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## INCOMMENSURABILITY, TRANSLATION AND UNDERSTANDING

BY HOWARD SANKEY

### I. INTRODUCTION

As scientific theories are altered and replaced, the concepts employed by theories also change. New concepts are introduced and old concepts undergo modification. Such conceptual change manifests itself, at the semantic level, in difference in the meaning of the vocabulary of theories. New terms with new meanings are introduced, and old terms shift their meaning in the transition between theories. Conceptual change is an integral part of theory change, and semantic variance between theories is the result.

The idea that meaning shifts with theory change has led to the thesis that theories may be incommensurable with one another. Kuhn (1970a, 1970b, 1976) and Feyerabend (1975, 1978, 1981a) have argued that the languages of some semantically variant theories fail to be fully inter-translatable, and that the content of such theories cannot be directly compared. For without being expressed in synonymous vocabulary, no consequence of one theory can assert or deny a statement the same in meaning as a consequence of the other. Theories whose content is incomparable because of such translation failure are said by Kuhn and Feyerabend to be incommensurable.

The standard response to the thesis has been to deny the incomparability of semantically variant theories by pointing to various relations of common reference between their terms.<sup>1</sup> Such relations enable the content of theories to be compared, since statements from rival theories whose constituent terms refer to the same things may enter into conflict or agreement with one another. And since the terms of theories may have the same reference without being synonymous, the content of such theories

<sup>1</sup> The response originates with Scheffler (1967), and is espoused, for example, by Putnam (1975) and Devitt (1979). Initially stated in terms of co-reference by Scheffler, the response was later extended to a variety of relations of referential overlap by Field (1973), Kitcher (1978) and Martin (1971).

may be compared even in the absence of the shared meaning which is required for translation. Thus, contrary to Kuhn and Feyerabend, translation failure between theories does not entail incomparability of content.<sup>2</sup>

Since comparison must take place in *some* language, the question arises in which language theories which fail to be intertranslatable may be compared. The key here is to distinguish the special terminology or sub-language employed by a theory from the background natural language in which it is embedded. Translation failure of the kind relevant to incommensurability involves an inability to translate between localized theoretical sub-languages within the context of a shared background language.<sup>3</sup>

Given the containment of such sub-languages within an encompassing background language, the background language may function as meta-language for the sub-languages. As such, analysis of semantic features of the vocabulary of the embedded sub-languages, treated as object-languages, may be conducted in the background language.<sup>4</sup> Comparison of the content of theories may therefore take place in a portion of the background language (possibly including one or both theoretical sub-languages), which may be employed as meta-language to discuss the referential relations between the terms of theories.<sup>5</sup>

In sum, an advocate of referential comparison is free to endorse the claim of untranslatability between theories.<sup>6</sup> However, any attempt to accommodate untranslatability must face serious objections with which the

<sup>2</sup> For convenience, rather than to erase the language-theory distinction, I will sometimes speak of translation failure between theories instead of between the languages of theories.

<sup>3</sup> Feyerabend's version of incommensurability is more extreme than Kuhn's. The former involves variation of meaning of the observational and theoretical terms associated with a theory (Feyerabend (1981a)), whereas the latter is restricted to a localized subset of the central terms used by a theory (Kuhn (1983)). Yet in both cases the range of semantic variance is confined to the language employed by a theory and does not extend to the natural language in which such theoretical language is embedded.

<sup>4</sup> This point deals with the objection that arguments for incommensurability court paradox by translating the untranslatable (Davidson (1984: 183-4)). In brief: it can be argued in a natural language taken as meta-language that a pair of embedded theoretical sub-languages fails to be intertranslatable. The point is developed at greater length in my (1990), section 2.

<sup>5</sup> Another option is to employ terms of one theory, possibly supplemented by vocabulary from the background language, to specify the referents of terms of the rival theory. In some cases, this strategy may only work for the tokens of rival term-types (see Kitcher (1978)).

<sup>6</sup> Indeed, recent work on the reference of terms employed by theories suggests that advocates of the referential response should embrace the untranslatability claim. For the relevant developments in the theory of reference, see my (1991). In that paper I employ a modified causal theory of reference to show that phlogistic terminology is untranslatable into the language of the oxygen theory.

claim has been confronted. Thus, in this paper I will address the issue of how it is possible to understand the language of an incommensurable theory. My aim here is to defend the idea of translation failure against the objection that it incoherently precludes understanding

## II. UNDERSTANDING AND FAILURE TO TRANSLATE

Translation may seem intimately related to understanding. Indeed, one might think that it is necessary for understanding, or that understanding a foreign language constitutes translation into a native language. But if understanding is in some way contingent on translation, Kuhn and Feyerabend have no business claiming to understand untranslatable concepts. For the claim that one can both understand and yet fail to translate would be incoherent.

This objection is raised by Putnam, who claims that proponents of theories incommensurable with ours 'would be conceptualizable by us only as animals producing responses to stimuli', so that 'to tell us that Galileo had "incommensurable" notions *and then to go on to describe them at length* is totally incoherent' (1981: 114–15).<sup>7</sup> Kuhn and Feyerabend have replied to Putnam by distinguishing learning a language from translation, and by arguing that the former may succeed though the latter fails. Feyerabend remarks that 'we can learn a language or a culture from scratch, as a child learns them, without detour through our native language' (1987: 76). And Kuhn claims that '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' (1983: 672–3). Both authors therefore distinguish understanding what is said in a foreign language from translating it into one's own. And both hold that the possibility of understanding without translation removes the threat of incoherence. In what follows I seek to defend their use of this distinction.

## III. TRANSLATION AND UNDERSTANDING

To translate from one language into another is to express in one language what is said in the other. This involves the formulation of sentences in one language which have the same meaning as sentences of the other. Translation from one language into another requires that the former be translatable into the latter. Translatability depends on the existence of

<sup>7</sup> Objections to incommensurability which raise related difficulties about communication and understanding have been made by a number of critics: e.g., Achinstein (1968: 97), Kitcher (1978: 519–20), Scheffler (1967: 16–17) and Trigg (1973: 101).

certain semantic relations between languages. In particular, it depends on whether the home language has the semantic resources required to formulate expressions with the same meaning as expressions of the target language.

The requirement of sameness of meaning reflects the need for translation in the relevant sense to be semantically exact. For although in practice translation between natural languages is often approximate, the incommensurability thesis at most denies exact translation.<sup>8</sup> However, the requirement does not imply that translation must be word for word. A complex expression or phrase may be synonymous with a single word and translate it exactly.<sup>9</sup>

By contrast, understanding is a relation between a speaker and a language; it involves no relation between languages. To understand something said in a language is to know what it means, and to arrive at knowledge of the meaning of an utterance requires a minimal competence in the language. For example, to determine the meaning of a sentence a speaker must employ knowledge of the syntax and semantics of the language to which the sentence belongs. As such, understanding what is said in a language is a cognitive relation between a speaker and a language. Neither translation nor any other interlinguistic relation enters into it.

On such a characterization, translation and understanding are distinct relationships. Translatability involves semantic relations between languages, whereas understanding is a cognitive relation between a speaker and a language. Given this, one language might be untranslatable into another which lacks the requisite semantic resources, and yet a speaker of one might understand the other. The semantic limits of a language need impose no limitation on a speaker's capacity to understand another language, so translation might fail while understanding succeeds.

<sup>8</sup> That incommensurability is the failure of exact rather than approximate translation may be seen from the similarity of the concepts which Kuhn and Feyerabend claim not to be interchangeable: e.g., Newtonian versus Einsteinian mass, impetus versus momentum, oxygen versus dephlogisticated air. For remarks explicitly bearing on this point, see Feyerabend (1975: 277) and Kuhn (1976: 191).

<sup>9</sup> Incommensurability requires more than mere absence of single-word equivalents, for the latter provides no basis for the denial of content comparability. Where exact translation succeeds in the absence of word-for-word equivalents, statements the same in meaning can be formulated and content unproblematically compared. See Kuhn's remark that translation need not replace 'words and phrases in the original' in a 'one-for-one' manner (1983: 672). The point is implicit in Feyerabend's repeated insistence that for incommensurability 'the conditions of concept formation in one theory forbid the formation of the basic concepts of the other' (1978: 68, fn. 118; cf. 1987: 31 and 1981b: 154, fn. 54). Presumably, the inability to form a concept involves the inability to define a term, rather than the mere absence of single-word synonymy.

#### IV. LANGUAGE-LEARNING AND BILINGUALISM

That translation is indeed unnecessary for understanding is suggested by reflection on the acquisition of language. Children do not enter the world equipped with a natural language. When they acquire their mother tongue they do not translate it, but rather learn to understand it directly. Similarly, adults may acquire a second language as children do their first. They may immerse themselves in a foreign language and learn it by the direct method from native speakers. So too a field linguist can acquire the unknown language of a primitive people, without the aid of an interpreter or translation manual. Nor need the acquisition of such a language proceed via translation into the linguist's home language, for the linguist too may employ a direct approach.

Further support for the independence of understanding from translation derives from reflection on bilingualism. The bilingual is a speaker with full native competence in two languages. Such speakers need not translate into a home language in order to understand. For with full native competence the bilingual understands both languages equally well. It is not as if such understanding requires translation back and forth inside the speaker's head. Moreover, the notion of a home language is inapplicable to the bilingual case, for with full native competence in both languages neither merits the status of home language.

The cases of direct language acquisition and bilingualism suggest that understanding a second language requires no mediation by a first language. The independence of understanding from translation, which thus emerges, in turn suggests that one can understand a language without translation. There need, therefore, be no incoherence in claiming to understand an untranslatable language.

#### V. THE PLACE OF DIRECT LANGUAGE-LEARNING

I will devote the rest of the discussion to objections which might be raised against the separation of understanding from translation. The first objection stems from the idea that learning a natural language differs significantly from learning the special language of a theory. The project of learning a natural language is a monumental undertaking, whereas learning the language of a theory is a localized activity which occurs within the context of a background natural language. Hence, it might be denied that it is necessary to learn the language of a theory by the method of direct language-learning.

An objection of this kind has been made by Achinstein, who takes incommensurability to imply that 'a person could not learn a theory by

having it explained to him using any words whose meanings he understands before he learns the theory' (1968: 97). Against this, he argues as follows:

The only thing I can do is try to learn the meanings *extra-linguistically*. I must watch what those who use the theory do in their laboratories, the sorts of items to which they apply their terms, and so forth. I must learn each new theory like a child first learning language (rather than like someone learning more of his own language or a second language after learning a first one). Perhaps it would be possible (though, I suspect, exceedingly difficult) to learn scientific theories this way. What I find unacceptable is the consequence that they *must* be learned this way. In actual practice at least some if not most terms in a new theory are explained to those learning the theory by using words whose meanings the learners already know.  
(1968: 97)

Here Achinstein does not deny that the terms of a theory could be learned as a child learns its first language. What he objects to is the idea that there should be no other way to learn such terms.

However, one might equally well object that child language-learning is irrelevant. For there is a fundamental difference between learning the everyday language of middle-sized physical objects and learning the technical vocabulary of laboratory and theory. One might, therefore, go further than Achinstein and deny that the child language-learning model applies to learning the language of a theory.

The lesson to be drawn from such objections is, however, a minimal one. Namely, there is an important disanalogy between learning a natural language and learning the language of a theory. The two projects differ in that acquiring the language of an untranslatable theory is not as radical an undertaking as that of learning an entire natural language from scratch. For, as noted in section I, incommensurability is not a failure to translate between natural languages, but between theoretical sub-languages which may be embedded within the same natural language.

Advocates of incommensurable theories may share a common natural language within which their semantical differences are localized. The task of acquiring a new theoretical sub-language is therefore the more restricted one of learning a new vocabulary or a new idiom within one's own natural language. Sharing a natural language enables rival theorists to make use of a common language in acquiring the new portion of their language. This is not to say that there is no need to acquire terms of the untranslatable language directly, but rather that the method of direct language acquisition

may be employed in favourable circumstances because the background language is shared.

Now, it might be objected that, given a shared natural language, anything expressible in one theory but not in a rival theory might be expressed in some portion of the encompassing natural language. In that case, no non-translational form of understanding is involved; for what is expressed in the one theory may be translated into a natural language known to advocates of the rival theory.

In reply to this objection, two cases need to be distinguished. It might happen that what is inexpressible in the rival theory can be expressed in a portion of the background natural language. In this first case, it is indeed unnecessary – albeit possible – to understand without translation. But there is no guarantee that such a situation will always obtain. What is expressible in the first theory may not be expressible in terms independent of that theory. In such a situation, what is expressible in the theory is not translatable into either the rival theory or the surrounding natural language. In this second case, therefore, the vocabulary of the theory can only be acquired directly, by learning it in the context of the theory. For understanding cannot be achieved via translation into the shared natural language.

## VI. THE PRINCIPLE OF EFFABILITY

I will now consider an objection to the separation of understanding from translation which derives from the so-called *principle of effability*.<sup>10</sup> The principle expresses the intuition that anything that can be thought can be said. To apply the principle to our problem, it may be stated in the following strong form: anything that can be thought can be said in any natural language.

The objection is that, according to the principle of effability, as so stated, understanding entails translation. For if one can understand something, one can think it. So if one can understand something said in a foreign language, it can be said in any language, and in particular it can be said in our language. Thus any understandable foreign language is translatable.

The strong statement of the principle assumes languages have unlimited expressive capacities. Yet the contrary assumption is not obviously false. It might well be that languages have semantic limits which prevent propositions sayable in one language from being expressed in another. This suggests that the effability principle should be weakened to: anything which

<sup>10</sup> The name of the principle – though not the formulation to be employed – is due to Katz (1972: 19), who traces the principle to Frege and Tarski.

can be thought can be said in some natural language. But, so weakened, the principle cannot sustain the objection to the translation–understanding distinction, since translation would no longer follow from understanding.

There is, however, a way to retain the strong version of the principle without weakening it in this way. The principle can be supplemented with the assumption that natural languages are infinitely enrichable. That would mean that anything sayable in one language is sayable in any other if, where necessary, the vocabulary of the other language is suitably extended.

There is much to be said for the view that natural languages are infinitely enrichable. For there seems to be no fact of the matter about where to draw the line between concurrent natural languages or between past and present stages of the same natural language. The actual divisions between natural languages rest on convention and historical accident. And such divisions as there are tend to be fluid, with terminological innovation frequently being based on inter-linguistic borrowing. Because there are no definite boundaries to natural languages, there are no limits to the alterations which may be made on such languages, so anything thinkable can be said in a natural language.

The strong principle of effability may, therefore, be conceded, provided that the assumption of infinite enrichability is made as well. Yet such a concession is entirely trivial. The assumption of infinite enrichability implies unlimited expressibility. And anything expressible in some language is translatable into a language with unlimited expressive capacities.

There is no need, though, to make a similar concession with respect to the more limited idioms or sub-languages which make up language as a whole. It is consistent with the concession of unlimited expressibility for natural languages to deny such expressibility for at least some sub-sections of natural languages. So while we may concede the principle of effability at the level of natural languages with no definite boundaries, the principle breaks down when it is applied to the more restricted sub-languages which such languages contain.

Here it might seem that if natural languages lack definite boundaries, their embedded sub-languages must, for similar reasons, lack such boundaries. Conversely, it might seem that if sub-languages have limits, such limits must give rise to limits on natural languages. Hence, it might be objected that effability must be uniformly either asserted or denied for both sub-languages and natural languages.

Such an objection fails, however, since it assumes indefinite natural-language boundaries to be incompatible with definite sub-linguistic boundaries. A natural language is a composite, which contains a multitude of localized vocabularies with special areas of application. While such

vocabularies may change in various ways, whole new vocabularies may be incorporated into the natural language. Thus, even if a given sub-language were subject to limits, the containing natural language need have no boundaries, since it may grow by the accretion of new vocabulary. Nor does the absence of definite boundaries on the containing language imply that the contained sub-language can have no limits. For it may be possible to isolate a portion of a language which constitutes one of its special vocabularies; and since it is designed for a specific context, the vocabulary may be subject to certain limitations.

In particular, there appear to be limits on the terminology which can be introduced within the context of a theory. These limits are set by the ontology of a theory and by the laws purported to govern the entities postulated by the ontology of the theory. Such limits arise because of the inability to introduce into the ontology of a theory entities whose nature or behaviour is incompatible with the ontology or the laws of the theory. Limits on the types of entity to which a theory may be committed lead to limits on the vocabulary which can be introduced in the context of the theory. For a term cannot be introduced into the vocabulary of a theory, *as a putatively referring expression of the theory*, if the entity, to which it purports to refer, does not exist according to the theory. Hence, the vocabulary employed in the context of a theory can be treated as a restricted sub-language which cannot be extended without limitation.

## VII. THE PRINCIPLE OF CHARITY

Finally, I will consider an objection which stems from the principle of interpretative charity, which advises us to attribute maximal truth when interpreting the speech and behaviour of others. The need for charity about true belief is thought to arise from the close connection between meaning and belief. We need to know what speakers' words mean to find out what they believe, and we cannot find out what they mean without finding out what they believe. In interpreting what speakers of an unknown language say, one way to discover what their words mean is to get a prior fix on their beliefs. If we charitably attribute to speakers of such a language beliefs which we would ourselves hold in the circumstances in which they find themselves, then we can use such beliefs to fix the meaning of their words.<sup>11</sup>

The objection arises as follows. It assumes charity to be necessary for interpretation. Interpretation is assumed to be how one comes to

<sup>11</sup> For such a view of the role of a principle of charity, see, for example, Davidson (1984: 195–7).

understand speech in an unknown language. Hence, charity is necessary for understanding. Charity involves the attribution of true beliefs to a speaker of the unknown language using sentences of our language which we hold true. But such attribution constitutes translation, for it equates utterances in the unknown language with sentences of our language. Hence, translation is necessary for understanding. Thus, the principle of charity makes understanding contingent on translation, and therefore the separation between translation and understanding is inconsistent with the principle of charity.

There are a number of things to be said in reply to such an appeal to charity. In the first place, there is no need to accept the purported link between charity and translation which licenses the inference from understanding to translation. For there is no reason why charity must involve the attribution of truth using sentences of our language. Charity may be incorporated into the direct language-learning approach in the form of the assumption that, translatable or not, what speakers of an unknown language say is on the whole true. Charitable interpretation need not, therefore, result in translation, so that charity might enable one to understand a language not translatable into one's own.

There is, however, a deeper problem with charity which undercuts such direct use of charitable truth attribution. The major difficulty facing any appeal to charity in the present context centres on the epistemological unsoundness of charity as a policy for the interpretation of theoretical discourse. No matter how well-motivated charity is with respect to common-sense belief, the policy of attributing maximal truth to theoretical belief is unwarranted, for reasons which are entirely standard.

For a start, while the history of science is a success story which is without parallel, it is in fact the history of good false theories which have been overthrown by better false theories. Not only does this undermine the advice to treat past theories as by-and-large true, it also suggests that we should resist the dictates of charity for present-day theories. For the vicissitudes of past theories license the expectation that today's theories will, in time, meet with a similar fate at the hands of future science.

Such a fallibilist attitude towards theories is reinforced by reflection on standard epistemological difficulties concerning the nature of empirical support. The combined weight of the problems of induction, under-determination of theory by data, theory-ladenness of observation and the Quine-Duhem thesis severely weakens the appeal of any unconditional assumption of the truth of theories. For, while the acceptance of a given theory may well be rationally justified, the generalized assumption of the truth of theories is not.

Thus reflection on the history of science and on the nature of empirical support reveals maximal truth attribution to theoretical belief to be unjustified. The claim that such belief must be interpreted charitably – and with it, the implication that any understandable theory is translatable – may, therefore, be rejected. Yet, given our earlier appeal to the possibility of direct language-learning, such a dismissal of charity cannot be left unqualified.

It might be held that learning a language from scratch requires charity. For it might seem that, without at least a tentative attribution of truth, one would have no grounds on which to base any particular assignment of content to utterances in an unknown language. Yet, if charity is both necessary for direct language-learning and inapplicable to theoretical discourse, the language employed by a theory cannot be learned directly.

To meet this problem it is not enough to disconnect charity from translation. The claim that charity can be applied directly to a language without translation is appropriate as a criticism of the view that the understanding of an untranslatable language is precluded by charity. But, given the above epistemological grounds for the rejection of charitable truth attribution, the problem now is to show that such charity is unnecessary for learning the language of a theory directly.

One option here is to appeal to a weaker version of the principle of charity on which charity is not characterized as maximal attribution of truth.<sup>12</sup> The principle of charity may be taken instead as the advice that, in seeking to understand the language of a theory, one should try to interpret theoretical belief as rational. Thus, in interpreting the words of a scientist, charity would license the provisional assumption that the scientist's words express beliefs which form a rational belief-set. One would then seek to understand the belief-set of a scientist as sensitive to the available evidence and internally coherent. To avoid imposing our own views on past scientists, one should also seek to understand such beliefs as appropriate, given the intellectual and historical context within which the scientist operates.

A principle of charity which advises rational interpretation of agents is immune to the above epistemological criticism of charitable truth attribution. The charitable assumption of epistemic rationality may therefore be incorporated into the project of learning the language of a theory directly. Since such charity may be applied directly to the unknown theoretical language, the ability to arrive at an understanding of such a language does not imply that it can be translated.

<sup>12</sup> Of course, a second option is to deny that charity in any form is required to learn the language of a theory directly. Whether this option is plausible or not, it is unnecessary to develop it here in order to meet the present objection.

## VIII. CONCLUSION

We have been considering the view that one may understand a theory whose vocabulary is untranslatable into the special language of the theory one accepts. I have argued that, since understanding is independent of translation, no incoherence attaches to the claim that one understands a theory untranslatable into one's own. In the process, I have rejected objections based on the principles of effability and charity which deny the independence of understanding and translation. The considerations I have raised constitute a defence of the use to which Kuhn and Feyerabend have put the distinction between translation and understanding. This defence provides a basis on which to conclude that the incommensurability thesis does not incoherently preclude the possibility of understanding conceptually variant theories.<sup>13</sup>

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