

ZERO-OUTPUT RULES

It is not uncommon to find that, in a language, certain things cannot be said, although in other languages the same can be said without difficulty. Perlmutter (1971: 19) proposes one possible solution to explain the absence of certain sentences in a language:

It is necessary to strengthen grammatical theory by the addition of *surface structure constraints* or *output conditions* that the output of the transformational component must satisfy.

He illustrates his proposal by formulating output conditions for clusters of Spanish and French clitic pronouns.¹

In some cases the lack of grammatical surface structures can be explained by universal constraints on rules of grammar. Thus, Ross's Complex-NP-Constraint (1967), together with the obligatoriness of WH-Fronting in relative clauses in English, explains the ungrammaticality of, e.g.:

- (1) *Have you seen the hat that I don't believe the story that you stole?

and the absence of any surface structure derived from the structure underlying (1). In languages which lack WH-Fronting in relative clauses, equivalents of (1) are fully grammatical.

There are other cases in English, however, where it is not clear what causes the absence of a well-formed surface structure:

- (2) *He is the man that I don't know who killed.

It is well-known that English, and many other languages, do not allow WH-fronting out of an embedded question, either in relative clauses, as in (2), or in questions. This is not a universal constraint, however, as appears from the Latin version of (2), which is fully grammatical:

- (3) Hic est vir quem qui necaverit nescio.

Apparently, in Latin, WH-Fronting in relative clauses takes place in steps. The WH-element is first moved to a position in front of its own S. Then, if that S is not the relative clause triggering the movement, the fronted WH-

¹ In a paper 'Clitic Pronoun Clusters' I discuss the merits of Perlmutter's output conditions for these cases. The conclusion is reached that output conditions are insufficient to account adequately for the facts. Italian clitic pronouns provide counterexamples to some of Perlmutter's universal claims in this respect.

element plus its S are moved to a front-position in the relative clause. Thus, from an underlying:

(4a) hic est vir [nescio (qui WH-eum necaverit)],

we proceed to:

(4b) hic est vir [nescio (WH-eum qui necaverit)],

and then to:

(4c) hic est vir [(WH-eum qui necaverit) nescio].

(It is to be noted that, although word-order is, on the whole, relatively free in Latin, the order of the words *quem qui necaverit nescio* in (3) cannot be changed: any other word-order results in an ungrammatical sentence.)

Possibly, the ungrammaticality of (2) and the lack of any grammatical version for it in English, is to be explained by a non-universal constraint, valid for certain languages only, forbidding movement out of an embedded question. I have not been able, however, to find other cases where movement out of an embedded question could conceivably take place but would be blocked by such a constraint. On the other hand, movement into embedded questions seems possible. The sentence:

(5) I understand why Fred dislikes many politicians

is ambiguous as to the scope of *many*. On the reading with the wider scope ('there are many politicians such that I understand why Fred dislikes them') there must be a mapping between that reading and sentence (5). In terms of semantic syntax this means that *many* is moved into the embedded question. In terms of Chomskyan autonomous syntax (his 'Extended Standard Theory') a rule of semantic interpretation must be assumed whereby *many* in (5) is moved out of the *why*-question. In either theory, movement takes place across the boundaries of an embedded question. It does, therefore, not appear plausible that there is, for English, a constraint forbidding movement out of or into embedded questions.

An alternative solution might be sought in the assumption of a transformational rule which maps onto the empty set of trees any structure which has a WH-element inside an embedded question. Such a rule would be a *zero-output rule*, differing from other rules in that its output is zero. The evidence in favour of such a solution for (2), is however, relatively weak.²

A much stronger case is provided by French. Here it seems quite clear that a zero-output rule is indeed the correct solution. As all good traditional

² The suggestion that the ungrammaticality of (2) might be due to a zero-output rule, rather than to a constraint, was made by my student Stuart Hamilton.

grammarians of the French language have observed, it is not possible to have a clitic pronoun cluster consisting of a first or second person pronoun, or the reflexive *se*, and a dative pronoun. Instead, the dative occurs, in such cases, in 'strong', or non-clitic, position. Hence the grammaticality of (6a), and the ungrammaticality of (6b) and (6c):

- (6a) Je vous présenterai à lui. (I shall introduce you to him.)
 (6b) *Je vous lui présenterai.
 (6c) *Je lui présenterai vous.

These facts can be accounted for in terms of transformational rules by assuming an underlying form where the pronouns are in 'strong', non-clitic, or canonical, position:

- (7) je Fut-présenter à lui vous.³

Post-cyclic rules of Clitic Movement are now to operate in such a way that Accusative Clitic Movement (ACM) takes place first, resulting in the shifting of *vous* to the position in front of *Fut*. (The precise constituent structure after this operation does not have to concern us here.) We then formulate Dative Clitic Movement (DCM) in such a way that it fails to apply whenever there is already a reflexive, or first or second person accusative pronoun in clitic position. In those cases the dative pronoun remains uncliticised.⁴ Clitic Movement rules are obligatory.

There are, however, also cases in French (and in Italian, which is similar to French in this respect), where both application and non-application of Clitic Movement result in an ungrammatical sentence. In these cases there is no surface structure available in the language for what otherwise are perfectly well-formed underlying structures. Thus, both (8a) and (8b) are ungrammatical:

- (8a) *Je lui ferai parler Jean.
 (8b) *Je ferai parler Jean à lui.

³ It will become clear below why the pronominal dative is taken to precede the accusative, although non-pronominal datives regularly follow the accusative.

⁴ It should be noted that all pronouns, in this discussion, are taken to be 'weak' pronouns, i.e., without emphatic or contrastive stress. 'Strong' pronouns are treated in every respect as full lexical nouns.

The facts of (6) cause Perlmutter's theory some difficulty. The cluster *vous lui* is, though ungrammatical, not ruled out by his output condition for French pronouns. In order to make up for this, Perlmutter resorts to so-called 'non-global constraints' (1971:60-65), i.e., valid only for particular clusters. The generalization that clitic datives are excluded whenever there is a non-third person, non-reflexive clitic accusative, is thereby lost, and no explanation is provided why (6a) should be grammatical but not (6c). See Seuren (1972), (1973).

Either of these sentences will be understood without difficulty by a speaker of French, but he will also reject them as ill-formed. They mean, or should mean: 'I shall get Jean to talk to him'.

There can be no question of a surface structure constraint in Perlmutter's sense here, since (9), which has the same surface structure as (8a) and has undergone obligatory Clitic Movement in the regular way, is fully grammatical:

- (9) Je lui ferai connaître Jean. (I shall get him to know Jean.)

Systematic observation reveals that the crucial difference between (8a) and (9) consists in the fact that in (8a) *Jean* is the underlying subject of *parler* (talk), whereas in (9) the underlying subject of *connaître* (know) is *lui* (him). *Jean*, in (9), is the object of *connaître*.

The picture is further enlivened by the fact if *Jean* in (8) is replaced by a pronoun, the sentence is still bad:

- (10a) *Je le lui ferai parler. (I shall get him to speak to him.)
 (10b) Je le lui ferai connaître. (I shall get him to know him.)

If only the NP corresponding with *Jean* in (8) is pronominal, but not the dative, ACM applies normally:⁵

- (11) Je le ferai parler à Jules. (I shall get him to speak to Jules.)

A similar case is the following. Adjectives in Predicate Nominal position can be pronominalized, in French, by means of an accusative pronoun (masculine, singular), corresponding to the English *so*:

- (12) Jean est heureux, et moi aussi, je le suis. (Jean is happy and I am so too.)

This is impossible, however, in the causative *faire*-construction:

- (13a) Je ferai devenir Jean heureux. (I shall make Jean become happy.)
 (13b) Je le ferai devenir Jean.

The b-sentence is grammatical, but cannot mean 'I shall make Jean become so;' its only meaning is 'I shall make him become Jean'. The verb *rendre* corresponds closely, in meaning and construction, to the phrase *faire devenir* (I am prepared to argue that the verb is a lexicalisation of the phrase⁶), with the restriction that the Predicate Nominal must be an adjective, not a noun

⁵ In fact, it is idiomatic, but not necessary, to use the dative here:

Je *lui* ferai parler à Jules.

This occurrence of the dative is discussed in Seuren (1972).

⁶ See Seuren (1972).

phrase. Here, the form corresponding to (13b) is ungrammatical:

(14a) Je rendrai Jean heureux.

(14b) *Je le rendrai Jean.

But *Jean* can be pronominal without difficulty:

(15) Je le rendrai heureux. (I shall make him (become) happy.)

It is not possible to have both the object and its predicative adjunct pronominal, since, anyway, both would fall under the rule of ACM, which can apply only once:⁷

(16) *Je le le rendrai. (I shall make him (become) so.)

Another case which appears similar is this. The dative in (17a) cannot be pronominal: not only is DCM impossible, but non-application of DCM results in an equally ungrammatical sentence:

(17a) Je crois Jean fidèle à sa femme. (I believe Jean to be faithful to his wife.)

(17b) *Je lui crois Jean fidèle.

(17c) *Je crois Jean fidèle à elle.

However, if the object-NP in a sentence such as (17a) is 'heavy', and is therefore shifted to the far right by Heavy-NP-Shift, a pronominal dative is cliticised in the normal way:

(18a) Je crois fidèles à leurs femmes tous ceux qui habitent dans le village. (I believe to be faithful to their wives all those who live in the village.)

(18b) Je leur crois fidèles tous ceux qui habitent dans le village.

The cases considered ((8), (13), (14), (17), (18)) suggest that there might be a single reason for the impossibility of either a cliticised or a non-cliticised form of the pronouns concerned. They suggest that it is the presence of a NP between the as yet uncliticised pronoun and the clitic-attracting verb, which puts an obstacle in the way not only of normal cliticisation, but of the whole sentence going through. This rejection, however, can take place only at a specific point in the derivation. It must take place after Heavy-NP-Shift, but before the rules of Clitic Movement (so that the contrast between (17) and (18) be explained). The rejection is thus ordered, in the normal way, with respect to the (postcyclic) rules of French syntax. It is natural, therefore, to regard the rejection of structures under the structural analysis defined above

⁷ Here, incidentally, we hit upon another source for the absence of surface structures for otherwise well-formed underlying structures.

as a zero-output rule. I shall speak of the rule in question as of 'NP-Baulk'.

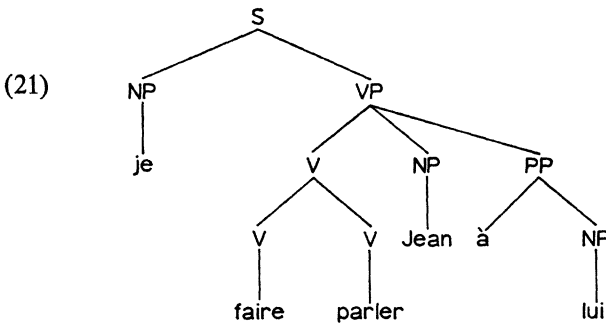
An apparent counterexample to the proposed rule of NP-Baulk is formed by (9). But a closer analysis of the French *faire*-construction will, in fact, confirm the status of NP-Baulk as a transformational rule of French syntax. The *faire*-construction was studied by Kayne (1969), and again by Seuren (1972). Let us first consider the derivation of (8). Kayne argues convincingly that the infinitive in the *faire*-construction originates as the verb of an embedded object-clause. His argument is based in part on the fact that passive embeddings are normal:

- (19) Je ferai tuer les prisonniers par les soldats. (I shall have the prisoners killed by the soldiers.)

He also argues that the lower verb is raised into the higher S by what he calls the rule of *Faire-Attraction*. It appears (Seuren, 1972) that, when a few necessary corrections have been made with respect to the derived structure, this rule is equivalent to McCawley's rule of Predicate Raising in a NP-VP-scheme. (8) thus has an origin roughly like this:

- (20) je faire [Jean parler à lui].

By Predicate Raising *parler* is Chomsky-adjoined to the right of *faire*, while the lower S-node is pruned. At the end of the cycle the structure is:



Heavy-NP-Shift does not apply. But NP-Baulk applies before DCM, and (21) is reduced to zero.

Now consider (9). Its origin may be represented as follows:

- (22) je faire [il connaître Jean].

By Predicate Raising we obtain:

- (23) je faire-connaître il Jean.

In general, in French, the subject of an active, transitive S embedded under *faire* becomes a dative. From, for example:

- (24) je faire [Jules manger une pomme]

the following surface structure is derived:

- (25) Je ferai manger une pomme à Jules. (I shall make Jules eat an apple.)

For *Jules* to end up as in (25) two operations have to take place. First, there must be insertion of the preposition *à* (to); then the old object and the new indirect object must swap places by a rule which we shall call Dative Movement (DM).⁸

The question now is how to arrange these two operations in the grammar in such a way that the crucial difference between (8) and (9) is accounted for. If both *à*-Insertion and DM apply in the cycle without further qualifications, then, at the end of the cycle, (23) will come out as:

- (26) je faire-connaître Jean à-lui,

with a constituent structure identical to that of (21), and NP-Baulk would have to reject (26). In that case, (9) would remain unexplained.

Let us assume that DM, but not *à*-Insertion, is postcyclic, and is to be ordered after the rules of Clitic Movement. Then, at the end of the cycle, (23) would be:

- (27) je faire-connaître à-lui Jean,

and NP-Baulk would not apply, so that the derivation can go through. There are, however, certain problems with this analysis, which, in my opinion, make it untenable.

We have seen that Heavy-NP-Shift will have to precede NP-Baulk and the Clitic Movement rules for (18) to be explained. When a sentence contains both a direct and an indirect object, and the direct object is 'heavy', the indirect object precedes the direct object, as in:

- (28) Il veut donner à son fils tous les cadeaux qu'il a reçus pendant son séjour en Afrique. (He wants to give to his son all the presents he received during his stay in Africa.)

If DM is to be ordered after Heavy-NP-Shift, a special provision is to be built into the rule of DM to the effect that DM does not apply when the object is 'heavy'. The result of this provision is exactly that of the rule of Heavy-NP-Shift, i.e., that 'heavy' objects come at the far right of the sentence. It seems that by ordering DM after Heavy-NP-Shift a generalization is lost.

Then there is a second difficulty with the assumption that DM is post-cyclic. The grammatical sentence:

- (29) Je le donnerai à Jean. (I shall give it to Jean.)

⁸ In Seuren (1972) it is argued that this is the regular origin of the dative, also for ordinary lexical datives.

would then have to be derived from pre-clitic:

- (30) je donner à-Jean le.

NP-Baulk would now not apply since the NP *Jean* is part of a prepositional phrase. Consider, however, the sentence:

- (31) Je lui ferai payer l'argent au médecin. (I shall make him pay the money to the doctor.)

This sentence cannot mean 'I shall make the doctor pay the money to him'. The latter meaning would be associated with (32b); the only possible meaning of (31) is associated with underlying (32a), assuming that DM is postcyclic:

- (32a) je faire [il payer au médecin l'argent]
 (32b) je faire [le médecin payer à-lui l'argent].

Through Predicate Raising these would become, respectively:

- (33a) je faire-payer il au médecin l'argent
 (33b) je faire-payer le médecin à-lui l'argent.

A difficulty now arises. Since *il* in (33a) will have to become a dative, as appears from (31), how are we to formulate *à*-Insertion in such a way that it applies even though the dative-to-be is not followed by an object-NP? Suppose we do formulate *à*-Insertion in such a way, then it will also apply to *le médecin* in (33b), and the result will be:

- (34a) je faire-payer à-lui au médecin l'argent
 (34b) je faire-payer à-le médecin à-lui l'argent.

This would be the situation at the end of the cycle. Now, however, there is no obstacle in the way of (34b); as we saw in connection with (30), NP-Baulk does not apply to a preceding prepositional phrase. DCM and DM would yield (31) from (34b). But this derivation must be baulked since (31) does not correspond with the analysis found in (34b) and its predecessors.

It seems that all problems are solved when we assume that both *à*-Insertion and DM are in the cycle, and are obligatory, but that DM does not apply when the dative consists of *à* followed by a pronoun. Under this assumption, (32a) will be replaced by:

- (35) je faire [il payer l'argent au médecin],

but (32b) will stand. The rule of *à*-Insertion can now be formulated in a simple way: *à* is inserted whenever an NP is immediately followed by an

original object-NP.⁹ At the end of the cycle, (35) thus becomes:

(36) je faire-payer à-lui l'argent au médecin.

DCM now applies normally. But (32b) will be (33b) at the end of the cycle, and NP-Baulk will stop any further derivation.

The grammaticality of (9) now also follows: due to the non-application of DM in the cycle because of the pronominal dative, the structure at the end of the cycle will be as in (27).

Let us now formulate the rule of NP-Baulk as follows:

$$X - V - NP - (\grave{a}) + \text{Pronoun} - Y \rightarrow \emptyset$$

As we have seen, this rule is to be ordered after Heavy-NP-Shift, but before the Clitic Movement rules. The fact that it is ordered after Heavy-NP-Shift makes it impossible to claim that we have to do with an output condition, if not on surface structure output, on shallow structure output (if we define as 'shallow structure' the output of the transformational cycle). Such a claim would seem to be vacuous anyway, since, given the notion of zero-output rules, Perlmutter's output conditions can be seen as a special case of zero-output rules.

It might be proposed that NP-Baulk is not a rule of grammar but, rather, a possibly general, condition on Clitic Movement. There is, however, critical evidence against such a proposal. Certain French verbs, such as *penser* (think) take a prepositional complement with *à* (of) but no cliticisation takes place when the prepositional object is a pronoun referring to a person:

(37a) Jules pense à elle. (Jules thinks of her.)

(37b) *Jules lui pense.

But when the prepositional object is inanimate, cliticisation is obligatory:

(38a) Jules pense à la maison. (Jules thinks of the house/of home.)

(38b) Jules y pense. (Jules thinks of it.)

When the structure underlying (37a) is embedded under *faire*, there is no possible surface structure:

(39) *Cela fera penser Jules à elle. (That will make Jules think of her.)

⁹ This is, then, a rule which takes the previous 'history' of a node into account. Lakoff (1970) speaks of 'global rules' in such cases. The specification that the following NP is an old object is necessary, since the dative does not occur in cases such as:

Je ferai devenir Jean un grand musicien. (I shall make Jean become a great musician.)

This is explained by NP-Bauk. Since there is no question of cliticisation in this case, the explanation cannot be sought in a condition on Clitic Movement rules.

There is, finally, a theoretical point of a very general nature which deserves discussion in this context. When rules are said to be 'ordered', metaphors of time are used, such as 'earlier' and 'later', 'before' and 'after'. In 'Deep Structure, Surface Structure, and Semantic Interpretation', Chomsky maintains (1972:70) that this is only a manner of speaking: one might as well present the ordering in opposite terms. The difference is purely notational, not empirical. He writes:

There is no general notion 'direction of a mapping' or 'order of steps of generation' to which one can appeal in attempting to differentiate the 'syntactically-based' standard theory from the 'semantically-based' alternative, or either from the 'alternative view' which regards the pairing of surface structure and semantic interpretation as determined by the 'independently selected' pairing of phonetic representation and deep structure, etc.

Chomsky warns here against an often found misconception according to which a transformational grammar is a model of speech production or, in wider terms, of performance. He then suggests that those who propose a semantic base for syntax may have fallen victim to this confusion.

It would seem, however, that when the purely temporal interpretation is eliminated, there is still room for an interpretation in terms of logical priority, in a sense sufficiently wide to encompass intrinsic priority in specification of structures that are transformationally related. When the temporal interpretation has been shown to be inadequate, it does not follow that, therefore (1972:71):

the notion of 'order of selection of structures' or 'intrinsic direction of a mapping' would have no more than an intuitive, suggestive role; the informal instruction would be one of any number of equivalent instructions for using the rules of the grammar to form structural descriptions.

For an adequate understanding of the nature of grammatical studies it is important to realize that a grammar, generative or transformational or both, is not to be interpreted as a model of performance, but, instead, as a model for the contents and internal organization of what we take to be 'tacit knowledge of a language', or 'linguistic competence'. Given a phrase-marker from the set of deep structures and a phrase-marker from the set of surface structures, the ordered set of transformations of a grammar *G* will enable us to decide whether or not the two phrase-markers are transformationally related under the mapping relation defined by *G*. It is the knowledge of this relation (*G*), which constitutes, at least in part, our knowledge of a given language. When we accept a given sentence of a language *L* as well-formed or grammatical, we have been able to single out at least one deep structure which,

under the mapping relation defined by G of L , is related to that sentence.

This interpretation does not, however, rule out a 'directionality' in the mapping relation, since the particular procedure by which it is decided whether or not there exists a relation under the mapping G between a given deep structure and a given surface structure, still remains to be specified. Given the empirical evidence drawn from natural languages, and given the nature of the transformational rules proposed to account for the evidence, it appears that those structures and rules which we have intuitively called "prior" to other structures and rules, are indeed intrinsically, or logically, prior. It would be logically impossible to formulate a grammar the other way around. This must reflect a property of the internal organization of our linguistic competence. The question of directionality is therefore not merely notational; the answer is either true or false with respect to linguistic competence. It is an empirical question.

At the Winter Meeting of the Linguistic Society of America of December 1970, held in Washington D.C., Barbara Partee read a paper in which she presented some evidence that transformational rules are intrinsically ordered from deep to surface structure. She gave examples of the following kind:

- (40) To whom did you intimate that Fred sold the book?

This sentence is ambiguous between the readings corresponding with the underlying structures:

- (41a) you intimated to whom that Fred sold the book?
 (41b) you intimated that Fred sold the book to whom?

The grammar of English allows WH-Movement from either position. Earlier rules have ensured that the WH-element (*whom*) occurs in one of the canonical positions of NP-constituents. If one tried to formulate the rule the other way around, there would be complications. Then it would have to be specified for sentences such as (40) where NP-constituents can be 'inserted': some definition would have to be provided for 'empty' NP-positions. However, in order to do so in the simplest possible way one needs precisely more deeply underlying structures, such as (41) and other, deeper, structures, onto which (40) has to be mapped in an 'inverted' grammar. The alternative would be to fall back on taxonomic grammar, the inadequacy of which is about the most central theme of transformational grammar. Under the premisses of transformational grammar it is thus logically impossible to 'invert' a grammar.

Zero-output rules form another case in point. In an 'inverted' grammar a mapping relation would have to be formulated between the empty set of structures and all phrase-markers falling under the structural analysis of the rule as formulated above. (Other mappings would have to be formulated for

those cases where the absence of surface structures is due to other factors, as exemplified in (1) or (2).) The structural analysis, however, of NP-Bauk contains the variables 'X' and 'Y'. Unless it is specified exactly in terms not containing variables what 'X' and 'Y' can stand for, it is not possible to pursue, in an inverted grammar, further derivations. It is therefore not possible, in such a grammar, to specify what deep structures cannot find expression in surface structure.

It should be evident that the claim of directionality as made here is free from any confusion between competence and performance. A zero-output rule explains the absence in a language of certain surface structures. If the concept were to be interpreted in terms of a performance theory, then it would be true, as a linguist recently remarked, in private conversation, by way of objection, that zero-output rules made no sense 'because, with such rules, silence would be infinitely ambiguous'. Grammar does not explain silence.

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