously, and opposite to Kant's universality and necessity of scientific knowledge, Kuhn's a priori is a relativized a priori. Consequently, we can imagine many different structures for possible experience, that is to say a plurality of different possible worlds; 'possible world' means a world stipulatable in some language, or a world conceptually accessible.<sup>7</sup> A possible world is available for experimental practice only when a scientific community agrees about the applications of the network of interdefined terms which makes the world linguistically accessible (for example 'mass', 'force', 'acceleration' and the respective laws and applications in the example of Newton's mechanics). In any case, Kuhn has denied that every language can make any possible world available. Through Newton's lexicon, scientific community can have access only to the worlds structured by the Newtonian language: a paradigm provides a structure for its experimental field, creates constraints for experience and excludes possibilities:

Only the possible worlds stipulatable in that language can be relevant to them [sentences and words in a specified language]. Extending quantification to include worlds accessible only by resort to other languages seems at best functionless, and in some applications it may be a source of error and confusion. [...] At least in their application to historical development, the power and utility of possible-worlds argument appears to require their restriction to the worlds accessible with a given lexicon, the worlds that can be stipulated by participants in a given language-community or culture. (Kuhn 1989/2000, pp. 64-65)

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<sup>7</sup> Since the "world-in-itself" is inaccessible to any lexicon by definition, it is necessarily excluded from the spectrum of the possible worlds: "The view toward which I grope would also be Kantian, but without 'things in themselves' and with categories of the mind which could change with time as the accommodation of language and experience proceeded. A view of that sort need not, I think, make the world less real." (Kuhn 1979/2000, p. 207). For a Kantian interpretation of Kuhn's philosophy of science see Hoyningen-Huene 1989/1993, pp. 31-63.

A paradigm establishes the limit of the conceivable and what we can say about it: it is “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” (Kuhn 1991/2000, p. 94). The access to a given experience field can exclude the access to other fields: a paradigm is something exclusive.<sup>8</sup> In a confrontation with anomalies, breaking down the limits of a lexicon implies a meaning change in its terms and a modification in the relevant truth values. For example,

What should one have said when confronted by an egg-laying creature that suckles its young? Is it a mammal or is it not? These are the circumstances in which, as Austin put it, “we don't know what to say. Words literally fail us”. Such circumstances, if they endure for long, call forth a locally different lexicon, one that permits an answer but to a slightly altered question: “Yes, the creature is a mammal” (but to be a mammal is not what it was before). The new lexicon opens new possibilities, ones that could not have been stipulated by the use of the old. (Kuhn 1989/2000, p. 72)<sup>9</sup>

On this point, Kuhn has reflected on the role played by the second law of motion, or the third law of motion, or Hooke's law, or the law of gravity, in Newtonian mechanics and what we would expect from a substantive revision of these basic laws. Replying to these questions, Kuhn quotes Wittgenstein and affirms that “these are not questions that individually have yes or no answers. Rather, like Wittgenstein's ‘Could one play chess without the queen?’ they suggest the strains placed on a lexicon by questions that his designer, whether God or cognitive evolution, did not anticipate its being required to answer” (Kuhn 1989/2000, p. 72). This reference to Wittgenstein is important to understand incommensurability. In fact, Kuhn's paradigms present many analogies with Wittgenstein's grammars. Although I cannot

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<sup>8</sup> Kuhn means that a member of a scientific community cannot follow two paradigms at the same time (unlike philosophers of artists) (Kuhn 1963, p. 352). This feature of paradigms seems to be a weak point of Kuhn's theory, in particular referring to the unsatisfactory example of the Copernican Revolution: scientists such as Tycho Brahe worked both with the Copernican paradigm and with the Ptolemaic one. I think it can be understood on the light of Wittgenstein's theory (1969) of the commitment to a grammar, according to which the commitment to grammatical principles must exclude alternative uses of language (See Forster 2004, pp. 166-167).

<sup>9</sup> Obviously Kuhn refers to the taxonomic case of the platypus. For an analysis of this problem from a semantic perspective see Eco 1997/1999.

develop this point here,<sup>10</sup> I will focus only on its consequences for semantic incommensurability. At first, as we have seen, referring to many of the terms occurring in in Newton's lexicon, Kuhn said that paradigms define the words which occur in their laws: "they function in part as laws but also in part as definitions of some of the symbols they deploy" (Kuhn 1970b/1970a, p. 183). We have also seen that a change in the lexical structure could provide major meaning changes. In the same way, a modification in the grammar implies, according to Wittgenstein, just a meaning change:

It is grammatical rules that determine meaning (constitute it) and so they themselves are not answerable to any meaning and to that extent are arbitrary. There cannot be a question whether those or other rules are the correct ones for the use of "not" (that is, whether they accord with its meaning). For without these rules the word has as yet no meaning; and if we change the rules, it now has another meaning (or none), and in that case we may just as well change the word too. (Wittgenstein 1974, p. 184)

Moreover, grammatical rules differ from descriptive propositions since the former are normative propositions which are neither true nor false. A proposition such as "a certain object is a meter long" can be tested by means of experience and the metric system. But we cannot ask for the length of the standard meter in Paris,<sup>11</sup> because that question is meaningless. Here the metric system plays an important role because, according to Kuhn, incommensurability is a mathematical term which means "no common measure" (Kuhn 1983/2000, p. 35). Moreover he compares paradigms with units of measurement or with metric systems (Kuhn 1989/2000, p. 63). The metric system allows us to attribute truth values in its application field, but it makes no sense to look for the truth value of the metric system itself.

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<sup>10</sup> For some information about the relationship between Kuhn and Wittgenstein about paradigms and grammars see Malone 1993; Glock 1996, p. 215; Sharrock, Read 2002, pp. 162-163; Baltas 2004.

<sup>11</sup> "There is one thing of which one can say neither that it is one meter long, nor that it is not one meter long, and that is the standard meter in Paris.—But this is, of course, not to ascribe any extraordinary property to it, but only to mark its peculiar role in the language-game of measuring with a meter-rule.—Let us imagine samples of color being preserved in Paris like the standard meter. We define: "sepia" means the color of the standard sepia which is there kept hermetically sealed. Then it will make no sense to say of this sample either that it is of this color or that it is not." (Wittgenstein 1958, § 50, p. 25).

Consequently, Kuhn has said that the analysis of the truth value of an empirical proposition is necessarily an activity internal to a lexicon:<sup>12</sup> “evaluation of a statement’s truth value is, in short, an activity that can be conducted only with a lexicon already in place, and its outcome depends upon that lexicon” (Kuhn 1989/2000, p. 77). But the fact that the attribution of truth values is a paradigm-dependent process implies, as we have seen, that a paradigm is neither true nor false:

A lexicon or lexical structure is the long – term product of tribal experience in the natural and social world, but its logical status, like that of world meaning in general, is that of convention. Each lexicon makes possible a corresponding form of life within which the truth or falsity of propositions may be both claimed and rationally justified, but the justification of lexicon or of lexical change can only be pragmatic. With the Aristotelian lexicon in place it does make sense to speak of the truth or falsity of the Aristotelian assertion in which terms like ‘force’ or ‘void’ play an essential role, but the truth values arrived at need have no bearing on the truth or falsity of apparently similar assertions made with the Newtonian lexicon. (Kuhn 1993/2000, p. 244)

These remarks clarify what kind of alethic relativism is entailed by Kuhn’s thesis of semantic incommensurability. Kuhn does not say that a proposition which is true in a certain paradigm could be false in another context; his relativism is not based on context-dependent truth value attributions. On the contrary, according to the semantic incommensurability thesis, some propositions, which are true or false in a lexicon (candidates for truth value attribution), are not candidates for truth or falseness in another one (see Wang 2002). The idea that the possibility to attribute a truth value is lexicon-dependent has been first elaborated by Ian Hacking (who also rejects conceptual relativism), and Kuhn accepted Hacking’s suggestion in his latest works (for example Kuhn 1993). In fact, he affirmed that the evaluation of an empirical statement consists of two steps: the first is the evaluation of the status of the statement: is it a candidate for truth value attribution? The answer to this question depends on the structure of the lexicon with which we are working, which determines whether the

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<sup>12</sup> Of course, this does not mean that the truth or falsity (the specific truth value) of a proposition is determined by the lexicon. Again with a Kantian attitude, the specific truth value of the statements is determined by experience, but the possibility of the truth value evaluation and attribution depends on the paradigm.

sentence is meaningful, verifiable or falsifiable. When we have established the status of the statement we can proceed with the second step: the empirical (or conceptual) justification of the statement (i.e. the specific truth value attribution); and, on the contrary, we can achieve this goal by means of the ordinary tools of experience, logic and evidence. As Wittgenstein noted, this could seem to eliminate logic, but really “it is one thing to describe methods of measurement, and another to obtain and state results of measurement” (Wittgenstein 1958, §242, p. 88). Achieving the right results of measurement is a normal empirical operation (the aim of normal science), but a method of measurement cannot, by contrast, be directly tested. It is in this connection that Kuhn deals with meaning change:

Where the lexicons of the parties to discourse differ, a given string of words will sometimes make different statements for each. A statement may be a candidate for truth/ falsity with one lexicon without having that status in the others. And even when it does, the two statements will not be the same: though identically phrased, strong evidence for one need not be evidence for the other. Communication breakdowns are then inevitable, and it is to avoid them that the bilingual is forced to remember at all times which lexicon is in play, which community the discourse is occurring within. (Kuhn 1991/2000, p. 100)

This claim is consistent with Kuhn’s interpretation of the origin of the notion of incommensurability. In fact, he first introduced incommensurability referring to the difficulties to understand seemingly nonsensical passages in ancient scientific texts (Kuhn 1983/2000, p. 59, 1989/2000, p. 87, 1991/2000, p. 91). According to Kuhn, this nonsense can be removed by acknowledging that there was a meaning shift in the terms involved and then a modification of the truth value relationships. The origin of Kuhn’s problem is that scientific revolutions imply the revision of the most basic propositions of the respective scientific theories (for example Newton’s second law of motion). According to my previous interpretation, a change in these propositions (just like Wittgenstein’s grammatical rules) entails a meaning change in the terms deployed, which generates difficulties in the attribution of truth values. Roughly, the negation of a grammatical proposition is not falsity, but nonsense.

Accordingly, semantic incommensurability should be viewed as a kind of relativism about the relation between truth and science because it claims that, since the possibility of truth value attributions is language-dependent, the concept of truth (as correspondence) is not applicable to whole theories; rather it is applicable only to the “empirical” (broadly speaking) sentences that we are allowed to express by means of the mathematical core of the theory. I shall call this relativism about truth “truth-value attributions relativism” (TVAR) and it is quite different from ordinary alethic relativism (AR). In fact, (AR) usually claims that the standards of truth (and falsity) change across communities, historical periods, cultures and sometimes individuals. That is, the truth-value of a sentence depends on the historical, social, linguistic or cultural background of the individual (or community) who/which tests the sentence:

(AR) The truth-values of propositions depend on their theoretical context.

The same proposition could be true according to the conceptual scheme  $C_1$  and false according to the conceptual scheme  $C_2$ .

(AR) is a metaphysical view about the essence of truth, claiming that the objectivity of truth is not tenable. By contrast, (TVAR) is consistent with all the ordinary beliefs about truth: that it is objective (the truth-value of a sentence depends on how things are in the world and therefore truth obtains independently of our theories), absolute and universal (truth is not perspectival and it is immutable) and (at least weak) realism (truth is a kind of relation between sentences and a mind-independent reality). (TVAR) questions the feasibility of having access to every possible world (to the content of all scientific propositions) by means of any lexical structure, as it maintains that certain propositions are not available for verification or falsification by means of some lexical structures. So, according to (TVAR) and semantic incommensurability, the correspondence theory of truth may apply to the

empirical sentences of the theory we are testing, but it cannot apply to the theoretical structure as a whole.<sup>13</sup>

#### **4. Conclusions**

We have seen that, according to Kuhn, semantic incommensurability does not imply conceptual-scheme relativism or radical untranslatability and reference discontinuity, but it does introduce a form of relativism about the ability of science to pursue truth. According to Kuhn, truth (as correspondence between theory and reality) cannot be considered the general aim of science, since research traditions need paradigms, that is to say “grammatical structures” which, as we have seen, are neither true nor false, because only the propositions articulated through the paradigm are true or false, i.e., experimentally verifiable or falsifiable. However, although paradigms can be justified only by a pragmatic viewpoint, we should not think that scientific theories are instruments which are only supposed to maintain internal coherence. Rather, Kuhn says that the agreement between paradigm and nature is possible thanks to the paradigm itself, which allows scientists to have access to the relevant section of reality. Again, no paradigm (as a whole) is truer than the others, but some paradigms articulate their experience fields better than the others, i.e., they allow scientists to express approximately true sentences according to the aims and standards of the paradigm itself. As we have seen, paradigms provide the structure for possible experience, not actual experience. The empirical propositions which are candidate for truth value in a certain paradigm are true-or-false thanks to experience and the traditional instruments of testing, but the truth value attributions are enabled by the paradigm itself. We have seen that a paradigm is a metric system and that we need it to attribute truth values. Finally, incommensurability (“no common measure”) affirms the impossibility to find a meta-metric system (absolute truth, neutral experience, Archimedean platform, observation language) to evaluate the likeness to the truth of the other metric systems.

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<sup>13</sup> In this paper I have, like Kuhn, focused on the correspondence theory of truth. It is to be noted, however, that considerations like the ones examined here can be related to some significant works on the coherence theories of truth (see Putnam 1981 and Young 2001) and on relative truth (see MacFarlane 2005).

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