



MORPHOLOGICAL INDETERMINACY IN UNDERLYING SYNTACTIC STRUCTURE

James D McCawley
University of Chicago

The existing transformational literature does not accord morphology anywhere near the status that many other linguistic theories give to it. Indeed, it is not much of an exaggeration to say that transformational studies make morphology a part of syntax when that is feasible and ignore it when it is not. In particular, the choice among different personal pronouns has been reduced to the same mechanisms as choose among different nouns or different verbs. Specifically, pronouns have been treated as either present as such in base structures, in which case they for all practical purposes are treated as nouns, or as derived from copies of their antecedents, in which case the choice of the particular pronoun has been taken to reflect features of the NP from which it is derived.

This policy is at the bottom of a type of argument that has appeared frequently in the recent literature, illustrated by one of Chomsky's arguments (1971: 211) that coreference is determined late in derivations rather than being specified throughout derivations. Following Dougherty, Chomsky takes each other as arising through the steps indicated informally in (1).

- (1) Each of those students hates the others
 - > Those students each hate the others
 - > Those students hate each other

However, when the first of these steps is applied in a case like (2a), a structure having different coreference possibilities results.

- (2) a Each of those men loves his brothers
- b Those men each love his brothers

In (2a), his can refer back to the subject, but in (2b) it can only refer to something in the previous discourse. Thus, Chomsky concludes, each-movement changes the possibilities for coreference and coreference must be predicted by an interpretive rule sensitive to a stage of derivations after that at which each-movement applies.

A question that naturally arises here is that of why Chomsky wishes to relate (2a) to (2b) and not to (3).

- (3) Those men each hate their brothers
- (See Partee 1971, where precisely that question is raised). Note, however, that the latter possibility is not at all easy to accommodate in Chomsky's framework. Either each-movement would apply at a

stage where in its place there is some non-pronominal NP that is later to be pronominalized

- (4) a Each of the men loves his brothers
 -> The men each love his brothers
 -> their
 b Each of the men loves that man's brothers
 -> *The men each love that man's brothers
 -> *those men's
 -> their

(The *'s in (4b) relate to an interpretation in which that man or those men refers back to the subject) Either you would have to change a singular pronoun into a plural (but under what conditions?) or you would have to change a singular anaphoric NP into the corresponding plural (but under what conditions, and how could you insure that it will then obligatorily be pronominalized, whereas pronominalization was optional if you didn't do each-movement?) Moreover, (3) does not mean exactly the same as (2a), since (2a) implies that the men have more than one brother each, whereas (3) is non-committal as to how many brothers each man has. Thus, it is not clear that there is a viable alternative to having each-movement relate (2a) to (2b) rather than to (3).

Note, however, an important unstated premise of Chomsky's argument and the above addenda to it: the assumption that at every stage of the derivation all nouns and pronouns are determinate as to number, i.e. either are explicitly singular or are explicitly plural, with no NP's unspecified as to number. The bulk of this paper will be concerned with alternatives which allow one to reject that premise and to relate (2a) to (3) in terms of derivations having NP's that are unspecified for number (and for that matter, for person, gender, and definiteness) until fairly late in the derivation.

It should be remarked at the outset, though, that the standard transformational policy on pronoun choice is a direct consequence of the standard conception of a transformational derivation, in which a transformation can be sensitive only to information present in its input structure (not e.g. to more remote syntactic structures, or to semantic structure, or to factors outside of the derivation altogether). In English, the distinctions among nominative, accusative, and genitive case in pronouns are in fact predictable from information present in some stage of derivations (cf. Klima 1964), namely whether a NP is 'in subject position' and whether it is 'in determiner position', and there has accordingly been no hesitation among transformational grammarians to take NP's in deep structure as

unspecified for case and to take case specifications as inserted in the course of the derivation. However, the number of a noun or pronoun and the person and gender of a pronoun are not predictable from structural configurations at some stage of derivations: what number a NP has depends on whether it purports to refer to one or more than one individual (subject to the qualification that some nouns are idiosyncratically plural regardless of their purported reference), what person a pronoun is depends on whether its purported reference includes the speaker and on whether it includes the addressee, and what gender a pronoun has depends on whether it purports to refer to a male person, a female person, or something else (again with qualifications about nouns that have idiosyncratic gender). Thus, for person and number to be 'predictable', NP's would have to carry a specification of purported reference throughout the derivation, and the specifications of reference would have to be rich enough to indicate not only referential identity and non-identity but also referential inclusion, to distinguish the speaker and the addressee from each other and from other purported referents (i.e. in effect, the performative analysis would have to be adopted), for gender of pronouns to be predictable, whatever underlies any third person singular pronoun would have to include information as to the sex of the purported referent.

Adherents of 'standard transformational grammar' have generally rejected all but the most rudimentary indications of reference within syntactic structure and have accordingly taken all NP's as specified for person and number in deep structure, and in Aspects the base component is taken as providing a gender specification for every noun in deep structure. Thus, 'standard transformational grammar' yields two possibilities for the derivation of pronouns: any personal pronoun either is derived from a repetition of its antecedent (in which case its person, number, and gender are features of the item that underlies it, and it is derived by a transformation that wipes out all of a NP except for those features, under a condition of identity with another NP), or it is not derived from a repetition of its antecedent, in which case it is an underlying complex of person, number, and gender features, which is to say that it is a pronoun from the outset of the derivation.

The way in which standard transformational grammar allows pronouns to be derived from copies of their antecedents has a serious flaw, however, namely that it requires the positing of spurious ambiguities. For example (as I pointed out in McCawley 1968), some occurrences of neighbor would have to be specified as 'male' and

others as 'female' if the grammar is to derive the sentences

- (5) a My neighbor hurt himself
 b My neighbor hurt herself

However, available tests for ambiguity indicate that neighbor is unspecified with regard to sex, rather than ambiguous, even in examples like (5). Note that (6a) is possible regardless of the sex of the two neighbors, and for many speakers (6b) is acceptable regardless of the sex of the neighbor²

- (6) a Lee is my neighbor, and so is Robin
 b My cousin hurt himself, and so did my neighbor

In addition, conjunction reduction on the structure underlying (7a) is applicable despite the difference in sex

- (7) a My cousin hurt himself, and my neighbor hurt herself too
 b My cousin and my neighbor hurt themselves

Similar examples can be constructed showing that if all NP's are determinate as to number in deep structure, then spurious ambiguities must be posited. For example, (8a) is unspecified rather than ambiguous with regard to whether each composer wrote more than one quartet, but if the conjunction reduction giving rise to (8a) were not carried out, the resulting sentence would have to specify whether one or more than one quartet was involved in each case

- (8) a The quartets of Eierkopf and Misthaufen are beautiful
 b The quartet(s) of Eierkopf is/are beautiful, and the quartet(s) of Misthaufen is/are beautiful

My claim that (8a) is derived by an application of conjunction-reduction which ignores the difference between singular quartet and plural quartets is confirmed by the observation that (9a) and (9b), which must be derived by conjunction reduction, since there is no other way that the passivization and tough-movement that they exhibit could take place, are also non-committal as to whether either composer wrote more than one quartet

- (9) a The quartets of Eierkopf and Misthaufen are in public domain and have been copyrighted by Misthaufen's widow respectively
 b The quartets of Eierkopf and Misthaufen are respectively exquisitely beautiful and unbearably difficult to listen to

Note also (10), in which VP-deletion has applied despite the fact that the deleted VP, which would have surfaced as love their wives, involves different number in both the determiner and the noun than in the corresponding words of the antecedent loves his wife

- (10) a John loves his wife, and my two brothers love their wives too
 b John loves his wife, and my two brothers do too³

The most commonly adopted way out of these difficulties has been

simply to deny that any anaphoric devices are derived by transformations from copies of their antecedents, this is the approach adopted most explicitly by Jackendoff (1972), and by Chomsky, Dougherty, and other adherents of the 'extended standard theory'. For this to provide a real way out, it would be necessary for one to also reject the transformation of Conjunction-reduction since some of the spurious ambiguities that arise when all NP's are determinate as to person, number, and gender in deep structure result through the application of conjunction reduction. While an analysis allegedly doing without conjunction reduction has been advanced by Dougherty (1970: 865-6), that analysis really just recasts Conjunction-reduction in a different form, rather than eliminating it, in particular, Dougherty's analysis provides no way to derive (9b) other than from a deep structure in which there are a sentence referring to the quartet(s) of Eierkopf and a sentence referring to the quartet(s) of Misthaufen, with a separate underlying occurrence of quartet for each composer.⁴

I wish to propose here an alternative way out, one which may be necessary even from the point of view of the 'extended standard theory', namely that the features relevant to choice among pronouns have nothing to do with deep structure, i.e. that nouns are unspecified with regard to number, and pronouns with regard to person, number, and gender, until a fairly late stage of derivations, and that only for the nouns and pronouns which are present at that and later stages do the person, number, and gender features play any role in the interpretation of the sentence or the conditions for its appropriate use.⁵

Under this proposal, the following sentences would all have derivations involving conjunction reduction

- (11) a John and I love our mothers
 b You and John love your mothers
 c Bill and John love their mothers

The choice of the pronoun would be based on its purported referent: if it includes the speaker, it is first person, if it includes the addressee but not the speaker, it is second person, and otherwise it is third person. With regard to this point, it is immaterial whether the pronoun is derived from a full NP, if it is, the pronominalization transformation would eliminate that NP except for its referential index, and the pronoun would be chosen on the basis of referential inclusion relations. In the case of pronouns with an antecedent, the pronoun is chosen to agree with the antecedent. Any grammatical idiosyncrasies of the antecedent (such as grammatical gender, or the idiosyncratic plural of shears and overalls) are reflected in the choice

of the pronoun. The different pronoun choice between (2a) and (3) reflects a difference in antecedent. In (2a), the antecedent of the pronoun is each of those men, which is grammatically singular, each-movement destroys that NP, leaving only those men as a possible antecedent, and thus requiring the third-person plural pronoun their.

An extension of this proposal provides a way of countering an objection that could be raised to the derivation (1).⁶ If all nouns have a specific number in deep structure, then other would have to be singular in the deep structures of some instances of each other and plural in other instances.

(12) a Each of the two boys helped the other/*others

b Each of the three boys helped the others/*other

Thus, each other in (13) would be ambiguous as to whether it had a singular source or a plural source (corresponding to whether the boys are two or more than two).

(13) The boys helped each other

However, this is a spurious ambiguity, since each other with a singular source and each other with a plural source count as identical. (14) Mary and Susan helped each other, and so did Tom, Dick, and Harry. The proposal of morphologically indeterminate underlying structures allows all occurrences of each other to be derived from a source that is unspecified as to number and thus allows the two occurrences of each other in (14) to be derived from sources that differ only in referential indices. However, if the steps forming each other are not carried out, a number must be assigned to other on the basis of the size of the set that it refers to, which means that a singular is required in (12a) but a plural in (12b) (since for any member of a two-element set there is only one other member, whereas for any member of a three-element set there are two other members).

A further morphological indeterminacy suggests itself when one observes that (13) is non-committal as to whether each boy helped all of the other boys, (13) in fact is appropriate even when each boy helped only one other boy. I propose that the structure underlying each other is indeterminate not only with respect to plurality but with respect to definiteness as well, i.e. that the structure underlying (13) is not 'Each of the boys helped the others' or 'helped the other' or 'helped others' or 'helped another', but rather 'helped other', where other is unspecified both with regard to number and with regard to definiteness. More specifically, underlying (13) there would be a structure containing an existential quantifier in the pristine form in which it occurs in formal logic: 'there is a $y \neq x$ such that x helped y ', totally noncommittal as to whether there is more than one such y , or as to whether there is anyone whom x did

not help. The definite article is forced on the speaker in (12a), since with regard to either member of a two-element set, one 'other' is all the others that there are, there need not be anything in the structure underlying (12a) that corresponds to the article.

Let me finally turn to two problems that to my knowledge have not been discussed in the literature, which an analysis in terms of morphologically indeterminate underlying structures may cast some light on. Observe first that (15) is appropriate even in the case where Harry has only one wife.

(15) Ahmed loves his wives, and so does Harry.
The repeated structure involves a universal quantifier ('for all x such that x is wife of Ahmed, Ahmed loves x, and for all y such that y is wife of Harry, Harry loves y'). Since wife appears overtly in the first clause, it must be supplied with a grammatical number, thus forcing the speaker to commit himself as to Ahmed's having more than one wife, however, the underlying occurrence of wife in the second conjunct does not surface and can thus remain indeterminate as to number, i.e. it does not commit the speaker as to how many wives Harry has. Suppose, however, that the order of the conjuncts in (15) were reversed.

(16) Harry loves his wife, and so does Ahmed.
Here it is not possible to interpret the second conjunct as meaning that Ahmed loves his wives -- it can only be 'Ahmed loves his wife'. I am not at all clear why this should be the case. Perhaps for some reason Harry loves his wife cannot be interpreted as containing a universal quantifier and thus that Ahmed loves his wives cannot be (sloppily) identical to it, and perhaps here I have further evidence for my conjecture that it is plural and not singular that is the unmarked number.

The second and final problem relates to 'agentless passives'. The most popular account of an agentless passive such as (17a) derives it from a structure with someone or something as subject (thus, the same structure would underlie (17a) as (17b) by Passivization plus deletion of an indefinite by-phrase).

(17) a Fred was attacked.
b Someone attacked Fred.

However, indefinite pronouns are not indefinite enough. For example, it has often been observed that agentless passives are possible even when the verb demands a 'semantically plural' subject and thus does not admit someone.

(18) a The fort was being surrounded.
b *Someone was surrounding the fort.

There is a further respect in which indefinite pronouns are not inde-

finite enough, which is illustrated in the ludicrousness of relating (19a) to (19b)

- (19) a Chomsky's Syntactic Structures was written in 1955
 b Someone wrote Chomsky's Syntactic Structures in 1955

The someone of (19b) must be interpreted as noncoreferential with Chomsky, it implies that someone other than Chomsky wrote Syntactic Structures. However, (19a) is completely noncommittal as to the authorship of Syntactic Structures it could be used equally appropriately by someone who believes the real author to be Chomsky as by someone who thinks it was written by Bernard Bloch (but who nonetheless persists in calling it 'Chomsky's Syntactic Structures', much in the way that people persist in speaking of 'Purcell's trumpet voluntary' even when they know that it is really by Jeremiah Clarke)

There is an important difference between (19a) and (19b) which I suspect is responsible for their different implications as to who wrote Syntactic Structures, namely that the someone of (19b) can serve as the antecedent of a pronoun (you could follow it with But nobody has figured out who he was), whereas the underlying subject of (19a) cannot serve as the antecedent of a pronoun. The someone of (19b) serves two functions: it both expresses an existential quantifier (i.e. asserts the existence of a person such that person wrote Chomsky's Syntactic Structures in 1955) and provides a constant that can be referred back to in subsequent discourse. As a result of the principles of sportsmanly behavior in language use that are associated with Grice's name, distinct NP's are taken as non-coreferential unless the speaker indicates somehow that they are to be taken as coreferential. The following approach to the difference between (19a) and (19b) is thus open to us: we can take (19a) and (19b) as both corresponding to an underlying structure with an existentially quantified NP, in (19b), the means chosen of expressing that existential quantifier will be misleading unless one holds that the author of Syntactic Structures is not (or may not be) Chomsky, however, in (19a), there is nothing about the sentence to lead the hearer into believing that the author is not Chomsky. I have concluded with this example, since it illustrates that indeterminacy covers a broader range of matters than just the choice among alternatives of a paradigm, as well as illustrating the interplay between conversational implicature and the presence vs. absence in surface structure of some crucial word or morpheme. I suspect that there are more such interactions, but at the moment I am just starting to look for them.

NOTES

¹I include person in this list, since 'full NP's' are not restricted to third person witness we linguists, you Republicans, which can themselves serve as antecedents of (first and second person) pronouns

We linguists love our profession
You Republicans should be ashamed of yourselves

²For other speakers, corresponding pronoun forms in the two VP's must be the same for the two VP's to count as identical (but cf fn 3), and thus (6b) is unacceptable for them if the neighbor is female

³Interestingly, this deletion is allowed even by speakers who supposedly 'require morphological identity' between the deleted VP and the antecedent VP, i.e. speakers who can only interpret John loves his wife and so do I as meaning that I love John's wife, not that I love my own wife

⁴In McCawley 1968, I claimed to have an analysis that did without conjunction reduction. However, the discussion in that paper is extremely faulty, since I paid no attention to those examples (such as Sam is both friendly and easy to please) in which a transformationally derived constituent appears as a conjunct of a coordinate structure, those are of course the examples which yield the strongest case for a rule of conjunction reduction

⁵The idea that I am proposing here is an outgrowth of a proposal made in an unpublished paper on presupposition by Østen Dahl, in which Dahl argued that the 'pragmatic presupposition' that an individual referred to with she is female is not part of the meaning of the sentence but is only a condition for its felicitous use

⁶My saying this should not be taken as a full endorsement of (1), which I would claim fails to account for some of the more interesting examples of each other, such as Those boys have a tendency to gang up on each other and They spent the day taking group photographs of each other (Or do these examples illustrate a further dimension of indeterminacy, namely indeterminacy as to whether the x and y of the 'fxy' that each is combined with range over individuals or over sets?) In any event, the objection to (1) that I am about to discuss provides an interesting example of an objection that has less substance than it appears to have

⁷This dual function of indefinite NP's is discussed insightfully in Karttunen 1969

BIBLIOGRAPHY

- CHOMSKY, NOAM A 1965 Aspects of the theory of syntax Cambridge, Mass MIT Press
- 1971 Deep structure, surface structure, and semantic interpretation In Danny Steinberg and Leon Jakobovits, editors, Semantics (London and New York Cambridge University Press), 183-216
- DOUGHERTY, RAY C. 1970 A grammar of coordinate conjoined structures I Language 46 850-898
- JACKENDOFF, RAY S 1972 Semantic interpretation in generative grammar Cambridge, Mass MIT Press
- KARTTUNEN, LAURI 1969 Discourse referents Paper presented at International Conference on Computational Linguistics, Sänga-Saby, Sweden
- KLIMA, EDWARD S 1964 Relatedness between grammatical systems Language 40 1-20
- MCCAWLEY, James D 1968 The role of semantics in a grammar In Emmon Bach and Robert Harms, editors, Universals in linguistic theory (New York Holt, Rinehart, and Winston), 124-169
- PARTEE, BARBARA 1971 Linguistic metatheory In W Dingwall, editor, A survey of linguistic science (University of Maryland), 650-679