chance that he will make the shore '. He may believe the probabilities to be low, but since it is in principle impossible to say (in this case) that there is *no* probability at all, he must, in swimming toward the shore, act upon the proposition ' there is probability n that he will make the shore '. And this, I suggest, he must believe to be true. Hence I conclude that it is false to assert that a man can act on a proposition which he believes to be false.

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A REPLY TO "PROJECTION AND PARAPHRASE IN SEMANTICS"

By JERROLD J. KATZ

IN a recent issue of ANALYSIS,[1] Mr. Fodor proposed the thesis that under certain conditions grammatical transformations preserve paraphrase relations. In particular, he claimed:

(1) If two kernel sentences k_1 and k_2 are P-related and if the transformations T_1, T_2, . . ., T_n are applied to k_1 and k_2 in the same order (i.e. T_1 is applied to k_i resulting in s_i^1, then T_2 is applied to s_i^1 resulting in s_i^2, . . ., then, finally, T_n is applied to s_i^{n-1} resulting in s_i^n), then the two final results s_1^n and s_2^n are P-related.

(2) If two P-related sentence fragments are embedded in two P-related matrix sentences by the same transformation, then the resulting sentences are P-related.

If these claims are true, or even true in general, Semantics benefits by a theory for projecting paraphrase relations among kernels to paraphrase relations among the indefinitely many sentences constructed from them transformationally.[2] Not only would this effect a systematization of the P-relations in the language, but it would explain one facet of the speaker's

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[1] ANALYSIS, 21.4 (March 1961), pp. 73–77. My reply requires no more of a knowledge of transformational analysis than Mr. Fodor's original paper.

[2] It should be made clear that, contrary to Mr. Fodor's remark (p. 77), his two conditions cannot be construed as restrictions on putative transformations, because no putative transformations which prove themselves in the grammatical analysis of English (which generate the sentences required without producing non-sentences, which explain and predict ambiguities, and which explicate relations between sentence types) will be rejected because they conflict with a semantic theory. Rather, the test is the other way round. This is my reason for referring to Mr. Fodor's two conditions as ' a theory for projecting paraphrase relations ' instead of ' restrictions on putative transformations '.

linguistic ability, i.e. his ability to recognize and freely produce para-
phrases of a sentence. Decisions about paraphrase relations exhibit
a high degree of systematicity: fluent speakers do not require special
training for new sentences to recognize a great many of their P-relations
to other sentences.[1] This strongly suggests some underlying mechanism
whose reconstruction in the form of explicit rules of a projection theory
would serve to explain the speaker's paraphrasing skills.[2]

In this paper, I will argue that Mr. Fodor's projection theory is
entirely inadequate. I will show that his explanation in terms of (1)
and (2) fails to apply to the theoretically interesting cases, the cases
where an explanation is most needed and where one would provide
most insight, and that it applies to the theoretically uninteresting cases
only vacuously so that it offers no explanation even for them. Further-
more, I will argue that his claim that understanding a sentence at least
in part involves the ability to recognize its paraphrases is dubious, and
that, rather than offering insight into the notion of understanding a
sentence, his contention assumes a measure of insight we do not have.

It is by no means clear what counts as a P-relation. Mr. Fodor does
not intend them to preserve truth. He says that two sentences can be
P-related even though one might be true while the other is false.[3] This
is the reason he claims that paraphrase is not synonymy. Further, his
examples show that he admits paraphrase relations between questions,
where no question of truth preservation is relevant. This seems quite
counter-intuitive because one would not say that a sentence S_1 is a
paraphrase of another sentence S_2 if S_2 is true and S_1 is false. Whether
or not this intuition proves correct, the notion of a P-relation is definitely
in need of clarification, because as it now stands we cannot determine
when a P-relation holds between a pair of kernels, and, without being
able to determine this, Mr. Fodor's projection theory cannot even get
started. One further point: if my criticism that his account does not
help to explain how sentences are understood is well taken, it is no
longer clear of what relevance a notion of paraphrase which fails to
preserve truth can be for Semantics.

Nonetheless, we can put some qualms aside and guide ourselves by
clear cases. P-related sentences fall into two groups. First, there are
what I shall call ' E-P-related ' cases: pairs of sentences that are P-related
by virtue of P-related expressions appearing at identical places in other-

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[1] On page 74 of Mr. Fodor's paper he asserts that, with a knowledge of the P-relations
among some proper sub-set of the sentences of the language, a speaker can determine the
P-relations among all other sentences in a mechanical fashion. I think that to say this can
be done in a mechanical fashion is overstating the case. When sentences become extremely
complicated or speakers become scrupulous about the notion of a paraphrase, some cases
cannot be decided until some new knowledge about the language is acquired.

[2] This way of explaining a linguistic ability is quite common in modern approaches to
grammar. Cf. N. Chomsky, ' Explanatory Models in Linguistics ' (mimeographed, Massa-
chusetts Institute of Technology, 1961).

[3] Footnote 1, p. 74 of Mr. Fodor's paper.

wise equivalent sentences. In E-P-related cases, we have, as a rule, two sentences with essentially the same grammatical structure. The notion of P-related expressions may be left open. We may give it some content by thinking of synonymous expressions, nearly synonymous expressions, theory-determined equivalences, stipulative equivalences, etc. Examples of some typical E-P-related sentences are: ' The man plays the game '/ ' The σ plays the game '; ' The game is played by the man '/ ' The game is played by the σ '; ' Does the man play the game? '/' Does the σ play the game? '; ' What does the man play? '/ ' What does the σ play? '; ' The man does not play the game '/' The σ does not play the game '; ' The man's playing of the game. . .'/' The σ's playing of the game. . .'; etc. In each case ' σ ' is to be some expression P-related to ' man ', e.g. ' rational animal ', ' featherless biped ', or whatever you wish. Second, there are what I shall call ' G-P-related ' cases: pairs of sentences that are P-related by virtue of different but appropriate grammatical structures. Basically, such cases do not involve P-related expressions.[1] Examples of some typical G-P-related cases are pairs of sentences from the following list: ' I saw the man '; ' The man was seen by me '; ' It was the man that I saw '; ' The man was whom I saw '; ' The one whom I saw was the man '; ' The one seen by me was the man '; and so forth.

G-P-related cases are the theoretically interesting ones because they are actually where transformations produce P-relations,[2] and, conversely, E-P-related cases are the theoretically uninteresting ones because transformations do not account for the speaker's ability to make decisions about their paraphrase relations. That Mr. Fodor's projection theory does not apply to G-P-related cases will be established below. Here we wish to show that though (1) and (2) apply to E-P-related cases, they apply only to the least philosophically interesting of these and to them vacuously.

Because Mr. Fodor's theory must start its projections from P-related kernel sentences, it is even inapplicable to many E-P-related cases, among which are virtually all the philosophically interesting ones. There are, of course, P-related single words in English, such as some of the so-called synonyms listed by a good dictionary, but philosophically interesting P-related expressions usually in one or both cases involve constructions of words where two or more play different grammatical roles. As a rule, to obtain an expression which is P-related to a particular term it is necessary to resort to constructions involving prenominal or postnominal adjectivals, preposition plus noun phrase modifiers, adverbials,

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[1] I say ' basically ' because any pair of G-P-related sentences may be turned into another pair of P-related sentences by replacing an expression in one by an expression P-related to the corresponding expression in the other. But, clearly, such cases are derivative.

[2] In fact, Mr. Fodor himself makes this point when he says, concerning the pair ' She admired me ' and ' I was admired by her ', two of his examples, ' It is P-relations of this kind of which we particularly need an account '; p. 75.

strings of these, and mixed strings, all of which are built in a sentence by transformations so that the sentence is not a kernel. Hence, all E-P-related pairs in which there is a P-related expression constructed transformationally and which cannot be reduced to a P-related kernel pair (e.g. ' Bachelors enjoy life ' and ' Unmarried males enjoy life ' cannot be reduced to a pair of P-related kernels because ' Bachelors enjoy life ' and ' Males enjoy life ' are not P-related) are beyond the scope of Mr. Fodor's projection theory.

In E-P-related cases everything depends on the unanalyzed notion of P-related expressions. The so far unknown criteria for the application of this concept completely determine when two sentences are E-P-related. This can be seen from the following:

(3) If there are two sentences S_1 and S_2 such that S_1 differs from S_2 only in that σ_1^1 appears in S_1 where σ_1^2 appears in S_2, σ_2^1 appears in S_1 where σ_2^2 appears in S_2, . . ., and σ_n^1 appears in S_1 where σ_n^2 appears in S_2 and σ_i^1 is P-related to σ_i^2, then S_1 is E-P-related to S_2.

This is trivially true, since the definition of ' P-related expression ' must have (3) as a consequence. (3) makes it obvious that the notion of P-related expressions alone suffices to determine E-P-related sentences. But this concept is not available and there is not the slightest suggestion of how it might be analyzed. Therefore, Mr. Fodor's explanation is vacuous for these cases.

Mr. Fodor is certainly right that the ability to determine P-relations is an important linguistic ability and one that badly needs explanation. But his claim that the determination of P-relations is necessary to understanding a sentence is somewhat dubious. He says that to understand a sentence it is necessary to be able to judge what constitutes paraphrases of it as well as other speakers and that to understand a pair of sentences it is necessary to be able to determine whether they are P-related.[1] Yet a person might be said to understand a sentence even though he is unable to judge its paraphrases adequately. And a person might understand pairs of sentences even though he is incapable of deciding whether they are P-related or not. I think we would have to say both these things if someone displayed sufficient appropriate behaviour. A person might very well understand a sentence without, at the same time, recognizing a connection between it and other sentences, viz. the P-relatedness of certain expressions in each. I think there are persons whose mental equipment is not adequate to afford them the use of the concepts necessary to mark such connections, though they behave appropriately enough in general for us to say they understand sentences. I do not think that making paraphrase decisions adequately is a necessary condition of understanding, but I do think making such decisions and behaving

[1] Mr. Fodor's paper, p. 76.

appropriately are each tests whose positive results can be sufficient to warrant the conclusion that a sentence is understood. I may well be wrong, but here the notion of understanding a sentence needs analysis, without which Mr. Fodor's side on this issue must be somewhat dubious, as, of course, must mine.

With G-P-related cases, the question of whether or not two sentences are P-related depends uniquely on whether or not a certain transformation institutes a paraphrase relation between them. The general inapplicability of (1) and (2) to G-P-related cases can be seen from the fact that with (1) and (2) we start with P-related *kernel* pairs and project this P-relation to pairs of sentences by the *same* ordered set of transformations. With G-P-related cases, however, there are no P-relations among kernels and pairs of G-P-related sentences can be constructed from a pair of P-related sentences by *different* transformations. In the case of G-P-relations, generally, one or more sentences are operated on by a transformation, then the result can be operated on by a different transformation, and this process is repeatable usually with different transformations entering at different steps—leaving a trail of P-related derived sentences.

Moreover, the systematization of P-relations for G-P-related cases is by no means an easy or simple matter, because the same transformation sometimes produces derived sentences which are P-related to their source sentences and sometimes produces derived sentences which are not P-related to their sources. For example, the passive-transformation produces a source-derived sentence pair which is P-related in the case ' I saw the man ' and ' The man was seen by me ', but not in the case ' Everyone in the room speaks two languages ' and ' Two languages are spoken in the room '.[1]

Finally, let us briefly consider an extension of Mr. Fodor's theory which might seem to provide a way out of these difficulties. Instead of (1) we have:

(4) If there are two sentences (not necessarily kernels) and if they are P-related, then if the transformation T is applied to both, the resulting sentences are P-related.

(2) is already in suitable form. The claim that (2) and (4) are generally applicable to cases where G-P-related sentence pairs transform into G-P-related sentences is false because this theory applies to very few such cases. For example, the G-P-related pair ' I saw the man ' and ' The man was seen by me ' transform, respectively, into 'Whom did I see? ' and ' Who was seen by me? ' but *not by the same transformation.* This is because a transformation cannot operate on two sentences unless both have the same grammatical structure—the unique structure which defines the domain of the transformation. This restriction greatly limits

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[1] N. Chomsky, *Syntactic Structures*, Mouton and Co., 'S-Gravenhage (1957), pp. 100–101.

the class of sentences on which a transformation can operate, and, in general, this narrowing down is such that only few transformations apply to both members of a G-P-related pair. For, being G-P-related pairs, the sentences are transformationally connected which means that structural changes on one have produced or led to the production of the other so that it must be structurally different in a significant respect.

Relaxing this restriction will not save the new theory because allowing transformations to operate on sentences with essentially different grammatical structure leads immediately to counter-examples.[1] For instance, the matrix sentence 'The man hit the man' can, by the same transformation rule, now have the sentence fragment 'old' embedded in it in front of either occurrence of 'man'. Thus, assuming the matrix and fragment each to be a paraphrase of itself (for nothing depends on this, as one can easily verify by constructing a different sentence and fragment using terms P-related to 'man' and 'old'), a P-related pair is transformed by the same rule into sentences that are not P-related: 'The old man hit the man' and 'The man hit the old man'. Similarly, by applying the same rule to 'The man hit the man' and 'The man hit the man' we can obtain both 'Who hit the man?' and 'Whom did the man hit?' Thus, also, in the case of (2), P-related sentences transform into sentences that are not P-related.

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[1] In linguistic theory the enforcement or relaxation of this restriction makes the difference between whether a rule is a transformation or a transformational schema. Cf. N. Chomsky, 'The Logical Structure of Linguistic Theory' (mimeographed, Massachusetts Institute of Technology, 1956).