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Meta-incommensurability Revisited *

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ABSTRACT: A popular rejoinder to the potential threat that incommensurability might pose to scientific realism has been the referential response: despite meaning variance, there can be referential continuity, which is sufficient for rational theory choice. This response has been charged with meta-incommensurability, according to which it begs the question by assuming a realist metaphysics. However, realists take it to be a rhetorical device that hinders productive discussion. By reconstructing the debate, this paper aims to demonstrate two things. First, there are unexpected commonalities between realists and non-realists, meaning that the charge of meta-incommensurability is more or less exaggerated. Second, meta-incommensurability, which is to be found in the ways to make sense of referential overlap at the token level, still plays a role in the realism debate.

Keywords: incommensurability; meta-incommensurability; scientific realism; Sankey; Hoyningen-Huene; token-referential overlap.

RESUMEN: Una réplica habitual a la amenaza potencial que la inconmensurabilidad podría representar para el realismo científico ha sido la respuesta referencial: a pesar de la variación de significado puede haber continuidad referencial, lo que basta para la elección racional de teoría. A esta respuesta se la ha acusado de meta-inconmensurabilidad, de acuerdo con lo cual caería en petición de principio al asumir una metafísica realista. Sin embargo, los realistas consideran esta acusación un recurso retórico que impide una discusión productiva. Mediante la reconstrucción del debate, este artículo pretende demostrar dos cosas. En primer lugar, que existen inesperados puntos en común entre realistas y no realistas, lo que significa que la acusación de meta-inconmensurabilidad es en alguna medida exagerada. En segundo lugar, que la inconmensurabilidad, que se puede encontrar en las formas de dar sentido a la coincidencia referencial en el nivel del ejemplar (*token*), aún cumple una función en el debate sobre el realismo.

Palabras clave: inconmensurabilidad, meta-inconmensurabilidad, realismo científico, Sankey, Hoyningen-Huene, coincidencia de la referencia al ejemplar.

1. Introduction

Whether and how the incommensurability thesis threatens scientific realism is a persistent problem in the philosophy of science. As is well known, the term ‘incommensurability’ was coined by Kuhn (1962) and Feyerabend (1962) to indicate radical scientific changes. Incommensurability is commonly held to have more than one dimension, but the semantic one has been regarded as the most relevant in the realism debate. When the same terms are in use, their ‘meanings’ may differ. (Or, the principal terms might not be shared by competing theories.) These are problematic because if the same terms with similar meaning are not used in competing theories, the theories

* I would like to thank anonymous reviewers for their helpful comments on earlier drafts of this paper. A version of this paper was presented at an international conference “Incommensurability 50” held in Taiwan, and I am grateful for the comments of Paul Hoyningen-Huene, Howard Sankey, and other participants.



cannot then be directly compared, challenging the idea of rational theory choice and scientific progress. A popular realist rejoinder to this threat from semantic incommensurability is the so called “referential response” (Scheffler 1967; Sankey 1994). According to this position, each term has two sorts of meaning (i.e., sense and reference), and thus meaning variance does not entail referential variance. This permits referential stability, which is secured by an appropriate form of a causal theory of reference, to be sufficient for content comparison.

This referential response, however, has been charged with meta-incommensurability by Hoyningen-Huene and colleagues (1996), according to which the response begs the question. By simply assuming the realist metaphysics, the response downplays the fact that the crucial terms in their discourse (i.e., ‘reality’, ‘world’, ‘comparison’, and ‘reference’) have different meanings for realists and non-realists, due to the different metaphysical assumptions. However, realists tend to disregard the charge as merely a rhetorical device that hinders productive discussion (Devitt 2001; Sankey 1997, 2008). By reconstructing their debate, this paper demonstrates that even in the recent exchanges among them (Sankey 2009a, 2009b; Hoyningen-Huene and Oberheim 2009), meta-incommensurability still plays a role, although the difference between them is more or less exaggerated. I also investigate where the real difference comes from.

Here is how I proceed. First, I introduce the meta-incommensurability thesis in Section 2. In Section 3, I delve into the meaning variance of ‘comparison’ and ‘rivalry’ between realists and non-realists, showing that their difference is exaggerated. In Section 4, I explore the possibility that the real difference is related to the way of making sense of the referential overlap. In Section 5, I show that beyond the discussion about reference the root of the incessant disagreement revolves around the notion of ‘nature’s joints’. In Section 6, I give a rough idea of how the discussion above can shed light on the realism debate more generally.

2. *The meta-incommensurability thesis*

2.1 *The charge of meta-incommensurability*

In a review article about Sankey’s *The Incommensurability Thesis* (1994) that put forward a sophisticated version of the referential response, Hoyningen-Huene and colleagues (1996) introduced the notion of meta-incommensurability (hereafter, MI) between realists and non-realists, which was instrumental in undercutting the referential response. They suggested two *indications* of MI. First, the crucial terms in the realism debate have different meanings for realists and non-realists, which leads to local communication failure between them. Second, the argument for or against realism appears circular, and thereby both of them have been mutually accused of question begging. These indications, however, did not distinguish the nature of MI from its explanatory role. It was also unclear whether it is explanans or explanandum.

In developing the idea of MI, Oberheim and Hoyningen-Huene (1997) furnished a useful distinction. MI states that there is meaning variance between realists and non-realists, due to their different metaphysical commitment, leading to partial failure of

communication across positions. Its existence is evidenced by circular arguments, accusations of mutual question begging, and indecisive arguments in the realism debate. Such phenomena give credence to MI because it provides us with the best explanation of these differences.

If MI exists between realists and non-realists, the referential response does not work against non-realism. The argument from MI is formulated as follows:

- P1. Causal theory of reference includes both linguistic and metaphysical components because reference is a way language is related to the world.
- P2. Incommensurability can be merely a linguistic issue only when the metaphysical issue has already been established.
- P3. A metaphysical issue is at stake between realists and non-realists.
- P4. However, the referential response treats incommensurability as a merely semantic or linguistic issue.
- C1. Therefore, it begs the question by assuming its own realist metaphysics, the commitment that there is the mind-independent world that may be commonly accessed by semantically incommensurable theories.
- C2. Therefore, the referential response does not pose any serious challenge to non-realism.

2.2 Realist rejoinders to MI

Sankey takes MI to be merely a rhetoric device that hinders productive discussion since it seems to function as an argument-stopper. In response, realists have two cards to play: the no-MI rejoinder and the *tu quoque* rejoinder (Sankey 2009a). First, they can argue that there is no such thing as MI, or that it does not play an important role in explaining the disagreement between realists and non-realists. Second, a 'you too' strategy can be taken.

Let me begin with this second rejoinder, in which Sankey presents a dilemma. It is trivially true that *either* the incommensurability thesis is based on anti-realistic metaphysics, *or* it is not based on it. If the former is the case, MI poses no challenge to realism because it begs the question too. If the latter is the case, there is no obstacle that prevents the referential response from working.¹ Hoyningen-Huene avoids this dilemma by holding that incommensurability is based on neither of them. Instead, he insists that incommensurability is established as a historical fact, which can be best explained

¹ In addition, Sankey claims that the Kantian position itself is not coherent, so realism is the preferred metaphysics on which the referential response can work. This criticism directs toward the notion of the world-in-itself. First, the world-in-itself is posited to be unknowable, but its existence and unknowability is knowable. Second, there is a serious worry about the external constraint exercised by the world-in-itself. It must be either causal or non-causal. If the external constraint is causal, there is no reason to think that it is unknowable. If it is non-causal, it is not clear what the nature of the non-causal constraint by the world-in-itself is. Therefore, Sankey thinks, realism is the default metaphysical position and a touchstone. This paper, however, does not examine whether Kantian is coherent as Sankey claims or whether realism is naïve as Hoyningen-Huene thinks. Instead, I will simply assume that both of them are respectable metaphysics.

by Kantian non-realism (Hoyningen-Huene and Oberheim 2009). Then, a more serious objection from realists would be that there is indeed no MI.

The second sort of realist response is to reject the existence (or, if any, its explanatory role) of MI. Realists might admit that there are meaning differences in the central terms employed in the realism debate. However, they are likely to claim that they are superficial, linguistic variations, not due to metaphysical differences. It would then be merely the result of terminological confusion. Given that semantic adjustment is common in philosophical debates, “a metalinguistic mode of discourse” enables us to “explicate the meaning of a mentioned term or else to specify its reference” (Sankey 2008, 74). Likewise, meaning difference, Devitt (2001, 153) says, “can easily be removed with a bit of terminological care.” In the following section, however, I will demonstrate that MI is not easily removed by terminological adjustment even after a metalinguistic explication.

A related objection is to deny that MI plays an important role in explaining phenomena in the realism debate. Although realists admit the existence of the phenomena, they might claim that “the occurrence of such phenomena does not depend on meaning differences” (Devitt 2001, 153). Instead, Devitt suggests four alternative explanations without an appeal to meaning difference:

- A. The theory-ladenness of our linguistic experience
- B. The great difficulty in putting together good arguments in philosophy
- C. Rigidity in thinking that hinders us in contemplating alien views
- D. The desire to win that is involved in philosophy debates

This response can be conceived as the referential response to MI. Realists seem to claim that even if some crucial terms have different meanings for realists and non-realists, they can talk about the same things or states of affairs. The semantically variant terms of meta-incommensurable theories can co-refer. Then, even if there is meaning variance, it raises no philosophical questions, but is merely a linguistic issue.

This objection, however, is not without its problems. First, the explanations proposed are not genuine alternatives that are incompatible with MI. Even if each alternative factor plays a role in explaining the disagreement between realists and non-realists, it does not rule out the role of MI. In addition, when it comes to considering why such reasons come to bring about communication difficulties or accusations of question begging in the realism debate, MI might provide the grounds for some of them (e.g., A and C) to hold. Second, if other explanations are not related to MI, they are unable to discriminate debates within one metaphysics from ones across different metaphysics. For example, given that B and D are involved in every debate of philosophy, it is very unlikely that B and D provide a good explanation of phenomena such as communication failure, which are more salient in the realism debate.

3. Meaning variance under scrutiny

By scrutinizing notable cases of meaning variance, I will show that it is not wide-ranging as Kantian non-realists envisage, but it is deeper than realists suggest. I also indicate the point where the two camps converge and diverge.

3.1 *Incommensurability and meta-incommensurability*

I would first like to mention the relationship between incommensurability and MI. Oberheim and Hoyningen-Huene (1997) once claimed that their argument for MI does not presuppose the existence of incommensurability at the science level. Be that as it may, it is obvious that MI is intimately related to the way to interpret the incommensurability thesis: whether and the extent to which incommensurability raises problems for scientific virtues such rationality, objectivity, or progress. Realists and non-realists agree on the potential problems posed: (1) how incommensurable theories can be rivals, (2) how such theories can be rationally compared, and (3) how decision-making among such theories can make progress. Interestingly enough, they also agree that there is no genuine problem. They concur that alleged incommensurable theories can be rivals and can be compared, and it does not pose a threat to scientific progress. However, they have different reasons, and this point deserves to receive attention.

It is worth noticing two different interpretations of alleged incommensurability: the realist interpretation and the Kantian interpretation. Sankey, as an advocate of the referential response, has approached it from a realist point of view. In his view, theories that are claimed to be incommensurable have central terms with different meanings, but they can be rationally compared due to the shared reference. This common reference allows the rivalry, comparability, and the realist notion of progress just because such theories are about the common domain of entities. The possibility that terms with different meanings refer to common things is secured by a causal-descriptivist theory of reference (see Sankey 1984, 2008).

Kantian non-realists treat incommensurability differently. They take it to be ontological replacement as a historical matter of fact, which cross-classifies individuals into different kinds. In this view, ontological redistribution implies referential change. Nonetheless, they claim that incommensurable theories can be compared, and that science makes progress through revolutions. However, Kantian solution seems more complicated (Kuhn 1983; Hoyningen-Huene 1990). There are three possible grounds for incommensurable theories to be compared. First, incommensurability has a local character. Thus, many terms that are semantically invariant might provide a common ground for theory comparison. Second, in particular situations, the referents of new concepts can be identified by means of old concepts, which allows for specific empirical assertions in those situations that can be collated with. Third, the merits of the two theories may be holistically compared at the global level (e.g., simplicity). They also claim that science makes progress in a non-realistic way. Scientific progress does not mean anything like “drawing closer to the Truth”, but rather improvement of the overall problem-solving capacity.

3.2 *Reconstructing MI: content comparison, and rivalry*

In the terms ‘content comparison’ and ‘rivalry’, Hoyningen-Huene finds a case for MI. It is not hard to find the reason why he thinks so. According to the realist view, the contents of theories can be compared only by means of the same reference. In contrast, according to the Kantian view, even if there is referential discontinuity, theories

can be compared with respect to their content.² The reason why referential change does not entail the incomparability of content is this: in particular situations, the referents of the new terms can be identified by means of the old terms, allowing for empirical assertions of the two theories to be compared.

Kantian non-realists distinguish two levels of reference: reference to kinds and reference to tokens (or specific samples) of the kinds. Reference to kinds, the sort of reference that the standard causal or descriptive theories of reference usually aim to explain, can be either variant or invariant. While reference to kinds cannot overlap, a token-referential overlap is possible. Thus, the referential relation at the token level has three possibilities: token-referential invariance, overlap, or disjoint.

Kantians point out that while incommensurability is relevant to kind-referential variance as it leads to redistribution of kind-terms, comparability of content only requires token-referential overlap. This ingenuous distinction is pivotal for the Kantian notion of comparison where incommensurable theories can be compared on the basis of their empirical predictions (Hoyningen-Huene and Oberheim 2009, 204-5). Given that, two senses of content comparison can be formulated.

Let us first state that the content of a theory is, roughly speaking, what the theory asserts, states, or represents. A way to give shape to this idea is to define the content of a theory as a set of statements like $\{s_k(e_i, a_j) \mid \text{statement } s_k \text{ about entities } e_i \text{ and activities } a_j\}$. Then, I present two senses of comparison of the two theories by means of their contents.

First, two theories can be compared in a *strict* (or *strong*) sense if it is possible to dissect each theory to its constituent statements about common types of entities, to juxtapose statements from the two theories, and to evaluate them comparatively. In these situations where the two theories are strictly comparable, statements from one theory may be contradictory with statements from the other.³ As it is not hard to notice, a strict comparison requires kind-referential invariance. Second, two theories can be compared in a *tolerant* (or *weak*) sense if it is possible to compare them on the basis of their empirical assertions in certain predictive situations, which may agree or disagree. Unlike a strict comparison, a tolerant one only demands a token-referential invariance or overlap. In this case, we have a good reason to say that while commensurable theories can be strictly compared, incommensurable theories can be only in a tolerant sense.

If this distinction is meaningful, we can conclude that realists and non-realists use the term ‘comparison’ in different ways. Sankey seems to claim that incommensurable

² Please notice that the issues concern comparison of content, not just about theory comparison in any manner. While theories may be compared with respect to theoretical or aesthetic virtues like simplicity, that is not the central question.

³ This notion of strict comparison, I believe, corresponds to what Kuhn meant by ‘point-by-point comparison.’ Please note that this notion is not identical to Hoyningen-Huene and Oberheim’s interpretation of ‘point-to-point comparison’ as “a comparison of every empirical prediction of one theory with a corresponding empirical prediction by the other” (2009, sect. 2.2) which is criticized by Sankey (2009, sect. 3).

theories with referential variance cannot be compared in a strong sense; however, Hoyningen-Huene claims that such theories can be compared in a weak sense.

A weak sense of comparison, however, may lead to a worry of rivalry. For we might wonder whether two theories that can be only tolerantly compared are genuine rivals. In response to this worry, Kantians ought to elucidate how incommensurable theories are genuinely competitive. Hoyningen-Huene once tried to answer by saying that incommensurable theories “target roughly the same object domain, as far as the world-in-itself is concerned, though this ‘object domain’ isn’t graspable in any theory-neutral way, since different lexica must always produce different object domains” (1993, 219). However, this reply is puzzling because it seems to rely on the same domain in the world-in-itself, which is not accessible. There is no idea of how to secure the sameness relation among unknowable things. Instead, I will propose another Kantian way to make sense of the notion of rivalry.

In general, two theories are competing alternatives if they make different assertions about the same domain of entities. Along with the distinction of comparison introduced above, I suggest two senses of rivalry. First, two theories are rivals in a *strong* sense if they make different assertions about the same domain of *entity-kinds*. Second, two theories are rivals in a *weak* sense if they make different assertions about the overlapped domain of *entity-tokens*. In this weak sense, incommensurable theories can be genuine rivals in that there might be predictive situations where they make conflicting outcomes. For Kantians, incommensurable theories are not strong rivals but weak rivals.⁴

3.3 Exaggerated difference

The distinctions of reference, comparison, and rivalry into different levels or senses may help to reveal where there is a serious difference between realists and non-realists. In particular, the notion of rational comparison seems crucial because it plays an essential role for the rationality of science. According to Hoyningen-Huene and colleagues, even though Sankey maintains that incommensurable theories cannot be compared, the theories can be compared in a tolerant sense. The fact that a strict comparison is not the only option has been ignored by realists. I claim, however, that while the two senses of comparison are instrumental to understand the *charge* of MI, they do not uncover the genuine difference between the two camps. Rather, the ‘metalinguistic’ explication shows that there is much agreement between them, which has been downplayed.

It is crucial to notice that Sankey’s stance is more sophisticated than his opponents assume. First, there is no reason to think that he would reject the tolerant comparison. He has claimed that referential overlap, if not identity, allows for content comparison. In addition, he claims that two levels of reference are taken from a realist position (Sankey 2009b, sect. 3). For example, an old term (e.g., ‘phlogiston’) simply failed to

⁴ At this moment, I do not claim that the weak sense of rivalry is appropriate for realists because realists are likely to want to speak of rival theories in a strong sense. The problem of rivalry will be discussed more in section 4.

refer to a kind; but some tokens of the term can be applied to some specific samples of a kind to which a new term (e.g., ‘oxygen’) refer (see Kitcher 1978, 1993).

Here we find very interesting, unexpected commonalities between the two parties. First, reference can be divided into two levels, reference to kinds and reference to tokens. Second, as in the phlogiston case, scientific changes may secure referential continuity at the token level, if not at the kind level. Third, token-referential continuity is sufficient for content comparison. Given the consensus that alleged incommensurable theories can be rationally compared in a tolerant sense, there is much agreement with respect to the rationality in science. Therefore, the charge of MI is more or less exaggerated.⁵

4. *The real difference underlying MI*

4.1 *Where is the divergence?*

Even if there is a very interesting agreement that incommensurable theories have token-referential overlap even where there is kind-referential variance, they differ in what is implied. Hoyningen-Huene insists that it is a serious problem for realism, but Sankey responds that it does not threaten realism at all. Where does this difference in opinion come from? It is worth noticing that realists and non-realists are likely to talk of different senses in which incommensurable theories are competing. For Kantians, such theories are at best weak rivals; but, they can be rivals in a strong sense for realists. This difference in rivalry is obviously associated with what incommensurability implies to scientific progress because the choice between strong rivals can be progress that approximates the objective truth. Still, it is not the case that the former is responsible for the latter or vice versa. A plausible suggestion would be that such divergence is due to a different understanding of the reference relation. Although the distinction of “two levels of reference” is largely independent of metaphysics, an unresolved question is how to make sense of token-referential overlap. And, I claim, the ways to answer this question show the real difference between realists and non-realists.

4.2 *A realistic notion of reference*

For realists, reference is a success notion, which means that there is a clear distinction between the purported reference and the actual reference. For example, ‘phlogiston’ was purported to refer to a kind, but it actually failed since phlogiston does not exist. Nonetheless, some tokens of the term-type were used to refer to specific samples of

⁵ A question remains: why is the consensus ignored by Kantian non-realists. They believe that since referential overlap is not coherent from a realistic point of view, realists ought to be committed to referential identity. Here is the reason. “If all theories whose terms have overlapping reference and support correct claims qualify as approximate truth, then every competing theories would be approximately true.” Then, many older theories would be approximately true, to varying degrees. They appear to be worried about this trivial conclusion. But I am not sure that they require more than pointing out that realists need to explicate the notion of approximate truth. Furthermore, Sankey has explicitly argued for referential overlap. I believe that we would be better to take his claim seriously.

hydrogen, and those term-tokens did refer to the kind (i.e., hydrogen) actually instantiated by the sample. Thus, Sankey argues for referential continuity between phlogiston theory and oxygen theory. He insists that this is a realist position indeed. For token-referential overlap was made possible because phlogiston theory and oxygen theory were applied to the same domain of objects and phenomena. This realist notion of reference raises two related questions:

(Application question)

How is it possible for referentially unsuccessful terms (e.g., 'phlogiston') to be applied to the world?

(Co-reference question)

How can distinct concepts co-refer? In particular, how can referentially unsuccessful terms and successful terms co-refer at least partially?

The realistic solutions might be the following. First, 'dephlogisticated air' was applied to the world because some tokens of the term-type did successfully refer on the occasions where it is clear that the tokens were intended to talk about whatever it is that supports combustion (i.e., oxygen).⁶ Second, the token-referential overlap is possible because both theories describe the common domain of *entity-kinds*. Obviously, these answers are dependent on realist metaphysics. However, it is important to notice that realism is not merely presupposed, but is intended to be the best explanation for the token-referential overlap.

Even if realism might provide a simple explanation of the referential overlap, it carries a burden concerning the way of understanding history within a realist framework. Realist historians would say that phlogiston theorists were investigating oxygen, hydrogen, and other chemical elements, which are the entities within objective reality, denying that they were dealing with phlogiston. It is also assumed that reference of past theories can be identified only by our best theory, which captures the entities in an objective world. Then, realism is vulnerable to charges of whiggish historiography, according to which every scientific episode can be best understood in terms of its contribution to contemporary scientific knowledge. To avoid this, if one holds that realism is not concerned about the history of science, then it might be accused of historical insensitivity in that it does not consider history seriously in its philosophical discourse.

4.2 *A Kantian notion of reference*

Hoyningen-Huene and colleagues have a different notion of reference. First of all, reference is not a success notion in a realist way. There is no sense to distinguish actual reference of a term used in earlier theories from purported reference because there is

⁶ It obviously depends on Kitcher's idea of reference potential. However, Psillos (1997) provided a criticism against Kitcher's theory of reference of term-tokens by showing that the principle of humanity employed by Kitcher fails to offer a systematic way to connect between different tokens of a term-type and different modes of reference (or intentions of a speaker). Nonetheless, Kitcher's proposal or its cognates is adopted in Sankey (2008, 2009b). See the section 6 for a further treatment of Psillos.

no fact of the matter whether old terms actually referred to from the present point of view. As Sankey assumes realism, Hoyningen-Huene assumes Kantian metaphysics. In this framework, as the world is not fixed once and for all, referential relations between the terms and the world are between invention and discovery. Terms refer to things in the phenomenal world, not the world-in-itself; hence, there is no trans-phenomenal-world reference.

Second, some tokens of ‘dephlogisticated air’ were used to refer to the same samples as tokens of ‘oxygen’ normally were (see Martin 1971). However, neither does this imply that both ‘dephlogisticated air’ and ‘oxygen’ were about the same domain of *entity-kinds*, nor that some tokens of ‘dephlogisticated air’ did refer to oxygen as a kind. Phlogiston theorists were not talking about oxygen. This would be the case only when realist metaphysics is already established. It is worth noticing that despite Sankey’s belief that two levels of reference adopted by Kantians is borrowed “from the realist’s tool kit” (i.e., Kicher on reference of term-tokens), Kantians’ explotations of two levels is closer to Martin, rather than Kitcher.⁷

Kantians thus provide different answers to the application question and co-reference question. First, they take the application question of how referentially unsuccessful terms like ‘phlogiston’ can be applied to the world to be a pseudo-problem. The question can be asked only when the distinction between the purported and actual reference of old terms holds. For Kantians, however, there is no sense in which the old terms does not refer to from the current perspective. Therefore, this question does not arise for Kantians.

Second, the co-reference question requires a more delicate answer than Hoyningen-Huene (1993) provided. A Kantian solution that explains token-referential overlap would be as follows. First, co-reference does not require purely objective entities (i.e., entity-kinds). Realists admit that purely objective entities can be characterized by more than one way, but at best one way provides the correct characterization, while the others do not. In contrast, non-realism holds that the entities are co-constituted by subject-sided and object-sided moments, but in some cases, the entities constituted partially by different theories can overlap. Second, successive theories inherit the explanandum and problems of their predecessors, meaning that there are common problems that both theories try to solve. In addition, the new theories preserve a large part of the problem-solving capacity of the old ones. This consideration makes the possibility of overlap more probable.

With regard for the concern of history, Kantians take seriously “the new historiography”, which attempts to explain the history of science in their own right, not from a contemporary perspective. Kantian historians would say that phlogiston theorists were dealing with phlogiston, not oxygen. Recall that to draw the philosophical implication of the new historiography has been the most important motivation for historical philosophers of science.

⁷ I do not mean that Martin’s account of referential variance and overlap can be understood only in a non-realist way. But it seems obvious that his account is available to Kantians in dealing with token-referential overlap.

To sum up, realism provides a simple explanation of referential overlap, but the realist understanding of history is likely to be whiggish. Kantian non-realist explanation is less simple and neat, but their explanation is in harmony with the ideal of a historicist philosophy of science.

5. *Beyond reference*

5.1 *Bracketing theories of reference*

I have claimed that MI between realists and non-realists stems from the different ways in explaining token-referential overlap. Contrary to the natural expectation, I now recommend to be temporarily silent on the issue of reference and to examine what would happen then. For doubt is cast on the assumption that theories of reference are fundamental to understand and evaluate MI. Without knowing the way reference is fixed, token-referential overlap can be established in particular situations. For example, whenever phlogiston theories call something ‘dephlogisticated air’, oxygen theories would call the same thing ‘oxygen’.

Given that specific *theories* of reference are not essential, I suggest bracketing any talk of reference. This suggestion is underpinned by experimental research within a recent philosophical movement, so called “experimental philosophy”, which has explored a variety of philosophical intuitions by means of the social scientific method. Among the subject matter of experimental philosophy is semantic intuition. In establishing a theory of reference, philosophers assume that language users have an implicit theory that produces an intuitive judgment about reference in actual or imaginary situations. Presumably, the most famous example is Kripke’s Gödel case, which has been explored by some experimental philosophers (Machery *et al.* 2004; Mallon *et al.* 2009). Here is the scenario, which is followed by a probe question.

Suppose that John has learned in college that Gödel is the man who proved an important mathematical theorem, called the incompleteness of arithmetic. John is quite good at mathematics and he can give an accurate statement of the incompleteness theorem, which he attributes to Gödel as the discoverer. But this is the only thing that he has heard about Gödel. Now suppose that Gödel was not the author of this theorem. A man called “Schmidt” whose body was found in Vienna under mysterious circumstances many years ago, actually did the work in question. His friend Gödel somehow got hold of the manuscript and claimed credit for the work, which was thereafter attributed to Gödel. Thus he has been known as the man who proved the incompleteness of arithmetic. Most people who have heard the name ‘Gödel’ are like John; the claim that Gödel discovered the incompleteness theorem is the only thing they have ever heard about Gödel. When John uses the name ‘Gödel’, is he talking about:

- (A) the person who really discovered the incompleteness of arithmetic? or,
- (B) the person who got hold of the manuscript and claimed credit for the work?

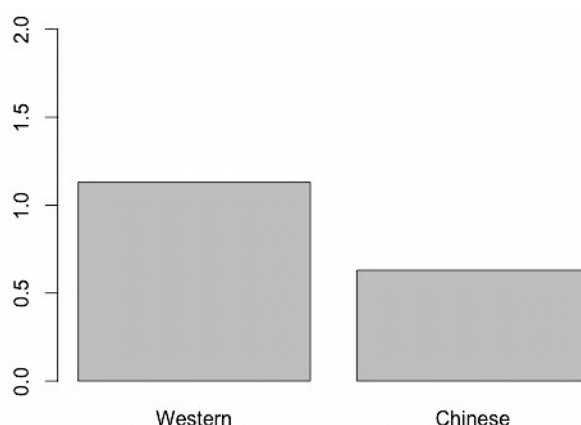


Figure 1: The result of a survey from Chinese and Western participants, where point 2 indicates a pure causal-historical response and point 0 indicates a pure descriptive response.

Let me briefly summarize the results. While the Western participants (score 1.13) were more likely to give a causal response, the Chinese participants (score 0.63) were more likely to give a descriptive one. This means that semantic intuitions may vary according to cultural background. In addition, they found intra-cultural differences as well. While the majority of Americans gave a causal response, about 45% of the population gave the opposite. Similarly, a majority of Chinese participants gave a descriptive response, but a sizable minority (about 30%) gave a causal response. Therefore, even if it might be premature to make a final statement, the result suggests that the semantic intuitions on which theories of reference draw vary within and across cultures.

Given these variations, there are two options philosophers can choose. First, one can endorse a theory of reference on the grounds that it lends support for metaphysical commitment. Obviously, it would be circular, which opens the position up to the charge of MI again. The second option is to give up any substantial theory of reference leaving no theory of reference at hand that can support any metaphysics. I have to mention that my intention here is not to argue for the skepticism of reference, but rather to explore the possible consequences of removing any theory of reference in the current discourse.

There are two possible objections.⁸ First, one might object to my proposal by pointing out that there are two sorts of theories of reference: theories of reference of term-types and of reference of term-tokens. Indeed, the experimental results about the semantic intuitions cast doubt on the former, not the latter. Furthermore, the objector might continue to say that I have already employed theories of reference of term-tokens such as Kitcher's and Martin's. Therefore, to give up theories of reference is inconsistent. My first response would be that although the primary consequence of the experimental studies is the skepticism of the universal semantic intuition about

⁸ I thank an anonymous reviewer for calling my attention to these objections.

how term-types refer to, it seems reasonable to cast some doubt on intuition about reference of term-tokens. In addition, it is worth noticing that to suggest bracketing reference is instrumental to shift the focus of the discussion to a more fundamental level. Therefore, the fact that theories of reference of term-tokens have been used is not contradictory with the proposal to bracket reference.

Second, one might object that doing without any theory of reference dissolves (rather than solves) the original problem, which is whether there are genuinely incommensurable theories with key terms whose references are variant. If the suggestion of bracketing reference does eliminate the problem I have to deal with, it would be unacceptable. However, since my proposal, as I mentioned earlier, is mainly instrumental, bracketing reference makes the problem of co-reference less fundamental (or more superficial), rather than dissolves the problem itself. Moreover, this objection presupposes that the realist and non-realist treatments of incommensurability have to be formulated only in terms of referential (in)variance. However, it is not the case because of what I will show in the following.

5.2 *Nature's joints to be carved*

Preferably, by bracketing the talk of reference, we are motivated to look into the issue at the more fundamental level. Accordingly, we are lead to witness the metaphysical root of our incessant disagreements, which brings about MI. Even without a causal theory of reference, realists would appeal to a mind-independent natural-kind structure, whether essentialist or not, where nature has its joints waiting to be carved (Psillos 1999; Sankey 2008). Kantian non-realists would deny such mind-independent objective reality in favor of pluralism exemplified by the thesis of the plurality of phenomenal worlds. For Kantians, nature has real joints, but not in the world in itself. Presumably, the joints are located in phenomenal worlds (see Andersen 2001). Therefore, even if we are skeptical about any substantial theory of reference, MI occurs around nature's real joints.

It is this very divergence in nature's joints that underlies MI. The difference in the understanding of nature's joint explains why realists and Kantians differ in explaining the token-referential overlap, which is in turn the source for various meaning differences. First, realists would say that phlogiston theorists were dealing with the samples of oxygen and other chemical elements, which fit with nature's joints. In contrast, for Kantian non-realists, phlogiston theorists were dealing with the tokens of phlogiston, which fit with the real joints in their phenomenal world to a considerable extent. Second, the difference in explaining token-referential overlap can be couched in terms of the different notions of nature's joints. For realists, phlogiston theory failed to carve nature at its joints, but some tokens of 'phlogiston' and other terms were successful to carve the joints in a partial way. For Kantians, phlogiston theory and oxygen theory did carve the real joints in their own phenomenal worlds (i.e., the phlogiston world and the oxygen world) respectively, but the two sets of joints overlapped. It would be surprising if there was no overlap at all when oxygen theory was developed from phlogiston theory and the two theories were competing. Therefore, we find a metaphysical difference again. *Pace* Sankey, MI exists.

5.3 Summary

Despite the meaning differences in the realism debate, there is a good deal of agreement between realists and non-realists. Thus, I have claimed that the charge of MI is somewhat exaggerated. Nonetheless, there is serious disagreement in explaining the token-referential overlap. In explaining this overlap, each party assumes its own metaphysical and historiographical commitment. In addition, I showed that even without any talk of reference, MI is to be found around nature's joints. Therefore, MI is not merely a rhetoric device.

In spite of their deep disagreements, Hoynigen-Huene and Oberheim were curious about how Sankey rejects MI. Sankey was also curious to see how Kantians are in denial of being commonsense realists despite much agreement. As I have shown, there is no curious disagreement. Although there is much agreement among realists and Kantian nonrealists, MI is real.

6. Expanding the Circle

The discussion above can, I believe, shed light on the realism debate more generally beyond the debate between Sankey and Devitt on the one hand and Hoynigen-Huene and Oberheim on the other.⁹ First, bracketing reference offers a means for discriminating structural realism from others. Structural realists tend to remove any talk of reference in defending their version of realism; other philosophers, realists or non-realists, face the problem of referential (in)variance.¹⁰ Second, the notion of nature's joints enables us to consider other positions than the two camps that I have focused on. Inevitably, it will be very selective and brief.

Among the major contributors in the realism debate is Psillos (1997, 1999), who has been an ardent advocate for realism. Psillos is comparable to Sankey in several respects. Both of them believe in the relevance of reference to defend realism against incommensurability or pessimistic meta-induction. In addition, they propose causal-descriptivist theories about reference with both causal and descriptive components, because pure causal theories and pure descriptivist theories are not well suited to account for reference-fixing of theoretical terms.

⁹ I do not intend that the difference in metaphysical commitment is the only source for diverse versions of realist and non-realism. Rather, it is widely held that the debates about realism have metaphysical, semantic, and epistemic dimensions. In this paper, however, the focus lies on the metaphysical assumptions underlying MI.

¹⁰ To avoid any talk of reference might amount to structural realism, a kind of realism which is doubtful of the relevance of the shared reference to defend realism. While bracketing reference in our discussion is largely instrumental, structural realists like Ladyman (2002, 2011) have deep skepticism about the importance of shared reference. If such skepticism can hold, structural realism has to get much attention. However, I do not deal with structural realism for two reasons. One reason is that whether referential stability is irrelevant in the realism debate deserves a full discussion, which requires another space. The other is that it does not help us to understand what is the point in the meta-incommensurable debate, in particular between realists who did referential response and Kantian non-realists who accused it as a question-begging, which motivated this paper.

However, there are a few differences relevant to our discussion. First, while Sankey has a strong leaning toward essentialism, viz. a Realist Outlook, Psillos posits a definite and mind-independent structure as a metaphysical basis for scientific realism. Nonetheless, they commonly assume a mind-independent, essentialist or non-essentialist, joints in nature, waiting to be carved, and thereby they belong to a realist family. Second, despite Sankey's endorsement of Kitcher's context-sensitive theory of reference, Psillos (1997) provides a sharp criticism of Kitcher's theory. It is important to see what this notable difference between them amounts to. Psillos has argued that 'phlogiston' refers to nothing, thereby denying the referential overlap between phlogiston theory and oxygen theory.

I do not intend to evaluate Psillos' objections against Kitcher, but to sketch what is implied in his denial of referential overlap. I have shown that the token-referential overlap can provide a common ground to solve the problem of rational comparison. Thus, a question arises: how can the two theories be rationally compared if the term 'phlogiston' is empty? He might respond by pointing out that 'phlogiston' was not a central term in that it is not indispensable for successful explanations of phenomena and novel predictions. I am not convinced for two reasons.

First, the notion of centrality is so counter-intuitive that 'phlogiston' in phlogiston theory is no longer central. The reason he adopts such a notion is, I suspect, that he wants to defend scientific realism by refuting pessimistic induction, not by facing the problem arising from incommensurability, which was what motivated Sankey to respond. Realists need to argue, Psillos believes, that if abandoned terms were central to past mature and successful theories, they really refer. Hence, if 'phlogiston' fails to refer, realists should posit that the term is merely peripheral. Having said that, in addition to being counter-intuitive, I am worried that the judgment whether a certain term is central in that sense can be done only from hindsight.

Second, even though his notion of centrality can hold, there is another problem. On his causal descriptivism, not alone 'phlogiston' but other theoretical terms in phlogiston theory might fail to refer. He also says that "a phlogiston-based *taxonomy* is wrong because no natural kind has the kind-constitutive properties attributed to phlogiston" (Psillos 1999, 288; italics added). If so, he does not answer to the problem of rational comparison until he tells us convincingly how the two theories were about the same domain of entities even though many terms in one theory refer to nothing.¹¹

By rejecting the token-referential overlap, Psillos takes another line of strategy to defend realism. To examine how such strategy can be done successfully would be a topic for another article. Nonetheless, he is not free from the charge of MI given that he posits realist metaphysics where the nature has a definite and mind-independent natural-kind structure.

Finally, I consider promiscuous realism as defended by Dupré (1993, 1996). Put simply, promiscuous realism is a type of realism in that (i) it posits just one world and

¹¹ Another possible reply would be to deny that they were compared, claiming that phlogiston theory was abandoned for its own shortcomings and oxygen theory was accepted for its merits. However, this reply misses the point. For if incommensurability matters, it might threaten the idea of rational comparison between rival theories. The question remains how they were genuinely competing.

(ii) things in the world are divided into kinds in an objective manner. The position contrasts with Kantian non-realism that posits a multiplicity of worlds. It is promiscuous in that it permits many equally legitimate, objectively grounded ways of classifying objects in the world into kinds. There is no unique criterion for membership provided by the essence of the kinds. Thus, promiscuous realism rejects essentialism or natural-kind-structuralism, commonly assuming that there is only one correct way to carve nature's joints.

To consider it as a serious alternative is useful for making explicit how MI appears in the realism debates. First, essentialist realism, Kantian non-realism, and promiscuous realism appears to share commonalities, which was mentioned earlier (see Section 3.3): two levels of reference, referential continuity at the token level, comparability in virtue of the token-referential overlap, and the rivalry of incommensurable theories. Second, despite the agreement, they posit different metaphysics to make sense of the token-referential overlap. Realism takes for granted both one world and one correct set of joints; Kantian non-realism postulates the world-in-itself and multiple phenomenal worlds, the worlds that have their own joints; and, promiscuous realism posits one world and more than one, equally legitimate sets of joints of the world. Third, promiscuous realism has its own merits. The token-referential overlap can be more advantageously explained than Kantian non-realism because it assumes only one world whose joints can be carved in different ways. In addition, the new historiography can be accommodated without an appeal to the plurality of phenomenal worlds. For example, phlogiston theories cut a set of nature's joints, but oxygen theories deal with another set of joints in the world.

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