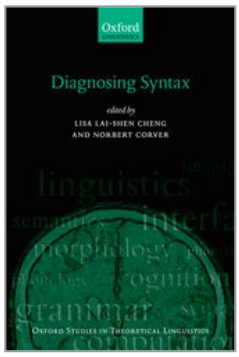

Diagnosing Syntax
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Diagnosing Head Movement

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Abstract and Keywords

This chapter first describes the clinical symptoms of head movement, and then sketches the options available for treatment of a case that has been so diagnosed. It shows that while the basic diagnostics for head movement are fairly clear, at least within broadly Chomskyan approaches to syntactic theory, there is little consensus on the best technology with which to attack it. An overview of the outstanding issues which complicate the discussion is also presented.

Keywords: head movements, diagnosis, syntactic theory, Chomsky

In this brief survey, I will first try to describe the clinical symptoms of head movement, and then sketch the options available for treatment of a case that has been so diagnosed. As we will see, while the basic diagnostics for head movement are fairly clear, at least within broadly Chomskyan approaches

to syntactic theory, there is little consensus on the best technology with which to attack it. Finally, I present an overview of the outstanding issues which complicate the discussion. This brief discussion should not be taken as comprehensive. For more complete overviews and in-depth discussion, see the individual articles in this section and references therein.

6.1 Displacement

The first, and best, indication that any kind of movement has taken place is an observed word order that is different than might be expected on independent theoretical or language-internal grounds.

Independent theoretical grounds for expecting a particular word order arise from the broad consensus on the ground rules about initial selectional relationships among constituents. The head–complement relation is fundamental: heads start off as sisters of their complements, with whom they stand in a semantic selection relationship. If a head and its selected complement are not adjacent, at least one of them has moved. If the complement has moved, it is a case of XP movement, that is phrasal movement, to a specifier or adjunct position higher in the tree, and the tests for such movement are quite clear (see Chapters 7 to 11, this volume). If, on the other hand, a head and its complement appear to be non-adjacent and it also seems unlikely that the complement has moved away—perhaps it is a narrow- scope indefinite object, for example, or perhaps the head is far to the left of its (p.113) complement—then head movement must be considered. (Often enough, both the head and its complement have moved, complicating the picture somewhat.)

Language-internal support for the postulation of distinct underlying and surface positions for a given head can come from constructions where the head appears in different linear orders with respect to otherwise identical constituents, as is the case for auxiliaries and modals in English yes-no questions:

(1)

a. Lisa <u>can</u> play the saxophone.
b. <u>Can</u> Lisa play the saxophone?

Similar word order variation is seen in *passé composé* and imperfective versions of the same clause in French, and in regular and construct-state versions of the same DP in Hebrew, where the head noun ‘house’ follows the determiner in the unmarked form but appears leftmost in the phrase in the construct state:

(2)

a.

Astérix	a	souvent	<u>mangé</u>	du	sanglier.
Asterix	has	often	eaten	of	boar
‘Asterix has often eaten boar’					

b.

Astérix	<u>mangeait</u>	souvent	du	sanglier.
Asterix	eat-P.IMPF	often	of	boar
‘Asterix often ate boar’				

(3)

a.

ha-<u>bayit</u>	ha-gadol	sel	ha-’iš
the-house	the-big	of	the-man
‘the big house of the man’s’			

b.

<u>beyt</u>	ha-’iš	ha-gadol
house	the-man	the-big

‘the man’s big house’
(Hebrew; Alexiadou et al. 2007)

6.2 Locality effects

Head movement typically traverses only a short distance in the tree; a single link often will not cross any intervening overt material, which can make it difficult to spot. Without the adverb *souvent* ‘often’ in (2), for example, there would be no clue that *mangé* in (2a) and *mangeait* in (2b) are in different places with respect to their complements. This follows if something like Relativized Minimality (Rizzi 1990) or the Minimal Link Constraint (Chomsky 1995b) applies to head movement, ensuring that any moved constituent must move to the closest c-commanding landing site of the appropriate type, not skipping intervening heads. Head movement chains of significant length, then, are the result of cyclic movement through intermediate head positions. Intervening head positions cannot be skipped, and if such a position is (p.114) unavailable for movement due to being occupied by another lexical item, that lexical item, rather than the lower potential target, must undergo head movement instead.

The Dutch finite clausein (4a) below is the kindof example which has been analysed as containing a multi-link head movement chain; the chain appears even longer linearly than it actually is structurally due to the head-final nature of the Dutch VP. The verb was, ‘was’, moves from its base position in the VP, through (head-final) T to the second position in the head-initial C position. In (4b), the C position is filled with the complementizer *dat*, ‘that’, and the verb cannot move there, remaining on the right, in the T head position. In (4c), the T position is filled by a closer auxiliary verb, *heeft*, ‘has’, and the main verb remains in the VPwhile the auxiliary cyclically moves up through T to C. Finally, (5) shows that the main verb, whether inflected (5b) or not (5a), cannot move to the verb-second C position across an auxiliary.

(4)

a.

[$_{CP}$ Toch [$_{C'}$ was [$_{TP}$ ze	gisteren	[ziek t_{was}]$_{VP}$ t_{was}]TP]c′]cp	
Yet	was she	yesterday	sick.
‘Yet she was sick yesterday’			

b.

[$_{CP}$ dat[$_{TP}$ ze	gisteren[$_{VP}$ ziek t_{was}]VPwas]$_{TP}$]$_{CP}$			
that	she	yesterday	sick	was
‘ … that she was sick yesterday’				

c.

[$_{CP}$ Wie[$_{C'}$ heeft[$_{TP}$ Jan[$_{TP}$[$_{VP}$[$_{VP}$ gezien]VPt_{heeft}]VPt_{heeft}]TP]C′]CP?			
Who	has	Jan	seen
‘Who has Jan seen?’ (Dutch; den Besten 1983)			

(5)

a.

*[$_{CP}$ Wie[$_{C'}$ gezien[$_{TP}$ Jan[$_{TP}$[$_{VP}$[$_{VP}$ t_{gezien}] $_{VP}$ t_{heeft}]$_{VP}$ heeft]$_{TP}$]$_{C'}$]$_{cP}$?			
Who	seen	Jan	has
‘Who has Jan seen?’			

b.

*[$_{CP}$ Wie[$_{C'}$ ziet[$_{TP}$ Jan[$_{TP}$[$_{VP}$[$_{VP}$ t_{ziet}]$_{VP}$ had]$_{VP}$ t_{ziet}]$_{TP}$]$_{C'}$]$_{CP}$?

Who	sees	Jan	had
‘Who has Jan seen?’			

In addition, unlike other kinds of movement, head movement is strictly clause- bounded, at least with respect to finite clauses. Examples in which the head of an embedded clause moves through the functional complex and adjoins to the head position of the matrix clause are almost nonexistent. The most convincing multi- clausal cases involve affixal causatives and other ‘light’ verbs, where the embedded clause is typically nonfinite, arguably a constituent smaller than CP or TP. Examples like (6b) plausibly start off from a base structure with the linear order of constituents like that in (6a), with subsequent head movement of the V head of the embedded VP to adjoin to the matrix V, and thence to matrix T as part of a compound verb.[1]

(p.115) (6)

a.

[$_{TP}$ Mtsikana a-na-chit-its-a [$_{VP}$ *t* *its*[$_{VP}$ kuti mtsuko u-gw-e]$_{VP}$]$_{VP}$]$_{TP}$		
the girl	3SG-PST-do-cause-FV	that waterpot 3-fall-FV
‘The girl made that waterpot fall’		

b.

[$_{TP}$ Mtsikana a-na-gw-ets-a [$_{VP}$ *t* *its* [$_{VP}$ kuti mtsuko *t* *gw*]$_{VP}$]$_{VP}$]$_{TP}$		
the girl	3SG-PST-fall-cause-FV	that waterpot
‘The girl broke/knocked over that waterpot’		(Chichewa; Baker 1988)

However, I know of no equivalent examples where the embedded verb clearly moves through finite T, C, and then from C up into the matrix clause. Head movement, then, is constrained to occur within a single CP domain.

6.3 Higher is bigger

Head movement is often correlated with affixation. For example, in the French example (2), the imperfective *-ait* suffix is often thought of as concatenated with the verb via head movement, existing as the lexical instantiation of the tense/aspect node and attached to V when the latter moves to the former. Similarly, if causative verbs are formed by head movement, it is natural to think of the affixal *-ets-* in the causative verb *a-na-gw-ets-a* 'make.fall, knock over', in (6b) above as the lexical instantiation of a causative V, affixed to the root V *-gw-* 'fall' when the latter head- moves to adjoin to the former. When it does not move, as in (6a), the causative affixation does not occur.

Friedmann (Chapter 4, this volume) exploits this diagnostic to determine whether agrammatic aphasic speakers have lost head movement to T. In repetition tasks, some subjects omitted tense inflection on Hebrew verbs in canonical word orders. This pattern of error can be modelled as failure of V-to-T movement, and consequent failure to mark the verbal inflection that is contributed or licensed by T. Correlation between this impairment and impairmentona word-order task involving a moved verb support the hypothesized link between movement and affixation.

As Platzack (Chapter 2, this volume) notes, if movement always entailed affixation, forms which remain in situ would always be morphologically less complex than forms which have undergone head movement.[2] However, as noted by both Platzack and Harley (Chapters 2 and 3, this volume) head movement does not always result in affixation. There frequently are head-moved items which are morphologically identical to non-head-moved items (as in English *can* in example (1b) above) and even ones which are morphophonologically smaller than items which have apparently moved less (compare Hebrew *bayit* and *beyt* in (3)

above, or the finite Dutch verb (p.116) *ziet* ‘sees’ with its participle *gezien* in (4). Consequently, affixation can be taken as indicative, but not conclusive, support for a head movement analysis.

6.4 Mirror effects

As discussed extensively in Harley (Chapter 3, this volume), when head movement produces morphologically complex forms, the hierarchical ordering of morphemes within the form typically reflects the hierarchy of projections in the clause. Baker (1985) argued that this tight syntax/morphology isomorphism is more than a coincidence, and introduced the Mirror Principle as a constraint on the syntax- morphology interface. In later work (Baker 1988), he showed that if head movement results in affixation, with each affix conceived of as the head of a projection in the tree, the matching morphological and syntactic hierarchies are predicted, rather than just described, by the theory.

Consider, for example, the Zulu example in (7) with its hypothesized internal structure, from Zeller (Chapter 5, this volume).

(7)

[a-	[ba-	$[[fik]_{V}$ -anga$]_{T}]_{AgrS}]_{Neg}$
neg	SM.CL2	arrive.PAST.NEG
‘(Class 2 Subj) did not arrive–		

The hierarchical internal structure of the complex verb form mirrors the hierarchical structure of the clause, assuming that Zulu is a language (like Irish or Catalan) in which NegP is base-generated high in the clause, above AgrSP and TP, rather than below TP as in English. This mirror effect is predicted if the complex verb is built up by successive-cyclic movement upwards through the tree, each head position contributing its own morphological content as it is syntactically adjoined to the complex form.

6.5 Head movement results in syntactically opaque constituents

When distinct sub-pieces of a complex head do correspond to the hierarchical sequence of heads through which head movement has taken place, and suggest the presence of syntactically derived complexity within the word, the complex head tends to resist syntactic subdivision in two important ways. First, it usually behaves as a unit with respect to constituency tests such as replacement by a proform and reordering; its internal constituent structure is not typically detectable with syntactic tests.

Second, incorporation via head movement bleeds locality effects due to the syntactic opacity of the complex head produced by head movement, as argued by Zeller (Chapter 5, this volume). Zeller demonstrates that incorporated applied object (p.117) pronouns in Kinyarwanda do not act as interveners for subsequent A-movement of lower DPs, while their non-incorporated, phrasal counterparts do. He argues that the failure of intervention follows because the incorporated object marker within the complex verb cannot count as a closer c-commandee targeted by the higher Tense Probe, due to the syntactic opacity of complex heads.

Third, it is strongly resistant to subextraction: a head never moves into a c-commanding head position and subsequently out of it, stranding a piece of material behind. Syntactically, this is reminiscent of the famous ‘freezing’ effect seen in phrasal movement (see, e.g., Culicover and Wexler 1973). Note that it is not clear that a syntactic account of this opacity is warranted, as it readily lends itself to morpho-phonological explanations as well as syntactic ones since the constituent produced by head movement is typically a phonological word. The relationship between syntactic head movement and phonological word-hood is typically simply stipulated, rather than derived from independently motivated correlations, however, and it is not clear why head-adjunction should produce single phonological-word- sized units rather than several such. Nonetheless, phonological-word-hood of a complex compositional form is a typical diagnostic for head

movement. See further discussion of the issue of affixation types in Section 6.7.

6.6 Semantic effects

Finally, in many cases of head movement, plausible potential semantic effects are absent. There is, for example, no difference in the relative scope of tense and the universal quantifier in the examples below, despite the head movement of T to C in (8b):

(8)

a. Everyone left.
b. Did everyone leave?

Both (8a) and (8b) admit both wide and narrow scope interpretations for the time variables introduced by tense, which has head-moved above the universal quantifier to C in (8b) but whose surface position is below the universal quantifier in spec-TP in (8a). Similarly, the variable position of the main verb with respect to the quantificational adverb *souvent* 'often', in the examples in (2), does not seem to produce any relevant interpretive effect. The absence of certain kinds of semantic interactions, then, is characteristic of head movement.[3] However, see the citations mentioned in Section 6.7 for arguments against this view.

(p.118) 6.7 Caveat philologus

None of the diagnostic properties of head movement described above are individually infallible, as each of them can arise from independent sources. Nor is a conjunction of one or more of them definitive.

For example, displacement of a single terminal node might be the result of phrasal movement if the moved phrase is a 'remnant', that is one from which all other constituents have already been removed via phrasal movement. Remnant phrasal movement can also be subject to locality effects, and will be clause-bounded with respect to finite clauses if it is A-movement. (See Zeller Chapter 5, this volume, for an extended

illustration of a comparison of the relative merits of a remnant movement vs. head movement analysis.)

Affixation is a particularly vexed diagnostic, as cases in which affixation takes place without head movement are not at all hard to come by; see discussion in Julien (2002), Harley (Chapter 3, this volume) and Platzack (Chapter 2, this volume). Nonhead movement affixation can also exhibit mirror effects, and some potential cases of head movement do not obviously behave as a single phonological word or forbid excorporation (as in Germanic prepositional prefixes and clitic climbing cases; see the discussion in Roberts (1991) and later work).

Finally, semantic interactions with negation and polarity triggered by head movement have been argued for by Lechner (2006), Kishimoto (2010), and Roberts (2010).

Nonetheless, when taken together, the above properties at least indicate that head movement is a strong analytic possibility, which one would need to explicitly justify abandoning when proposing some alternative.

6.8 Treatment

Head movement, although generally a well-accepted concept, is subject to regular theoretical reworkings. Within present Minimalist syntactic theorizing, there is a tension between the classical treatment of head movement and the fundamental hypotheses of the phrase-structure component, the proposed Bare Phrase Structure of Chomsky (1995a).

The most typical Government and Binding Theory (GB) structural analysis of head movement treated it as adjunction of one head to another: the moving head raises and adjoins to the immediately c-commanding (and selecting) head. On that view, special definitions for c-command and government had to be introduced (as (p.119) in, e.g., Baker 1988) so as to allow the moved head to govern its trace and satisfy the empty category principle (ECP). Each head movment operation would create a separate chain, on such a view, as successive links are each headed by their own category.

An alternative within GB treated head movement as a substitution operation: V would not adjoin to T in a typical case of V-to-T movement; rather, it would substitute for it (see, e.g., Rizzi 1990). The definitions of c-command and government needed no adjustment in this formulation, but the resulting surface structures violated the X-bar template. Further, substitution would not account for the morphological complexity observed in Baker's incorporation analysis, nor for the Mirror Principle effects that Baker also noted. Adjunction, therefore, was more widely adopted.

With the advent of Bare Phrase Structure (BPS), however, the adjunction analysis came into direct conflict with a central plank of the new Minimalist platform, namely the reduction of the phrase structure component to the single operation Merge. The puzzles BPS poses for head-adjunction are comprehensively described in Chomsky (1995a) and elsewhere, and will not be recapitulated here. Suffice it to say that a plethora of alternative models of head movement, and amendments to the BPS phrase structure component, have been advanced. A limited sampling of new or modified phrase-structural technologies developed specifically to model head movement following Chomsky's (1995a) commentary include the following: Bobaljik and Brown (1997), Brody (2000), Boeckx and Stjepanović (2001), Hornstein and Uria- gereka (2002), Julien (2002), Fanselow (2003), Mahajan (2003), Harley (2004), Surányi (2005a), Matushansky (2006), Citko (2008), Roberts (2010), and Svenonius (2012), among others. Whatever the most correct model of the phenomenon ultimately turns out to be, however, the diagnostics discussed above should provide a reasonable field guide to assist in recognizing head movement when you encounter it in the wild. What to do about it after that is up to you.

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or choice of examples or emphasis, however, for which I take full responsibility. (p.120)

Notes:

([1]) The change in the form of the causative from *-its-* (6a) to *-ets-* in (6b) is phonological in nature.

([2]) A similar intuition is appealed to by Cardinaletti and Starke (1999) in their analysis of clitic, weak, and free pronouns, arguing that free pronouns are typically phonologically larger because they contain more structure than clitic pronouns do, the latter representing only a single terminal node and the former the concatenation/spell-out of several.

([3]) Note that the structural restrictions on head movement can have semantic consequences, though these are not *introduced* by head movement, but rather a precondition on its occurrence. For example, noun incorporation into V is typically restricted to indefinite, non-specific nouns (see e.g. Baker 1988, van Geenhoven 1998); this is perhaps due to the blocking effect that the definiteness/specificity-contributing D would have; on the DP hypothesis, as a closer intervening head, such a D would prevent incorporation of N into V (alternatively, moving from N to D to V would constitute an example of movement from lexical to functional to lexical domains, also independently ruled out on some formulations). Because only D-less structures allow incorporation of N, head movement in this case is restricted to applying only to nonspecific, indefinite N—an effect of the structural constraints on head movement, not an interpretive effect of the head movement operation. Thanks to Norbert Corver (p.c.) for this point.