Review of *Essays on Form and Interpretation*, by Noam Chomsky. Elsevier North-Holland, 1977.

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For the past quarter-century, Noam Chomsky has been an (if not the) acknowledged leader in the business of devising and revising linguistic theories. The book under review (hereafter referred to as *Essays*) contains four articles previously published between 1973 and 1976, together with an introduction which states that "[t]he essays that follow fall within the framework of the so-called 'extended standard theory' (EST)". EST is an outgrowth of the linguistic theory that Chomsky presented in *Aspects of the Theory of Syntax*,[1] which has since come to be known as "standard theory" (ST).[2] When EST was first developed, it was held to differ from ST in only one major respect, namely in the way that the syntactic and semantic components of a grammar are related to one another.[3] In ST, it is assumed that:

> ... the semantic interpretation of a sentence depends only on its lexical items and the grammatical functions and relations represented in the underlying structures in which they appear.[4]

In EST, on the other hand:

> ... semantic interpretation is held to be determined by the pair (deep structure, surface structure) ... , rather than by deep structure alone; further, it is proposed that insofar as grammatical relations play a role in determining meaning, it is the grammatical relations of the deep structure that are relevant (as before), but that such matters as scope of "logical elements" and quantifiers, coreference, focus and certain kinds of presupposition, and certain other properties, are determined by rules that take surface structure ... into account.[5]

However, there is another important difference between Chomsky's position in *Aspects* and that of his later work, regarding semantics. Crucial to ST is the thesis that semantic representations (in the form of "readings" of senses of sentences) are constructed by purely formal rules of grammar.[6] In *Studies*, however, Chomsky expresses doubt that semantic representations can be fully determined by grammatical rule. He writes:

> Thus one might argue that nonlinguistic beliefs, intentions of the speaker, and other factors enter into the interpretation of utterances in so intimate ... a fashion that it is hopeless and misguided to attempt to represent independently the "purely grammatical" component of meaning, the various "readings" of expressions in the sense of . . . the standard theory, and the relation between such readings and a syntactic structure (67).[7]

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[1] MIT Press (1965); hereafter referred to as *Aspects*.

[2] Both the names 'standard theory' and 'extended standard theory' are due to Chomsky; see his *Studies on Semantics in Generative* Grammar, Mouton (1972), hereafter referred to as *Studies*, pp. 66, 134.

[3] The other theoretical innovations that Chomsky introduced following the publication of *Aspects* and prior to the original appearance of the articles anthologized in *Essays* (for example, the "lexicalist hypothesis" and the "X-bar notation"; see p. 5) do not count as revisions of ST so much as refinements of it.

[4] *Aspects*, p. 136. In a footnote to this passage (224), Chomsky qualifies it in a way that indicates that, even as he was writing *Aspects*, he was not entirely convinced of the correctness of ST on this point. He writes: "As it stands, this claim seems to me somewhat too strong…. For example, it seems clear that the order of 'quantifiers' in surface structure sometimes plays a role in semantic interpretation." Although, later in the same footnote, he undoes this qualification by indicating how phenomena involving the order of quantifiers could be handled within ST, he was not persuaded by his own counterargument, as his testimony in *Reflections on Language*, Pantheon (1975), hereafter referred to as *Reflections*, indicates: "My own version of the standard theory was qualified in that I suggested that some aspects of meaning are determined by surface structure. By the time that [*Aspects*] appeared, I had become convinced that this was true to a significant extent." (239)

[5] *Studies*, p. 134. By "take surface structure ... into account," it is clear that Chomsky had in mind something stronger, such as "are determined at the level of surface structure."

[6] Thus *Aspects*, pp. 161/2: "It is clear, as Katz and Fodor have emphasized, that the meaning of a sentence is based on the meaning of its elementary parts and the manner of their combination."

[7] On the other hand, Chomsky was not and is not skeptical about the ability of rules of grammar to determine fully the syntactic representations of sentences (in particular, the ability of the grammar to distinguish between syntactically well- and ill-formed sentences), despite the fact that one could question "whether it makes sense to speak of the well-formedness of sentences in isolation, removed from all assumptions about the nature of the world" (*Studies*, p. 121). He points out that "'[w]ell-formedness' is a theoretical term. We are free to define it so that it takes its place within a sensible theory" (*ibid.*); and then he proceeds to define it so that it "takes its place" within the syntactic component of a grammar. Why, then, does he not choose

In *Essays,* Chomsky appears to have concluded that this doubt is justified.[8] To determine full semantic representations of sentences, he argues, it is necessary to consider certain matters of fact and belief, in addition to the representations of those sentences that are provided by a grammar. He supposes, however, that certain aspects of semantic representation are strictly determined by rules of grammar, and the system of representation of those aspects he calls "logical form" (LF).[9] In other words, Chomsky now contends that there are two levels of semantic representation. One, the level of logical form, is determined by rules of grammar that he calls "rules of semantic interpretation SI-1" (195). The other, the level of "fuller" semantic interpretation, is determined by rules that are not part of grammar, called rules of semantic interpretation Sl-2, which operate on representations in LF "along with other cognitive representations" (195/6).[10]

What aspects of semantic representation belong in LF? Chomsky tells us that "[t]he extension of this concept remains to be determined" (166), but from his discussions, both in *Essays* and in *Reflections,* we can conclude that LF for Chomsky includes such information as the scope and interpretation of logical constants and quantifiers, indications of necessary coreference and non-coreference (the latter Chomsky calls "'disjoint reference"), of what elements are in "focus," and of what "thematic relations"[11] hold.[12] Except for the indication of thematic relations, LF contains only those aspects of meaning which Chomsky had already indicated he believes are determined on the basis of surface structure alone.[13] However, although thematic relations are said to be defined at the level of deep structure, they can also be determined at the level of surface structure, provided that the theory of syntactic transformations (as spelled out in ST or in early versions of EST) is modified so that the position from which a constituent is moved by a transformation comes to be occupied by an unpronounced pronoun-like element, called a "trace" (symbolized *t*), which is interpreted by SI-1 rules as a variable bound by the moved constituent.[14] Since this modification of transformational theory is motivated, according to Chomsky, by independent syntactic considerations,[15] it can be assumed that all information necessary for the determination of LF is present at the level of surface structure. In short, that "[s]urface structure determines LF" (194).[16]

Chomsky's presentation of the evolution of his ideas from *Aspects* to *Essays* makes it appear that each of his formulations of linguistic theory developed organically from its immediate predecessor: that ST gave way to early EST with the addition of surface structures as input to the rules of semantic interpretation; and that early EST gave way to later EST[17] by the removal of deep structures as input to those rules. However, as was pointed out above, Chomsky also along the way revised the notion of semantic interpretation. The semantic component of a grammar written in conformity to ST yields senses of sentences as output, where

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to do something similar with the theoretical term 'semantic representation'? It would appear, in fact, that the methodological assumptions of *Aspects,* which he says continue to underlie his present work *(Essays,* p. 1), would demand that he do so.

[8] In *Essays,* as well as in *Reflections,* Chomsky continues to write as if the matter were technically still open, but, from the over-all tone of his discussions, it is clear that he believes that the matter is settled. See *Essays,* p. 196, and *Reflections,* pp. 104/5, for passages in which Chomsky lets his customary caution slip.

[9] *Essays,* pp. 5, 36/7, 165/6; *Reflections,* p. 105.

[10] See also p. 166 and *Reflections*, pp. 104/5.

[11] By "thematic relations," Chomsky means those grammatical relations which are determined at the level of deep structure.

[12] *Essays*, pp. 9/10, 16/7, 192-205; *Reflections*, pp. 93-105.

[13] In *Essays,* p. 35, Chomsky also takes the semantic relations between such pairs of words as *murder* and *assassinate* and *uncle* and *male* "to be expressible in terms that are not drawn from the theory of syntactic forms and categories or the world of fact or belief." That is, such relations are also expressible at the level of LF. However, not all semantic relations that hold between pairs of words are so expressible, since Chomsky appears to agree with Hilary Putnam that "'natural kinds' terms … cannot be provided with 'dictionary entries' that ignore matters of fact and belief" (*Essays,* p. 36), and, consequently, with W. V. Quine that "analyticity will not always be distinguished from shared belief" (*Essays,* p. 37). In any event, since words appear in surface-structure representations, such semantic relations among words that are grammatically determined are determinable at the level of surface structure.

[14] The variable is said to be bound much as the variable associated with a reflexive or reciprocal pronoun is bound by the antecedent of that pronoun; see *Essays,* pp. 9, 179.

[15] Some of these considerations are discussed in *Essays*; see pp. 75/6, 131, 135/6, 180/1, 187-189. But, as Chomsky points out, "[t]he trace theory too is controversial and not without its problems" (76).

[16] See also *Reflections,* pp. 96, 115-117.

[17] Called "revised extended standard theory" (REST) by Robert Fiengo, "On Trace Theory," *Linguistic Inquiry,* 8,1 (1977): 53.

the sense of a sentence is the proposition it expresses.[18] The semantic component (rules of SI-1) of a grammar written in conformity to present-day EST yields a set of structures (logical forms) that cannot be directly compared with the set of structures that represent senses of sentences, since on the one hand certain information is missing in logical forms that is present in senses of sentences (for example, information about the meaning of "natural kinds" terms; see fn 13), and on the other hand certain information is present in logical forms that is missing in senses of sentences (for example, information about what is in "focus"[19]). Nor can the senses of sentences be identified with the output of the rules of SI-2, since the senses contain only enough information to determine role in "semantic inference"[20] and conditions of possible use, whereas the output of the rules contains all information necessary "to determine role in inference [generally], conditions of appropriate use, etc." (166).

As the passage just quoted shows, Chomsky, in *Essays*, espouses a "use theory of meaning,"[21] from which it follows that no formal system, and hence no generative grammar, can provide a complete account of meaning. However, a grammar can certainly provide a partial account of meaning-in-use, and on this very general point, present-day proponents of ST (such as Katz) and of EST (such as Chomsky) are in complete agreement.[22] The dispute between these two camps is focused rather on two issues. First, what domain does the semantic component of a generative grammar account for? and second, what is the nature of the rules of that component?

The second of these issues concerns mainly technical matters and is, furthermore, obscured by the fact that proponents of EST have not provided enough details about the formal nature of the rules of semantic interpretation for a thorough comparison with ST to be made.[23] Hence this issue will not be dealt with further here.

Concerning the first issue, we note that both Katz and Chomsky appropriate the term 'logical form' to characterize the objects that are constructed by the rules of the semantic component of a grammar.[24] By their use of this term, both Chomsky and Katz commit themselves to the claim that the entities to which the laws of logic apply are the objects constructed by the semantic component of a grammar. Though we may agree that what, exactly, the laws of logic are is a matter to be determined by further research, we must also recognize that there is a substantial degree of consensus as to what many of those laws are. Hence we can evaluate in part what ST and EST say about logical form by examining the consequences of the application of accepted laws of logic to the logical forms constructed by grammars conforming to those theories.

One of the major, recurring criticisms of ST is its failure to provide an account of the scope of quantifiers and negation. The usual way in which this criticism is put is that deep structures (the inputs to the rules of semantic interpretation in ST) do not provide enough information to determine what the scope relations are in

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[18] If the sentence is unambiguous, that is. If it is ambiguous, then each of its meanings is a sense.

[19] See Jerrold J. Katz, *Semantic Theory*, Harper & Row, (1972), pp. 425/6.

[20] Where "semantic inference" is to be distinguished from "inference" by excluding deductive inference; see Katz, op. cit., pp. 190/1.

[21] As he acknowledges (43), prior to the period immediately preceding work on *Aspects*, Chomsky held a use theory of meaning. It would appear that he returned to such a theory shortly upon completion of *Aspects*, and certainly by the time that he wrote the following passage (*Studies*, pp. 67/8): "Or consider such a sentence as 'I am not against MY FATHER, only against THE LABOR MINISTER', spoken recently by a radical Brazilian student. Knowing further that the speaker is the son of the labor minister, we would assign to this utterance a reading in which the emphasized phrases are coreferential. On one reading, the sentence is contradictory, but knowing the facts just cited a more natural interpretation would be that the speaker is opposed to what his father does in his capacity as labor minister."

[22] For an outline of a program to study the relation of grammatically determined meaning to meaning-in-use in ST, see Jerrold J. Katz and D. Terence Langendoen, "Pragmatics and Presupposition," *Language* 52, 1 (1976): 1-17.

[23] Chomsky's published formulations of rules of SI-I are extremely sketchy. In part this reflects his belief that the statement of the rules can be kept very simple, with the slack being taken up by various "conditions on rules" (*Essays*, p. 179). In addition it reflects the fact that work on semantics within EST is only in its early stages, and we may hope to see more detailed and less programmatic formulations appearing soon.

While the statement of rules of semantic interpretation (semantic markers for lexical items and projection rules for combining them) in ST has been much more rigorous, the domain dealt with by those statements is almost entirely disjoint from that covered by the semantic interpretation rules of EST so far formulated.

[24] For Katz's use of this term, see his "Logic and Language: An Examination of Recent Criticisms of Intensionalism," in Keith Gunderson, ed., *Language, Mind, and Knowledge*, Minnesota Studies in the Philosophy of Science, 7, University of Minnesota Press (1975), p. 36.

certain sentences of a language like English. In addition, it is sometimes argued that deep structures provide the wrong information. Although the criticism may be justified, the usual ways in which it is put are misleading. To sustain a substantive charge against ST in the matter of scope of quantifiers and negation, one would have to show that the logical forms constructed by grammars written in conformity to that theory do not provide an adequate basis for the application of the laws of logic relating to scope. It is insufficient simply to point out that deep structures are inadequate, since deep structures are not themselves logical forms. It would be more accurate to say that no worker in ST has yet to publish an account of the logical forms of sentences containing quantifiers or negative operators in sufficient detail that one can determine whether the laws of logic apply to them in such a way as to give a correct account of how those sentences enter into valid arguments.

Perhaps the most important criticism to be made of the notion of logical form in EST is that many of the distinctions it makes do not appear to have anything to do with logic. Take, for example, the matter of "focus." The following sentences (in which the word receiving emphatic stress is capitalized) differ in focus, and hence, according to Chomsky, in logical form: *Amy gave BILL a car* and *Amy gave Bill a CAR.* Yet no commonly agreed-upon law of logic would distinguish between those sentences. Since Chomsky has yet to demonstrate that difference in focus is a logical difference, either he must come up with and justify such a difference, or he must give up the idea that focus is a matter of logical form. Similarly, consider disjointness of reference. According to the SI-1 rule of disjoint reference (179), the phrases *the students* and *him* in the sentence *The students admire him* can have no referent in common. Hence, according to Chomsky, from that sentence we can conclude that *The one whom the students admire is not one of the students.* But although one might ordinarily draw this conclusion from this sentence, the conclusion is surely not a logical consequence of the sentence, since the sentence could be true and the "conclusion" false.[25] We conclude, therefore, that Chomsky must either further restrict the domain of logical form so as to exclude disjointness of reference or else give up the claim that the objects constructed by SI-1 rules of grammar are logical forms.

Chomsky's innovations in syntactic theory that are presented in *Essays* are as striking as his innovations in semantic theory. We have already alluded to one of these, the "trace theory of movement rules." Another is his elaboration of a system of "conditions on transformations."[26] The problem that Chomsky is trying to solve with this system is one of his own creation. After having postulated, back in the 1950s, the existence of rules of grammar of a certain type—syntactic transformations—to handle certain facts of language, he found that the theory of grammar incorporating such rules is insufficiently constrained to be of much theoretical interest. The solution to this problem which he envisions involves the formulation of "conditions on the way the rules of grammar apply to generate structural descriptions in such a way as to restrict severely the operation of the rules of grammar while not affecting their form" (81, 84). Moreover, if the system of conditions on application can be made rich enough, it can then be claimed that no grammar contains more than a very small number of very simply stated transformations. Each such rule will interact in a special way with the system of conditions to produce a constellation of effects that serves to identify the rule in question. In particular, the "core" of English syntax might contain just two very simple transformations, NP-Movement and *wh*-Movement, "each of considerably broader scope than has hitherto been imagined" (205).[27]

Chomsky's proposal to scale down the transformational component, together with his proposal to eliminate the contribution of deep structures to semantic interpretation, suggests the possibility that EST

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[25] Chomsky himself acknowledges that there is something special about the operation of the rule of disjoint reference, when he points out that violations of the rule result in interpretations that are "strange" (*Essays*, p. 179); that is, "out of the ordinary" or "unnatural." But such strangeness has nothing to do with logic, whose subject matter is not how people ordinarily go about drawing conclusions from premises, but rather how conclusions validly follow from premises.

[26] Which is the title of the longest and most difficult article in *Essays* (pp. 81-160). The system originated in proposals made in Chomsky's monograph *Current Issues in Linguistic Theory*, Mouton (1964), and has undergone further elaboration in a more recent paper, "On *Wh*-Movement," in Peter W. Culicover *et al.*, eds., *Formal Syntax*, Academic Press (1977), pp. 71-132, but not in such a way as to materially affect what I have to say about it here. Also see Noam Chomsky and Howard Lasnik, "Filters and Control," *Linguistic Inquiry*, 8, 3 (1977): 425-504.

[27] See also "On *Wh*-Movement," *op. cit.*

will evolve into a theory in which deep structures and syntactic transformations are eliminated entirely. There are several strong hints in *Essays* that such a development is in the making; for example, at one point Chomsky raises the question whether "more extensive reliance on rules of interpretation [would] suffice to permit us to eliminate *wh*-Movement in favor of [a revision in the] expansion of [the category] COMP in the base" (157).[28] And at another point he speculates that "[i]t may be possible to devise an alternative to transformational grammar in which rules [like NP-Movement and *wh*-Movement] are regarded as interpretive" (206). Certainly the ingredients for the development of this alternative are now available to proponents of EST. One of the conditions on transformations that Chomsky adopts, at least for such rules as NP-Movement and *wh*-Movement, is the "structure preserving condition" of Joseph Emonds.[29] According to this condition, it is guaranteed that surface structures can be generated by exactly the same phrase-structure rules that generate deep structures, up to lexical material. Suppose then, that we eliminate deep structures entirely, and permit the phrase-structure rules of grammar to generate surface-structure configurations directly. All that we need now suppose is that lexical material is inserted directly into surface-structure configurations, an assumption that is consistent with EST.[30] Even if the structure-preserving condition on transformations is not imposed, however, the set of surface structures of a language can still be generated by a phrase-structure grammar, together with rules of lexical insertion, and a set of "surface exclusion filters" (143, 157)[31] that eliminate unwanted structures.

The resulting theory has much to recommend it over EST, since it handles the same range of syntactic phenomena without the kinds of duplications that are found in EST. For example, in EST the "filtering" of derivations is handled not only by the surface exclusion filters, but also by the transformations themselves,[32] whereas in the resulting theory filtering is carried out by the filters alone. Also, in EST lexically unfilled nodes can arise either directly by the failure of lexical insertion rules to fill them or indirectly by the removal of their lexical material by transformations, whereas in the resulting theory they arise only directly. Such nodes occur in well-formed surface structures only under the condition that they be properly bound by identically categorized lexical material appearing elsewhere in those structures. Since the proper binding conditions need be stated only at the level of surface structure, there is no point in introducing lexically unfilled nodes in two distinct ways, as is done in EST.

If, however, something like the resulting theory is adopted by Chomsky, it will be a significant departure not only from ST and EST, but also from the entire grammatical tradition that he has created, in which the distinction between deep and surface structure in syntax is taken to be fundamental. In light of that tradition, the decision to adopt it will not be easy to make.

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[28] In a footnote to this passage, Chomsky mentions two English constructions that he thinks it might be difficult to account for in a grammar without *wh*-Movement. I fail to see what the difficulty is. The first example is *Which pictures of each other were the men looking at?* If the alleged difficulty is that, without *wh*-Movement, the reciprocal expression must precede its antecedent throughout the derivation, it is not a real difficulty, since such sentences exist independently of *wh*-Movement, for example *Pictures of each other amused the men.* Since I do not see any other relevant difficulty in the example, I conclude that it poses no particular problem for a grammar without *wh*-Movement. The second example is the phrase *the pictures of each other that the men were looking at.* Here the difficulty is that the reciprocal expression is outside of the clause containing its antecedent. But this is a difficulty that is not solved by the assumption that *wh*-Movement has applied in its derivation. Hence the example, though interesting for other reasons, is irrelevant to the question whether there is a rule of *wh*-Movement in English grammar.

[29] *A Transformational Approach to English Syntax,* Academic Press (1976); *Essays,* pp. 8, 14, 87-88, 173.

[30] As pointed out, for example, by Chomsky and Lasnik, *op. cit.*

[31] See also Chomsky and Lasnik, *op. cit.*

[32] *Aspects,* pp. 137-139.