NON-VERBAL PREDICATION AND HEAD MOVEMENT

by Andrew Carnie

reviewed by Peter Svenonius

Summary by the author

1. Introduction

One of the goals of the recent Chomskyan minimalist movement is the simplification (often on conceptual grounds) of the mechanisms found in syntactic theory. In this thesis, I further one such reduction and attempt to justify it with empirical evidence. Primarily using evidence from copular constructions in Modern Irish, I argue for an underdetermined theory of phrase structure where a p-marker’s behavior in the syntax determines its X-bar status rather than the X-bar stipulations driving the p-marker’s behavior.

Since the advent of generative grammar, the notions of phrase and head have been viewed as primitives by many syntacticians (see for example, Comisky 1957). More recently some authors have claimed that they can be derived from other structural relations (such as terminality (i.e. a head) or being dominated by an element that is not a projection of the head (i.e. a phrase) (see for example Speas 1990, Chametzky 1996, Comisky 1994, 1995). Under both of these conceptions of phrasality, however, the standard assumption is that whether a phrase marker (henceforth p-marker) is a head or a phrase determines its behavior with respect to the rest of the syntax. By contrast, I claim the “phrasality” or “headness” of a phrase marker is determined solely by the function and behavior of that p-marker. “Phrases” and “heads” in this conception are thus simply artifacts of the behavior of the p-markers involved. What limits the behavior of p-markers are other properties of the human language computational system (such as the interface with morphology/phonology and the interface with the semantic component), instead of a structural definition or stipulation of the p-markers’ status as a phrase or head.

2. The facts and assumptions underlying the argument

Modern Irish is a VSO language as seen in (1):

(1) Leanann an t-ainmní an briathar i nGaeilge

The subject follows the verb in Irish

Following McCloskey (1983) among many others, I assume that this order is derived from an underlying SVO order. In chapters 2 and 3 of this thesis, I argue for a particular analysis of VSO order in chapters 2 and 3 of this thesis (and in later work like Carnie forthcming), following a suggestion in Collberg (1990) and related work on Breton by Hendrick (1996), I analyze this as the head movement of the non-verbal predicate to a same position as verbal predicates in VSO sentences:

This construction can be contrasted with the one I call an equative copular construction seen in (5):

(5) Is é Seán an dochtúir C agr John the doctor 'John is a doctor'

In the equative construction, where two definite or referring NPs are equated, neither NP appears in the privileged head moved position between the complementizer and the agreement morpheme. Instead, both NPs appear to the right of the agreement morpheme. I claim that the difference between the equative and predicative constructions reduces to the controversial difference in argument structure. Equative constructions involve an abstract equative predicate (COP) which takes two arguments (6a). Predicative constructions by contrast involve a single argument, with the other non-verbal predicate functioning predicatively (6b).

3.1. The mysterious phrasal predicates

The analysis described above runs into problems when it comes to complex nominal predicates like that in (9). The whole predicate appears in the position associated with the headmoved element. Since head movement is, by definition, the movement of heads, not of phrasal categories, it seems unusual to claim such movement is possible for what appear to be phrases.

In chapter 7, I consider alternative analyses to word order alternations in copular constructions, including the unified be analysis of Heggie (1988) and others, DeGraff’s (1992) theory based on reversive pronouns, and Doerty’s (1996) analysis and show that they are inadequate to the task of dealing with all the facts of the equative/predicative alternation of Irish.

The headmovement of non-verbal predicates forms the basis for my claim that phrase structure is underdetermined with respect to phrasality.
3.2. Evidence from wh-extraction

One piece of evidence in favor of the X°-like status of complex indefinite nominal predicates comes from wh-extraction. The argument is as follows. If predicates have undergone head movement X°s and XP-ness of these predicates should not be able to extract via wh-movement. Before proceeding to the actual test, it is worth noting that an account of such violations in terms of island effects and subjacency is untenable in Irish, however, as Irish does consistently allow subjacency/ECP type violations (McCloskey 1979). If the speaker leaves a resumptive pronoun at the extraction site and changes the highest component from a head-movement X° to an XP, then a sentence with a subjacency violation is rendered grammatical (see McCloskey 1979 for more details). Given that such extraction is licit, we can use wh-extraction as a test for the X°-like status of a nominal, in contrast to the situation found in English. If wh-extraction is licit, then the sequence of morphemes is behaving like a fully phrasal p-marker; if wh-extraction is illicit, then the sequence is behaving like an X°. This distribution is exactly what we find with nominal predicates. An indefinite, nonreferential NP predicate like that in (10) does not allow extraction, despite the fact that Irish normally allows extraction out of nominal islands. This is consistent with the idea that these are really functioning as X°s.

This can be strikingly contrasted with the definite NP attributes, which are not predicates and do not undergo X° movement. In these sentences wh-extraction from the definite NP is licit.

3.3. Evidence from the responsive system

There is some further evidence that these complex predicates are behaving like X°s. This evidence comes from the responsive system. Irish has no words for yes or no, instead, the verb is repeated in either the positive or negative form, as seen in (12) (where the negative form is indicated by an adjoined negative complementizer):

This can be analyzed as the elision of everything to the right of the V+Inf complex in a manner familiar from VP ellipsis (see McCloskey 1991 for more discussion). For example, the shaded parts of the sentence schematized in (13).

Given that I have claimed predicates in copular clauses are in Inf, then when elision occurs, then the predicate should remain. At least for the adjectival and propositional predicates which appear in this construction, this is true (see (14), (15)).

Q An leis an Subaru? A Is leis ‘Yes’
Q With John the Subaru? Comp Inf. ‘Yes’
Q Does John own the Subaru? Comp with him

In sentences with referential NP attributes, similar behavior also occurs. Recall that in the analysis sketched above, referential NP attributes are not X°s in an functional projection, rather, they are the argument of an abstract COP predicate. Thus in sentences with definite or referential NPs, we expect only the pronominal agreement realization of the abstract COP predicate to remain after elipsis. This prediction is also true (16).

Q Is liam the farmer? A Is liam the farmer? ‘Yes’
Q Is Joseph a doctor? A Is Joseph a doctor? ‘Yes’

The situation is more complex with indefinite nonreferential nominal predicates (17) which I argue appear in Inf. In these cases the predicate does not surface, but is replaced by the dummy pronominal copula.

This may well be similar to ‘do support’. This dummy pronominal shows up when there is a nonreferential indefinite predicate. What is crucial here is that the element appearing in the Inf head is retained (via the pro-form e) in responses, supporting the analysis that these complex nominal predicates are part of Inf.

4. An underdetermined theory of phrase structure

I propose simply that when an element is behaving like an X°, it is treated by at least some parts of the grammar as an X°. With respect to other components of the grammar that same p-marker may appear phrasal. Complex nominal predicates in Irish are treated by the grammar like X°s and are allowed to undergo head-move ment to adjoin to functional categories just like verbs:

What mechanisms determine whether a p-marker is an X° or an XP? I propose that the notions X° and XP are simply artifacts of the behavior of the p-marker with respect to other components of the computational system. For example, let us propose that the ability to bear tense and agreement features is a property only associated with elements that undergo head to head movement (this notion will be articulated more precisely below), whereas the ability to bear case features is a property associated with element that undergo XP movement (A or A-bar).

I suggest, partially following Chomsky, that the following are some possible criteria for the XP-ness or X°-ness of a p-marker. Recall that a p-marker can be both an XP and an X° at the same time, so we need to consider the fact that the following properties are necessarily the definition of an XP or an X°. Rather, a p-marker can have any number of properties of both X°s and XP and therefore accordingly. We now have a straightforward account of why a “phrase-like” element in Irish appears in a position associated with X°: its phrasal status is underdetermined. Syntactically this element behaves like an X°, but phonologically, morphologically, and p-marker internally it behaves phrasal.

A more important question remains, however. Why such behavior is typologically rare and a restricted phenomenon? Why is it the case that, in the vast majority of cases, such as French, or even Irish verbal predicates, this mismatch between phrasality and X°ness is not found? We must now account for the fact that most of the time, there is a strict alignment of phrasality, where a p-marker functions consistently as either X° or an XP, but usually not both. One possible answer is that such mismatches only apply when the syntax is forced by morphological reasons to head-move elements that are not single morphological units. The reason that complex predicates are not allowed to adjoin to heads in languages like English follows from the fact that they are not allowed to bear tense and agreement features. Adjoining a complex predicate p-marker to an inflectional head would cause the derivation to crash, since none of the appropriate features could be checked. The phrase/head status of the element is thus determined by its behavior with respect to the rest of the computational system. Irish, on the other hand, is special, since it allows complex predicates to bear tense and agreement features, which are therefore forced to check their features in a head-head relation. The narrowness of the phenomenon is thus derived from the fact that such mismatches will only show up with morphological irregularities, such as atypical feature association. In the thesis, other similar cases from Tagalog, Persian and other languages are seen to exhibit similar behavior under similar circumstances.

5. Summary

The theory I suggested in this thesis is that phrase status not be stipulated or structurally derived, but rather is merely epiphenomenal, with other output constraints (such as constraints on the configuration of feature checking) resulting in the surface appearance of such artifacts.

References

Irish example sentences and attentively discusses previous work on Irish. He notes problems for Doherty’s (1996) analysis of Irish copular constructions, which locates the subject in an undermaintained right-hand specifier. Carnie provides an alternative which does not make use of a right specifier, involving movement of the predicate to the left. For several aspects of Irish syntax, Carnie argues persuasively for a specific analysis within the framework assumed, approximately that of Chomsky (1993). For example, his arguments that the copular element is is located in C rather than in Inf seem cogent. But when he deviates from that framework, proposing theoretical modifications, he is less careful to motivate the innovations or explore their consequences. My focus in this review will be on the broader implications of Carnie’s main theoretical proposal, a revision of the distinction between head and phrase. It is an interesting and potentially important proposal, and although ultimately I suggest that it cannot be maintained on the basis of the evidence provided, it raises serious and useful questions.

1. Properties of heads and of phrases

The most radical theoretical contribution of the work at hand is an analysis of the claim that a phrase element can move to a head position. Carnie suggests (pp. 184–191) that this fits naturally with the theory of phrase structure outlined in Chomsky (1994). Carnie points out that the phrase-irrelevant distinction is not primitive, but is determined by the “behavior” of a p-marker (e.g. p. 185). It is not always entirely clear what Carnie means by this. On p. 202 he lists five features which are supposed to be characteristic of XPs and X0s, in Table 1, attributing them to Chomsky. Carnie suggests that “a p-marker can have any number of properties of both Xs and XPs and thus behave accordingly” (ibid.), apparently meaning that a p-marker can have some properties from the left of Table 1, and some from the right, in any combination. The case of the Irish copular construction would be a case in which the non-verbal head/hydrates Tense and/or agree-

Properties of Xs

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<td>bear Tense and Agreement features (undergo head movement)</td>
<td>bear Case features (undergo X movement)</td>
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<td>select for complements</td>
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<td>don’t have reference</td>
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In a typology of works in linguistics, one important division would be between the sort that take a transformational device (often motivated by a broad range of empirical evidence) as the starting point and then develop it against a range of linguistic data, and the sort that take a construction type or set of construction types as the starting point (assuming some theoretical framework, of course) and then derive theoretical claims based on that evidence. This dissertation builds firmly in the latter category. In fact, the abstraction of the title belies the earthly nature of the content: the dissertation is really primarily about Irish clausal syntax. Forays into other languages are but brief, and although claims are made about syntactic theory, the focus is consistently on how it relates to the Irish data.

That is not to say that the dissertation fails to significantly treat non-verbal predication or head movement: it provides a head-movement analysis for the non-verbal predicate in copular constructions in Irish. Nor do I intend to intimate that there are no interesting theoretical proposals with relevance for other languages, in fact I will discuss one at length below. But the crux of the dissertation is its careful and detailed treatment of Irish syntax, especially for copular constructions. Carnie lays out a wealth of (often original)
takes to be in Infl; and (iii) (pp. 195–197) responses to Yes–No questions in Irish generally require that the element in Infl be repeated; when copular sentences like that in (1) are made into questions, they are answered (affirmatively) with the copula plus a dummy element ez, which Carnie takes to be located in Infl.

The second and third arguments can be rapidly dispatched. Doherty (1997:86) falsifies (ii) with an example that shows that the features cannot be realized on N0 is morphologically without the rest of the NP being moved. Carnie points out, on Carnie’s account it is mysterious that Irish exceptionally allows tense and agreement features cannot be realized on N0 is morphologically without the rest of the NP being moved. Carnie’s content that it is a pro-form of the predicate raises more questions than it answers.

Arguments (ii) is more substantial, promoting as it does uniformity in the derivation of clauses. However, there are at least two ways to maintain parallelism in Irish copular and non-copular clauses without allowing an XP to move to a head position. I discuss them in §4, but first, in §3, I probe the deeper implications of Carnie’s proposal.

3. Distinguishing heads from phrases in the morphology

Claim (p. 185) that “[w]hat limits the behavior of p-markers are other properties of the human language computational system (such as the interface with morphology/phonology and the interface with the semantic component), not the p-marker itself” (Carnie 1991:91) requires a little bit of effort to determine just what is being proposed here. As it turns out, Carnie’s vision mainly involves shifting burdens from X-bar theory to the morphological component.

Carnie assumes (p. 27) a basic distinction between N-features and V-features, apparently derived from Chomsky (1993). The position Carnie takes is that N-features must be checked in a specifier position, while V-features must be checked in a head position. Thus the labels are misleading: if head-movement of N0 to D0 occurs, for example, it must be triggered by a V-feature. For Irish, Carnie assumes that there are strong V-features for the Agr head. Carnie furthermore suggests (pp. 202–204) that Irish exceptionally allows tense and agreement features to attach to a non-nominal predicate, which we can assume for argument’s sake to be an NP; these are the features that can check the strong features on T; hence the feature checking theory of Chomsky (1993), NP will have to move to the checking domain of T. The specifier of T, SpecTP, is the nearest XP position in the checking domain of T, and NP will therefore be forced to move there (equivalently, assuming something like Hoekstra 1991 or Kayne 1994, NP adjoins to TP). This is the reason that the features cannot be realized on N0 is morphologically; there is no lexical item in Irish corresponding to a tense N. Thus, the features remain at the phrase level.

He also suggests (p. 202) that when phrases are prevented from moving to head positions, it is because they fail to bear the right feature specifications. The usual assumption is that morphosyntactic feature specifications are shared between a head and its projections (cf. Gazdar, Pullum, & Sag 1982). Thus non-percolating head features are an important part of Carnie’s theory; for example, whatever feature triggers head movement of the verb in a V2 construction must not percolate to VP. A better move, given Carnie’s other assumptions, would be to assume that EPP involves a categorial feature, N or D (Chomsky 1993). For Carnie, this would have to be a phrasal feature (despite being morphologically realized on certain heads).

Nevertheless, Carnie will still be forced to postulate non-percolating prharsal features, as the trigger for XP movement, stipulating that they are attached at the maximal node, rather than to some lower node. The assumption seems problematic: XP-movement, for example, involves XP-s, so the wh-feature must be a phrasal feature (despite being morphologically realized on certain heads).

Or perhaps wh-movement is movement of an operator, and there are semantic reasons that only XPs can be operators. But it seems unlikely that all phrasal movement could be due to semantic factors. Take, for example, DP movement to a Case position: Carnie must claim that the feature checked in SpecAgP (Chomsky 1993) that is the nearest XP position in the checking domain of T. The specifier of T, SpecTP, is the nearest XP position in the checking domain of T. The specifier of T, SpecTP, is the nearest XP position in the checking domain of T, and NP will therefore be forced to move there (equivalently, assuming something like Hoekstra 1991 or Kayne 1994, NP adjoins to TP). This is the reason that the features cannot be realized on N0 is morphologically; there is no lexical item in Irish corresponding to a tense N. Thus, the features remain at the phrase level.

4. Alternatives

Consider a possibility available if we reject Carnie’s opposition of V-features to N-features, but retain the assumption that only heads can move to head positions in the syntax. Then Carnie’s suggestion that tense and agreement features in Irish can be associated with a nominal predicate on a different cat is that of Massam & Smallwood 1991 or Kayne 1994, NP adjoins to TP). This is the reason that the features cannot be realized on N0 is morphologically; there is no lexical item in Irish corresponding to a tense N. Thus, the features remain at the phrase level.

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Another alternative, which maintains the parallelism between copular and non-copular clauses but which requires abandoning neither Carnie’s N-feature/V-feature distinction nor the syntactic head-phrase distinction, would be to
assume that VSO order in non-copular clauses is derived not by head movement, but by VP movement. This is made possible by the analysis of Irish clause structure in Bobaljik & Carnie (1996), by which both the subject and the object evacuate from the VP to higher specifier positions in tensed clauses. The VP, then, contains only V, just as in Hinterhölzl’s (1997) analysis of West Germanic Verb Raising as involving VP-remnant movement, or in the recent analysis of English constructions. Such a proposal is not compatible with Carnie’s arguments about minimality (pp. 104 ff.); he assumes, following the theory of minimality motivated in Bobaljik & Jonas (1999) and formalized in Chomsky (1995), that the subject and object cannot both leave VP without V having moved to some higher position. However, this need not stop us: the foundations for that theory of minimality are called into serious question by Holmberg (1997).

If VSO is derived by VP movement in general, then VOS languages like Tzo’tzil are more similar to SVO languages like Irish than previously thought; and languages like Chamorro, in which VOS and VSO could, be analyzed as raising the object out of VP only optionally. Of course, in order to derive VSO order, substantial leftward VP movement has to be postulated and motivated, in order to evacuate the VP before VP movement, much as in recent Kayne analyses of OV order. It must also be explained why such fronting does not occur in non-verbal predicates—consider how the phrase ‘This letter is from my sister’ would be analyzed in Icelandic. PPs never front along with the Irish verb. But this seems to be an interesting area for investigation (cf. the similar yet intriguingly different proposal for Irish in Duffield 1985).

The cross-linguistic evidence warrants an approach based on universal distinctions between verbal and non-verbal predicates. Carnie treats the parallelism of verb-initial clauses and non-verbal predicate-initial clauses as parochial when he suggests that Irish non-verbal predicates exceptionally bear verbal features (p. 202). However, it seems that the pattern is widespread; for example Carnie himself notes that it holds for Tagalog, and Chung (1990:570) notes it for Chamorro, giving examples like the one in (3a), while Massam & Smallwood (1997) note it for Nienuean, as shown in (3b) (from their p. 268).

### 5. Examples from other languages of P-markers with mixed phrase-head characteristics

Carnie provides (pp. 211–228) some cross-linguistic evidence for an “ambiguity between phrasal and Xⁿ behavior” (p. 210) which is intended to support the proposal discussed above. He briefly discusses about a dozen half-examples of cases which are supposed to show a mix of head and phrase properties. However, he provides no indication as to how his theory is to account for these cases, nor even whether they are consistent with his proposal. In most cases there are perfect plausible accounts which do not rely on abandoning the head-phrase distinction. The section concludes with an especially curious example which Carnie clearly identifies the head-phrase properties at issue, nor explained why they should be associated with heads or phrases. I will not discuss all six examples here for reasons of space, but will briefly note two, to illustrate my point.

For example, he discusses some Yoruba constructions with phrasal complexity (citing Pulleyblank & Akinyili 1988, which I have not seen), suggesting that they are headlike in being islands for either inalienable or prototypical properties, and which Carnie (1993) says are islands for anaphoric properties. Worse, if excorporation is possible, as argued in Roberts (1991) or Koopman (1994), then heads are not islands for movement. Nor are they anaphoric islands, if N-incorporation structures are heads, as Carnie assumes (p. 214). But Carnie explicitly uses the referential transparency of incorporated nouns to motivate a syntactic account; cf. Baker’s pp. 78–81.

Most interesting to the Yoruba phrases show derivational morphology. But this might be subsumable under a theory of phrasal affixation, such as that of Miller (1991), Anderson (1992), or Halpern (1995).

In any case, Carnie says nothing about how his theory would handle the Yoruba examples, being content to note them as a case of mixed head and phrase properties. Thus it remains unclear whether his theory “predicts” the existence of cases like Yoruba, as he claims (p. 228).

Carnie also mentions (p. 223) a case which is in a sense the opposite of the Yoruba case, that of separable prefix verbs (he mentions only Yiddish in this context, but German and Dutch are identical in the relevant respects). Separable-prefix verbs have some headlike properties, for example the prefixes are typically not phrasally complex, but on the other hand they can be separated by V movement.

Once again, Carnie does not propose an analysis, but is content to present this as a case of mixed head-phrase properties. There are two different ways out of this problem other than the abandonment of the head-phrase distinction. One is to accept excorporation as a possibility (cf. above). After all, Carnie does not suggest why excorporation should be impossible. The other approach that Carnie takes is to say that phrasal and head-phrase distinction is to assume that separable prefix verbs are not heads at all. Zwart (1993) and Taraldsen (1998) both provide analyses in the which the ‘prefix’ occupies a phrasal position to the left of the verb.

The other examples Carnie presents are generally similar in that he provides no specifics as to how his theory would handle such cases, nor does he show reasons for rejecting the reasonable alternatives available in the literature.

### 6. Conclusion

Carnie’s work is a careful and detailed study of Irish clausal syntax. It is to be commended for its clear discussion, ample supply of example sentences, sensible organization, attentiveness to previous work, and considerate citation etiquette. No evidence provided here or elsewhere in Carnie suggests that the lateral and head-phrase distinctions are well motivated or supported by the evidence presented. The reader is left free to pursue his own critical tour through the literature helpful and illuminating.

In addition, it makes some provocative theoretical claims, but these seem to me to be less well motivated and developed. I have examined the material in detail, the bold proposal that the X-bar theoretical distinction between heads and phrases be jettisoned. I believe I have demonstrated that Carnie’s system preserves the head-phrase distinction in a way which supports some of the arguments Carnie presents against the morphological component. Having systematically examined his empirical arguments for his revision of X-bar theory, I have concluded that they are wanting, and I have pointed out two alternatives to his specific proposal for non-verbal predicate constructions.

However, there are at least three ways in which even this proposal represents headway. First, it provides the first formal proposal for the analysis of Irish copular constructions to have preceded it (Doherty 1996) in that it derives the predicate-subject order by leftward movement of the predicate, a move which is adopted in Doherty (1997). Second, it makes a first stab at capturing the parallelism between sentence-initial verbal heads and sentence-initial non-verbal predicate phrases, a distinction which looks likely to remain with us for some time. Third, it calls attention to the study of the nature of our fundamental assumptions about phrase structure, widely assumed but rarely discussed. Even if I have rejected the specifics of Carnie’s fact, the proposal remains that the X-bar distinction between head and phrase is generally underexamined.

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**Note**

Thanks to Jim McCluskey, Cathal Doherty, and David Adger for discussion of this material. All opinions expressed and metaphors mixed are my own.

Abbreviations appearing in glosses are: a.o. ab.-artikel, cl. classifier, COOP complementizer, cop. copula, l linker, P preposition, poss. possessive, PREP preposition. See the work cited for explanations.

**References**


THE COPY THEORY OF MOVEMENT AND LINEARIZATION OF CHAINS IN THE MINIMALIST PROGRAM

by Iairo Nunes
reviewed by Hans-Martin Gärtner

Summary by the author

A considerable amount of research within the Principles and Parameters Theory has been devoted to properly characterize the properties of movement, traces, and chains. In the recent developments of the Principles and Parameters Theory which have culminated with the proposal of a Minimalist Program for linguistic theory (see Chomsky 1995), these issues arise anew in face of the elimination of much of the rich theoretical apparatus previously available.

Chomsky (1993) incorporates into the Minimalist Program the “copy theory of movement”, according to which a trace is a copy of the moved element, which is deleted in the phonological component, but remains available for interpretation at LF. Under this view, the operation Move is devoting to properly characterize the properties of movement, traces, and chains.


Another conceptual problem with the computational system as proposed in Chomsky (1994, 1995: chap. 4) is that Merge is taken to be an operation in its own right in certain cases, and a suboperation (of Move) in other cases. In an optimal system, we should in principle expect Merge to have the same theoretical status in every computation. Finally, as is emphasized by Brody (1995), if chain formation and Move express the same type of relation, a theory which contains both notions is redundant.

This dissertation develops a strictly Minimalist version of the copy theory of movement which overcomes the conceptual problems raised above and has a broader empirical coverage than the versions developed in Chomsky (1993, 1994, 1995: chap. 4). It proposes that the fact that a chain cannot have more than only link overtly realized (see (2b)) follows from Kayne’s (1994) Linear Correspondence Axiom (LCA), according to which the linear order of a PF sequence is determined by asymmetric c-command. Under the assumption that the two copies of John in (1) are “nondistinct” (they relate to the same element in the initial numeration), no linear order can be established in accordance with the LCA. Given that the verb was was in (1), for instance, asymmetrically c-commands and is asymmetrically c-commanded by the “same” element, namely John, the LCA should require that was precede and be preceded by John, violating the asymmetry condition on linear order. Put simply, deletion of all but one link is forced upon a given chain CH in order for the structure containing CH to be linearized in accordance with the LCA. The derivations of (2a) and (2b) therefore cannot be compared for economic purposes, because only the former yields a PF object.

The next question to be addressed then is why it is the case that only traces are deleted for purposes of linearization, but not heads of chains.