D. Lewis – "General semantics"

I. Introduction

Assuming that all possible languages may be given a categorially based transformational grammar, we may answer two questions:

(Q1) what are meanings
(Q2) how does semantic composition occur

Restrictions on semantics:

1. *semantics is truth-conditional semantics* (not translational semantics) [for a discussion, see (Carston 2002: 56 ff)]: "Semantics with no treatment of truth conditions is not semantics"; translational semantics just postpones the problem of given a truth-conditional semantics

2. *semantics is not psychological or sociological*: that a population speaks a language may be factored into two moments: (a) the abstract description of a correlation between strings and meanings; (b) the description of the psychological or sociological facts in virtue of which a population uses one semantics rather than another

II. Categorially based grammars

(a) **Base component**:

A *categorial grammar* es a context-free phrase structure grammar with:

1. a small number of *basic categories* (S, N, C)

2. infinitely many *derived categories*: for any categories $c, c_1 \ldots c_n$, we have the derived category $(c/c_1 \ldots c_n)$

3. *context-free phrase structure rules* of the form:

   $$c \rightarrow (c/c_1 \ldots c_n) + c_1 + \ldots + c_n$$

   where '+' indicates CONCAT

4. a finite *lexicon*

A categorial grammar thus defined is a notational variant of a context-free grammar. Only the output of the base component is relevant for semantic interpretation (= the transformational component does not affect meaning).

(b) **Transformational component**:

The base component overgenerates like crazy. A suitable transformational component may filter agrammatical sentences due to: (a) strange word order; (b) inappropriate iteration of operators; (c) allow for noun phrase objects.

If meaning is determined by the base component, then it is easy to provide answers for questions (Q1) and (Q2) above.

III. Intensions for basic categories

An answer to (Q1) has two moments: (a) determine the function of meanings; (b) posit something that accomplishes that function.

One function of meaning is to determine, together with facts about the world, extension (relative to relevant parameters). In particular:

1. sentence meaning determines the conditions under which a sentence is true or false (cf. "Index, context, and content" for a different take on sentential meaning)

2. name meaning determines a thing

3. common noun meaning determines a set

Carnapian intensions (*possibly partial functions from indices to appropriate extensions*) may fulfill this function of meaning.

An **index** is an *n*-tuple of elements (coordinates) which enter into the determination of extensions. An index has several coordinates:

1. *possible world coordinate*

2. *contextual coordinates*: time, place, speaker, audience, indicated objects, previous discourse

3. *assignment coordinate*

However, intensions are not all there is to meaning (since all tautologies differ in meaning and share intension).

[Digression: Tarskian ontological hierarchies and the impossibility of a universal semantic metalanguage]

IV. Intensions for derived categories

There are some C/C (= adjectives) that do not have extensions – v.g., "alleged". It is best to think of meanings of derived categories as **non-Carnapian compositional intensions**: *functions from intensions to intensions*:

> an appropriate intension for a derived category ($c/c_1 \ldots c_n$) is a function from $<c_1$-intensions$\ldots c_n$-intensions$>$ to c-intensions

Semantic projection is *functional application* [Q2]:

$$[[(c/c_1 \ldots c_n) + c_1 + \ldots + c_n]] = \varphi_0(\varphi_1 \ldots \varphi_n)$$

Examples:

- C/C [adjectives]: function from common noun intensions to common noun intensions
- S/N [VP]: function from name intensions to sentence intensions
- (S/N)/(S/N) [adverbs]: function from VP-intensions to VP-intensions

[Simpler intentions might be possible for some categories, but only if functional application as the only form of semantic projection is dropped.]

[*Selection restrictions* may be accounted for by allowing partial compositional intensions: 'green'-intension may be undefined for the 'idea' argument. Alternatively, we may allow for the assignment of null intensions for the problematic cases.]

V. Meanings

Differences in intension give only coarse differences in meaning:

- compound expressions may have same intension and different meaning
- co-intensionality is a sufficient condition of synonymy only for lexical constituents

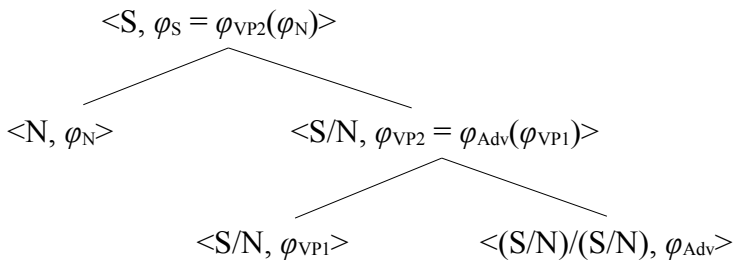
Meanings may be identified with *semantically interpreted phrase markers minus the terminal nodes*: these constructions give, for any constituent, (a) its syntactic category, (b) its intension, and (c) the categories and intensions of its constituents.

A few qualifications:

1. *interpreted phrase structures do not cut too finely*: in ordinary talk, we say that "S" and "it is not the case that not S" have the same meaning; however, the ordinary concept of meaning may signify anything from intensions to interpreted phrase structures (cf. "Index, Context, and Content" for essentially the same point about "saying")

2. *interpreted phrase structures are theoretical constructs*: if they are not meaning themselves, they represent meanings in one-to-one correspondence

Phrase structure rules encode conditions of well-formedness of meanings: a meaning is well formed if it is compound following phrase structure rules. A meaning is a tree obeying certain constraints:



Once we define *truth at an index*, we are able to define further semantic notions:

- a sentence *S* is **analytic** iff it is true at every index
- a sentence *S* is **analytic on a given occasion** iff it is true at every index differing from the index of the context in at most world an assignment
- a sentence *S* is an **eternal truth on an occasion** iff it is true at every index differing from the index of the context in at most time and assignment
- a sentence *S* is **true on an occasion** iff it is true under every assignment

We also are able to define notions of truth stronger than truth at every index by means of the concepts of *semantic variant of (a meaning) m* and of *s-fixed semantic variant of m*: *s-true*, *logically true*, *mathematically true*, *s-consequence*, and others. [Here, logical and mathematical truth are defined without considering alternative interpretations. It seems to be a case of Bolzano-consequence.]

VI. Grammars reconstructed

The *base component* of a categorially based transformational grammar may be specified by giving a *lexicon*: each lexical item is a triple $<e, c, \varphi>$, where *e* is an expression, *c* is a category, and φ is an intension. [I omit the other way of constructing the base.]

The *transformational component* imposes finitely many constraints on finite sequences of phrase markers [i.e., it blocks certain derivations as ill-formed].

We have the following *definitions*:

- A sequence $<p_1 \ldots p_n>$ of phrase markers is a *transformational derivation of p_n from p_1 in T* iff it satisfies the constraints imposed by T

- An expression *e has a meaning m* iff there is a transformational derivation $<p_1 \ldots p_n>$ in T such that *e* is the terminal string of p_n and p_1 represents *m* (relative to the lexicon L)

- *e* is a *meaningful expression* iff *e* has a meaning *m*, for some *m*

- p_n is a **surface structure** of *e*
- p_1 is a **base structure** of *e*
- $p_2 \ldots p_{n-1}$ are **intermediate (deep) structures** of *e*

CONVENTION: let a **base structure** be *any* phrase marker that represents a meaning relative to L (regardless of whether it is the base structure of an expression or not).

Given a representation relation (between expressions and meanings), semantic relations defined for meanings may be defined for expressions.

The transformational component imposes **two constraints on sequences of phrase markers**: (a) a *local constraint*, that two phrase markers in a sequence stand in one (of finitely many) transformational relation; (b) *global constraints*, holding between non-adjacent phrase markers in a sequence.

[Selection restrictions do not occur upon lexical insertion, but abnormal sentences are filtered out before reaching the transformational component.]

VII. Treatment of quantification and noun phrases

Quantifier expressions are of type S/(S/N). Determiners appearing in quantifiers are of type (S/(S/N))/C. Then, compositional intensions for quantifier expressions are functions from S/N-intensions to S-intensions.

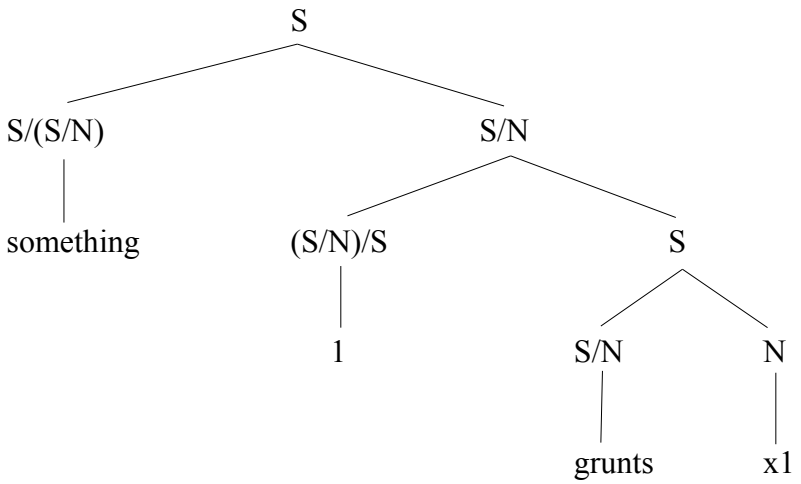
However, occurrences of quantifiers in object position raise problems:

1. We may try "doubling" the object takers to allow for quantifiers in object position [this is not actually just doubling: it is type-shifting]. However, this way of **interpreting quantifiers *in situ*** can not account for the existence of two readings in quantificational constructions like:

   (1) Every woman loves a man

   It can not account for the reading in which "a man" has wide scope.

2. Another solution is **variable binding**: we may posit a binder, of type (S/N)/S, different from the quantifier itself, and have only quantifiers of type S/(S/N). Thus, we have a structure like:



   However, the extension of variable binding to all cases of quantifier interaction puts too much weight on transformations [actually, Lewis' treatment of binding is the standard treatment of P&P; the problem is that in the 1970s, nobody thought of quantifier movement, or of the idea of covert movement].

3. One may try to **assimilate names to quantifiers**: for every name of category N, we define a pseudo-name of category S(S/N); then, we call "NP" to the category S(S/N). This eliminates names as subjects; to eliminate them as objects, we must define pseudo-verbs (as in pseudo-transitives) in order to allow them to take NPs as objects (rather than Ns).

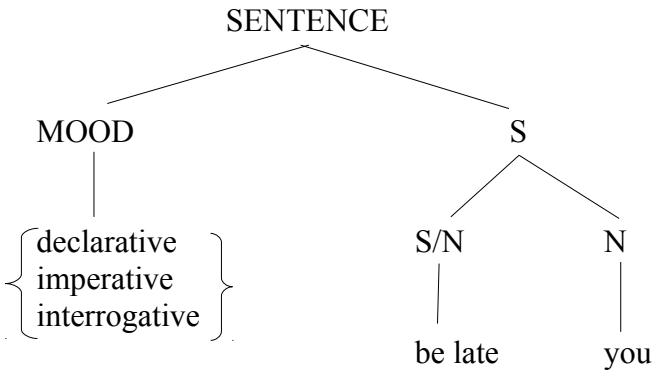
   Once names are eliminated, we can have quantifiers as objects, and avoid variable binding. Some sort of variable binding is still needed, but variables are now pseudo-variables with a lifted type.

4. One last possibility is to **assimilate quantifiers to names**: we posit that the extensions of

NPs are characters (individual or generic, according to whether the NP is a proper name or a quantifier expression). Still, some variable binding is required

VIII. Treatment of non-declaratives

Method of sentence radicals: one way of dealing with non-declaratives is to analyze every sentence into (a) a sentence radical and (b) a mood operator, as in:



Sentence radicals (S) have truth values as extensions. The semantics for moods consists of rules of language use. [Again, this view was standard (and still is) in the 1980s.]

Method of paraphrased performatives: instead, Lewis proposes that non-declaratives be treated as paraphrases of performative sentences:

"Be late"	<	"I command you to be late"
"Are you late?"	<	"I ask you whether you are late"

Issues raised:

1. whether performatives are to be counted as declaratives or not (Lewis feels inclined towards a positive answer)

2. this method calls for an assignment of truth value to non-declarative sentences, and the truth value assigned corresponds to the truth value of the paraphrased performative, which might seem counter-intuitive

3. performatives might not have truth value (Austin)

4. ordinary declaratives should not be treated as paraphrased performatives (otherwise, "the Earth is flat" would be a paraphrase of "I declare that the Earth is flat" and that would assign the wrong truth conditions)

APPENDIX: INDICES EXPANDED

Modification of index coordinates:

1. To accommodate more than one *designatum*: the indicated object coordinate is to be thought

of as an infinite sequence of sets of indicated objects

2. Prominent objects coordinate: in order to account for incomplete definite descriptions

3. Delineation coordinate: in order to account for vagueness

Postscripts to "General Semantics"

A. Index and Context

It is difficult to specify in advance all the relevant coordinates for the determination of extensions. So, instead of indices to determine extensions, let **context** do that job: the features of contexts are given mostly implicitly; a context is to be though of as a triple of world, time and speaker:

$$c = \langle w, t, a \rangle$$

A context is characterized by the fact that the speaker is present at the time of the context at the world of the context. This relatedness ensures that we can retrieve the features of context relevant for the determination of extensions.

However, contexts cannot replace **indices**: the evaluation of sentences containing certain operators demand the variation of parameters in a fashion that destroys the relatedness characteristic of contexts. We must be able to shift certain parameters while keeping others fixed.

We may define an index as an *n*-tuple containing as coordinates: (a) the context and (b) all the parameters that may be shifted. An **original index** is one in which the shiftable parameters are determined by the context of the index; a **shifted index** is one in which at least one parameter is shifted away.

Truth at a context is truth at the original index; truth at an index is an auxiliary notion used to define truth at a context whenever we have shifting operators in the language.

B. Variables and binding

[…]

C. Infinitives versus clauses

Surface infinitives may be preserved: they need not be transformed into underlying sentential clauses. This is in line with "Attitudes *de dicto* and *de se*", where Lewis defends the idea that the objects of attitudes are properties rather than propositions.