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SOCIAL INDETERMINACY AND QUINE'S INDETERMINACY THESIS

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Abstract. This article examines whether *Willard Van Orman Quine's* indeterminacy thesis can be sustained. The *argument from above*, Quine argues, can derive indeterminacy as its conclusion. I will argue that the indeterminacy claim cannot be sustained. I further argue that Quine changed the formulation of the underdetermination of theory by evidence (UTE) argument from what Duhem said to the Quine/Pierce meaning verification view, in order use the new formulation of UTE to imply indeterminacy. Given all that, we see when we apply the old UTE argument we only arrive at underdetermination of theory by evidence, and that applies to all sciences, philosophy and knowledge, including philosophy of language.

Quine's argument of indeterminacy is one where the premises alone do not make the conclusion obvious, and further difficulty arises because he has not given enough examples of the indeterminacy in his writings. Given that, I will look at how can we draw the particular conclusion Quine maintains on the basis of the single fundamental premise he puts forward, bearing in mind Quine's other philosophical views and background beliefs. I will look at further ways of approaching the indeterminacy argument, through which I shall try to examine whether Quine's premise can derive the conclusion of indeterminacy, examining the role of the underdetermination of theories by evidence in the *argument from above*, and its relation to the indeterminacy thesis.

Keywords: Ontological relativity; Indeterminacy; Underdetermination of theory by evidence; Theory of meaning; Quine; Argument from above.

Introduction

My intention of this article is to examine whether *Willard Van Orman Quine's* indeterminacy thesis (Quine, 1960) can be sustained. Further to examine the *argument from above*¹⁾ as given by Quine can derive indeterminacy as its conclusion as Quine argued. However, this is not as straightforward as it sounds, for Quine's argument of indeterminacy is one where the premises alone do not make the conclusion obvious, and further difficulty arises because he has not given enough ex-

amples of the indeterminacy in his writings. Given that, I will look at how we can draw the particular conclusion Quine maintains on the basis of the single fundamental premise he puts forward, bearing in mind Quine's other philosophical views and background beliefs.

To proceed with this, first I will present Quine's argument for indeterminacy through those of his writings which focus upon the indeterminacy of translation thesis. Then, I look at further ways of approaching the indeterminacy argument, through which I shall try to examine whether the *argument from above* can derive the conclusion of indeterminacy. In doing this we shall look at the role of the underdetermination of theories by evidence in the argument from above, and its relation to the indeterminacy thesis. We look at whether these two arguments, underdetermination and indeterminacy, are compatible, and can be used in one argument for the indeterminacy conclusion. If they are not compatible, why not? We will also look at some suggested links between Quine's other views and the indeterminacy thesis: if the conclusion of the argument for indeterminacy is not implied by its premise, then what other possible assumptions might Quine have made in constructing the thesis? The nature of such an addition will be controversial, as it must depend, as we shall see, upon disputable interpretations of Quine's other views and commitments on topics such as physicalism, behaviorism, remnants of logical positivism, holism, etc.; an argument of this form, with a strong and much disputed conclusion, gives rise to a variety of interpretations and a host of platitudes. My conclusion is that Quine's indeterminacy of translation as it is given in the argument from above cannot be sustained.

Section one: Quine indeterminacy thesis in a nutshell

In 'Word and Object' (1960)²⁾ Quine put the thesis of indeterminacy of translation in this way:

*"the infinite totality of sentences of any given speaker's language can be so permuted, or mapped onto itself, that (a) the totality of the speaker's dispositions to verbal behaviour remains invariant, and yet (b) the mapping is no mere correlation of sentences with equivalent sentences, in any plausible sense of equivalence however loose." And: "manuals for translating one language into another can be set up in divergent ways, all compatible with the totality of speech dispositions, yet incompatible with one another"*³⁾

Some might see this as a mere linguistic view about translations between languages, but the claim Quine makes here holds much more. Though Quine uses translation as a vehicle to convey his view, his claim is not directed solely at translations between different languages. Quine's claim is about the theory of meaning in general. Indeterminacy theory is specifically directed at attempts to construct formal semantic meaning in natural languages which demands a precise scientific theory of linguistic meaning based upon evidence. It is very strong claim and I shall

discuss whether it can be sustained, but, one does not need to endorse it to see the point Quine wants to make. Further, it moderates attempts to make extreme claims based on the fixed notion of culture across history and individuals. This can be applied in relation to any given classifications of locality, 'original' cultures, and multi cultures, intercultural, and so on.

In order to have a formal semantic theory of meaning⁴, we need to have a theory determining references: the reference of a sentence is determined by the reference of its parts (terms, expressions, words used in the sentence). Quine's claim, in a nutshell, is that the reference of these parts is not fixed, and the evidence cannot uniquely determine the truth of one theory over its rivals. He concludes that the meaning is indeterminate. I shall explain his argument in detail.

In *'Word and Object'* Quine introduces his 'Gavagai' argument, as a thought experiment in radical translation, in order to show the inscrutability of reference of terms, and in his later paper *'On the Reasons for Indeterminacy of Translation'* (Quine, 1970), he uses this as a first premise in the argument of the indeterminacy of translation. In *'Ontological Relativity and Other Essays'* (Quine, 1969), he says that radical translation begins at home, and that the inscrutability of reference applies in the same way in the home language⁵, but to see the picture realistically requires a switch to radical translation. Quine uses radical translation as an inferential process, starting from behavioural evidence alone, in order to exclude the following: semantic information, use of linguistic concepts, and any information on people's beliefs and meanings. Therefore, we start without prior knowledge of the language we want to translate. The aim is to set up a unique and correct manual for translation (or formal semantic theory of meaning). We must do this in such a way as to preserve meanings, and meaning is presented as an undefined notion.

The thought experiment of radical translation given by the 'Gavagai' example is about the reference of terms. In this procedure, we associate meanings to terms, and, because terms have their meaning as a part of a sentence in which they appear, Quine accordingly chooses the one-word sentence 'Gavagai' in an unknown natural language to be matched with its one word English sentence synonym. Quine gives preference to these sorts of sentences in the example, for they are also (most importantly) observation sentences, as opposed to standing (non- observation or theoretica⁶) sentences. One reason for this is that Quine restricts the available evidence to the native's utterances and her current observable circumstances. He chooses observation sentences because they are 'occasion sentences': sentences which are assented to, or dissented from depending on the occasion of utterance, and which are closely connected to the observable circumstances. We try to match the observation sentence of one language with its synonym in another. We can have synonyms when, and only when, the two observation sentences convey the same meaning. Because sentences get their meaning holistically, as bundles of sentences, rather than as individual sentences, we have to map the totality of the sentences

by preserving the relation of inference between these sentences. We preserve this relation between the sentences within any language too, and we have to preserve it when we (translate or) compare between any two languages, or more.

In his much later paper, '*On the Reason for Indeterminacy of Translation*' (Quine, 1970) Quine said that the 'Gavagai' argument was meant to establish the inscrutability of reference of terms. Quine then gives two ways to argue for the indeterminacy claim, the argument from below and the argument from above.⁶⁾ The inscrutability of reference of terms ('Gavagai' argument) is used as a first premise in the argument from below. To outline again the fundamental idea which is shown by the 'Gavagai' argument: given the procedures of radical translation, and only the behavioural evidence, we are to translate the unknown native language onto ours.

The argument for the indeterminacy of translation can be mounted in two ways⁷⁾ Quine argued: the argument from above, and the argument from below. The argument from above, we can now say, is given as a real ground for indeterminacy; and the underdetermination of theory by evidence is given as a fundamental premise in this argument. Quine granted us that indeterminacy is derived from UTE (The underdetermination of theory by evidence).

Section two: On the fundamental premise in the argument

Quine has given UTE as a fundamental premise in his argument for the indeterminacy thesis, let's examine this premise. The idea of UTE thesis emerged from the theory-ladenness argument, known as the Duhem-Quine argument. However, it is disputed whether what Quine thought agrees with Duhem's claim, and if so, how much of the Duhem/Quine thesis can be attributed to Duhem. What we cannot dispute is that both Duhem's and Quine's arguments are directed against a certain notion of empiricism, but in different ways.

Duhem's claim is that all observations are theory-laden (Duhem, 1914). Duhem's argument⁸⁾ proceeded by criticizing the empiricists' claim that the meaning of observational terms is not problematic, as opposed to the meaning of theoretical terms. The meanings of theoretical terms were taken to be problematic by empiricism because theoretical terms refer to things that cannot be encountered in experience, they refer to unobservables. Since the empiricists' main claim in this area is that experience is the sole source of empirical knowledge, they have, therefore, tied meaningful empirical discourse to the possibility of experiential verification.

On this view, the empiricists argued that, knowledge of unobservable entities is unattainable. What this meant to science is that scientific theories are meaningless. Any scientific theory posits a number of unobservable entities and mechanisms which are not directly accessible in experience. Where the language used in science is concerned, this view about science led to an eliminative semantic instrumentalism, which says that all assertions involving theoretical terms can be meaningful or have truth if they can be translated or reduced into assertions

involving only observational terms⁹). The outcome of this was instrumentalism (Dewey, 1984 & Popper, 1935).¹⁰

The distinction between Quine's thesis and Duhem's thesis can be established from the following points in their arguments: Duhem argued, we posit the unobservable entities in science (such as electrons, for instance); he holds that these entities are real, he also recognized that scientific theories are linked to observation holistically, and not sentence by sentence. Quine takes observation sentences to be connected with experience directly, and non-observation sentences are connected with experience indirectly and holistically. Quine develops his view in the '*Two Dogmas of Empiricism*' (Quine, 1951), in the context of his argument to deny the analytic and synthetic distinction. This was not an issue for Duhem, who wrote in the context of discussions about '*The Aim and Structure of Physical Theory*' (Duhem, 1914). All of these points can be used to draw some sort of distinction between Duhem's and Quine's arguments.¹¹

Whatever gap can be drawn between what Duhem and Quine have said, what is unshaken is that Duhem responded to the gap between theory and observation, and so did Quine. They both rejected the distinction between theory and observation, but each of them rejected that distinction in different ways. They both employed holism, though Duhem limits holism by limiting the size of the group of hypotheses involved in testing the one hypothesis in question, while Quine leaves this open and unlimited. On the basis of this we could argue that we can still construct a version of UTE containing some chosen elements from both Quine's and Duhem's arguments.

What is of importance in relation to our discussion, is that they have both, in different ways, argued to the conclusion that there is no observation of phenomena which is purely observational, without a reliance on background theories. This position became known as the theory-ladenness argument, and Quine became established as a contemporary empiricist philosopher arguing for theory-ladenness and a rejection of a positivist view of empiricism. For he, through this and other arguments, has abandoned a positivist view of empiricism. Quine's contributions to epistemology and philosophy of science, for the most part was based on his insistence on theory-ladenness: that there is no clear division between observational sentences, which are assumed to report pure sensory experience without involving any theory, and non-observation sentences which are theory-laden. This was Quine's move to break away from semantic positivism and epistemological positivism, which both claimed that all empirical statements are decidable by immediate experience.¹²

Christopher Boorse (Boorse, 1976: 369 – 387)¹³ argues that in the thesis of indeterminacy Quine only involves the connection to stimulation of the nerve ending, in defining the stimulus meaning, and as a result neglects intersentential connection. He concludes that the thought behind Quine's unwillingness to involve intersentential connections in defining stimulus meaning is the guiding principle

that intersentential connections can be constitutive of meaning, only when they result in an indirect connection to stimulation. What Boorse points to, as an element of semantic positivism in Quine's thought, is the assumption that the meaning of a sentence is its sensory consequences.¹⁴⁾

Quine is well-known for his challenge to the positivist movement in his writings prior to the indeterminacy thesis. He advocated pragmatism in *'From a Logical Point of View'*, which includes his famous attack on logical empiricism in the *'Two Dogmas of Empiricism'*, in which Quine attacked the semantic doctrine of the positivists and concluded that the use of the notion of meaning was indefensible. He attacked the link between particular propositions and experience, criticized philosophical analysis aimed at clarifying the meanings of words and sentences, and challenged positivist reductionist assumptions, insisting on the view that relations between belief and experience have a holistic character. So, it is true to say that in Quine's view, the meaning of a sentence and the truth of an expression are tied to experience. It is also true to say that Quine holds a holistic view, contrary to semantic positivists. That is, while semantic positivism insists that the meaning of a sentence is tied with a particular experience, Quine holds that the meaning of a sentence is given in the totality of experience.

While we recognize that these areas of positivist thought have been targeted by Quine's attack on positivism, one can argue that positivist thought had more components than Quine's criticism allowed. For instance, among many others Christopher Hookway (Hookway, 1988: vol. 2)¹⁵⁾ argues that one of the positivist components which remained untouched by Quine's criticism is the physicalist view of knowledge and reality, that is, the view that: scientific knowledge serves as the paradigm for all knowledge; philosophy has to conceive of itself as science; and the aim is that of unification of all sciences into a single field of scientific knowledge, which is physics.

What is at issue in Quine's argument is, that, given extreme linguistic behaviourism, can there be an empirically motivated notion of sameness of meaning? This is the thought behind Quine's conclusion: that if all there is to meaning is a pattern of stimulus and response, then it would be impossible to discriminate meanings, which are in fact behaviourally indiscriminable though discriminable in other terms, and that is *reductio ad absurdum*. John Searle (Searle, 1987: 123 – 146.) argues that although Quine himself doesn't admit it, his conclusion disproved his premises. Both the indeterminacy argument and the inscrutability argument depend on the assumption of behaviourism, and the result is refutation of that assumption.¹⁶⁾

Dorit Bar-On (Bar-On, 1987: 123 – 146) questioned this relation between UTE and indeterminacy in *'Semantic Indeterminacy and Scientific Underdetermination'*.¹⁷⁾ She accepts that UTE poses a problem for anyone who wants to maintain a fully realist attitude toward science, but she writes, the full solution to this problem, is either that:

1 – We are assured that there are grounds for a rational choice between empirically equivalent theories in order to declare one of the alternatives true.

Or:

2 – We are allowed to deny there is any theoretical choice to be made, and to deny we can have any significant alternatives.

Quine deployed the latter as a strategy in supporting the indeterminacy thesis, and this strategy is not only at odds with what Quine wanted to defend in UTE as a scientific realist philosopher, but also with Quine's recent formulation of the UTE argument, which "*depends on a certain view of theoretical content which is, in effect, encapsulated by indeterminacy thesis*"¹⁸⁾, for "Quine's recent resolutions to the UTE problem rely on the view of theoretical content that is contained in the indeterminacy thesis".¹⁹⁾ That 'certain view' Quine holds is holistic meaning – verificationist; which is a blend of the 'Duhem/ Peirce doctrine': this holds that theoretical sentences have meaning as larger blocks of theory and not as single sentences (this is Duhem's theory – Quine says total), while from Charles Sanders Peirce comes the doctrine that the meaning of a sentence turns on what evidence it has for its truth (Quine takes it to be the total evidence for its truth). The combination of these two is what Quine holds, and this is the source of the problem, Dorit Bar – on suggests.

Section three: the ontological relativity

This is one of the major philosophical claims of indeterminacy between different languages; hence, between different societies, cultures, and by its consequence, it applies even between two individuals within the same society and the same culture. Quine's argument leads to ontological relativity; because reference is relative to a coordinate system – or a translation scheme – and the coordinate system is provided by the background language, and this differs from one language to another. The relativistic thesis Quine holds is that we cannot fully interpret a theory from one language to another unless the reference of the objects described in that theory is fixed upon how the reference of these objects are fixed by our own theory. Also translating a theory is doubly relative because that translation is relative to the background theory of the language we translate from, and is relative to the manual of translation arbitrary selected, given the indeterminacy of translation, to translate that theory into ours, or another language.²⁰⁾ So translation in this sense is doubly relative. But if Searle is right in saying that Quine's thesis of indeterminacy of translation and inscrutability of reference is based on Quine's behaviourist's assumption, then if behaviourism is refuted, as Searle argued by *reductio ad absurdum*, the thesis of ontological relativity fails too. For what Quine holds as ontological relativity is supported by his two theses of inscrutability and indeterminacy, and if these two theses are supported by behaviourism assumption, and the result is refutation of that assumption, then Quine's ontological relativity fails too.

Donald Davidson (Davidson, 1979: 7 – 19)²¹⁾ has rejected ontological relativity, and stands against the first-person case, but he kept inscrutability of reference and indeterminacy. For on his view the semantic feature of language is a public feature and the public feature is subject to indeterminacy, therefore there is no unique reference. Davidson then makes an appeal to the principle of charity and Tarski- style theory of truth to put constraint on meaning. He holds that truth and logical form can be indeterminate; even if they are fixed, acceptable theories may still differ with respect to the reference they assign to the same words and phrases. On his view the only empirical evidence is the fact that speakers ‘hold true’ certain sentences in certain situations and that there are alternative ways of matching words with objects which are inconsistent, but can equally well explain why the speaker holds a sentence true. Searle’s argument against indeterminacy and inscrutability, as given in relation to Quine’s, stands against Davidson’s acceptance of them. Searle’s view is that both Quine’s and Davidson’s arguments converge and that both arguments can be construed as a *reductio ad absurdum* of the premises they involve, given the two theses of inscrutability and indeterminacy are based on a behaviourist assumption. In order for Davidson to accept inscrutability or indeterminacy claims he need to hold, as Quine does, the identified assumption of behaviourism- or the added hidden premise- to Quine’s argument of indeterminacy.

Quine’s indeterminacy of translation is controversial, one should not rush to accept the full view. After writing ‘*Word and Object*’ he provoked a high degree of discussion and criticism, some of which was based on misreading of versions of Quine’s theses. Hence, Quine had to write more on indeterminacy in order to clarify what he meant and what he thinks the thesis is. So, he wrote exclusively on this issue in ‘*On the Reasons for Indeterminacy of Translation*’. The criticism continued. Quine was invited on many occasions, including at conferences held on his philosophy in general, to discuss the thesis further, to reply to his critics, even to endorse different definitions of notions such as observation, stimulus meaning, and to reconsider his earlier thesis of the underdetermination of theory by evidence.

Quine had a firm standpoint on many other issues in his lifetime of philosophical writing, some of which he himself reviewed and altered. With this in mind many found it useful to read Quine’s thesis of indeterminacy in the light of his other philosophical views in relation to other much-debated issues, such as the logical positivist movement, physicalism, behaviourism, etc. This was encouraged by two observations: one is that there are tensions between Quine’s philosophical views; the second is that there is a lack of examples given by Quine for indeterminacy. The latter prompted the use of the ‘Gavagai’ example as an indeterminacy example. After much discussion and further clarifications in his subsequent writings to the effect that the ‘Gavagai’ example is not meant to be used solely for indeterminacy, but, for the inscrutability of reference, he provided us with two ways of structuring the argument for indeterminacy. He gives us the first premises of each of the two

ways indicated by himself: the inscrutability of reference, used as a premise in the argument from below, illustrated by the 'Gavagai' example; the underdetermination of theory by evidence, used as a premise in the argument from above, given elsewhere in his previous writings. I have presented the 'Gavagai' argument as Quine has in '*Word and Object*', then the additional clarifications Quine provided in '*On the Reasons for Indeterminacy of Translation*'; the argument from above, and the argument from below. We look exclusively at the argument from above and the role of the underdetermination of theories by evidence in this argument.

Further, we looked at whether the argument from above can be sustained, by way of the UTE claim which is given by Quine as a first premise for the indeterminacy conclusion. Over the dispute about whether Quine's UTE thesis can be attributed to Duhem as much as to Quine, as Quine wishes, we saw that even if they can be distinguished as two different versions of UTE, the result will not have an impact on the question we have raised: whether we can derive indeterminacy from the UTE premise. For what Quine thought UTE is, has been given as a first premise in the indeterminacy argument and his version of UTE is what we have in question. We claimed that there is a tension in Quine's philosophy. We have given two ways to read this tension in relation to the indeterminacy claim: One way of identifying the tension is presented as the incompatibility between UTE and the indeterminacy argument. This incompatibility arises because, on the one hand, Quine defended scientific realism through the UTE argument which he achieved by legitimizing constraints on empirical inquiries other than evidence criteria, such as simplicity, non-contradiction with other true theories, etc., and this is different from what is given in the indeterminacy claim. Seeing the tension in this way gives a strong impression that Quine's argument must rely on some other unstated premise, or background assumption, which is not defended by the UTE argument. This is where Quine's other views needed to be brought into question, such as physicalism, behaviourism, holism, etc. However, in this way Quine's other views cannot rescue the argument for indeterminacy as it is stated by the argument from above, it can only clarify that Quine might have assumed in addition to the first premise (UTE) behaviourist and physicalist assumption in the argument for indeterminacy. Given this, the argument for indeterminacy then can be challenged through challenging these assumptions. The argument for indeterminacy on this approach fails to derive the indeterminacy conclusion from UTE – its first premise – as presented in the argument from above; the other way in which the tension is perceived is that, because Quine had difficulty in sustaining the UTE argument, he kept changing UTE formulations in order to provide solutions to UTE problems. The UTE formulation Quine had in mind when writing, indeterminacy is modified, having no tensions with the indeterminacy argument, as the first view above has suggested. This is because by the time Quine wrote '*Word and Object*', he had already re-formulated the UTE argument according to

the Duhem/Peirce (Peirce, 1955)²²) meaning-verificationist view. On this view, the indeterminacy Quine claims is already part of UTE, it is built into it. This view, while it accommodates the tension between the old formulation of UTE and the indeterminacy, presents one possibility of what Quine might have had in mind when he thought we could derive indeterminacy from UTE.

Whatever view we accept, we arrive at the conclusion that the indeterminacy claim cannot be sustained as presented by the argument from above. For, if we accept the first view, the (old version of) the UTE argument would not take us to the indeterminacy conclusion as it is stated by the argument from above, and, if we accept the second view, that the UTE argument, presented and used in constructing the indeterminacy argument (and re-formulated differently than the old UTE argument) already had the indeterminacy argument built to it, then the argument for indeterminacy has a premise circularity, the conclusion already exists in the first premise given by Quine as the UTE argument. Either way, if either of these two views is true, then the argument from above is not proved; on the first view the conclusion does not follow from its premise; on the second view, in addition, the argument has premise circularity.

If this is accepted, then we may think that the consequence of this has to be, we have to accept that both theories of meaning and scientific theories are underdetermined by evidence. That is, the old formulation of UTE applies to both, or both scientific theories and theories of meaning are indeterminate, given the new formulation of UTE. But this choice will not arise, for only by accepting the new formulation of UTE can we follow an argument for indeterminacy, and by doing this, we end up in a kind of premise circularity, because of the indeterminacy part which is built into the new formulation of UTE, for this reason we cannot use the new formulation. By doing this we will be left with either the old UTE argument or something similar or to the same effect. Either way this would not produce Quine's indeterminacy argument as stated in the argument from above, for the same reason that the old UTE did not produce indeterminacy.

Conclusion

The indeterminacy claim cannot be sustained, if it was, Quine's thesis of indeterminacy is one arguments that will put each one of us apart into different worlds. We can accept the underdetermination of theory by evidence in meaning, but not indeterminacy between different languages, nations, social groups, and between individuals. Quine changed the formulation of the underdetermination of theory by evidence (UTE) argument from what Duhem said to the Quine/Pierce meaning verification view, in order use the new formulation of UTE to imply indeterminacy. Given that, we see when we apply the old UTE argument we only arrive at underdetermination of theory by evidence, and that applies to all sciences, philosophy and knowledge, including philosophy of language.

NOTES

1. Quine, *On the Reason for Indeterminacy of Translation* (1970)
2. W. V. Quine, *Word and Object* (MIT Press, 1960): 27.
3. W. V. Quine, *Word and Object* (MIT Press, 1960): 27.
4. Martin Davies, "Philosophy of language" in *The Blackwell Companion to Philosophy*, 2nd Edition, eds: N. Bunnin & E. Tsui-James, (2002): 90 – 146.
5. W. V. Quine *Ontological Relativity and Other Essays* (Columbia University Press, 1969): 46 Chapter 2.
6. W. V. Quine 'On the Reasons for Indeterminacy of Translation' in *Journal of Philosophy*, 67, no. 6 (1970): 178 – 183.
7. Quine himself has forwarded the argument in these two ways; pressing from above, and pressing from below in his ORIT. See p.183.
8. Pierre Duhem, *The Aim and Structure of Physical Theory* (originally published in 1914) (Princeton University Press, 1991).
9. This is known as the reductive account of scientific language in which the truth conditions of theoretical terms are reducible to observable phenomena. This is also called eliminative instrumentalism, for they argued to eliminate theoretical terms.
10. Instrumentalists say that scientific theories are useful instruments for classification and systematization of observable phenomena. On instrumentalism, read both (John Dewey 1984, in "John Dewey: The later work" v.2, ed: Boydston and Jo Ann, Illinois university press.) & (Karl Popper 1935, "Logic of scientific discovery". London: Routledge.)
11. For instance, it can be argued that in Duhem's argument we posit these unobservable entities: they are real, they exist. That would make him an instrumentalist and an agnostic but not an eliminative one. Quine on the other hand has argued a much stronger claim.
12. Along with other components of positivist claims such as that the meaning of a sentences is exhausted by its implication for sensory experience, and that every statement has to be true, or false, or meaningless.
13. Christopher Boorse. "The Origins of Indeterminacy Thesis", *Journal of Philosophy* 72, no.13 (1976): 369 – 387.
14. *Ibid*, 369 – 387.
15. Christopher Hookway, *Quine, Language, Experience and Reality Vol 2* (Stanford University Press, 1988).
16. John Searle "Indeterminacy, Empiricism, and the First Person", *Journal of Philosophy* 84, no. 3 (1987): 123 – 146.
17. Dorit Bar-On, "Semantic Indeterminacy and Scientific Underdetermination" in *Pacific Philosophical Quarterly* 67, no.4 (1986).
18. *Ibid* 245 – 246.
19. *Ibid*, 246.
20. Quine in *Ontologic Relativity*, 54 – 55.
21. Donald Davidson, "The Inscrutability of Reference", *Southwestern Journal of Philosophy* 10, no. 2 (1979): 7 – 19.
22. Charles Sanders Peirce and Justus Buchler, *"Philosophical Writings of Peirce"* (Dover Publications, 1955).

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