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PROJECTION AND PARAPHRASE IN SEMANTICS¹

By J. A. FODOR

ONE aspect of the traditional problem of meaning which recent discoveries in structural linguistics may illuminate concerns the ability of speakers of natural languages to compose and interpret indefinitely large numbers of novel sentences at will. There is, of course, no reason to suppose that this nominally linguistic ability to deal appropriately with unfamiliar sentences is in any sense homogeneous. Rather it seems likely that cues of many different kinds are relied upon in deciding what interpretation to place upon token occurrences of sentences. Many of these cues are, in all probability, non-verbal. I have argued elsewhere that to ask what a speaker means *by* a sentence—as distinct from asking what the sentence he utters means—is often to invite reference to aspects of the non-linguistic context of the utterance.²

Nevertheless, it seems that some aspects of the ability to understand and produce novel sentences may be characterized in terms of our present knowledge about the systematic relations of sentences in natural languages. To give one example: it is clearly a necessary condition for understanding a new sentence that one should be implicitly capable of giving a grammatical analysis of the sentence. This involves at least the ability to decide correctly upon those substitutions for various components of the sentence which preserve grammaticality. The set of such substitutions, however, partially determines the relation between the sentence in question and other sentences in the language. Thus, understanding

1. The boy went to the store
involves knowing such facts as that
2. The girl went to the store
is a grammatical sentence in English while
3. The gives went to the store
is not.

¹ This paper assumes some acquaintance with the notion of a transformational grammar considered as a device for recursively enumerating the set of grammatical sentences in a natural language. Cf. N. Chomsky, *Syntactic Structures*, Mouton and Co. 'S-Gravenhage, 1957.

² J. A. Fodor, "What Do You Mean?", *Journal of Philosophy*, 12 July, 1960.

An ability to give grammatical analyses of novel sentences, though clearly *necessary* to understand them, is equally clearly not sufficient. Thus, one might be able to group all the English sentences of a given grammatical type without knowing what any of the sentences so grouped mean. It is not inconceivable that one should know the grammar of a language without knowing the language. For example, among the extra-grammatical abilities involved in understanding sentences, we may count the following: one cannot in general be said to understand a pair of sentences unless one can decide whether or not they are paraphrases of one another.¹

The ability to decide upon its relations of paraphrase (P-relations) is, I shall assume, one dimension of the understanding of a sentence. To understand a sentence is at least in part to be in agreement with other speakers of the language as to what constitutes a paraphrase of that sentence. The relevance of this point to the problem about how speakers understand *novel* sentences lies in the fact that P-relations, like grammatical relations, seem to be to some extent projectible. One does not have to be trained in the case of each new sentence to recognize its P-relations. Rather, given a knowledge of the P-relations among some proper sub-set of the sentences, it seems possible for speakers to determine the P-relations among the rest of the sentences in a mechanical fashion. In general, the arguments which suggest the recursiveness of the grammatical rules governing natural languages seem to suggest that the same characteristic belongs to the rules governing P-relatedness. It is this latter system of rules which a theory of semantics must seek to uncover.²

At this point we must again be careful to notice the heterogeneity which is characteristic of verbal skills. Not *all* the rules governing P-relatedness are reasonably to be considered linguistic rules. For example, some P-relations are mediated by theories.³ That

4. An accumulation of ferrous oxide

is P-related to

5. A deposit of rust

is a consequence of chemical theory, not of the conventions of ordinary language. This point need not, however, cause us to despair of the possibility of a linguistic theory of P-relations. Markedly theory-

¹ I use 'paraphrase' rather than 'synonym' in part to postpone the usual problems about referential opacity. 'John said that it will rain' is a paraphrase of 'John said "it will rain"', though the sentences are not synonyms in that one might be true while the other is false.

² For the recursiveness of grammatical rules, cf. H. Putnam, 'Some Issues in The Theory of Grammars', forthcoming in the *Symposium on Mathematical Methods in Linguistics* published by the American Mathematical Society.

³ Cf. H. Putnam, 'Dreaming and Language' (unpublished).

mediated P-relations such as that which obtains between 4 and 5 may in fact *not* be among the relations of a sentence upon which one must be able to decide if one is to be counted as understanding the sentence. Again, though P-relations are often theory-mediated, they are surely not always so. That

6. She admired me

and

7. I was admired by her

are P-related is a consequence not of theoretical connexions but of P-relations involved in the structure of ordinary language. It is P-relations of this kind of which we particularly need an account.

Since it appears that P-relations are decidable for new sentences of arbitrary length (if one has time for computation) it seems plausible to think of the P-relations of long sentences as determined by the P-relations of their components. A theory of P-relations might well take the following form. One assumes as given the P-relations among a finite set of minimally short sentences.¹ (Quine, in a proposal which we shall discuss presently, permits himself only the weak assumption that every such sentence is P-related to itself.) One then requires a set of rules which project these kernels into the set of grammatical sentences. Such a mapping is a transformational grammar of the language. A transformational grammar which preserves P-relatedness in some non-trivial way would, *ipso facto*, constitute a theory of P-relatedness among the sentences of the language. Simplicity of the general theory requires, of course, that wherever possible an intimate relation shall be maintained between the grammatical rules and the semantical rules.

In *Word and Object* Quine makes the following suggestion:

. . . a concept of synonymy initially significant only for short sentences can be extended to long sentences by analogy as follows. By a *construction*, linguistically speaking, let us understand any fixed way of building a composite expression from arbitrary components of appropriate sort, one or more at a time. . . . Now two sentence-forming constructions may be so related that whenever applied to the same components they yield mutually synonymous results, as long as the results are short enough to be compared for synonymy. In this event it is natural, by extension, to count also mutually synonymous, any results of applying those constructions to identical components however long.²

The technique that Quine suggests, if it is feasible, must lead to a theory of synonymy relations among (at least some) sentences, and, a

¹ A minimally short or 'kernel' sentence is, tentatively, one from which the deletion of any morpheme renders the sentence ungrammatical. (But what sentences are in fact taken as kernels relative to a given grammar will be decided in part by considerations of the simplicity of the grammar as a whole.)

² Quine, W. V., *Word and Object*, The Technology Press of The Massachusetts Institute of Technology, 1960, page 49.

fortiori, to a theory of P-relations among those sentences. There are, however, rather strong objections to attempting to construct a theory in this form.

It should be noticed to begin with that the rules generally employed by linguists for generating a language from kernels do not yield synonymous (or, for that matter, P-related) outputs for applications of alternative transformations (constructions) to a given string. That is, if two transformations are distinct, the sentence which results from applying one of these to a given sentence will not in general be a synonym of the sentence which results from the application of the other transformation to that same sentence. The reason for this is not far to seek. Transformations may be roughly classified as either (a) permutative, or (b) additive.¹ Permutative transformations have the effect of varying the order of the morphemic components of a sentence, and hence obtain between such sentence pairs as

8. The butler did kill the squire

and

9. Did the butler kill the squire?

Additive transformations embed (not necessarily proper) sentence fragments in a given 'matrix' sentence. Thus they obtain between such pairs as

10. The young man robbed the bank

and

11. The young man whom I knew in Chicago robbed the bank.

Thus, the result of an application of an arbitrary transformation to an arbitrary sentence is either to change the number of morphemes comprising the sentence or to vary their arrangement, or both. A pair of transformations is identical in case they apply to the same sentences and yield the same output.

The point of this is that in general, though not invariably,² the performance of either kind of operation, addition or permutation, upon any sentence will change the meaning of that sentence. We cannot usually add morphemes or change their order *ad. lib.* without prejudice to meaning. It is this fact which prompts the belief that the meaning of a sentence (and hence its P-relations) must be in part determined by the set of decisions made at optional choice-points in its transformational generation.³

¹ The question whether transformations which delete morphemes may be allowed, and if so under what restrictions, is at present disputed. Upon its solution depend both the recursiveness of the generative rules and the asymmetry of the transformational relationship.

² The most important exception is the so-called active-passive transformation, which obtains between such pairs as 6 and 7 above.

³ I owe this suggestion at least to N. Chomsky, H. Putnam, and P. Ziff.

The extent to which transformation varies meaning may be grasped from the observation that sentences are only rarely synonymous with sentences in their own derivational history. That is, it is generally the case that if S_1 is a sentence transformationally related to S , then S and S_1 are not synonyms.

If, then, transforms of a given sentence are not usually synonymous, is there any way in which P-relations (or synonymy relations) among kernels may be projected in such fashion as to determine the P-relations among constructed sentences? That is, is there any reasonable restriction that can be placed upon putative transformations which will have the effect of systematizing the P-relations in the language? I should like to propose, tentatively, the following as necessary conditions to this end.

We might require of permutative transformations that they be such that if the same ordered set of transformations is applied to two originally P-related kernels, then the resulting output sentences must be P-related. Of additive transformations we might require that if they embed P-related sentence fragments of a given grammatical type in originally P-related matrix sentences, then, again, the output sentences must be P-related.

To put the matter briefly, we can state the difference between Quine's proposal and this one as follows. Quine requires that we find constructions which satisfy the condition that for any sentence S there exist a pair of transformations T_1 and T_2 such that the sentence which results from applying T_2 to S is a synonym of the sentence which results from applying T_1 to S . Our proposal, on the other hand, requires, in effect, that given any set of sentences which are antecedently known to be P-related, the results of applying identical sets of transformations in the appropriate fashion should be P-related. It is a consequence of both proposals that they permit decisions as to the P-relations of very many sentences, given knowledge of the derivational history of those sentences (and, in the present case, given knowledge of the P-relations among kernels).¹ I wish to claim for my version only that it is a more plausible proposal given what we know of the rules actually employed in transformational descriptions of languages and of the effects of transformation upon meaning.

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¹ From the psycho-linguistic point of view it seems reasonable to suppose that the P-relations among kernels are assimilated directly in learning a language. As a point in semantics, however, it is tempting to think of a dictionary as primarily a device for establishing such relations among the basic sentences of a language.