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Index, context, and content

1. SYNOPSIS

If a grammar is to do its jobs as part of a systematic restatement of our common knowledge about our practices of linguistic communication, it must assign semantic values that determine which sentences are true in which contexts. If the semantic values of sentences also serve to help determine the semantic values of larger sentences having the given sentence as a constituent, then also the semantic values must determine how the truth of a sentence varies when certain features of context are shifted, one feature at a time.

Two sorts of dependence of truth on features of context are involved: *context-dependence* and *index-dependence*. A *context* is a location – time, place, and possible world – where a sentence is said. It has countless features, determined by the character of the location. An *index* is an *n*-tuple of features of context, but not necessarily features that go together in any possible context. Thus an index might consist of a speaker, a time before his birth, a world where he never lived at all, and so on. Since we are unlikely to think of all the features of

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context on which truth sometimes depends, and hence unlikely to construct adequately rich indices, we cannot get by without context-dependence as well as index-dependence. Since indices but not contexts can be shifted one feature at a time, we cannot get by without index-dependence as well as context-dependence. An assignment of semantic values must give us the relation: sentence *s* is true at context *c* at index *i*, where *i* need not be the index that gives the features of context *c*. Fortunately, an index used together with a context in this way need not give all relevant features of context; only the shiftable features, which are much fewer.

Two alternative strategies are available. (1) Variable but simple semantic values: a sentence has different semantic values at different contexts, and these semantic values are functions from indices to truth values. (2) Complex but constant semantic values: a sentence has the same semantic value at all contexts, and this value is a function from context-index pairs to truth values. But the strategies are not genuine alternatives. They differ only superficially. Hence attempts to argue for the superiority of one over the other are misguided. Whatever one can do, the other can do, and with almost equal convenience.

2. PHILOSOPHY AND GRAMMAR

We have made it part of the business of philosophy to set down, in an explicit and systematic fashion, the broad outlines of our common knowledge about the practice of language. Part of this restatement of what we all know should run as follows. The foremost thing we do with words is to impart information, and this is how we do it. Suppose (1) that you do not know whether *A* or *B* or . . . ; and (2) that I do know; and (3) that I want you to know; and (4) that no extraneous reasons much constrain my choice of words; and (5) that we both know that the conditions (1)–(5) obtain. Then I will be truthful and you will be trusting and thereby you will come to share my knowledge. I will find something to say that depends for its truth on whether *A* or *B* or . . . and that I take to be true. I will say it and you will hear it. You, trusting me to be willing and able to tell the truth, will then be in a position to infer whether *A* or *B* or. . . .

That was not quite right. Consider the tribe of Liars – the ones in

the riddles, the folk we fear to meet at forks in the road. Unlike common liars, the Liars have no wish to mislead. They convey information smoothly to each other; and once we know them for what they are, we too can learn from them which road leads to the city. They are as truthful in their own way as we are in ours. But they are truthful in Liarese and we are truthful in English, and Liarese is a language like English but with all the truth values reversed. The missing part of my story concerns our knowledge that we are not of the tribe of Liars. I should not have spoken simply of my truthfulness and your trust. I should have said: I will be truthful-in-English and you will be trusting-in-English, and that is how you will come to share my knowledge. I will find something to say that depends for its truth-in-English on whether *A* or *B* or . . . and that I take to be true-in-English; you will trust me to be willing and able to tell the truth-in-English. Truthfulness-in-Liarese would have done as well (and truthfulness-in-English would not have done) had you been trusting-in-Liarese.

Truth-in-English – what is that? A complete restatement of our common knowledge about the practice of language may not use this phrase without explaining it. We need a chapter which culminates in a specification of the conditions under which someone tells the truth-in-English. I call that chapter a *grammar* for English.

I use the word 'grammar' in a broad sense. Else I could have found little to say about our assigned topic. If it is to end by characterizing truth-in-English, a grammar must cover most of what has been called syntax, much of what has been called semantics, and even part of the miscellany that has been called pragmatics. It must cover the part of pragmatics that might better have been called indexical semantics – pragmatics in the sense of Bar-Hillel [1] and Montague [10]. It need not cover some other parts of pragmatics: conversational appropriateness and implicature, disambiguation, taxonomy of speech acts, or what it is about us that makes some grammars right and others wrong.

I am proposing both a delineation of the subject of grammar and a modest condition of adequacy for grammars. A good grammar is one suited to play a certain role in a systematic restatement of our common knowledge about language. It is the detailed and parochial part – the part that would be different if we were Liars, or if we were

Japanese. It attaches to the rest by way of the concept of truth-in-English (or in some other language), which the grammar supplies and which the rest of the restatement employs.

The subject might be differently delineated, and more stringent conditions of adequacy might be demanded. You might insist that a good grammar should be suited to fit into a psycholinguistic theory that goes beyond our common knowledge and explains the inner mechanisms that make our practice possible. There is nothing wrong in principle with this ambitious goal, but I doubt that it is worthwhile to pursue it in our present state of knowledge. Be that as it may, it is certainly not a goal I dare pursue.

3. CONTEXT-DEPENDENCE

Any adequate grammar must tell us that truth-in-English depends not only on what words are said and on the facts, but also on features of the situation in which the words are said. The dependence is surprisingly multifarious. If the words are 'Now I am hungry.' then some facts about who is hungry when matter, but also it matters when the speech occurs and who is speaking. If the words are 'France is hexagonal.' of course the shape of France matters, but so do the aspects of previous discourse that raise or lower the standards of precision. Truth-in-English has been achieved if the last thing said before was 'Italy is sort of boot-shaped.' but not if the last thing said before was 'Shapes in geometry are ever so much simpler than shapes in geography'. If the words are 'That one costs too much.' of course the prices of certain things matter, and it matters which things are traversed by the line projected from the speaker's pointing finger, but also the relations of comparative salience among these things matter. These relations in turn depend on various aspects of the situation, especially the previous discourse. If the words are 'Fred came floating up through the hatch of the spaceship and turned left.', then it matters what point of reference and what orientation we have established. Beware: these are established in a complicated way. (See Fillmore [3].) They need not be the location and orientation of the speaker, or of the audience, or of Fred, either now or at the time under discussion.

When truth-in-English depends on matters of fact, that is called

contingency. When it depends on features of context, that is called *indexicality.* But need we distinguish? Some contingent facts are facts about context, but are there any that are not? Every context is located not only in physical space but also in logical space. It is at some particular possible world – our world if it is an actual context, another world if it is a merely possible context. (As you see, I presuppose a metaphysics of modal realism. It's not that I think this ontological commitment is indispensable to proper philosophy of language – in philosophy there are usually many ways to skin a cat. Rather, I reject the popular presumption that modal realism stands in need of justification.) It is a feature of any context, actual or otherwise, that its world is one where matters of contingent fact are a certain way. Just as truth-in-English may depend on the time of the context, or the speaker, or the standards of precision, or the salience relations, so likewise may it depend on the world of the context. Contingency is a kind of indexicality.

4. SEMANTIC VALUES

A concise grammar for a big language – for instance, a finite grammar for an infinite language like ours – had better work on the compositional principle. Most linguistic expressions must be built up stepwise, by concatenation or in some more complicated way, from a stock of basic expressions.

(Alternatively, structures that are not linguistic expressions may be built up stepwise, and some of these may be transformed into linguistic expressions. For evidence that these approaches differ only superficially, see Cooper and Parsons [4].)

To go beyond syntax, a compositional grammar must associate with each expression an entity that I shall call its *semantic value.* (In case of ambiguity, more than one must be assigned.) These play a twofold role. First, the semantic values of some expressions, the *sentences,* must enter somehow into determining whether truth-in-English would be achieved if the expression were uttered in a given context. Second, the semantic value of any expression is to be determined by the semantic values of the (immediate) constituents from which it is built, together with the way it is built from them.

To the extent that sentences are built up, directly or indirectly, from sentences, the semantic values of sentences have both jobs to do. The semantic values of non-sentences have only one job: to do their bit toward determining the semantic values of the sentences.

Semantic values may be anything, so long as their jobs get done. Different compositional grammars may assign different sorts of semantic values, yet succeed equally well in telling us the conditions of truth-in-English and therefore serve equally well as chapters in the systematic restatement of our common knowledge about language. Likewise, different but equally adequate grammars might parse sentences into different constituents, combined according to different rules.

More ambitious goals presumably would mean tighter constraints. Maybe a grammar that assigns one sort of semantic value could fit better into future psycholinguistics than one that assigns another sort. Thereof I shall not speculate.

Another source of obscure and unwanted constraints is our traditional semantic vocabulary. We have too many words for semantic values, and for the relation of having a semantic value:

apply to	express	represent
Bedeutung	extension	satisfy
character	fall under	sense
comply with	intension	signify
comprehension	interpretation	*Sinn*
concept	meaning	stand for
connotation	name	statement
denote	nominatum	symbolize
designate	refer	true of

for a start. Not just any of these words can be used for just any sort of assignment of semantic values, but it is far from clear which go with which. (See Lewis [9].) There are conflicting tendencies in past usage, and presuppositions we ought to abandon. So I have thought it best to use a newish and neutral term, thereby dodging all issues about which possible sorts of semantic values would deserve which of the familiar names.

5. SHIFTINESS

Often the truth (-in-English) of a sentence in a context depends on the truth of some related sentence when some feature of the original context is shifted. 'There have been dogs.' is true now iff 'There are dogs.' is true at some time before now. 'Somewhere the sun is shining.' is true here iff 'The sun is shining.' is true somewhere. 'Aunts must be women.' is true at our world iff 'Aunts are women.' is true at all worlds. 'Strictly speaking, France is not hexagonal.' is true even under low standards of precision iff 'France is not hexagonal.' is true under stricter standards.

In such a case, it may be good strategy for a compositional grammar to parse one sentence as the result of applying a modifier to another:

'There have been dogs.' = 'It has been that . . .' + 'There are dogs.'

'Somewhere the sun is shining.' = 'Somewhere . . .' + 'The sun is shining.'

'Aunts must be women.' = 'It must be that . . .' + 'Aunts are women.'

'Strictly speaking, France is not hexagonal.' = 'Strictly speaking . . .' + 'France is not hexagonal.'

Then if the semantic value of the first sentence is to determine its truth in various contexts, and if that value is to be determined by the values of constituents, then the value of the second sentence must provide information about how the second sentence varies in truth value when the relevant feature of context is shifted.

I emphasized that context-dependence was multifarious, but perhaps the shifty kind of context-dependence is less so. The list of shiftable features of context may be quite short. I have suggested that the list should include time, place, world, and (some aspects of) standards of precision. I am not sure what more should be added.

To be sure, we could speak a language in which 'As for you, I am hungry.' is true iff 'I am hungry.' is true when the role of speaker is shifted from me to you – in other words, iff you are hungry. We

could – but we don't. For English, the speaker is not a shiftable feature of context. We could speak a language in which 'Backward, that one costs too much.' is true iff 'That one costs too much.' is true under a reversal of the direction the speaker's finger points. But we don't. We could speak a language in which 'Upside down, Fred came floating up through the hatch of the spaceship and turned left.' is true iff 'Fred came floating up through the hatch of the spaceship and turned left.' is true under a reversal of the orientation established in the original context. But we don't. There are ever so many conceivable forms of shiftiness that we don't indulge in.

(To forestall confusion, let me say that in calling a feature of context unshiftable, I do not mean that we cannot change it. I just mean that it does not figure in any rules relating truth of one sentence in context to truth of a second sentence when some feature of the original context is shifted. The established orientation of a context is changeable but probably not shiftable. The world of a context is shiftable but not changeable.)

We seem to have a happy coincidence. To do their first job of determining whether truth-in-English would be achieved if a given sentence were uttered in a given context, it seems that the semantic values of sentences must provide information about the dependence of truth on features of context. That seems to be the very information that is also needed, in view of shiftiness, if semantic values are to do their second job of helping to determine the semantic values of sentences with a given sentence as constituent. How nice.

No; we shall see that matters are more complicated.

6. CONTEXT AND INDEX

Whenever a sentence is said, it is said at some particular time, place, and world. The production of a token is located, both in physical space-time and in logical space. I call such a location a *context.*

That is not to say that the only features of context are time, place, and world. There are countless other features, but they do not vary independently. They are given by the intrinsic and relational character of the time, place, and world in question. The speaker of the context is the one who is speaking at that time, at that place, at that

world. (There may be none; not every context is a context of utterance. I here ignore the possibility that more than one speaker might be speaking at the same time, place, and world.) The audience, the standards of precision, the salience relations, the presuppositions . . . of the context are given less directly. They are determined, so far as they are determined at all, by such things as the previous course of the conversation that is still going on at the context, the states of mind of the participants, and the conspicuous aspects of their surroundings.

Suppose a grammar assigns semantic values in such a way as to determine, for each context and each sentence (or for each disambiguation of each sentence), whether that sentence is true in that context. Is that enough? What more could we wish to know about the dependence of truth on features of context?

That is not enough. Unless our grammar explains away all seeming cases of shiftiness, we need to know what happens to the truth values of constituent sentences when one feature of context is shifted and the rest are held fixed. But features of context do not vary independently. No two contexts differ by only one feature. Shift one feature only, and the result of the shift is not a context at all.

Example: under one disambiguation, 'If someone is speaking here then I exist.' is true at any context whatever. No shift from one context to another can make it false. But a time shift, holding other features fixed, can make it false; that is why 'Forevermore, if someone is speaking here then I will exist.' is false in the original context. Likewise a world shift can make it false; that is why 'Necessarily, if someone is speaking here then I must exist.' is false in the original context. The shifts that make the sentence false must not be shifts from one context to another.

The proper treatment of shiftiness requires not contexts but *indices:* packages of features of context so combined that they *can* vary independently. An index is an n-tuple of features of context of various sorts; call these features the *coordinates* of the index. We impose no requirement that the coordinates of an index should all be features of any one context. For instance, an index might have among its coordinates a speaker, a time before his birth, and a world where he never lived at all. Any n-tuple of things of the right kinds is an index. So, although we can never go from one context to another by

shifting only one feature, we can always go from one index to another by shifting only one coordinate.

Given a context, there is an index having coordinates that match the appropriate features of that context. Call it the *index of* the context. If we start with the index of a context and shift one coordinate, often the result will be an index that is not the index of any context. That was the case for the time shifts and world shifts that made our example sentence 'If someone is speaking here then I exist.' go false.

Contexts have countless features. Not so for indices: they have the features of context that are packed into them as coordinates, and no others. Given an index, we cannot expect to recover the salience relations (for example) by asking what was salient to the speaker of the index at the time of the index at the world of the index. That method works for a context, or for the index of a context, but not for indices generally. What do we do if the speaker of the index does not exist at that time at that world? Or if the speaker never exists at that world? Or if the time does not exist at the world, since that world is one with circular time? The only way we can recover salience relations from an arbitrary index is if we have put them there as coordinates, varying independently of the other coordinates. Likewise for any other feature of context.

I emphasized that the dependence of truth on context was surprisingly multifarious. It would be no easy matter to devise a list of all the features of context that are sometimes relevant to truth-in-English. In [7] I gave a list that was long for its day, but not nearly long enough. Cresswell rightly complained:

> Writers who, like David Lewis, . . . try to give a bit more body to these notions talk about times, places, speakers, hearers, . . . etc. and then go through agonies of conscience in trying to decide whether they have taken account of enough. It seems to me impossible to lay down in advance what sort of thing is going to count [as a relevant feature of context]. . . . The moral here seems to be that there is no way of specifying a finite list of contextual coordinates. ([2], p. 8)

Cresswell goes on to employ objects which, though not the same as the time-place-world locations I have called contexts, are like them

and unlike indices in giving information about indefinitely many features of context.

7. THE INDEXICALIST'S DILEMMA

To do their first job of determining whether truth-in-English would be achieved if a given sentence were uttered in a given context, the semantic values of sentences must provide information about the dependence of truth on context. Dependence on indices won't do, unless they are built inclusively enough to include every feature that is ever relevant to truth. We have almost certainly overlooked a great many features. So for the present, while the task of constructing an explicit grammar is still unfinished, the indices we know how to construct won't do. Indices are no substitute for contexts because contexts are rich in features and indices are poor.

To do their second job of helping to determine the semantic values of sentences with a given sentence as a constituent, the semantic values of sentences must provide information about the dependence of truth on indices. Dependence on contexts won't do, since we must look at the variation of truth value under shifts of one feature only. Contexts are no substitute for indices because contexts are not amenable to shifting.

Contexts and indices will not do each other's work. Therefore we need both. An adequate assignment of semantic values must capture two different dependencies of truth on features of context: context-dependence and index-dependence. We need the relation: sentence s is true at context c at index i. We need both the case in which i is the index of the context c and the case in which i has been shifted away, in one or more coordinates, from the index of the context. The former case can be abbreviated. Let us say that sentence s is true at context c iff s is true at c at the index of the context c.

Once we help ourselves to contexts and indices both, we need not go through agonies of conscience to make sure that no relevant features of context have been left out of the coordinates of our indices. Such difficult inclusiveness is needed only if indices are meant to replace contexts. If not, then it is enough to make sure that every shiftable feature of context is included as a coordinate. If most features of context that are relevant to truth are unshiftable, as it seems

reasonable to hope, then it might not be too hard to list all the shiftable ones.

8. SCHMENTENCES

Besides the ambitious plan of dispensing with contexts after learning how to construct sufficiently inclusive indices, there is another way to evade my conclusion that we need context-dependence and index-dependence both. The latter was needed only for the treatment of shiftiness, and we might claim that there is no such thing. We can perfectly well build a compositional grammar in which it never happens that sentences are constituents of other sentences, or of anything else. (Make an exception if you like for truth-functional compounding, which isn't shifty; but I shall consider the strategy in its most extreme form.) In this grammar sentences are the output, but never an intermediate step, of the compositional process.

If we take this course, we will need replacements for the sentences hitherto regarded as constituents. The stand-ins will have to be more or less sentence-like. But we will no longer call them sentences, reserving that title for the output sentences. Let us call them *schmentences* instead. We can go on parsing 'There have been dogs.' as the result of applying 'It has been that . . .' to 'There are dogs.'; but we must now distinguish the constituent *schmentence* 'There are dogs.' from the homonymous *sentence,* which is not a constituent of anything. Now the semantic values of genuine sentences have only the first of their former jobs: determining whether truth-in-English would be achieved if a given sentence were uttered in a given context. For that job, dependence of truth on context is all we need. The second job, that of helping to determine the semantic values of sentences with a given constituent, now belongs to the semantic values of schmentences. That job, of course, still requires index-dependence (and context-dependence too, unless the indices are inclusive enough). But nothing requires index-dependent truth of genuine sentences. Instead of giving the semantic values of sentences what it takes to do a double job, we can divide the labour.

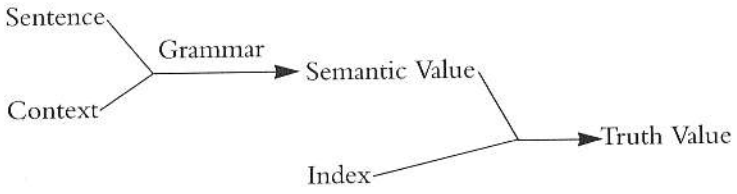
A variant of the schmentencite strategy is to distinguish schmentences from sentences syntactically. We might write the schmentences without a capital letter and a period. Or we might decorate the schmentences with free variables as appropriate. Then we might parse 'There have been dogs.' as the result of applying 'It has been that . . .' to the schmentence 'there are dogs at *t*' where '*t*' is regarded as a variable over times. The confusing homonymy between schmentences and sentences is thereby removed. Index-dependence of the schmentence thus derives from index-dependence of the values of its variables. Schmentences would be akin to the open formulas that figure in the standard treatment of quantification. Truth of a schmentence at an index would be like satisfaction of a formula by an assignment of values to variables. But while the schmentencite might proceed in this way, I insist that he need not. Not all is a variable that varies. If the coordinates of indices were homogeneous in kind and unlimited in number – which they are not – then it might be handy to use variables as a device for keeping track of exactly how the truth value of a schmentence depends on the various coordinates. But variables can be explained away even then (see Quine [14]); or rather, they can be replaced by other devices to serve the same purpose. If the coordinates of indices are few and different in kind, it is not clear that variables would even be a convenience.

(Just as we can liken index-dependent schmentences to formulas that depend for truth on the assignment of values to their free variables, so also we can go in the reverse direction. We can include the value assignments as coordinates of indices, as I did in [7], and thereby subsume assignment-dependence of formulas under index-dependence of sentences. However, this treatment is possible only if we limit the values of variables. For instance we cannot let a variable take as its value a function from indices, since that would mean that some index was a member of a member of . . . a member of itself – which is impossible.)

I concede this victory to the schmentencite: strictly speaking, we *do not need* to provide both context-dependence and index-dependence in the assignment of semantic values to genuine sentences. His victory is both cheap and pointless. I propose to ignore it.

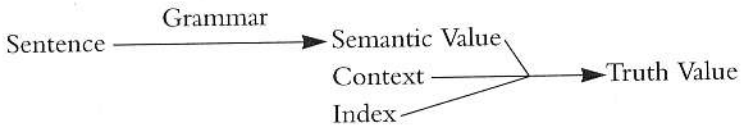
Therefore, let us agree that sentences depend for their truth on both context and index. What, then, should we take as their semantic values? We have two options.

First option: the semantic values of sentences are variable but simple. A value for a sentence is a function, perhaps partial, from indices to truth values. (Alternatively, it is a set of indices.) However, a sentence may have different semantic values in different contexts, and the grammar must tell us how value depends on context. The grammar assigns a semantic value (or more than one, in case of ambiguity) to each sentence-context pair. The value in turn is something which, together with an index, yields a truth value. Diagrammatically:



Sentence s is true at context c at index i iff $V^s_c(i)$ is truth, where V^s_c is the value of s at c. Sentence s is true at context c iff $V^s_c(i_c)$ is truth, where i_c is the index of the context c.

Second option: the semantic values of sentences are *constant but complicated*. A value for a sentence is a function, perhaps partial, from combinations of a context and an index to truth values. (Alternatively, it is a set of context-index combinations.) The semantic value of a sentence (or its set of values, in case of ambiguity) does not vary from context to context. The grammar assigns it once and for all. Diagrammatically:



Sentence s is true at context c at index i iff $V^s(c + i)$ is truth, where V^s is the constant semantic value of s. Sentence s is true at context c

iff $V^s(c + i_c)$ is truth, where i_c is the index of the context c. Context-index combinations could be taken in either of two ways: as pairs $\langle c, i \rangle$ of a context c and an index i, or alternatively as $(n + 1)$-tuples $\langle c, i_1, \ldots, i_n \rangle$ that start with c and continue with the n coordinates of i.

(It is worth mentioning and rejecting a zeroth option: the semantic values of sentences are *very variable but very simple*. They are simply truth values; however, a sentence has different semantic values at different context-index combinations. This option flouts the compositional principle, which requires that the semantic values of sentences be determined by the semantic values of their constituent sentences. The truth value of a sentence at a given context and index may depend not on the truth value of a constituent sentence at that context and index, but rather on its truth value at that context and other, shifted indices. The less I have said about what so-called semantic values must be, the more I am entitled to insist on what I *did* say. If they don't obey the compositional principle, they are not what I call semantic values.)

Asked to choose between our two options, you may well suspect that we have a distinction without a difference. Given a grammar that assigns semantic values according to one option, it is perfectly automatic to convert it into one of the other sort. Suppose given a grammar that assigns variable but simple semantic values: for any sentence s and context c, the value of s at c is V^s_c. Suppose you would prefer a grammar that assigns constant but complicated values. Very well: to each sentence s, assign once and for all the function V^s such that, for every context c and index i, $V^s(c + i)$ is $V^s_c(i)$. Or suppose given a grammar that assigns constant but complicated semantic values: to sentence s it assigns, once and for all, the value V^s. Suppose you would prefer a grammar that assigns variable but simple values. Very well: to the sentence s and context c, assign the function V^s_c such that, for every index i, $V^s_c(i)$ is $V^s(c + i)$.

Given the ease of conversion, how could anything of importance possibly turn on the choice between our two options? Whichever sort of assignment we are given, we have the other as well; and the assigned entities equally well deserve the name of semantic values because they equally well do the jobs of semantic values. (If we asked whether they equally well deserved some other name in our traditional semantic vocabulary, that would be a harder question but an

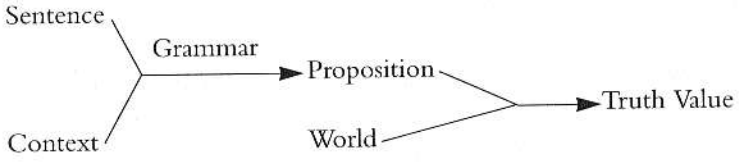
idle one. If we asked whether they would fit equally well into future psycholinguistics, that would – in my opinion – be a question so hard and speculative as to be altogether futile.) How could the choice between the options possibly be a serious issue?

I have certainly not taken the issue very seriously. In [7] I opted for constant but complicated semantic values (though not quite as I described them here, since I underestimated the agonies of constructing sufficiently rich indices). But in [6] and [8], written at about the same time, I thought it made for smoother exposition to use variable but simple values (again, not quite as described here). I thought the choice a matter of indifference, and took for granted that my readers would think so to.

But I was wrong. Robert Stalnaker [11] and David Kaplan [5] have taken the issue very seriously indeed. They have argued that we ought to prefer the first option: variable but simple semantic values. Each thinks that simple, context-dependent semantic values of the proper sort (but not complicated constant ones) are good because they can do an extra job, besides the two jobs for semantic values that we have been considering so far. They differ about what this extra job is, however, and accordingly they advocate somewhat different choices of variable but simple values.

10. CONTENT AS OBJECT OF ATTITUDES: STALNAKER

In Stalnaker's theory, the semantic value of a sentence in context (after disambiguation) is a *proposition:* a function from possible worlds to truth values. Diagrammatically:



He mentions the alternative analysis on which a sentence is assigned, once and for all, a function from context-world combinations to truth values.

> It is a simpler analysis than the one I am sketching; I need some argument for the necessity or desirability of the extra step on the road from sentences to truth values. This step is justified only if the middlemen – the propositions – are of some independent interest,. . . . The independent interest in propositions comes from the fact that they are the objects of illocutionary acts and propositional attitudes. A proposition is supposed to be the common content of statements, judgements, promises, wishes and wants, questions and answers, things that are possible or probable. ([11], pp. 277–278)

I agree with much of this. Stalnaker is right that we can assign propositional content to sentences in context, taking propositions as functions from worlds to truth values. He is also right that propositions have an independent interest as suitable objects for attitudes such as belief, and in the other ways he mentions. (Here I pass over a big idealization; it could be defended in several ways and I am not sure which I prefer.) Furthermore, an account of truthful communication – not part of the grammar itself, but another chapter in the systematic restatement of our common knowledge about language – must concern itself at least implicitly with the relations between the propositional objects of the speaker's attitudes and the propositional content of his sentences.

To revert to our initial example: I know, and you need to know, whether *A* or *B* or . . . ; so I say a sentence that I take to be true-in-English, in its context, and that depends for its truth on whether *A* or *B* or . . . ; and thereby, if all goes well, you find out what you needed to know. My choice of what to say is guided by my beliefs. It depends on whether I believe the proposition true at exactly the *A*-worlds, or the one true at exactly the *B*-worlds, or. . . . In the simplest case, the sentence I choose to say is one whose propositional content (in English, in context) is whichever one of these propositions I believe.

That is all very well, but it does not mean that we need to equate the propositional content and the semantic value of a sentence in context. It is enough that the assignment of semantic values should somehow determine the assignment of propositional content. And it does, whether we opt for variable but simple values or for constant but complicated ones. Either way, we have the relation: sentence *s* is true at context *c* at index *i*. From that we can define the proposi-

tional content of sentence s in context c as that proposition that is true at world w iff s is true at c at the index i_c^w that results if we take the index i_c of the context c and shift its world coordinate to w.

(We can call this the *horizontal propositional content* of s in c; borrowing and modifying a suggestion of Stalnaker in [12] we could also define the *diagonal propositional content* of s in c. Suppose someone utters s in c but without knowing whether the context of his utterance is c or whether it is some other possible context in some other world which is indistinguishable from c. Since all ignorance about contingent matters of fact is ignorance about features of context, the sort of ignorance under consideration is a universal predicament. Let c^w be that context, if there is one, that is located at world w and indistinguishable from c; then for all the speaker knows he might inhabit w and c^w might be the context of his utterance. (I ignore the case of two indistinguishable contexts at the same world.) Let $i_c w$ be the index of the context c^w; note that this may differ from the index i_c^w mentioned above, since the contexts c and c_w will differ not only in world but in other features as well and the indices of the differing contexts may inherit some of their differences. We define the diagonal content of s in c as that proposition that is true at a world w iff (1) there is a context c^w of the sort just considered, and (2) s is true at c^w at $i_c w$. Stalnaker shows in [12] that horizontal and diagonal content both enter into an account of linguistic communication. The former plays the central role if there is no significant ignorance of features of context relevant to truth; otherwise we do well to consider the latter instead. Stalnaker speaks of reinterpreting sentences in certain contexts so that they express their diagonal rather than their horizontal content. I find this an inadvisable way of putting the point, since if there is a horizontal-diagonal ambiguity it is very unlike ordinary sorts of ambiguity. I doubt that we can perceive it as an ambiguity; it is neither syntactic nor lexical; and it is remarkably widespread. I think it might be better to say that a sentence in context has both a horizontal and a diagonal content; that these may or may not be the same; and that they enter in different ways into an account of communication. Be that as it may, I shall from now on confine my attention to propositional content of the horizontal sort; but what I say would go for diagonal content also.)

It would be a convenience, nothing more, if we could take the propositional content of a sentence in context as its semantic value. But we cannot. The propositional contents of sentences do not obey the compositional principle, therefore they are not semantic values. Such are the ways of shiftiness that the propositional content of 'Somewhere the sun is shining.' in context c is not determined by the content in c of the constituent sentence 'The sun is shining.'. For an adequate treatment of shiftiness we need not just world-dependence but index-dependence – dependence of truth on all the shiftable features of context. World is not the only shiftable feature.

(Stalnaker does suggest, at one point, that he might put world-time pairs in place of worlds. "Does a tensed sentence determine a proposition which is sometimes true, sometimes false, or does it express different timeless propositions at different times? I doubt that a single general answer can be given." ([11], p. 289) But this does not go far enough. World and time are not the only shiftable features of context. And also perhaps it goes too far. If propositions are reconstrued so that they may vary in truth from one time to another, are they still suitable objects for propositional attitudes?*)

There is always the schementencite way out: to rescue a generalization, reclassify the exceptions. If we said that the seeming sentences involved in shiftiness of features other than world (and perhaps time) were not genuine sentences, then we would be free to say that the semantic value of a genuine sentence, in context, was its propositional content. But what's the point?

I have been a bit unfair to complain that the propositional content of a sentence in context is not its semantic value. Stalnaker never said it was. 'Semantic value' is my term, not his. Nor did he falsely claim that contents obeys the compositional principle.

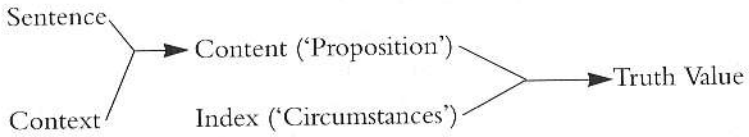
But my point can be stated fairly. Nothing is wrong with what Stalnaker says, but by omission he gives a misleading impression of simplicity. Besides the propositional content of a given sentence in a given context, and besides the function that yields the content of a given sentence in any context, we need something more – some-

* [Added 1996] Yes indeed. For discussion, see my 'Attitudes *De Dicto* and *De Se*', *The Philosophical Review* 88 (1979), pp. 513–543.

thing that goes unmentioned in Stalnaker's theory. We need an assignment of semantic values to sentences (or to schmentences) that captures the dependence of truth both on context and on index, and that obeys the compositional principle. An assignment of variable but simple semantic values would meet the need, and so would an assignment of constant but complicated ones. Neither of these could *be* the assignment of propositional content. Either would suffice to determine it. So Stalnaker's discussion of propositional content affords no reason for us to prefer variable but simple semantic values rather than constant but complicated ones.

11. CONTENT AS WHAT IS SAID: KAPLAN

Kaplan [5], unlike Stalnaker, clearly advocates the assignment of variable but simple semantic values as I have described it here. His terminology is like Stalnaker's, but what he calls the content of a sentence in context is a function from moderately rich indices to truth values. Diagrammatically:



I cannot complain against Kaplan, as I did against Stalnaker, that his so-called contents are not semantic values because they violate compositionality. But Kaplan cannot plausibly claim, as Stalnaker did, that his contents have an independent interest as suitable objects for propositional attitudes.

Kaplan claims a different sort of independent interest for his contents – that is, for variable but simple semantic values. We have the intuitive, pre-theoretical notion of 'what is said' by a sentence in context. We have two sentences in two contexts, or one sentence in two contexts, or two sentences in one context; and we judge that what has been said is or is not the same for both sentence-context pairs. Kaplan thinks that if we assign simple, context-dependent semantic values of the right sort, then we can use them to explicate our judgements of sameness of what is said: what is said by sentence

s_1 in context c_1 is the same as what is said by sentence s_2 in context c_2 iff the semantic value of s_1 in c_1 and the semantic value of s_2 in c_2 are identical. Indeed, Kaplan suggests that our informal locution 'what is said' is just a handy synonym for his technical term 'content'.

> Thus if I say, today, 'I was insulted yesterday.' and you utter the same words tomorrow what is said is different. If what we say differs in truth value, that is enough to show that we say different things. But even if the truth values were the same, it is clear that there are possible circumstances in which what I said would be true but what you said would be false. Thus we say different things. Let us call this first kind of meaning – what is said – *content*. ([5], p. 19)

Consider some further examples. (1) I say 'I am hungry.'. You simultaneously say to me 'You are hungry.'. What is said is the same. (2) I say 'I am hungry.'. You simultaneously say 'I am hungry.'. What is said is not the same. Perhaps what I said is true but what you said isn't. (3) I say on 6 June 1977 'Today is Monday.'. You say on 7 June 1977 'Yesterday was Monday.'. What is said is the same. (4) Same for me, but you say on 7 June 1977 'Today is Tuesday.'. What is said is the same. (5) I say on 6 June 1977 'It is Monday.'. I might have said, in the very same context, '6 June 1977 is Monday.'. or perhaps 'Today is Monday.'. What is said is not the same. What I did say is false on six days out of every seven, whereas the two things I might have said are never false.

I put it to you that not one of these examples carries conviction. In every case, the proper naive response is that in some sense what is said is the same for both sentence-context pairs, whereas in another – equally legitimate – sense, what is said is not the same. Unless we give it some special technical meaning, the locution 'what is said' is very far from univocal. It can mean the propositional content, in Stalnaker's sense (horizontal or diagonal). It can mean the exact words. I suspect that it can mean almost anything in between. True, what is said is the same, in some sense, iff the semantic value is the same according to a grammar that assigns variable but simple values. So what, unless the sense in question is more than one among many? I think it is also so that what is said is the same, in some sense, iff the semantic value is the same according to a grammar that assigns constant but complicated values.

Kaplan's readers learn to focus on the sense of 'what is said' that he has in mind, ignoring the fact that the same words can be used to make different distinctions. For the time being, the words mark a definite distinction. But why mark that distinction rather than others that we could equally well attend to? It is not a special advantage of variable but simple semantic values that they can easily be used to explicate those distinctions that they can easily be used to explicate.

12. SOLIDARITY FOREVER

I see Stalnaker and Kaplan as putting forth package deals. Offered the whole of either package – take it or leave it – I take it. But I would rather divide the issues. Part of each package is a preference, which I oppose as unwarranted and arbitrary, for variable but simple semantic values. But there is much in each package that I applaud; and that I have incorporated into the proposals of the present paper, whichever option is chosen. In particular there are three points on which Stalnaker and Kaplan and I join in disagreeing with my earlier self, the author of [7].

First, the author of [7] thought it an easy thing to construct indices richly enough to include all features of context that are ever relevant to truth. Stalnaker and Kaplan and I all have recourse to genuine context-dependence and thereby shirk the quest for rich indices. Stalnaker and Kaplan do not dwell on this as a virtue of their theories, but it is one all the same.

Second, I take it that Stalnaker and Kaplan and I join in opposing any proposal for constant but complicated but not complicated enough semantic values that would ignore the following distinction. There are sentences that are true in any context, but perhaps not necessarily true; and there are sentences in context that are necessarily true, though perhaps the same sentence is not necessarily true, or not true at all, in another context. (This is at least an aspect of Kripke's well-known distinction between the *a priori* and the necessary.) The distinction might be missed by a treatment that simply assigns functions from indices to truth values (as in [7]), or functions from contexts to truth values, as the constant semantic values of sentences. It is captured by any treatment that combines context-

dependence and index-dependence, as in Kaplan's theory or the treatment proposed here; it is likewise captured by any treatment that combines context-dependence and world-dependence, as in Stalnaker's theory or my [6] and [8]. In the first case it is the distinction between (1) a sentence that is true at every context c at the index i_c of c, and (2) a sentence that is true at a particular context c at every index i'' that comes from the index i_c of the context c by shifting the world coordinate. In the second case it is the distinction between (1) a sentence that is true at every context c at the world of c, and (2) a sentence that is true at some particular context c at every world.

Third, all three of us, unlike the author of [7], have availed ourselves of the device of *double indexing*. Context-dependence and index-dependence (or world-dependence) together give a double world-dependence: truth may depend both on the world of the context and on the world-coordinate of the index, and these may differ since the latter may have been shifted. That facilitates the semantic analysis of such modifiers as 'actually': 'Actually ϕ.' is true at context c at index i iff ϕ is true at c at i'', the index that comes from i by shifting the world coordinate to the world w of the context c. Similarly, context-dependence and index-dependence together give a double time-dependence (if indices have time coordinates) so that we can give a version of Kamp's analysis of 'now': 'Now ϕ.' is true at context c at index i iff ϕ is true at c at i', the index that comes from i by shifting the time coordinate to the time t of the context c.

For extensive discussions of the uses and origins of double indexing, see Kaplan [5] and van Fraassen [13]. However, there is a measure of disappointment in store. For some uses of double indexing, it is enough to have double world-dependence (or time-dependence) in which the world (or time) appears once shiftably and once unshiftably. 'Actually' (or 'now'), for instance, will always bring us back to the world (or time) of the context. For these uses, the extra world-dependence and time-dependence that come as part of context-dependence will meet our needs. But there are other applications of double indexing, no less useful in the semanticist's toolbox, that require double shiftability. The principal application in [13] is of this sort. Moreover, if we combine several applications that each require double shiftability, we may then need more than double index-

ing. Coordinates that have been shifted for one purpose are not available unshifted for another purpose. If we want multiply shiftable multiple indexing, then we will have to repeat the world or time coordinates of our indices as many times over as needed. The unshiftable world and time of the context will take us only part of the way.

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3

'Whether' report

KNOWING WHETHER AND TELLING WHETHER

Mr. Body lies foully murdered, and the suspects are Green, Mustard, Peacock, Plum, Scarlet, and White. We may take it as settled that one of them did it, and only one. The question is whether Green did it, or Mustard did it, or Peacock, or Plum, or Scarlet, or White. Holmes is on the scene.

If Green did it, then Holmes knows whether Green did it or . . . or White did it if and only if he knows that Green did it. Likewise if Mustard did it, then Holmes knows whether . . . if and only if he knows that Mustard did it. Likewise for the other cases. In short, Holmes knows whether . . . if and only if he knows the true one of the alternatives presented by the 'whether'-clause, whichever one that is.

Similarly for telling. In at least one principal sense, Holmes tells Watson whether Green did it, or Mustard did it, or Peacock, or Plum, or Scarlet, or White, if and only if Holmes tells Watson the true one of the alternatives presented by the 'whether'-clause. That is: if and only if either Green did it and Holmes tells Watson that

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