THEORIA ET HISTORIA SCIENTIARUM VOL. II
Ed. Nicolaus Copernicus University 1992

The Queen's College
Oxford

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TRUTH AND REFERENCE: SOME DOUBTS ABOUT FORMAL SEMANTICS

1. THE CASE FOR FORMAL SEMANTICS

Formal semantics might be understood as the attempt to show that the most fruitful theories about a natural language are based upon a formalized specification of that language's structure. Since it hopes to provide the basis for theories about language, formal semantics is obviously concerned with notions like grammaticality, reference, and meaning. Just as a system of formal logic attempts to give a formal account of our intuitions about the validity of informal arguments, so does the formalization of semantics attempt to systematize and make rigorous our intuitions about, for example, the grammaticality, significance, synonymy, reference, and truth value of certain expressions in a natural language. The ultimate aim of formal semantics might be thought of as constructing an account of meaning analogous to the logical account of validity, viz. one that would provide necessary and sufficient conditions for determining the meaning of any expression in the natural language, or portion of a natural language, that is being formalized.

I do not believe that this goal can be realized. In fact, I hope to show that the approach to language taken by philosophers who subscribe to the program of formal semantics is fruitless because formalizations of a natural language can explain nothing about that language. Before beginning my argument, however, a brief digression will be useful to distinguish my position from an attack on formalization that I wish to disavow.

2. THE GOAL OF FORMALIZATION

If the definition in logical theory of the logical connectives is construed as an attempt to give a formalized account of the meanings of the English words commonly associated with the connectives, my argument against the formalization of natural language is not that the definitions of the logical connectives are inconsistent with some of our intuitions about the meaning of these English words.

The logical connective '&' is often associated with the English word 'and', the logical connective 'v' with the word 'or', the logical connective '-->' with the phrase 'if...then...', and so on. The literature abounds with discussions of instances where the definitions of the logical symbols conflict with our ordinary usage of these words. The question of the significance of these discrepancies is not as clear.

A formal system obviously cannot accommodate all of our intuitions if some of our intuitions are mutually inconsistent. But I am not concerned with this discrepancy between our intuitions and a formal systematization of them. Rather, consider instances where the definitions of the logical connectives in logical theory either (1) have features that do not represent any intuitions or (2) have features that are inconsistent with certain intuitions. I do not believe that formal semantics is fundamentally flawed if it turns out that it is impossible to avoid some of these discrepancies. The project of giving formal analyses of language is often compared to the construction of scientific theories. Although I shall argue that this analogy is often extended too far, in this case it is in order. To quote R. B. Marcus,

> **...the formal logician's role is analogous to that of the theoretician in any science [...] if the theory is too disparate with the data his task is to alter the theory, not to abandon theory altogether... (Marcus 1962:259).**

It is unreasonable to demand that a formal representation of a natural language accommodate every intuition about that language because the point of formalization is to simplify, generalize, and make these intuitions precise and rigorous. It is unreasonable to assume that these goals can be met if every intuition is to be preserved. As S. Haack puts it in terms of the formalization of validity,

> **...if formal logic faithfully followed informal arguments in all their complexity and vagueness, there would be little point in formalization (Haack, 1978:33).**

Consider that according to logical theory the conditional 'A --> B' is true if its antecedent is false. But we don't usually assert conditionals if we believe that the antecedent is false; in this case, logical theory departs from ordinary usage by giving truth values to expressions that we normally don't use. Similarly, in

logical theory 'A v B' follows from 'A' even though we wouldn't normally use a disjunction if we knew that one of the disjuncts is true (e.g., we normally wouldn't say 'John has the book or Mary has it' if we knew that Mary has the book).

In these cases the definition of the logical connectives departs from ordinary usage only where that usage is lacking. Logical theory also sometimes explicitly contravenes ordinary usage. Thus, as W.V.O. Quine points out, the truth table of the

conditional is at variance with our usage of the subjunctive conditional. The subjunctive mood is normally used when one believes that the antecedent is false as in 'if he had started his essay earlier, he would have passed'. It is certainly not the case that every subjunctive conditional is true; as we saw, however, according to logical theory, every conditional with a false antecedent is true (Quine, 1981:16).

What is the significance of these discrepancies? Obviously, a formalization is inadequate if it has too many discrepancies or if it fails to accommodate intuitions that are considered essential. But one might take the harsher view that the existence of any discrepancy between the definitions of the logical connectives and the words associated with them in English shows that the project of constructing formal representations of validity is hopeless and should be abandoned. As I suggested above, this seems too harsh because the goal of formalization is to simplify, generalize, and make these intuitions precise and rigorous. Many of the discrepancies I listed result from the truth functionality of the logical connectives. Truth-functions are especially amenable to formalization and one might argue that these benefits make the discrepancies acceptable. That is, one might conclude that these considerations lead one to (1) accept the truth-functional definitions of the connectives where there is no ordinary usage and, when we judge that usage inconsistent with the definitions is not essential, to (2) claim that we must turn elsewhere, e.g., for formalizations of the temporal use of 'and' and the subjunctive conditional.

Similarly it would be a significant achievement if a formalization of a natural language could be constructed that accommodated most of our intuitions about a natural language, or even most of our intuitions about some small portion of that language. There seems to be no need to construct one single formal model covering each area of a natural language; toleration is the order of the day in formal semantics and it would be perfectly satisfactory if many separate formalizations for many different areas in English were worked out. L. Linsky takes this toleration to an extreme by agreeing with Carnap's principle that „in logic there are no morals". He argues that there is a place for both the substitutional and quantificational interpretations of quantifiers, writing

> **...each existential quantifier corresponds to a different use of 'there is' in ordinary language [...] one need not choose between the two concepts of quantification but may use either the one or the other as we find convenient (Linsky, 1972:239).**

The moral is that even modest formalizations of a natural language would be philosophically interesting and consistent with the goals of the program of formal semantics.

3. FORMALIZATION AS SCIENTIFIC IDEALIZATION

The program of formal semantics might be understood as being concerned with exhibiting those features of a natural language which are reasonably systematic. If

the formalization leaves much of the language undescribed, this is because that language is unsystematic, amorphous and incoherent. Quine expresses this view about the imprecision of natural language when he writes that quantification theory:

> **...cuts across the vernacular use of 'all', 'every', 'any', and also 'some', 'a certain', etc., in such fashion as to clear away a baffling tangle of ambiguities and obscurities... [quantification theory] subjects this level of discourse, for the first time, to a clear and general algorithm. It reveals the precise connection, hitherto obscure, between general statements and truth-functional composition. (1981:61)**

As we saw, one of the virtues of formalizations of natural language is precisely that they are supposed to eliminate ambiguity, vagueness, and imprecision in natural language. I take it that this view is motivated by the conviction that just as a scientist introduces idealizations like perfect vacuums, perfectly rigid bodies, and ideal gas to reduce the complexity of observed phenomena to manageable proportions, so can greatly-simplified formalizations illuminate features of natural language.

But this claim seems suspect. For one thing, it seems methodologically improper to merely assume that natural language is irregular and unsystematic and conclude that theorizing about language requires formal „idealizations". The notion that one could demonstrate that a natural language is incoherent and amorphous is troubling. The root idea behind this claim seems to be that natural language cannot be described systematically without idealization. It seems, however, that one could not show this because the supposed irregularity in language might be nothing more than a philosopher's failure to describe language adequately. The failure of any particular attempt to provide a systematic description of language does not show that no attempt could be successful; it might be the case that the philosopher has not described regularities that are in fact present in the natural language. For a formal semanticist to say that his description of some portion of a natural language is adequate but the language itself is unsystematic is like a physicist saying that his theory is adequate and the exceptions to it don't matter.

This objection highlights a second problem with the claim that formalizations of language are like idealizations in physics. An idealization in science is acceptable only if a theory connects the idealization with the phenomena which it purports to model. This connection might be understood as an isomorphism between features of the idealization and features of the phenomena, an isomorphism which is cashed out empirically, e.g., by showing that the idealization allows a scientist to make predictions that are accurate in certain conditions within a certain margin of error. This suggests that a formalization of a portion of natural language can be considered an adequate idealization of that language only if the idealizations allows one to make „predictions" about the natural language. It is not clear, however, that there are predictions about natural language which follow from formalizations. Suppose that there two or more different formalizations are each proposed as the best idealization of a portion of a natural language. It seems that the possibility of adjudicating between different formalizations requires nothing less than an adequate theory of the semantics of the natural language! But this is precisely what formalizations purport to supply; the project of formal semantics seems hopeless.

Formal semantics, at least as we have construed it, faces a dilemma: on the one hand, to merely claim that a given formalization is a adequate idealization begs the question; on the other, there is no way to show that a formalization is an adequate idealization except by appeal to an independent theory of semantics of the natural language it purports to explicate. The conclusion to be drawn from this dilemma seems to be that because showing that a formalization is adequate requires an independent theory of semantics, formal semantics cannot provide the basis for theories about natural language. Returning to the analogy with idealization in physics, formal semantics seems a hopeless way to approach language because there is no way to demonstrate that an isomorphism holds between the formalization and the natural language it purports to model; formal semantics seems wholly uninformative.

4. THE OBJECTION RECONSIDERED

Perhaps a more modest conclusion should be drawn from these objections, viz. that formalizations of natural language should not be construed as „idealizations" of a natural language. We saw that if a formal semanticists restricts himself to the modest goal of explaining certain portions of a natural language, his formalizations of a natural language are revealing only insofar as they reflect the structure of that natural language. What is needed is a theory that is based upon and represents the full structural complexity of the portion of a natural language it purports to model; if a formalization is to explain a natural language, it must be more than formally correct and consistent.

As we saw, if the choice of a formalization with which to model a language is

merely arbitrary, then there is no reason to think that theories based upon that formalization are theories about a natural language. If any arbitrary formalization is chosen as a model for some portion of a natural language, then that formalization cannot be supposed to offer solutions to philosophically-interesting problems about that natural language. The problem with formal semantics is that there seems to be no way of showing that a formalization is not arbitrary without having an independent answer to the very questions that the formalization is meant to address.

But perhaps it is possible to avoid this objection by construing the goal of formal semantics differently. Suppose that formalizations of semantics are not meant to explain notions like analyticity, synonymy, reference, truth, and meaning. The objection raised above suggests that these notions must be clarified before a portion of natural language is modeled by a formalization. If so, formal semantics might have a legitimate role as a means of systematizing knowledge about a natural language. Marcus seems to endorse this role of formalization of natural language when she writes

...a source of the power an economy of ordinary language is the plurality of functions which can be assumed by a single expression or group of expressions [...] one of the tasks of logic is to separate out such uses (Marcus, 1962:259).

Quine's claim that the „obviousness" of simple logical truths can be explained by appeal to behavioral criterion might be understood as an extreme version of the claim that logic is concerned with systematizing independent intuitions about our use of language. „Naturally the habit of accepting these truths will be acquired hand in hand with grammatical habits", he writes and adds:

Naturally therefore the logical truths, or the simple ones will go without saying; everyone will unhesitatingly assent to them if asked. Logical truths will qualify as obvious, in the behavioral sense in which I am using this term, or potentially obvious. (Quine, 1986:102)

A question to ask of this conception of formal semantics is why, even if it is possible to do so, would it be valuable to systematize our „piecemeal" knowledge about a natural language. Perhaps the ordinary-language approach to language, the approach taken by Wittgenstein in the *Investigations,* is sufficient. To simplify to the extreme, the „ordinary language" approach denies that a formalization can represent the richness and complexity of a natural language. Language on this view is a hideously complicated form of social behavior that can only be studied through the detailed analysis of how speakers of the language use particular words and expressions in particular contexts. I take one implication of Wittgenstein's notions of family resemblance and

language games to be that it makes no sense to impose the requirement that a speaker's use of a certain be made „fully precise" (Cf. *Philosophical Investigations* remarks 69f, 91f). On this view, „theories" of language begin and end with a careful study of the details of how a natural language is used.

Philosophers who support the program of formal semantics would undoubtedly respond to this objection by arguing that any account of a natural language which does not provide a formal specification of that language is inadequate. The goal of formal semantics is to use this formal specification to explain how expressions in that language are understood, e.g., by specifying how the truth value of any complex sentence can be understood through a truth-functional analysis of atomic sentences and adopting a verificationalist account of meaning. Harrison lists the hope that formalizations might „tell us what a speaker of a language needs to know if he is to be able to interpret any well formed sentence of his language" as a primary motivation behind formal semantics:

> In short, it seems as if logic in general can be regarded as formalizing and making explicit certain features of ordinary language, and it can be argued that, so far as the use of language to make true statements is concerned, the features which can in this way be taken up into logic are the important ones. The aim of understanding meaning can thus seem best served by the effort to bring language piecemeal under the sway of logic. (Harrison, 1979:79)

But this program seems doomed for the reasons discussed above: a formalization can only be judged adequate by supplying independent answers to the questions it supposedly addresses. I tried to give a construal of formal semantics which avoided this objection, viz. one where formalizations systematized our independent knowledge of a natural language. In the rest of this essay I will try to show that this re-construal of formal semantics is not immune to the objection it was intended to avoid. I will also try to show that this objection is a very general one that can be applied to possible world semantics and Hintikka's game-theoretical semantics as well as traditional formal semantics, but is not so general that its skeptical conclusion extends to the attempt to construct a formal account of validity. I will start by looking at the structure of a formal language in more detail.

5. FORMAL SEMANTICS AND FORMAL LANGUAGES

We saw that the object of formal semantics is to understand the semantic properties of a portion of a natural language, e.g., the relation between truth and reference in that language, „by constructing formal languages which offer rigorously defined formal analogues of such relationships" (Harrison, 1979:78). Formal languages are set-theoretic constructions. Viewed generally, a formal language can be seen as consisting of three kinds of defined elements. First,

a formal language has an array of primitive expressions which fall into one or more syntactic categories. Examples of these are predicates (symbolized by 'F,' 'G,'...), names (symbolized by 'a,' 'b,'...), quantifiers ('(x),' '(Ex),'...), variables ('x,' 'y,'...),

and the logical connectives ('~,' 'v,' '&,' etc.). This elementary vocabulary of primitive expressions, sometimes called the formal language's lexicon (e.g., by Quine, 1986:16), provides the building blocks out of which complex sentences in the formal language are constructed.

Complex expressions are constructed out of the primitive expressions by following what are known variously as formation rules, concatenation rules, sentence schemata, and grammatical constructions and transformations. The general idea is that these rules precisely define recursive truth-functional methods of constructing all the complex expressions of the language from the primitive expressions. The intuitive motivation behind the attempt to recursively define complex expressions from a list of primitive expressions is that any speaker of a natural language can understand an infinite number of expressions in that language. It is hoped that a formal language can explain how a speaker understands any expression in (a portion of) a natural language by appeal to this recursive enumeration of complex expressions. B. Harrison gives a helpful description of this goal of formal semantics:

> It is perhaps evident that the ability of native speakers of a language to interpret sentences which they have never encountered before must depend upon the application of some system of recursion rules or another. But it is not at all clear what sort of recursion rules these are, and how, and upon what, they operate.
>
> The formal semantidst has an answer to these questions which has at least the merits of darity and straightforwardness. His suggestion is that the recursion rules in question are of the relatively familiar kind employed in formal theories of truth. That is, they permit the truth conditions of complex sentences to be specified in terms of truth and falsehood as applied to some set of basic sentences formulated in terms of the primitive expressions of the language.
>
> ...A formal theory of truth thus looks as though it might well tell us what a speaker of a language needs to know if he is to be able to interpret any well-formed sentence of his language. (Harrison, 1979:79)

This brings us to the third defined element in a formal language, the 'theory of truth' for that language. As the passage from Harrison suggests, this element explains how to determine the truth conditions of any sentence which can be expressed in the formal language. I believe that it is this element of a formal language that makes the program of formal semantics hopeless. Unfortunately, it is rather difficult to specify exactly what this part of a formal language amounts to. Perhaps we can begin by saying that a theory of truth for a formal language is what a formalization of ordinary language requires in addition to the ordinary machinery of formal logic supplemented by a lexicon.

The first question to ask is why a formal language must contain this third element, that is why the truth conditions of the expressions of the language cannot be specified by appeal to the principles of formal logic and the definitions of the names, predicates, and other primitive expressions of that language. Fortunately, it is easy to see why formal languages that do not include a theory of truth for that language are inadequate. Consider a formal language where the meaning of an expression is held to be whatever that expression dentoes. It seems that there is no need to define a theory of truth for such a language because, roughly, (1) atomic sentences are true iff the objects designated by the name has the property designated

by the predicate and (2) the truth conditions of complex sentences can be determined from the truth conditions of atomic sentences and the principles of first order logic (i.e., propositional logic, identity logic, and quantificational logic). But, as Frege pointed out, the denotative theory of meaning which lies behind this putative formal language is manifestly inadequate; meaning and reference are different because (1) expressions with different meanings can refer to the same things (e.g., the 'morning star' and 'the evening star,' 'animal with a heart' and 'animal with a kidney') and (2) some meaningful expressions seem to denote nothing ('Pegasus,' 'Santa Claus'). This objection suggests that the relationship between the meaning of expressions in a formal language and their truth conditions cannot be specified merely by a truth functional analysis; to be complete, the vocabulary of a formal language must be interpreted further, viz. by the theory of truth for that language. Intuitively, this additional must account for the semantic relationships between expressions, e.g., by formally specifying why 'Joe is not married' can be inferred from 'Joe is a bachelor.'

We saw before that the goal of a formalization of natural language is to give an account of meaning for that language that is based on recursion rules that allow one to specify the truth conditions of any sentence in the natural language in terms of the truth conditions of some set of sentences that are expressed by the primitive terms of the formal language. The inadequacy of the denotative theory of meaning shows that this recursion rules cannot be defined solely as truth-functional recursion; rather, they must take into account, extend the interpretation of the primitives to cover, the semantical relationships holding between expressions. My contention is that the interpretation of the primitives cannot be thus extended in a non-arbitrary non question-begging way. If I am right, then formal representations of language are wholly uniformative and the program of formal semantics is a futile waste of time.

The inadequacy of the denotative theory of meaning shows that formal languages must make a sharp distinction between meaning and reference. This is unfortunate because, as we saw, the claim that an expression's meaning is some function or another of its truth conditions is essential to the program of formal semantics. Thus to be complete, a formal language must contain an apparatus that specifies the relationship between truth and reference in that
language. That is, this apparatus, the theory of truth for that language, must specify the class of true expressions in that language.

A theory of truth for a formal language can be conceived of a set-theoretic function (perhaps, as Harrison suggests, defined in terms of the satisfaction relation), that picks out all and only the true sentences in that language (or the portion that is being formalized) (1979:78). But what relation should one use? As we saw, the truth conditions of certain expressions, e.g., 'expression *a* is synonymous with expression *b'* cannot be specified in terms of truth-functional recursion from primitive expressions. The problematic part of the theory of truth of a formal language is that the theory of truth „extends the interpretation" of these primitives by assigning such anomalous expressions a truth value.

This extension is problematic because there seems to be no non-arbitrary way of making the extension within the resources of formal semantics. If the interpretation

is „correct", then the formal representation clarifies the semantical concepts of the portion of the natural language it is intended to formalize. Obviously, if a formal representation of a portion of a natural language is to explain that language, the extension cannot be justified by appeal to antecedently-clarified semantical concepts. But how else can one interpretation be judged „correct"? Can we test it against our unsystematic intuitions about the natural language being considered? Clearly not or there would be no point in formalizing the natural language: the formalization is intended to draw upon our confused insights to clarify semantical concepts that we don't already understand. The ancient problem of „the wheel" seems to haunt formal semantics with a vengeance.

I will attempt to restate the problem in another way. One of the most important features of formal representations of language seems to be the classification of sentences according to such semantical concepts as analyticity, synonymy, and entailment. As Hintikka puts it, „the distribution of sentences into these categories is said to be among the most important phenomena to be explained by a semantical theory" (Hintikka, 1979:72). The brunt of this burden seems to be borne in formal languages by the definition of truth for that language. The problem is that there seems to be no way to show that the theory of truth does an adequate job of distributing expressions into these categories. It seems that any justification of a particular theory of truth, as opposed to another, can only be made by appeal to the intuitions of a speaker of that language. But the whole point of attempting to formalize natural language was to systematize these intuitions and, in a sense, to „go beyond" the intuitions by giving an explanation of them. But if a theory of truth of a formal language can only be justified by appeal to these raw intuitions, then there is no possibility of carrying through with this project, a theory of truth can be judged an adequate
representation of a natural language only if one begs the questions, or viewed another way, already understands what the formalization is supposed to explain.

It seems that the theory of truth of a formal language can only stipulate answers to the philosophically-interesting questions it supposedly illuminates. These stipulations can provide no new information about a natural language because a formal language gives no account of why these stipulations, rather than others, correctly reflect the semantical characteristics of the natural language that is supposedly being formalized. Earlier I suggested that formalizations of natural language are wholly uninformative because there is no way to tell whether they adequately represent that natural language unless we have an independent understanding of the semantics of that natural language. Now we can see more clearly the reason for this defect: there is no way to show, without begging all the relevant questions, that the relationship between truth and reference specified by the formal language's theory of truth accurately reflects the relationship in the portion of natural language under consideration.

Formal semantics seems to be entirely uninformative, the product of a misguided way of thinking about language. I will now suggest that the same objection can be made against two other approaches to semantics, Hintikka's

game-theoretical semantics and possible world semantics.

6. HINTIKKA'S GAME-THEORETICAL SEMANTICS

My claim that Hintikka's game-theoretical semantics is susceptible to the same objection I've raised against traditional formal semantics might seem odd in the face of Hintikka's rejection of formal semantics. Hintikka repudiates the „regimentation and abstraction" approach to language (1976:28, 1979:50), pledges his allegiance to Wittgenstein's conception of language games (1976:254, 1973:47f), and argues that the expressions of any natural language cannot be recursively enumerated (1979:61f, 1973:45). He even gives an objection to standard quantificational theory that is similar to my objection to formal semantics:

> The main obstacle to applications of quantificational theory to the study of natural-language quantifiers is [...] the difficulty of giving explicit transformation rules to connect the two. Generative semantidsts' claims notwithstanding, nothing remotely like a satisfactory set of such rules can be found in the literature. (1979:32)

However, there is a major difference between Hintikka's and my criticism of formal semantics. Whereas I claim that it is in principle impossible to supply rules that connect formalizations with a natural language without begging all the relevant questions, Hintikka seems to think that his game-theoretical semantics supplies something like „a satisfactory set of such rules".

Indeed, it becomes clear that Hintikka's reaction to the defects he finds in standard formal semantics is not, his allegiance to Wittgenstein notwithstanding, to develop a radically different approach to language. Rather, his „game-theoretical semantics" seems to be an attempt to fix the defects he finds in formal semantics by developing a highly formalized theory that uses concepts from game theory and second order logic. One warning flag is that Hintikka consistently holds that the games in his game-theoretical semantics are true to Wittgenstein's conception of language games but „can also be formulated as Games in the precise game-theoretical sense of the word" (e.g., 1976:234).

Similarly, it is a little disappointing that after discussing why the project of attempting to recursively enumerate all the expressions of a language is hopeless in formal semantics, he then argues that, by contrast, „the game-theoretical approach gives us a more powerful and flexible theory" (1976:230) and claims that one of its virtues is that „game-theoretical semantics is much more readily extended beyond first-order logic in certain directions" (1979:53). Just how close game-theoretical semantics is to formal semantics in many respects is seen by Hintikka's description of the aims and structure of analysis by game-theoretical semantics:

> These languages are of course to be thought of as *interpreted* languages, which means that we are given a domain of individuals *D* on which all the predicates of the language in question — call it L — are interpreted [...] each atomic sentence built up of the predicates of *L* and of the names of the members of *D* has a definite truth value, true or false. Since the crucial concept of all semantics is that of truth (on an interpretation), what our task is essentially to extend the notion of truth to all the sentences of *L,* no matter how many quantifiers and sentential connectives they contain...
>
> The games *G(S)* that serves to accomplish this may be thought of as idealized processes of verification... (1976:216)

Of course, the important question for this essay is whether Hintikka's semantics differ from formal semantics in one respect in particular, viz. whether his game-theoretical semantics, unlike formal semantics, escapes the dilemma about giving reasons why a particular formalization of some portion of a natural language adequately reflects the structure of that language. *Prima facie,* Hintikka seems to be in a very bad position: the claim that „the crucial concept of all semantics" is an interpreted notion of truth which is extended from atomic expressions to all the sentences of an „interpreted language" seems very close to the claim that the crucial concept for semantics is the theory of truth for a formal language by appeal to which the truth conditions for every expression in that language can be specified.

A brief sketch of Hintikka's games will show that this initial pessimism is justified. Essentially, his games are „outdoor games" where the player 'Myself tries to find objects that make a sentence true while another player 'Nature' tries to provide a counter-example to the sentence. The „game" ends when the

sentence has been decomposed (by rules Hintikka specifies) to an atomic sentence which is either true of false. As Hintikka points out, in this respect the games are very similar to theorem-proving procedures in formal logic (1973:45). However, Hintikka is not only concerned with logical truths, but also wishes to explain the semantical relations holding among the expressions of a portion of language. To do this he develops the notion of truth as a „winning strategy". He writes:

> The reason why this game-theoretical interpretation of quantifiers yields a full-fledged semantical theory of a first-order language is that the truth of S on *D* (with the appropriate predicates defined on *D)* can be defined in terms of our games. It is easily seen that *S* is true in the usual sense if and only if I have a winning strategy in the associated game. Hence, in our approach, the truth of S van simply be defined as the existence of a winning strategy. This definition assumes that truth and falsity have been defined for atomic sentences (plus, possibly, their negations) and serves to extend it for arbitrary truth functions and for quantified sentences. (1973:40)

The problem plaguing „extensions" of the theory of truth for a formal language is that these extensions cannot, without begging the question, give a non-arbitrary account of the semantic relations holding between the expressions in the natural language. A similar problem seems to plague Hintikka: of course he can specify the semantics of a formal language, but he, like the formal semanticist, cannot claim that he has thereby illuminated the semantics of any portion of a natural language.

Seeing how Hintikka's game-theoretical semantics is caught by the dilemma that plagues formal semantics is, in a way, easier than seeing why formal semantics is caught by it. For his discussion of his crucial notion of strategy consists of little more than an argument to the effect that for any true statement in a formal language, there must be a set-theoretical function (a Skolem function, in second-order logic) which represents the strategy defining truth for the sentence (e.g., 1979:53, 1976:219, 1976:268). But the crucial question is not whether there is such a function, but which particular function one should choose. If, as he wishes to do, Hintikka is to explain the semantics of a portion of natural language, then the truth function must „interpret" the semantical relations of the language. But this task seems no more plausible for the game-theoretical approach than it did for formal semantics. Hintikka's game-theoretical semantics does not seem informative because there seems to be no way to evaluate whether one particular strategy, rather than another, represents the best interpretation of truth for a sentence. If we can answer this question, why should we bother with game-theoretical semantics? If we can't, how can game-theoretical semantics help us think about language?

Another remark by Hintikka suggests that his notion of a winning strategy is not very different from the notion of the theory of truth for a formal language. The comment is about a certain line of thought „connected with the basic ideas of game-theoretical semantics, and more specifically with the

50 definition of truth for quantified sentences as the existence of a winning strategy in the associated game":

> If we want to think of our semantical games realistically, it may be suggested, we must restrict the strategy sets available to Myself drastically. For surely it makes no sense for me to try to play a game in accordance with a strategy represented by a function which is not recursive and perhaps not even remotely like a recursive function, it is perhaps thought. In a realistic game-theoretical semantics, the strategies available to Myself — possibly the strategies available to Nature also —must according to this view be restricted to recursive strategies or at least to st rategies defined by some 'almost recursive' functions [...] It seems to me that this line of thought has to be taken very seriously. (1979:73)

If Hintikka accepts this suggestion (he does not commit himself one way or the other in the article cited), than it is even harder to see how game-theoretical semantics can avoid the dilemma confronting formal semantics.

Of course, it is possible that Hintikka's semantics is distinguished from traditional semantics in the relevant respects because it relies on some feature of the technical game theoretical definition of „game", „strategy", „move", etc. Nevertheless, I have cited many passages which suggest that Hintikka's approach to language, especially his notion of a winning strategy, is very similar to the wrongheaded approach taken by formal semantics. Given the extent that he underplays the role of technical game theory in his game-theoretical semantics, it seems doubtful that Hintikka's use of language games and game theory does represent a better approach. He writes „the semantics... I am about to sketch is formulated in terms borrowed from the mathematical theory of games [...] the concepts involved are so straightforward, however, that they can be appreciated without any knowledge of game theory" (1979:51). He makes a similar comment about the crucial notion of a strategy, writing „'strategy' is to be understood in the precise sense of the mathematical theory of games [...] the idea it embodies is nevertheless so natural that it can be understood without any familiarity of game-theoretical results or conceptualizations" (1976:218).

In sum, it appears that Hintikka makes a self-defeating response to the flaws he discerns in traditional formal semantics. Instead of abandoning the impotent approach to truth adopted by formal semantics, he seems to embark on the hopeless task of „improving" the futile project.

7. POSSIBLE WORLD SEMANTICS

The objection I have raised against traditional formal semantics and Hintikka's game-theoretical semantics also extends to at least one form of possible world semantics.

Hintikka describes possible world semantics in this way:

> The scope of game-theoretical semantics can be expanded by wedding it to a suitable possible-world semantics for epistemic and modal notion[...] Instead of just one 'world' (D with predicates interpreted on it), we must consider a set of them with suitable alternativeness relations defined on it. At each stage we are considering a world *w and* a sentence. When [in the game] we have reached 'John doesn't knows that AT,' I may select an epistemic alternative to *wj* with respect to John [...] When we have reached 'John knows that A", Nature may select a similar world *wj* and the game is continued with respect to *X* and *wj*... (Hintikka, 1979:56)

The crucial notions are obviously those of a world and an alternativeness relation. What these seem to amount to is a further extension of the function representing a winning „strategy". Cast in more traditional terms, this construal of possible world semantics seems to extend the interpretation of truth for a formal language to alternate domains.

By now it should be clear why this attempt to „explain" semantics is unsatisfactory: one must select a truth function, but there is no non question-begging way to justify the selection of one function rather than another. Perhaps other possible world semantics fare better than Hintikka's. It does seem safe to conclude, however, that as long as possible world semantics retains a set-theoretical interpretation of truth that supposedly explains the semantical relations in a fragment of a natural language, then this program is just as hopeless, for the same reasons, as traditional formal semantics and Hintikka's game-theoretical semantics.

I have tried to sketch the reasons why my objection to formal semantics has a very wide application. One might begin to suspect that the objection must be specious because it is too general. I wish to end this essay by suggesting that the objection is not fatal to the task of ordinary logic which we discussed above, viz. the attempt to construct a formal account of validity.

8. VALIDITY REVISITED

I do not have an original reason to explain why I think formalizations of validity can be successful whereas formalizations that attempt to explain semantic notions are uninformative. My suggestion relies on the familiar and perhaps controversial notion that validity is a syntactic property. Quine gives a helpful expression of this view:

> A logically true statements has this peculiarity: basic particles such as 'is', 'not', 'and', 'or', "unless', 'if, "then', 'neither', 'nor', 'some', 'all', etc. occur in the statement in such a way that the statement is true independently of its other ingredients [i.e., of the meanings or other semantic properties of the other words in the statement]. Thus, consider the classical example:

1) If every man is mortal and Socrates is a man then Socrates is mortal

Not only is this statement true, but it is true independently of the constituents 'man', 'moral', and 'Socrates'; no alteration of these word is capable of turning the statement into a falsehood. Any other statement of the form:

2) If every — is — and — is a — then — is —

is equally true, so long merely as the first and fourth blanks are filled alike, and the second and last, and the third and fifth. A still simpler logical truth is:

3) Socrates is mortal or Socrates is not mortal;

alteration of'Socrates' and 'mortal' is incapable of making the statement false. (Quine, 1981:1—2).

The attempt to provide a formal account of validity might be understood as an attempt to construct a formal logic with a proof procedure enabling one to decide whether any statement is or is not a logical truth. Although the problems of interpreting the logical constants are relevant, there seems no reason to suppose that this project is in principle hopeless for the same reasons that the program of formal semantics is futile. The major difference is that there is no need to extend the „theory of truth" to account for non-logical inferences licensed by the semantical relationships among expressions.

The problems with formal semantics, we saw, arise because formal representations of a natural language cannot clarify the semantic relationship between truth and reference in a natural language. This problem does not arise in formal representations of validity because this formalization does not make the necessarily abortive attempt to clarify any semantical concepts.

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