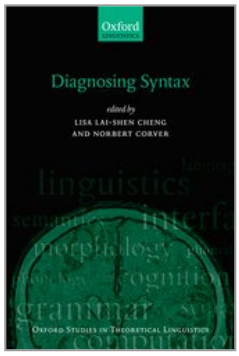

Diagnosing Syntax
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Getting Morphemes in Order: Merger, Affixation, and Head Movement

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Abstract and Keywords

Head movement is usually diagnosed by consideration of whether there is evidence for displacement of a single-word item. The multimorphemic character of a given form often being taken to bear on the issue, particularly when the morpheme order mirrors the order of the extended projection in the syntax. However, just as there can be head movement without affixation, there can be affixation without head movement. Even the issue of which morpheme orders can be taken as 'mirroring' the syntax is somewhat more complex in implementation than commonly assumed. Additional mechanisms must be at work in deriving certain types of complex forms. An analysis of the Cupeño verbal complex is argued to involve an intricate interplay of independently motivated possibilities. Finally, some of the formal problems posed by head adjunction analysis of head movement are

reviewed, and a brief overview of some alternative theoretical approaches to head movement is given.

Keywords: Cupeño, the Extension Condition, merger under adjacency, M-merger, cyclicity

3.1 Introduction

Head movement is in a way the poor sister in the theoretical typology of movement operations. Of the three types of movement operations, head movement typically travels quite a short distance in the linear string, which makes diagnosing it particularly challenging; investigators must often rely heavily on the position of single-word constituents like negation to confirm that displacement has taken place. Further, its structural implementation has always been theoretically problematic. In earlier Government and Binding theory, the definition of government had to be carefully formulated in order to ensure that traces of head movement could satisfy the ECP appropriately. Within Minimalism, head movement violates the Extend Target and Chain Uniformity conditions, two intuitively natural restrictions easily derived from more fundamental premisses, and which themselves impose empirically robust constraints on derivations—the very kind of constraint that Minimalist thinking predicts should apply in the syntax of natural language. Finally, head movement is situated firmly at the interface between morphology and syntax, which means that much of the central data which head movement is designed to account for must be considered from a morphological perspective as well as a syntactic perspective—and theories of the morphology-syntax interface are even more contentious and disparate than theories of syntax proper.

On the other hand, many of the empirical results produced by the theory of head movement are among the most intuitively satisfying ideas in modern syntactic theory. It is gratifying, for example, to see students come to understand the fundamentals of the analysis of German V2 phenomena, and to watch the ‘aha’ moment when they grasp the explanation of the clause-final position of the tensed verb in (p.45) embedded contexts in contrast to its V2 position in matrix

contexts (den Besten 1977).[1] Similarly, head movement analyses have produced several of the most plausible and straightforward examples of parametric variation: the V-to-T parameter that differentiates French from English (Emonds 1976; Pollock 1989), the T-to-C parameter that differentiates German from French; the V-to-v parameter that distinguishes Hindi and Persian complex predicates (Folli, Harley, and Karimi 2005), the N-to-V parameter that differentiates true incorporation in Mohawk (Baker 1988) from pseudo-incorporation in Niuean (Massam 2001) or Hindi (Dayal 2003). Finally, syntactic head movement can provide a satisfying explanation for the existence of the morphological ordering generalizations characterized by Baker's (1985) Mirror Principle. In short, the theory of head movement has generated an extremely fruitful and empirically significant line of inquiry, despite the difficulties associated with specifying exactly what head movement *is*, structurally speaking

In this chapter, I will first briefly exemplify some of the generally accepted symptoms of head movement—the empirical clues that tend to suggest to linguists that head movement may have occurred (Section 3.2). Having identified these symptoms, we can then ask, what are the particular theoretical tools available to the syntactician to model them? I will first consider the analytical and typological possibilities offered by perhaps the most standard view of the head movement operation, head adjunction. I then discuss cases from English and Cupeño that present clear challenges to this view, and identify two independently motivated operations on X^0 terminals that are available at the mapping to PF, Merger Under Adjacency, and Affix-Specific Linearization. The interaction of these three operations expands the typology of morpheme orders available to the theory, and allows for an account of cases which would otherwise pose an insuperable challenge to the unadorned head adjunction theory (Section 3.3). Finally, I will review the theory- internal issues with the structural implementation of head movement in current Minimalist phrase-structure thinking, and very briefly describe the varied alternative toolbox for dealing with head movement made available by various modern syntactic theorists (Section 3.4). These theories reject the standard head adjunction

analysis outlined in the first section of the paper for principled theory-internal reasons, and address the resulting theoretical gap in several different ways.

3.2 Diagnosing head movement

3.2.1 Position

As with any kind of movement, the primary indication that movement has occurred is a reordering of the linear string. For example, finite French verbs appear to the left (p.46) of the negative element *pas* (1), while participial versions of the same verb, bearing the same semantic relationship to negation and the clause's arguments, appear to the right of negation (2):

(1)

Jean	ne	parlait	**pas**	français
Jean	NEG	speak.3P.IMP	NEG	French
‘Jean wasn’t speaking French’				

(2)

Jean	n’a	**pas**	parlé	français
Jean	NEG’has	NEG	SPEAK.PPL	French
‘Jean has not spoken French’				

Similarly, in the VSO language Irish, the finite and non-finite verbs appear in different places in the sentence, though in this case, the diagnostic element with respect to which the verb is reordered is the subject DP, rather than a smaller monomorphemic element like negation:

(3)

a.

Phóg	**Máire**	an	lucharachán	(Carnie 2002)
kissed	Máire	the	leprechaun	
‘Máire kissed the leprechaun’				

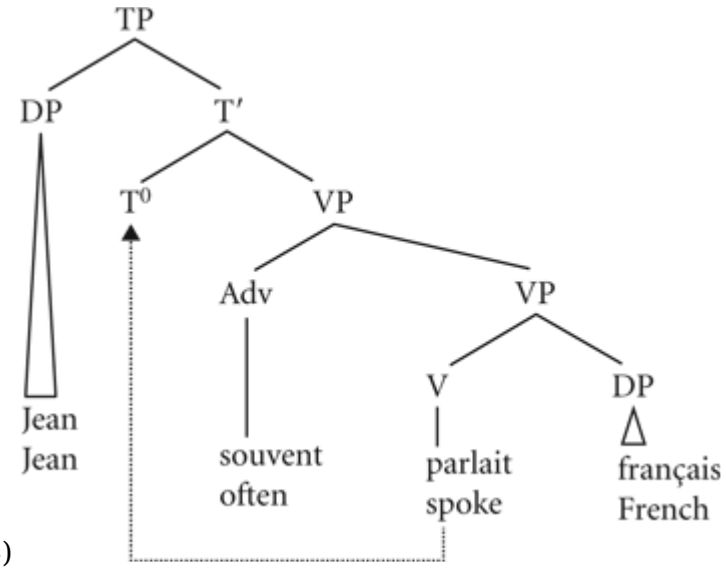
b.

Tá	Máire	ag	pógail	an	lucharachán
is	Mary	PROG	kiss	the	leprechaun
‘Mary is kissing the leprechaun’					

Since the subject DP can involve arbitrarily large structures, the distance between the two possible positions of the main verb is in principle unbounded.

In these cases, the main verb only surfaces in the lower position when the upper position is independently occupied by an overt element—an auxiliary in these examples. This effect is reminiscent of both the *Wh*-Island Constraint and the ban on Superraising. A *wh*-element cannot move into a position already occupied by another *wh*-element, and it cannot skip such positions, given the ill-formedness of sentences like *<u>*What*</u> *did John wonder why Bill liked <u>t</u>*. Similarly, a DP cannot A-move into a position already occupied by another DP, and also cannot skip such positions, as shown by the ill-formedness of *<u>*Two men*</u> *seemed there to be <u>t</u> in the room*. In the same way, the higher auxiliary intervenes between the main verb position and higher head positions, so that even in contexts where verb-fronting would be possible were the auxiliary not present, the presence of the auxiliary blocks it: *<u>*Parlé*</u> *Jean a <u>t</u> français?* vs. <u>*A*</u>*-t-il <u>t</u> parlé français?* and *Parlait-il français* [2] (Travis 1984).

This parallel suggests that a movement-based account of the variable position of the main verb in (1) and (2) is appropriate. The central idea is that the lexical verb is always base-generated within the VP, where argument-structural relations are satisfied. When it appears in positions manifestly outside the VP, it has moved there (p.47) by head movement—movement and adjunction to the closest c-commanding head position, illustrated below:



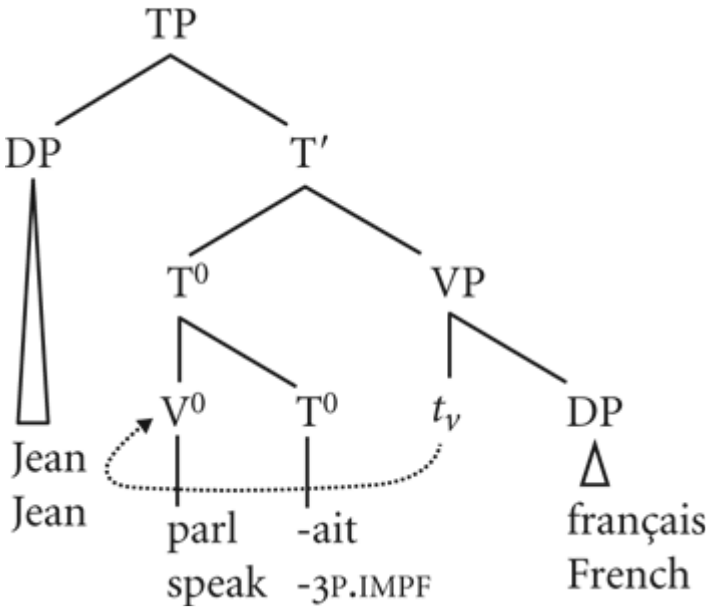
(4)

When the target position is independently filled, as in (1) and (2), head movement is blocked. Travis (1984) first modelled this effect with the Head Movement Constraint, later argued by Rizzi (1990) to be a subcase of a generalized locality constraint on all movement operations, Relativized Minimality. This parallelism between head movement and other cases of syntactic movement was taken as strong evidence for the proposal that a movement operation was responsible for the variable position of the verb in pairs like (1)–l(3).

3.2.2 Affixation

Syntactic head movement is also often associated with multi-morphemic status, where a head-moved item appears attached to morphemes associated with the target head node. So, for example, the *-ait* suffix in (1) indicates tense and subject agreement information, and appears on the verb only when it has moved to T^0— imperfective-marked verbs always appear to the left of negation. One natural hypothesis is to assume that the affix is the phonological content associated with the target node. If head movement creates an adjunction structure, where the moved head adjoins to the c-commanding target head, then each morpheme in the verb is associated with a single syntactic terminal node.[3] Head adjunction creates the correct morphosyntactic environment for the affix to attach to its host (cf. Baker 1988: 68–74); in the head adjunction configuration, both affix and host are dominated by a single word-level X^0 projection:

(p.48) (5)



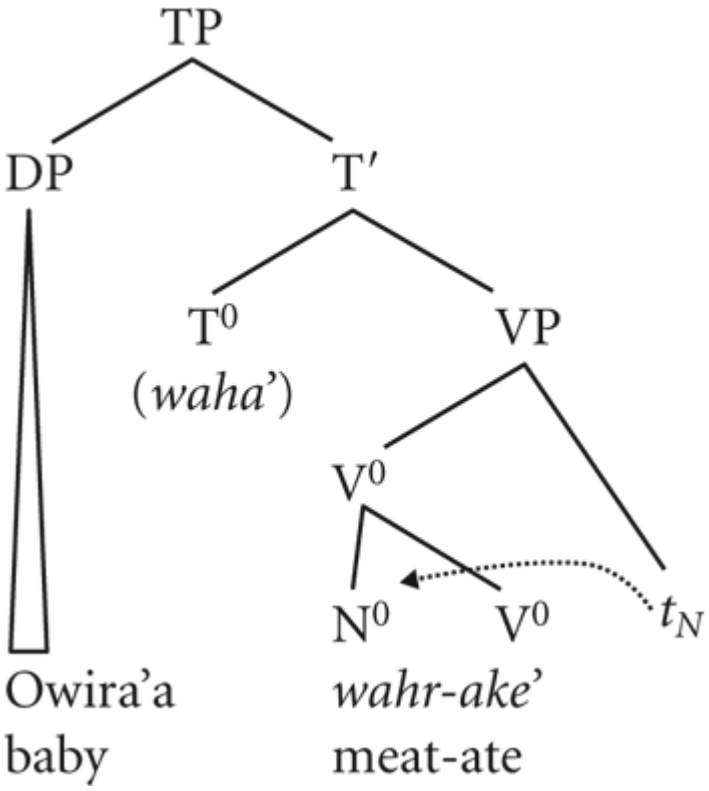
The notion that head movement is not just a syntactic operation, but is also a morphological operation which builds word structures, has been very influential within generative grammar (though the two ideas are in principle independent of each other). Baker (1988), in a study of incorporation processes cross-linguistically, proposed building noun incorporation structures and morphologically causative verbs by head movement in the syntax—that is, he argued that head movement could create these morphologically complex forms, and that a syntactic treatment was explanatory: the syntactic constraints on head movement account for the attested and non-attested types of noun incorporation. So, for example, Baker proposed that incorporation of an object noun *wahr-* 'meat' into the verb *-ake*', 'eat', in Mohawk, was not a morphological, derivational N–V compounding operation, but rather a syntactic head movement operation:[4]

(6)

a.

Owira'a	waha'-	wahr-ake'	(Baker 1988)
baby	AGR-	meat-ate	
'The baby ate meat'			

b.



(p.49) This proposal accounted for both the thematic relationship between the verb and the nominal object, as well as allowing a syntactic explanation for the failure of external-argument incorporation, in terms of the ECP.

Thinking of affixation as head movement also allowed the theory to account for another important observation of Baker’s: that morpheme order reflected semantic scope. Baker (1985) showed that a verb marked with both causative and reciprocal morphology could be interpreted as a causative of a reciprocal or a reciprocal of a causative, depending crucially on the order of affixation. He dubbed the generalized proposal that order of affixation reflects syntactic and semantic scope the ‘Mirror Principle’. In that paper, Baker did not argue for a head movement approach to all affixation, but the attraction is clear: if affixation is a syntactic operation, constrained by the Head Movement Principle, the Mirror Principle is derived as a prediction of the theory. This is so because the hierarchical structure created by several iterations of head adjunction up through the syntactic tree would necessarily directly match

the hierarchical structure of the tree itself, given that no head in the extended projection could be skipped (the HMC), and that downward syntactic movement is impossible. The Mirror Principle is thus predicted if affixation is treated as a syntactic operation, while it must be treated as a stipulated correspondence relation in a theory where morphological operations like affixation are encapsulated in their own submodule in the lexicon, separate from syntactic structure-building. Patterns of verbal affixation like that of Korean *siph-ess-ta*, 'want-T_{past}-C_{decl}', for example, are the predicted outcome of a model which equates (i) affixation with syntactically constrained head movement and (ii) in which the hierarchy of projections is CP-TP-VP; given these two premisses, the inverse order of tense marking and mood marking is predicted to be impossible.

In sum, two key properties which are often taken to be diagnostic of syntactic head movement, especially in combination, are (i) variable position in the syntactic string, especially when associated with locality effects, and (ii) affixation.

3.2.3 Zero-affixation and string-vacuous head movement

However, in many cases, perhaps most, the two diagnostic properties fail to correlate. One can detect displacement which is not accompanied by affixation, as in the case of sentence-initial auxiliaries and modals in English yes-no questions, which have no additional morphology despite their adjunction to C^0. An example is given in (7a,b) below:

(p.50) (7)

a. He can type.
b. Can he type?

Such cases, however, are easily accommodated in the framework if one assumes that zero exponence is a possible outcome for a terminal node. On that account, (7b), involving head movement and adjunction of T^0 to C^0, does involve 'affixation', but by a purely morphological accident, the affix realizing the C^0 node is a null morpheme.

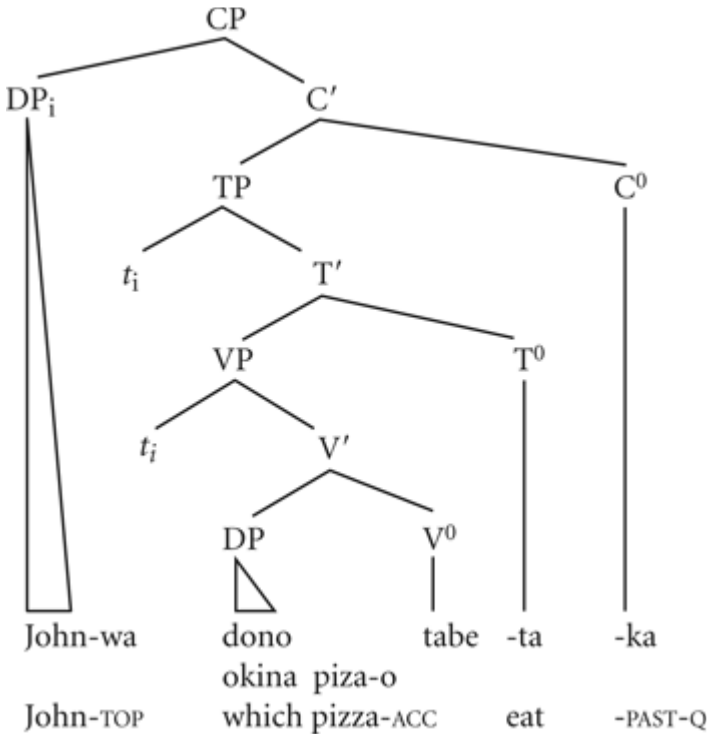
It is also easy to identify cases of affixation which are not obviously accompanied by displacement. The latter situation is amply represented in Altaic-type head-final languages, which typically exhibit a verb inflected in sequence with agglutinative morphemes respecting the clause-structure hierarchy, but where displacement, if it exists, cannot be detected due to the strictly head-final character of the language. If in such languages all head positions are on the right, the morphemes appear in the correct hierarchical order with or without the application of head movement, as illustrated in the alternative trees in (8b,c):

(8)

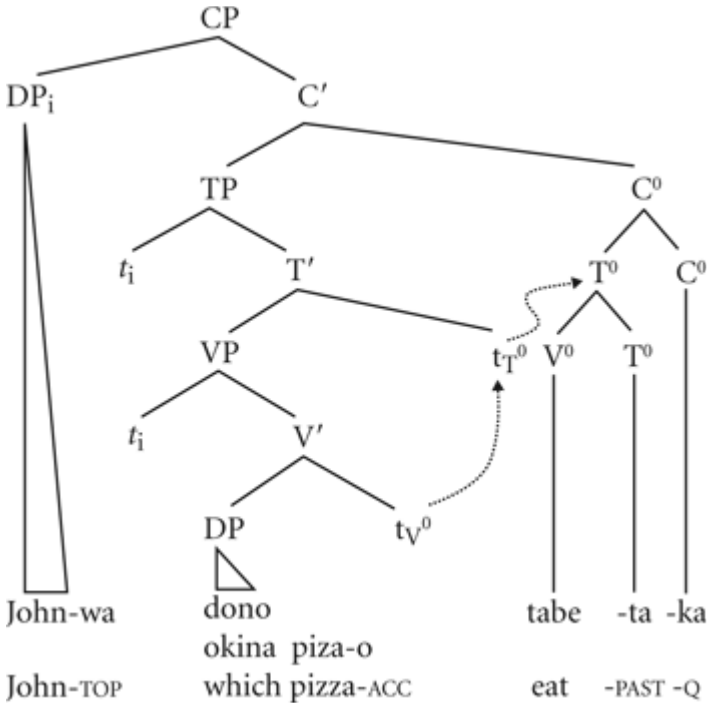
a.

John-wa	dono	okina	piza-o	tabe-ta-ka?
John-TOP	which	big	pizza-ACC	eat-PAST-Q?
‘Which big pizza did John eat?’				

b.



(p.51) c.



Again, however, we can easily accommodate such cases in the framework if we are willing to posit string-vacuous head movement for theory-internal reasons. Most broadly generative theories consider affixation to involve bundling

under a single syntactic terminal node—that is, in the unmarked case, one 'leaf' of the syntactic tree should correspond to a single phonological word.[5] Given this assumption, morphological affixation is taken as an indication that, by the time of spell-out, distinct syntactic terminal nodes have been grouped together under a single X^0 terminal node. If that is the case, the right analysis for (8a) is (8c), not (8b), just as this system of assumptions entails that the right analysis for (7b) involves a zero morpheme. Either displacement or affixation, then, might be motivation enough to posit the occurrence of head movement in the syntactic tree.

3.3 Affixation, displacement, and the Mirror Principle[6]

Adopting the notion that head movement is head adjunction, thereby providing a unified theoretical treatment of both characteristic properties of the process (p.52) described in the previous section, we can derive a clear picture of what 'ideal' cases of head movement should look like: they should show evidence of displacement and exhibit a multimorphemic, affixed form whose affixal ordering respects the Mirror Principle. However, in many very familiar cases, this ideal is not realized. We review some analyses of such deviation below.

3.3.1 Supplemental Mechanism I: Merger Under Adjacency

We have seen in the previous section that displacement and affixation can each surface independently, without clear corroborating evidence for head movement provided by the other diagnostic. We now turn to a well-known case in which the two diagnostics clearly *contradict* each other: English tense inflection on lexical verbs. The discussion and analysis below is based on that in Bobaljik (1994) and Halle and Marantz (1993).

In auxiliary-less English declarative clauses, the main verb shows affixation for tense and subject agreement (*-ed* in past tense, *-s* in present tense with a 3sg subject). By the affixation criterion, then, the verb must have head-moved to T^0, forming

a single complex terminal node which can be spelled out as a single phonological word.

However, when such English clauses are tested for displacement of the main verb to T^0, the tests come up negative, as shown by Emonds (1976). The English main verb must appear to the right of VP-adjoined adverbs such as *often* and *never*, even when inflected for tense—that is, it behaves like French nonfinite main verbs. In contrast, English auxiliary verbs and modals appear to the left of such adverbs, just as French finite main verbs and auxiliary verbs do.

(9)

a. Mary **often** walked to school
b. Mary may **often** walk to school

Another marker of the VP domain, negation, behaves perfectly normally in English clauses with auxiliaries: it intervenes between the finite auxiliary and the nonfinite main verb, just as in French. However, when an auxiliary-less clause like (9a) is negated, a startling transformation occurs: the main verb may no longer be inflected for Tense, and the dummy auxiliary *do* appears in the normal position for auxiliaries, indicating tense and agreement:

(10)

a. Mary did **not** walk/*walked to school.
b. Mary does **not** walk/*walks to school.

Similarly, when T^0 moves to C^0 to form a yes-no or *wh*-question in a clause which does not involve an auxiliary, the main verb may not be inflected for tense, and *do*-support applies:

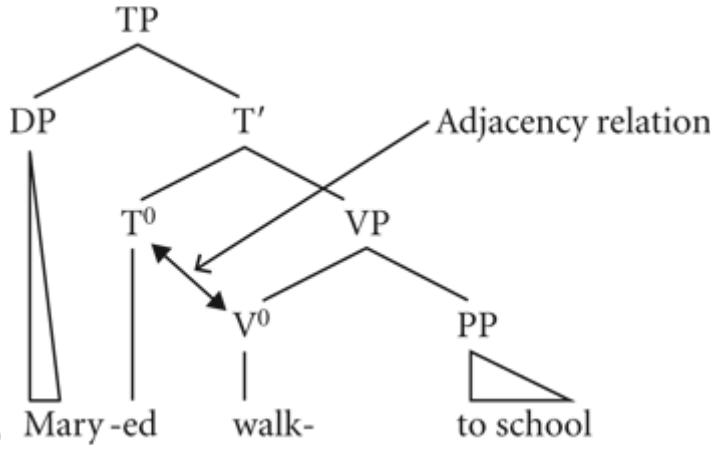
(p.53) (11)

a. Did Mary walk/*walked to school?
b. Does Mary walk/*walks to school?

The structural analysis of the facts in (10) and (11) seems very straightforward; the puzzle concerns the mechanism for attaching tense inflection to the verb in cases like (9a). Bobaljik proposes that a post-syntactic affixation operation originally introduced by Marantz (1984) applies: M(orphological)-Merger, which he refers to as *Merger Under Adjacency*.

On Bobaljik's account, terminal nodes can be adjoined to each other in the postsyntactic component as well as in the syntactic component. Post-syntactic adjunction is possible provided that after linearization the two nodes are structurally adjacent to each other. In a normal English declarative clause without an auxiliary, T^0 and V^0 are adjacent in the relevant sense, and hence can undergo Merger Under Adjacency in the post-syntactic component. In such cases, then, affixation can occur in the absence of head movement, as a kind of 'repair' when a stray affix is present. This is effectively a reinterpretation of an Affix Hopping analysis (Chomsky 1957) within a modern framework.[7] Merger Under Adjacency is illustrated below:

(12)



Intervening heads, such as negation in (10), or specifiers, such as the subject in (11), disrupt the adjacency relation, preventing Merger Under Adjacency, and requiring the application of a different repair operation, namely the insertion of dummy *do* to support stranded T^0.[8]

Given the lesson of English inflected main verbs, we can draw two primary conclusions. First, displacement is a more important diagnostic of head movement than affixation.

Second, head movement is not the only mechanism available to derive (p.54) morphologically complex forms; rather, there is at least one other source for affixal behaviour, albeit constrained in very particular ways by structure and linear order: Merger Under Adjacency. The model must be supplemented with such an operation to account for the behaviour of English inflected main verbs.

3.3.2 Supplemental Mechanism II: Affix-specific linearization

Turning back to the outcome of head movement proper, we can ask what theoretical constraints there are on the adjunction operation itself. In an Antisymmetric approach to syntactic structure (Kayne 1994), the result of head adjunction will always produce forms consistent with the Right-hand Head Rule of Williams (1981), where the moved and adjoined lower head (e.g. V^0) precedes the upper target head (e.g. T^0). In an antisymmetric theory, then, head movement which produces structures headed by prefixes, rather than suffixes, should be impossible. A head-moved verb should appear suffixed with agglutinative morphemes, each of which is realizing the head of phrases dominating VP. These suffixes should appear in their respective hierarchical order.

Plenty of languages, however, include prefixation as well as suffixation in the morphological makeup of complex inflected verbs. Consider, for example, the agreeing tense and aspect affixes of the Uto-Aztecan language Cupeño, as described in Hill (2005) and analysed in Barragan (2003):

(13)

pe-	ya-	qál	
3SG.PAST-	say-	IMPF.SG	
T/Agr-	V-	Asp^0	
‘He was saying’			(Hill 2005: ex. 2c)

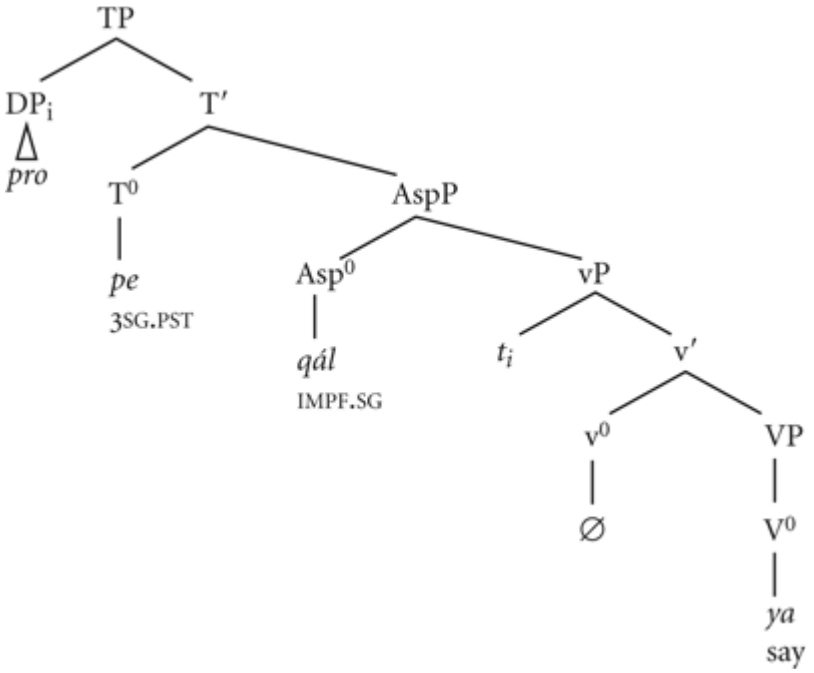
In an antisymmetric approach, such a prefixal pattern has to be treated without using head adjunction (see discussion in footnote 11). However, an alternative is available in theories

which adopt a parametric-linearization view of morphological headedness, as in Distributed Morphology (Halle and Marantz 1993).

Let us assume, in accordance with the discussion in the previous section, that the complex affixed form in (13) has been formed by head movement. Further, let us assume that UG provides a template for the extended projection of VP in which TP dominates AspP, which in turn dominates VP. (I will also assume in the diagrams which follow that 'VP' is itself composed of two projections, vP and VP, in accordance with the theories proposed by Hale and Keyser (1993) and Chomsky (1995a, b), among many others. See Section 3.3 for further discussion.)

Given these assumptions, we can posit the following kind of underlying structure for the complex form in (13):

(p.55) (14)



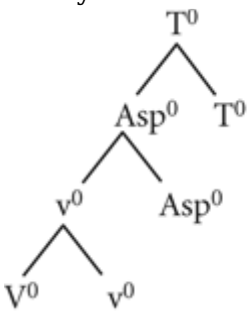
With simple left-adjoining head movement, in an antisymmetry approach, the predicted surface form is **ya-qál-pe*. However, with the addition of the straightforward assumption that affixes themselves specify whether they are positioned to the left or the right of their host, the correct form can be derived

while still respecting the Mirror Principle. Call this assumption *Affix-specific Linearization*.[9]

In this approach, the syntactic derivation only creates hierarchical structure, leaving linearization for the morphological component at Spell-Out. Head movement adjoins V^0 to v^0, v^0 to Asp0, and Asp^0 to T^0, creating a four-layer complex T^0 structure. There are then several possible morpheme orders which represent a legitimate outcome of linearization, from a Mirror Principle perspective, depending on the prefixal or suffixal status of each terminal node in the structure.[10] The eight possible orders are illustrated below:

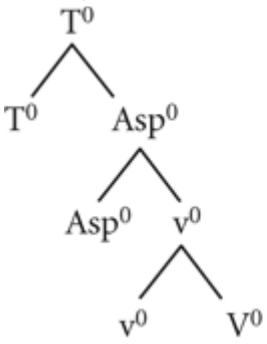
(p.56) (15)

a. Everything suffixes to its sister (the Antisymmetric order):



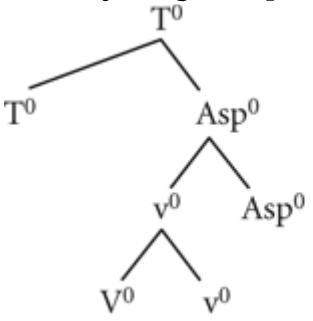
Order: [[[V-v]-Asp]-T]

b. Everything prefixal (a uniform right-adjunction order)



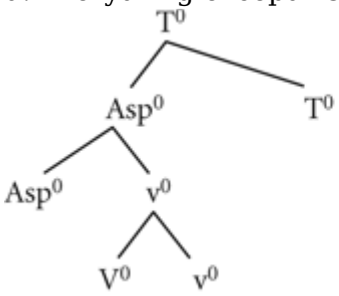
Order: [T-[Asp-[v-V]]]

c. Everything except T^0 suffixal, T^0 prefixal



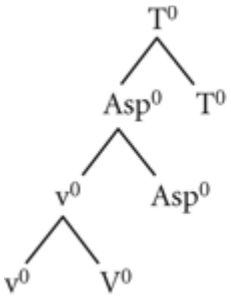
Order: [T-[[V-v]-Asp]]

d. Everything except Asp^0 suffixal, Asp^0 prefixal



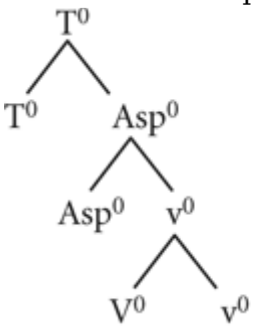
Order: [[Asp-[V-v]]-T]

(p.57) e. Everything except v^0 suffixal, v^0 prefixal



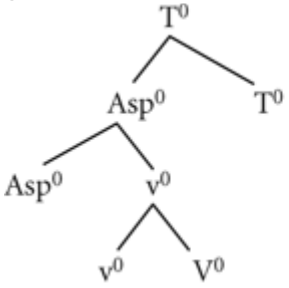
Order: [[[v-V]-Asp]-T]

f. Both T^0 and Asp^0 prefixal, v^0 suffixal



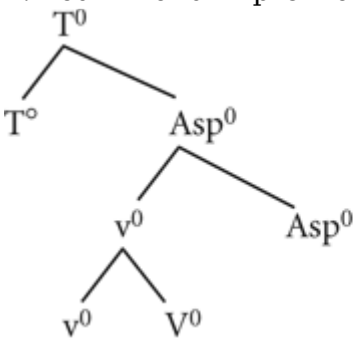
Order: [T-[Asp-[V-v]]]

g. Both Asp^0 and v^0 prefixal, T^0 suffixal



Order: [[Asp-[v-V]]-T]

h. Both T^0 and v^0 prefixal, Asp^0 suffixal



Order: [T-[[v-V]-Asp]]

(p.58) In this case, assume that the Tense morpheme *pe-*, '3sg.pst' is listed as a prefix, while the Aspect morpheme *-qál*, 'impf.sg', is listed as a suffix. The Cupeño complex T structure, then, must linearize in configuration (15c) or (15h). Since the v^0 head in this example is not overtly realized, for the moment we cannot determine which of these two options is chosen (though perhaps linearization of non-overt morphemes is irrelevant to the grammar, in which case it remains simply underdetermined).

Supplemented with the possibility of affix-specific linearization, then, the number of Mirror-Principle-respecting morpheme orders is considerably larger than a simple left-adjunction approach to head movement permits. The Mirror Principle is not made vacuous by this additional assumption, however. There are still many morpheme orders which are underivable with this mechanism. For example, any morpheme order in which a Tense morpheme intervenes between Asp and the verb stem, or between v and V, is impossible; similarly any morpheme order in which Aspect intervenes between v and V is equally impossible.[11]

3.3.3 Exploiting the analytical space: Cupeño complex predicates

We have seen that morphologically complex words can be formed by head movement, but that the head movement operation must be supplemented with additional assumptions to account for two fairly basic patterns. The two additional items now added to our toolbox are affix-specific linearization and merger under adjacency. We have seen cases in which each of these two tools is exploited independently; it is natural to ask whether the typological patterns of the world's languages provide evidence that the effects of the two supplemental mechanisms can be detected in combination.

(p.59) Barragan (2003) provides data from Cupeño which argue that indeed, both mechanisms must sometimes be exploited in the derivation of a single complex form. Cupeño contains many complex predicates, constructed from a lexical root corresponding to the v^0 node in the split-vP structure, and a light verb element, corresponding to the v^0 node. The particular v^0 used alternates depending on whether the complex predicate is causative or inchoative, a common pattern cross-linguistically (see e.g. Jacobsen 1993 on Japanese):

(16)

a. caqe-in FLAT-IN 'to flatten'	a′. caqe-yax FLAT-YAX 'to be oblique'
b. cene-in ROLL-IN 'roll something'	b.′. cene-yax ROLL-YAX 'something rolls'
c. hiwe-in LUKEWARM-IN 'heat to lukewarm'	c.′. hiwe-yax LUKEWARM-YAX 'something is lukewarm'
d. puve-in ROUND-IN 'make round'	d′. puve-yax ROUND-YAX 'something is spherical'

In effect, we have three kinds of v^0 in Cupeño. There are verbs which occur without an overt v^0 element, like *ya*, 'lsay', in (13) above, and two kinds of overt v^0, the causative *-in*, and the inchoative *-yax*. I assume, following Hale and Keyser (1993) and Marantz (1997) that the causative v^0 selects an external argument which appears in its specifier, and the inchoative v^0 prevents the appearance of such an argument.

The morphosyntactic problem posed by such verbs has to do with their interaction with tense and aspect morphology. Recall that with the zero-class verb *ya* 'say', tense was prefixed to the verb stem, and aspect suffixed. With complex predicates, however, tense morphology appears following the lexical verb, intervening between the lexical verb and the v^0 element. This pattern is illustrated by the examples in (17):

(17)

a.

pe-	ya- qál	(Ø-class verbs)
PST.3SG -	say-IMP.SG	(Monomorphemic V)
'He was saying'		

b.

mi=	wíchax-	**ne**-	n-	qál	(*in*-class verbs)
3PL.OB=	throw-	PST.1SG-	VAGT-IMP.SG		(Bipartite V+v: Agentive)
“I was throwing them”					

c.

nám-**pem**-	yax- wen	(*yax*-class verbs)
cross-PST.3PL-	VNON AG-IMP.PL	(Bipartite V+v: Nonagentive)
‘They used to cross’		

(p.60) This configuration—v^0-T^0-v^0-Asp^0—is precisely ruled out by the Mirror Principle, on any interpretation. In no hierarchical structure generated by the syntax does T occur between the VP projection and the vP projection.

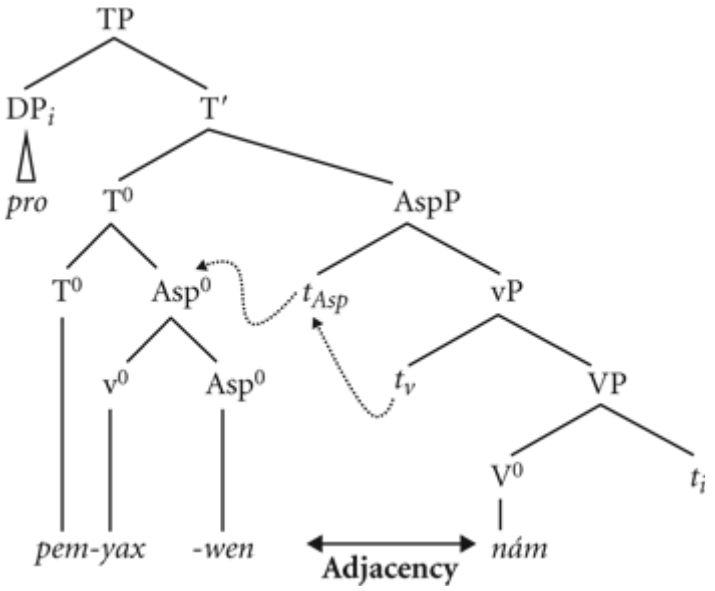
Barragan points out, however, that if we consider the v^0 morpheme on its own, ignoring the main verb for a moment, the pattern of affixation looks very familiar. Consider the v^0 morphemes *in* and *yax* as ‘light’ verbs—almost like auxiliaries. If we follow the normal rules of Cupeño grammar for inflecting those elements as verbs, we derive exactly the pattern in (17b) and (c) above: ense prefixed to v^0, Aspect suffixed to v^0. The only puzzle is in the location of the V^0 morpheme.

In order to derive the Mirror-Principle-violating morpheme order with bipartite verbs, Barragan proposes that in the complex predicates, it is v^0, rather than V^0, which head-moves to T^0. In a sense, the pattern is exactly like that in a V2 language. There, a main verb will head-move to T except when there is an overt, intervening auxiliary verb, in which case the auxiliary moves to T, and the main verb remains *in situ* in the verb phrase. In the identical way, in Cupeño, V moves up to T (through v^0) iff there is no overt v morpheme, that is when the verb is a member of the Ø-class. When there *is* an overt v morpheme, as in the bipartite -*in* and -*yax* classes, v^0 moves to T, stranding the main V. The V is later subject to Merger Under Adjacency with the complex T-v-Asp form.

Let us consider Barragan’s proposal for the derivation of the form (17c) above. In the syntax, the light verb *yax* head-moves first to Asp^0 (which suffixes to it) and then to T^0 (which prefixes to it). Then Merger Under Adjacency applies between

T^0 and V^0, prefixing the heavy verb root to the T^0 complex, deriving the surface morpheme order:[12]

(18)



(p.61) This solution is consistent with what we know about the effects of overt intervening heads on head movement in other languages (namely that they block its application to lower elements), and derives the unusual morpheme order from two independent properties of Cupeño grammar: the existence of verb classes with an overt v^0 morpheme, and the prefixal status of T^0. The only unusual aspect of the analysis is the application of Merger Under Adjacency to the syntactically complex T^0 form containing the light verb and aspect as well as T—but since Merger Under Adjacency is a post-syntactic process, and head movement proper is a syntactic one, there is no principled reason why the two cannot be combined in this way.[13]

3.3.4 Affixation: Head movement or Merger Under Adjacency?

We have seen above that although affixation is one common diagnostic for head movement, it seems clear that affixal behaviour can also arise from other sources; in the above, I have endorsed the proposal that Merger Under Adjacency is one such source. This kind of adjacency-driven affixation? cliticization operation has been broadly appealed to in analyses of apparent non-constituent affixation as in English *John's* or *She'll*. Wojdak (2008) argues that a version of this operation is highly productive in the Salish language Nuu-

Chah-Nulth. Similar proposals concerning affixation under adjacency between non-constituents, in the absence of head movement, are made by Selkirk and Shen (1990) for Shanghai Chinese and by Myers (1990) for Shona prepositions. Julien (2002) similarly proposes that such an operation is responsible for a broad spectrum of affixation facts cross-linguistically, particularly in cases of prefixation.

So affixation is sometimes a diagnostic for head movement, and sometimes not. Affixal order, too, is sometimes a diagnostic for the syntactic hierarchy of projections, because in general it respects the Mirror Principle. But as shown above, if this kind of Merger Under Adjacency operation is allowed to interact with head movement operations, the Mirror Principle effect can be disrupted, as in Cupeño complex predicates. One can ask then, when affixation tells us anything at all—either about the syntactic hierarchy, or about head movement?

Let us consider the former question first: When can a piece of morpheme-order- related evidence justify an argument about functional projections, rather than about morpheme-ordering technology? The answer is found in the fact that when affixal order reflects the syntactic hierarchy of functional projections, it should also be the case that affixal order respects semantic scope, as noted by Keren Rice in her detailed consideration of morpheme order in the Athapaskan verb (Rice 2000). Indeed, this very effect is the original *raison d'être* for the Mirror Principle itself. Baker (1985: 395) (p.62) points out the different interpretations that attend the different morpheme orders in the following Bemba examples involving reciprocal and causative morphemes (examples originally from Givón 1976):

(19)

a.

Naa-mon-an-ya	Mwape na Mutumba
1SGS-see-recip-cause	Mwape and Mutumba

‘I made Mwape and Mutumba see each other’

b.

Mwape na Chilufya	baa-mon-eshy-ana	Mutumba
Mwape and Chilufya	3PS-see-cause-recip	Mutumba.
‘Mwape and Chilufya made each other see Mutumba’		

Baker’s point, of course, is that the binding and argument structure relations— presumably determined by syntactic configurations—are reflected in lock-step by the morpheme order on the verb. If the verb is causativized first, then reciprocalized, the subject of causativization binds the logical subject of the embedded verb. If the verb is reciprocalized first, then causativized, the logical subject of the embedded verb binds the embedded object, and the subject of causativization does not enter into the binding relations defined by the reciprocalization. In short, the syntactic and semantic properties of these clauses mirror the morphological ordering on the verb. In these cases, then, it would be a mistake to derive the morpheme order via one mechanism and the syntactic and semantic hierarchy via another mechanism—the presence of Mirror Principle effects is enough to substantiate the claim that a given morpheme order reflects the syntactic and semantic hierarchy.

The second question, whether affixation without displacement can ever diagnose head movement, is considerably more delicate. If a particular affixal form does not seem to exhibit displacement effects, are there other kinds of evidence one can bring to bear which could argue for a head movement analysis? If head movement is syntactic, and hence involves syntactic operations such as Copy and Remerge, then one might expect that head movement, like other kinds of syntactic movement, could in fact affect *semantic* interpretation—that is, the content of a given head might be interpreted in a higher scopal position than its First Merge position. Lechner (2006)

marshalls an array of arguments in favour of this conclusion about head movement, in opposition to many previous claims to the effect that head movement is always semantically vacuous—that is, claims that heads are always interpreted in their base-generated First Merge position. The key data he adduces involve the relative scope of interpretation of a modal operator, negation, and a universal quantifier:

(20) Not every pearl can be above average size.

Meaning: It is not possible for every pearl to be above average size.

(p.63) The interpretation of (20) involves 'neg-splitting'. The negation contained within the subject DP takes widest scope. The modal is interpreted within the scope of negation but—crucially—outside the scope of the universal quantifier, also contained within the subject DP, giving the scope relations ◇〉¬〉∀. The crucial problem posed by this piece of data involves establishing the syntactic position in which the universal quantifier is interpreted. Lechner brings together a collection of arguments which point toward the conclusion that the universal quantifier cannot be interpreted below Spec-TP. How, then, can the modal, in T^0, be interpreted outside the scope of the universal quantifier? Lechner proposes that the modal has head-moved above Spec-TP, to a c-commanding AgrSP head; the subject's surface position is in the specifier of this AgrSP phrase. The modal, having moved to $AgrS^0$, thus can take scope over the subject's universal quantifier at LF, after the latter is reconstructed and interpreted in Spec-TP. This proposal requires that head movement, like other syntactic movements, is semantically active in at least some cases, that is, it produces interpretive effects at LF.

A related proposal is advanced by Kishimoto (2010), where head movement of negation to T is argued to expand the NPI-licensing domain of the clause to include the subject. Such head movement of negation cases with NPI subjects form minimal pairs with cases where negation does not raise to T, and only objects, but not subjects, can contain an NPI. Kishimoto argues that since neg-movement to T is the usual

case in Japanese, there is typically no subject/object asymmetry for NPI licensing:

(21)

a.

John-ga	nani-mo	kawa-nakat-ta.
John-NOM	anything	buy-NEG-PAST
‘John did not buy anything’		

b.

Dare-mo	hon-o	kawa-nakat-ta.	
anyone	book-acc	buy-NEG-PAST	
‘No one bought the book’			(Kishimoto 2010)

However, in cases where *do*-support separates Negation and the verb stem, as Kishimoto shows is possible in a limited number of situations, we see a typical subject-object asymmetry with regard to NPI licensing:

(22)

a.

John-ga	dare-mo	haire-naku si-ta.
John-NOM	anyone	enter.can-NEG do-PAST
‘John made no one able to enter’		

b.

*Dare-mo	Mary-o	haire-naku	si-ta.	
anyone	Mary-ACC	enter.can-NEG	do-PAST	
‘Anyone made Mary unable to enter’				(Kishimoto 2010)

(p.64) Kishimoto takes these facts to show that head movement does affect scopal relations such as NPI licensing, and consequently that head movement is semantically active; it is then a ‘true’ syntactic movement, resulting in LF-interpretive differences.[14]

If Lechner’s and Kishimoto’s conclusions prove to have broad empirical application, then in at least some cases, scopal effects associated with head movement would be a crucial diagnostic for whether a given case of affixation should be treated as a case of true syntactic head movement or as a post-syntactic Merger. Syntactic head movement would then be like any other kind of movement, in which the structures altered by movement have more interpretive possibilities at LF than structures without movement.

In the next section, we turn to a set of alternative proposals for head movement, some of which are developed as theoretical approaches to the view of the empirical landscape taken by Chomsky (2001a, b) among others, according to which head movement in fact has no interpretive ramifications whatever. It is important to note, however, that no advocate of such a position[15] has yet offered an alternative account of Lechner’s scope-splitting facts or other putative semantic consequences of head movement.

3.4 Other approaches to head movement

Let us first quickly review why devising a coherent technology to implement head movement is problematic for syntactic theory. It has to do with the particular properties of the phrase structure component of modern Minimalist theory, Bare Phrase Structure (Chomsky 1995a).

3.4.1 Theoretical issues: Bare Phrase Structure, Extend Target, and Chain Uniformity

It is a bit ironic that head movement should pose a major technical problem for syntactic theory. At the beginning of the 1990s, it fit beautifully into the system of assumptions that were coalescing into the Minimalist Program. The Head Movement Constraint of Travis (1984) had been unified with other constraints on movement as an instance of Rizzi’s (1990: 11) Relativized Minimality, the first overarching vision of how

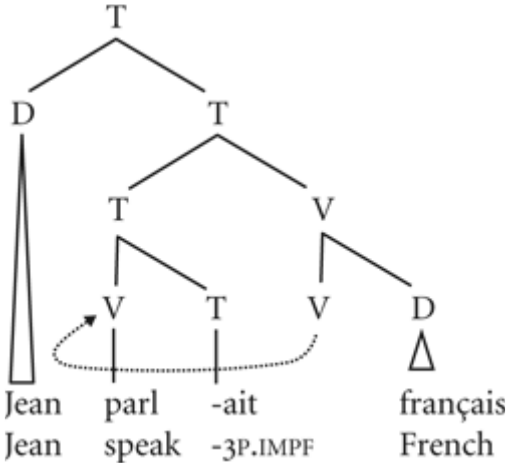
economy considerations might restrict Move-α. As noted in Section 3.1, the empirical picture for certain basic cases seemed equally rosy, so much so that they were and are staples of introductory syntax classes.

(p.65) Nonetheless, getting the structural mechanism of head movement to interact properly with the other fundamentals of the theory was a headache even within X-bar theory.[16] Within Chomsky's Bare Phrase Structure formalism, it is essentially impossible. In Bare Phrase Structure, the crucial notion 'segment of X^0' becomes incoherent, since 'head' is equivalent to 'terminal node' and an X^0 is simply a terminal element with something adjoined to it, so that it projects; anything dominating a branching node is not an X^0. Consequently, within Bare Phrase Structure, an adjunction-to-X^0 account of head movement violates not only cyclicity[17] (since adjunction is to a non-root node), but also Chain Uniformity, as outlined by Chomsky (1995b):

> We have so far sidestepped a problem that arises in the case of ordinary head adjunction. Take α, K to be X^0 s in (120) [they're sisters—HH], with α raising to target K, which projects, forming $L - \{\langle H(K), H(K)\rangle, \{a, K\}\}$. Since K projects, α is maximal. Thus, α is both maximal and minimal. If that is true of t as well (e.g. in the case of clitic raising), then CH[ain] satisfies the uniformity condition. But suppose t is nonmaximal, as is common in the case of V-raising to I or to V. Then, under a natural interpretation, [chain uniformity] is violated; CH is not a legitimate object at LF, and the derivation crashes. (Chomsky 1995b: 321)

Both the cyclicity issue and the Chain Uniformity issue are illustrated in the tree in example (23), repeated from (5) above, shorn of its pre-BPS XP vs. X^0 annotations:

(23)



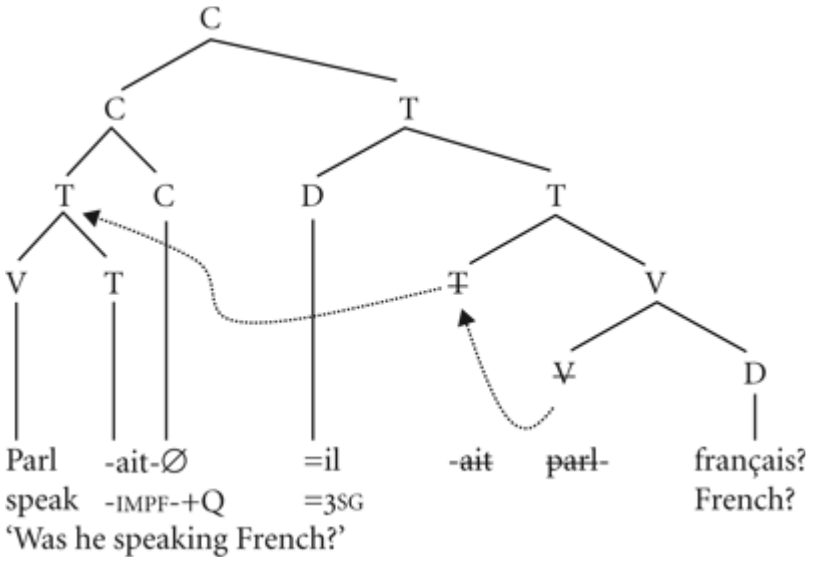
Before V can raise and adjoin to T, T must enter the derivation via Merge with the already-built V projection (the V node corresponding to the VP node in (5)).[18] (p.66) The result of that Merge operation would require a label, and the T element, as the head of the structure, is copied to provide that label (producing the T node that corresponds to the T′ node in (5) above).[19] To implement traditional head adjunction, at this point the lowest V in the structure (corresponding to V^0 in (5) above) undergoes Move—that is, Copy and Re-Merge. However, in the traditional implementation of head movement, the copy of V must now Merge with the non-maximal T, rather than the root node T. Thus, head adjunction is counter-cyclic.

In order to grasp the violation of Chain Uniformity implicit in the tree above, it is important to understand that the categories ‘maximal projection’ and ‘minimal projection’ are intended to be *derived* properties in Bare Phrase Structure. Following a proposal of Speas (1991), Chomsky adopts the idea that ‘minimal projection’ is simply any node which does not dominate a copy of itself, and ‘maximal projection’ is any node which is not dominated by a copy of itself. Chain Uniformity, then, is the natural requirement that copies of a given constituent must match the minimal and/or maximal status of the copied element.

In (23), V in its base-position is a minimal projection (it does not dominate a copy of itself) and not a maximal projection (it is dominated by a copy of itself). In its head-moved position, however, it *is* a maximal projection (since it is not dominated by a copy of itself). The chain formed by the movement of the V *parl-*, then, consists of a head in one position and a maximal projection in another. Hence, head adjunction violates Chain Uniformity.

The problem is exacerbated as the process continues. At least both steps of head movement in (23) operate on and produce a syntactically 'visible' constituent, that is a minimal and/or maximal projection. Successive-cyclic head movement poses an even greater problem for the theory. Consider the tree in (24), where V to T is followed by T to C:[20]

(p.67) (24)



Here, the second step of head movement, where the complex T moves to adjoin to the C head, involves Copy and Re-merge of an *intermediate*-level projection. The complex T at the point of Copy is neither minimal nor maximal. By hypothesis, syntactic operations are able to apply only to constituents they can 'see'; non-maximal constituents do not meet this criterion, and hence should not be able to undergo syntactic movement as in (24).

These difficulties, as well as the difficulty in getting V2 order to work out correctly given certain other assumptions

(Chomsky 1995b: 368), led Chomsky to conclude that head movement is essentially phonological—not part of the syntactic component at all. This view is reiterated in Chomsky (2001a, n. 69). He provides no suggestions as to how this conclusion can be implemented in such a way as to retain the empirical generalizations and locality effects that made a syntactic treatment of head movement so attractive in the first place.

However, discussion in Chomsky (2001b: 37) does lay out an empirical basis for considering head movement to be a purely phonological operation. Prior to Lechner's proposal, most theoreticians had taken it as axiomatic that heads are always interpreted in their base position, regardless of how many iterations of head movement have applied. Sentential negation in French and English exhibits the same scopal relationships with regard to the verb in sentences like those in (25), despite the presence of verb movement in one language but not the other; the same is true language-internally, as well, in that French sentences with auxiliaries, involving no head movement of the main verb, behave the same scopally as those without.

(25)

a.	John didn’t know that Mary was speaking to him.		¬; ⊁*know*
b.	Jean ne savait pas que Marie lui	parlait.	¬ ⊁ *know*
	J. NEG knew not that M.	to.him spoke.	

(p.68) Similarly, examples like those in (26) have been taken to indicate that mandatory modal movement across sentential negation is not interptreted. Given that the modal scopes below negation, the assumption is that it is interpreted in its base position:[21]

(26) John cannot leave. ¬>◇, *◇¬

In short, examples where head movement *fails* to affect interpretation are rather easy to come by, in contrast to cases where it does. Chomsky (2001b: 37) writes 'semantic effects of head movement in the core inflectional system are slight or nonexistent, as contrasted with XP movement, with effects that are substantial and systematic. That would follow insofar as head raising is not part of narrow syntax.'

In summary, then, implementation of head movement as syntactic head adjunction poses significant technical problems. The seeming absence of semantic effects of head movement (*pace* Lechner and Kishimoto) is taken by Chomsky to suggest that head movement is not a syntactic phenomenon at all, but rather a PF operation. In what follows, we (very) briefly discuss a number of alternative proposals for the technical implementation of head movement. In some of these, head movement still occurs in the narrow syntax; others attempt to implement Chomsky's notion of a PF operation; still others adopt entirely novel morphosyntactic structure-building operations.

Alternative theoretical approaches to head movement are designed to solve either or both the theory-internal structural problem and the potential issue raised by the apparent lack of interaction of head movement and interpretation. I will next briefly describe a few such approaches in the literature, finishing with a discussion of my own approach, itself an adaptation of a proposal from Hale and Keyser (2002). These alternative technical frameworks would each interact differently with the morpheme order and displacement issues raised earlier; I will point out some implications of that data where I think I can see what they might be, but extensive work would still be required in each case to address these questions properly.

3.4.2 Brody (2000): Mirror theory

Brody (2000) proposes a model which inverts the more usual syntactico-centric priorities in favour of a 'morphocentric' approach, eliminating head movement from the theory by viewing syntactic structure as an interpretation of morphological structure, rather than the other way around. Morphologically complex words' internal structure is 'mirrored' in the syntactic projections: morphological (affixal) (p.69) 'specifiers' are interpreted and projected as syntactic complements. Brody adopts the idea that specifiers, morphological or syntactic, are universally to the left of the constituents they are specifiers of. Given that assumption, the linear order of morphemes within a word is a diagnostic for morphological specifierhood. A word like the Italian 3sg future form *finira*, therefore, must have a complex structure like that in (27):

(27)

Morphology		
fin-	*ir-*	*a*
finish-	FUT-	3SG
[V	[T	[AgrS]]]

In Brody's system, the V is a morphological specifier of T, which is a morphological specifier of Agr. After this form is subject to the operation Mirror, projecting a syntactic tree, the familiar syntactic projection results in which V is the complement of T and T is the complement of AgrS. The locus of spell-out of the complex morphological form in the projection line is determined by parametrically varying feature strength, as in Chomsky (1995b: 195); no head need actually 'move' from any position to any other position during the course of the syntactic derivation.[22]

3.4.3 Phrasal movement approaches

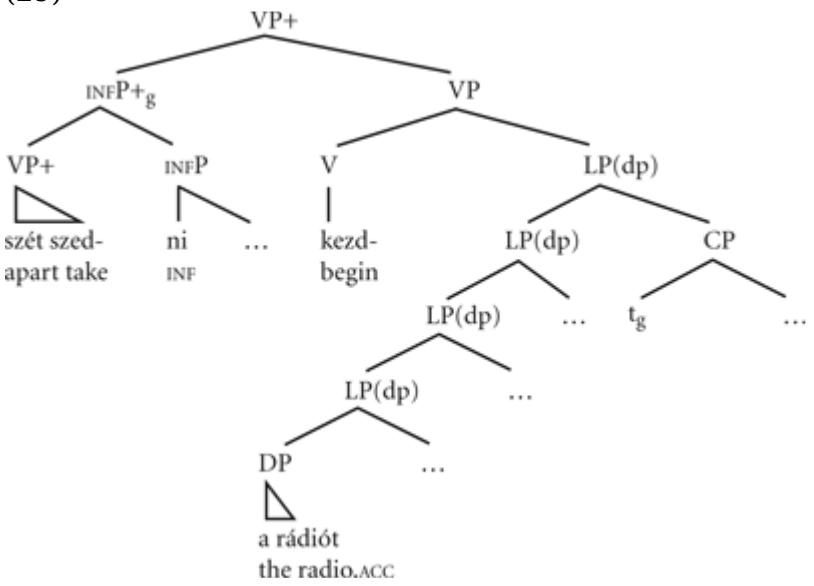
Another family of approaches, deriving from Kayne's Antisymmetry model (Koopman and Szabolcsi 2000; Mahajan 2003, a.o.), treat displacement of heads as a disguised species

of regular XP movement. Head movement, on these accounts, is actually remnant phrasal movement: all maximal projections in the specifier and complement position of, for example, VP, move leftwards and upwards in the tree, leaving behind a VP populated only with the V head itself, together with the traces of its erstwhile specifier and complement. The VP itself can then move leftwards and upwards in the tree, to a higher specifier position. Since the V is the sole remaining occupant of the VP, this produces the appearance of head movement without actually moving a head itself.[23] After several iterations of these processes, the resulting derivations involve 'roll-up' trees on a massive scale. Examples (28) and (29) replicate part of a derivation of a Hungarian complex predicate from Koopman and Szabolcsi (2000). The relevant sentence is given first, then a tree fragment illustrating the final step of the derivation of the embedded complex predicate is provided:

(p.70) (28)

Nem	akartam	szét	szedni	kezdeni	a	rádiót
not	want.1SG	apart	take.INF	begin.INF	the	radio.ACC
‘I did not want to begin to take apart the radio’						

(29)



In this derivation, the peculiar order of the embedded verb *szét szed-* 'take apart' with respect to the matrix aspectual verb *kezd* 'begin' is treated as the result of remnant movement of the InfP clause contained within the complement of *kezd*'s VP to *kezd-*'s specifier. (Note that the morpheme order in the embedded InfP has already been established by movement of the embedded VP to spec-InfP.) Because all the arguments of the embedded verb have already moved out of the embedded InfP (to spec of LP, in a series of roll-up movements), the only visible effect of movement of the embedded InfP is to place the infinitive embedded verb to the left of the matrix verb in whose specifier it is sitting, leaving the embedded object to its right. Morphological processes will then apply to derive appropriate phonological words from adjacent elements of the appropriate types, as in Merger Under Adjacency.

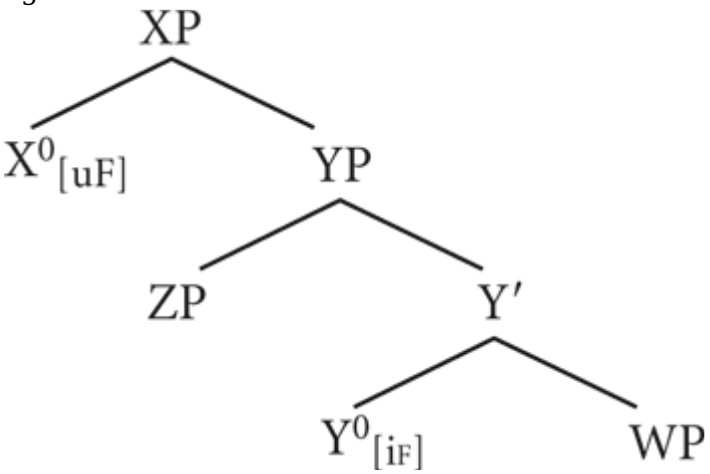
3.4.4 Head movement approaches: Matushansky (2006) (also Platzack (Chapter 2, this volume))

In a proposal directly aimed at addressing the difficult theoretical contradictions raised by head movement, outlined in Section 3.4.1, Matushansky (2006) proposes a version of head movement which obeys the Extension Condition, adjoining moved (p.71) heads to the node at the root of the tree under construction. This is then followed by a version of the Merger Under Adjacency operation, m(orphological)-merger, whereby the moved head is lowered and adjoined to

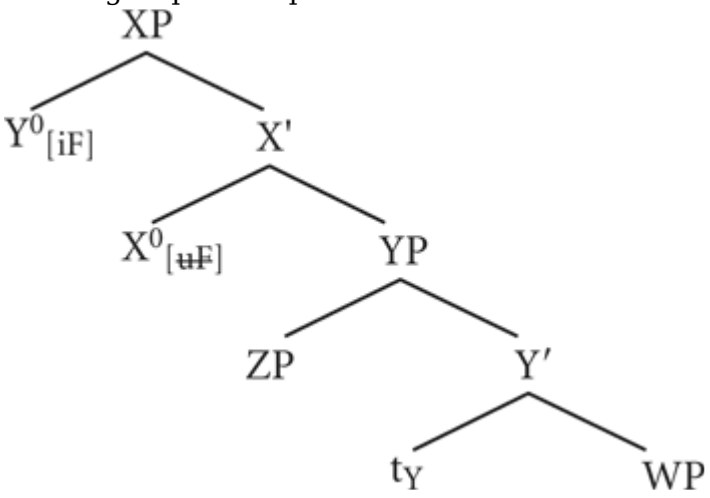
the now-adjacent head of the projection it has adjoined to. This sequence of operations is illustrated in (30):

(30)

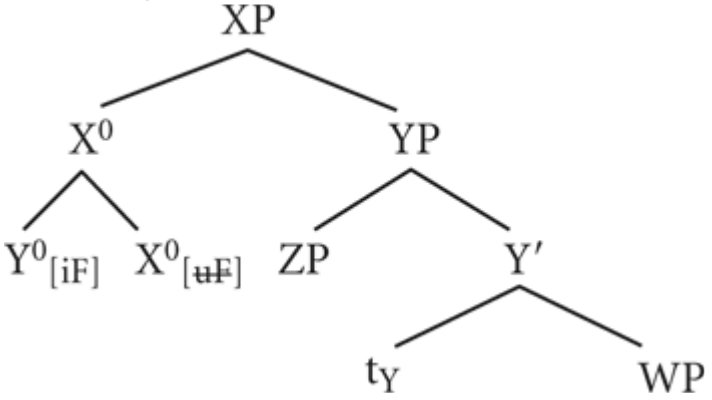
a. Upper head X probes to value its features against lower head Y:



b. Lower head Y copies and re-merges to XP, creating a specifier position:



c. M-merger applies, lowering Y^0 to X^0 to satisfy morphological constraints



Subsequent operations might create further specifiers of XP, or move the complex X^0 bundle by the same sequence of operations described in (30).

The output of Matushansky's proposed process is on the surface identical to the traditional head adjunction account, and captures many of its benefits. In particular, head movement is unified with other forms of movement in reflecting a feature-checking operation, and its local character is a consequence of the standard locality (p.72) constraints on feature-checking. It also succeeds in eliminating the formal problem involving cyclicity/Extend Target, and (as in the discussion above) only makes use of independently motivated operations necessary elsewhere in the theory. In these regards, it is a successful adaptation of traditional head movement within Minimalist Program assumptions.

However, in one regard, it fails to be a fully satisfactory solution to the formal problems raised by head movement in Bare Phrase Structure. It fails to ameliorate the Chain Uniformity violation identified by Chomsky (1995b), outlined in the quote at the end of Section 3.4.1. The higher copy of the head Y^0 in (30b,c) is, by definition, phrasal, since not dominated by a copy of itself. The lower copy, on the other hand, is necessarily a head. The chain [Y^0, t_Y], then, is not uniform.

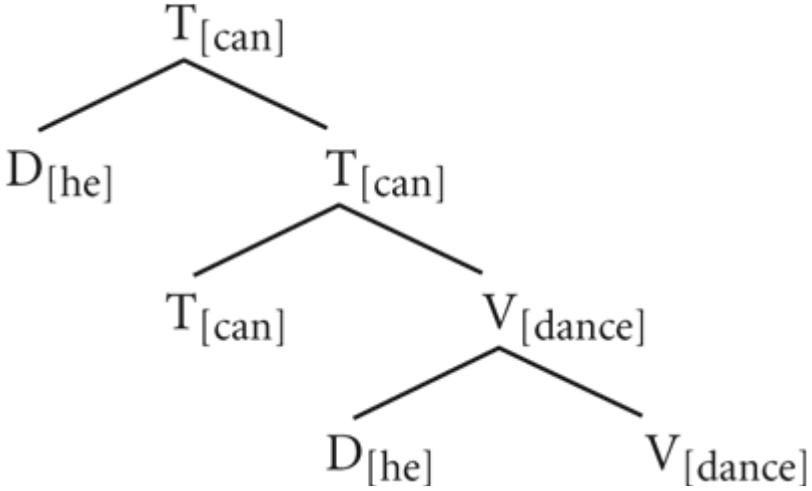
3.4.5 Conflation (Hale and Keyser (2002), Harley (2004))

The final approach to head movement I will outline here gives it a fundamentally different character from true syntactic movement; in a sense, this proposal is a species of 'no-movement' approach. Nonetheless, the effect of head movement in this view is triggered by a syntactic operation, so it does not require a view of morphology as separate or independent of syntax, but rather continues to allow the standard 'interpretive' view of the morphological/PF component.

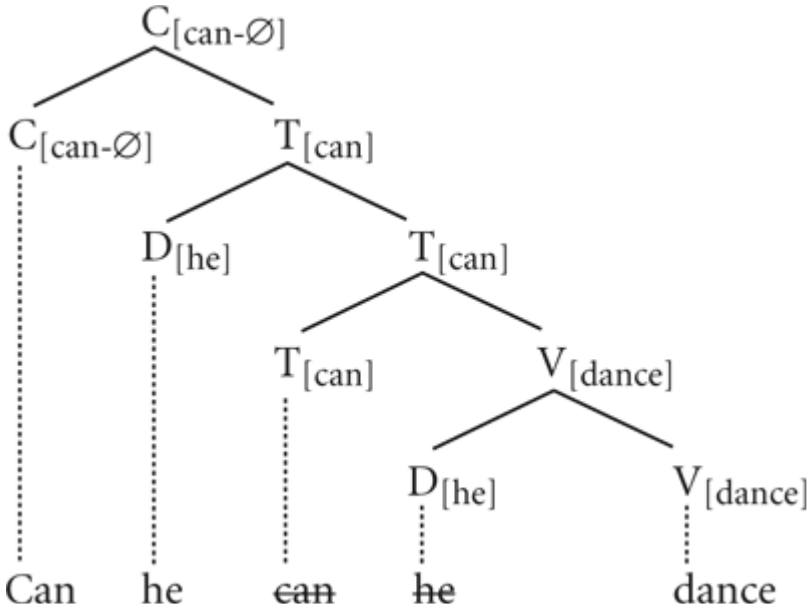
Hale and Keyser (2002) put forward a formal mechanism for deriving what they term 'conflation' phenomena, which Harley (2004) shows can also account cleanly for the core cases of head movement. Conflation involves copying the phonological feature matrix of the sister s label at Merge of a new X^0 constituent. Since the sister s label in Bare Phrase Structure is a copy of its head, copying the phonological feature matrix of the sister constituent is equivalent to copying the phonological feature matrix of the head of the sister. The derivation of an English yes-no question using conflation to account for the apparent movement of T^0 to C^0, is illustrated below. The derivation is illustrated from the point at which the [+ Q] C^0 element is drawn from the numeration and Merged with the existing structure in the workspace, a TP. At Merge, C^0 triggers conflation: the phonological feature matrix of the element it is merged with—the label of TP—is copied into the phonological feature matrix of the C^0. The phonological feature matrix that is associated with the label of TP is 'can', so this is copied into the phonological matrix of C^0. C ^{0}'s own phonological matrix happens to be a Ø-morpheme in English, so the effect is that the C^0 terminal node is pronounced as 'can'. The phonological feature matrices of each node are indicated as subscripts to the node:

(p.73) (31)

a. {$C_{[Ø]}$} Merges with



b.



The final spell-out of each terminal node will as usual affect only the highest copy of any phonological feature matrix in the tree.

Understanding head movement as conflation provides a clear explanation for its local character: conflation is an operation that only applies to two sister nodes at Merge, motivated by the syntactically affixal status of the Merged element. It will naturally be successive-cyclic in character, since the labels resulting from Merge, themselves copies of the Merged head, will contain the copied phonological feature matrix. And since

there is no actual movement involved, no formal problems concerning the chain condition or cyclicity arise—indeed, the conflation operation is strictly cyclic in its application.

Note that in many cases (as in the derivation of the French verb *parl-ait* in (5)) the copying head will itself also contain an overt phonological feature matrix, albeit one which cannot stand as a word on its own. In such cases, conflation creates an affixation relationship between the copied phonological feature matrix and the copying head. It is worth noting that in a Late-insertion model like Distributed Morphology, the copied material is not literally a phonological string, but rather the Position-Of-Exponence which is associated with every terminal node in the numeration. In order to predict internal morphological hierarchical effects (for example, the existence of morphophonological processes which are sensitive to word-internal structure, as in level-ordered phonology), we need to assume that the grammar keeps a record of the hierarchy of positions-of-exponence within the head which triggered (p.74) conflation. This record could be derivational in character—cyclic, phase-like spell- out of each position of exponence in turn, for example—or representational, endowing the string of positions of exponence resulting from conflation with the equivalent of bracketed structure. It is clear, however, that insertion operations and morphophonological readjustment operations are sensitive to this ordered hierarchy within the word, so the output of the conflation operation must be adjunction-like, rather than substitution-like, in character.

Harley (2004) proposed that conflation can provide a formal mechanism to accommodate Chomsky's (2000a) assertion that head movement is phonological in character, not syntactic, while retaining natural and syntactic explanations for many of its key properties. In deciding between a truly movement-based approach and the conflation account, the empirical question of whether head movement is associated with semantic effects will prove decisive. Conflation cannot, in principle, result in semantic effects, since it involves only phonological features/positions of exponence; a true movement account, on the other hand, can do so. Consequently, the proposals and data advanced by Lechner

and Kishimoto that were described above will be central to the debate around which is the correct model.

3.5 Conclusion

The primary goal of this paper, following along with the goals of the volume, has been to address the question of what the diagnostics for syntactic head movement are, and whether these individual diagnostics are in fact reliable cues. I hope to have shown that one tempting pair of diagnostics must be applied with extreme caution, namely, affixation and morpheme order. It is clear that while affixation can result from the application of syntactic head movement, it is not the case that affixation is invariably diagnostic of it, as there are clear cases of affixation which can be independently shown not to result from head movement. Further, while syntactic head movement must produce morpheme orders that respect Baker's (1985) Mirror Principle, it is plausible that the Mirror Principle itself is less constraining of morpheme order than one might at first imagine, if we allow for the possibility of affix-specific linearization.

Nonetheless, it seems clear that when affixation, morpheme order, and semantic scope are correlated, it is reasonable to conclude that syntactic head movement has indeed created the complex form, as in Baker's original discussion. Consequently, some form of head movement, constrained by locality and cyclicity considerations, must be implemented in any adequate syntactic theory. The question of how best to accomplish this, however, remains a point of considerable contention.

Notes:

([1]) This being, of course, one case where head movement traverses a significant linear distance in the string.

([2]) Literally glossed: **Spoken John has French?; Has he spoken French?; and Spoke he French*?

([3]) In some formulations of head movement, in contrast, the moving element is substituted for the target (e.g. Rizzi and Roberts 1989).

([4]) Note that in the tree diagram in (6b), I indicate only the first step in the construction of the complex word, namely the incorporation of the theme N into the V. The resulting complex V might or might not then head-move into T^0 to be prefixed with *waha'*-,—the T/Agr node—it might do so, and exploit affix-specific linearization to ensure it is realized prefixally rather than suffixally; on the other hand, it might also remain in situ and undergo Merger Under Adjacency with the verbal complex in V on its right. See below for discussion of these mechanisms; I do not have access to data from Mohawk which might potentially decide between them, if such data are even possible given Mohawk's polysynthetic character.

([5]) Though, again, of course, mismatches in both directions are not difficult to come up with. There are certain cases of apparent movement that can be perspicuously treated as head movement but do not (obviously) appear to result in affixation; one candidate case is particle shift (*John looked the number up* vs. *John looked up the number*), treated by Johnson (1991), Koizumi (1993), den Dikken (1995, a.o.), as involving head movement. Similarly, there are plenty of cases of morphological dependence that are not obvious candidates for a head movement analysis, for example 'leaner' clitics like *'ll* in *I'll see you tomorrow*. See also the discussion in Julien (2002).

([6]) Much of the discussion in this section also appears in Harley (2011).

([7]) Embick and Noyer (2001) argue that Merger Under Adjacency is effectively a post-syntactic Lowering operation, which creates a complex terminal node under the V^0 head when T^0 is adjacent to V^0. On that approach, the relationship between X^0 status and the phonological word is maintained. They distinguish two operations, Lowering and Local Dislocation; we will not be concerned with the precise nature of their distinction here.

([8]) Adverbial adjuncts like *often*, due to their distinct structural status, do not intervene in the relevant sense, according to Bobaljik's proposal.

([9]) A reviewer rightly points out that in many cases, treating linearization as driven literally by particular phonological affixes will miss language-wide generalizations: it is often a *category*, rather than a particular affix, which is subject to this kind of linearization constraint. In Cupeño, as we will see, for example, *all* Tense/Agr morphemes are prefixes, not just the particular one *pe-*. Consequently, it would perhaps be better in many cases to state the linearization preference at the level of the category, rather than the affix itself; this would be a straightforward elaboration of the standard Headedness Parameter applied at the X^0 level rather than the XP level.

([10]) See Speas (1991) for this very point, although not elaborated in the direction taken here.

([11]) Julien (2002) also uses a combination of head movement and morphophonological merger to analyse affixation patterns cross-linguistically, but adopts a more restrictive antisymmetric framework in which affix-specific linearization is not available. Since heads in the projection line (TP-AspP-VP) will frequently be adjacent (whenever no phrasal elements occupy intervening specifier positions), they are typically good candidates for such affixation-under-adjacency processes, producing prefixal T-Asp-V orders. Of course, they also undergo head movement, to produce inverse (suffixal) orders. In Julien's antisymmetric framework, however, linear orders of affixation which cannot be derived from the combination of projection-line merger and head movement must be derived by phrasal movement. So, for example, the morpheme order in (15a) (V-v-Asp-T) would be produced by head movement; the order in (15b), involving preffixation (T-Asp-v-V), would be produced by preffixation-under-adjacency directly in the projection line, with no movement of any kind necessary. The order in (15c) (T-V-v-Asp) would be produced by a combination of head movement of V through v to Asp, followed by prefixation-under-adjacency of the T head to the left of Asp, without movement to T. Orders like that in (15d) (Asp-V-v-T), however, would have to involve phrasal movement: they could be produced by head movement of V to v, followed by remnant phrasal movement of AspP to the left of T, followed by affixation-under-adjacency. Predicting that orderings produced by such phrasal movement are expected to be rarer

than orderings produced by base-generated or head-moved structures, Julien (2002) performed an analysis of the distribution of V, Asp, and T morpheme orders in 530 languages, confirming that the distribution of the various orderings tend to conform to the expectations of the theory. The affix-driven linearization approach described here, in contrast, would need to appeal to external factors to motivate different probabilities of occurrence of each of the orderings given in (15), since formally all are eqally all are equally probable, being able to appear without using Merger-Under Adjacency. See also the discussion in Gorrie (2010).

([12]) In fact, Cupeño tends to be head-final, like many Uto-Aztecan languages, so the trees illustrating these structures should very likely in fact be mirror-images of what is presented here; note that in that case, the correct order between V and the T-v-Asp complex is derived simply by the usual headedness properties of the syntactic structure. In that case, Merger Under Adjacency could operate just as a ‘leaner’ cliticization operation would. See also the discussion in note 11.

([13]) See Gorrie (2010) for discussion and analysis of the increased typological variation introduced by allowing for the possibility of combining these operations; remarkably, morpheme order even on these assumptions is still somewhat constrained by the theory.

([14]) The literature concerning head movement in head-final languages is substantial, and the discussion of Kishimoto’s proposal here is not intended to imply the existence of a consensus view. Arguments against a head movement analysis for such languages are presented in Yoon (1994), Koopman (2005), and Fukui and Sakai (2003), and contrasting arguments in favour of head movement in Otani and Whitman (1991), Han et al. (2007), and Koizumi (2000).

([15]) Including myself!

([16]) For example, Rizzi (1990: 117 n. 19) concluded that it must be substitution, rather than adjunction, as did Roberts (1991). Chomsky and Lasnik (1993: ex. 51, 58) concluded the opposite.

([17]) Also known as Extend Target (Chomsky 1995b: 190) and the Extension Condition. Syntactic Merge, as formulated, within BPS can only operate on whole phrase-markers, not on substructures within extant phrase-markers.

([18]) An alternative is to consider that V can ‘sideways-Merge’ with T before T itself enters the derivation, à la Nunes (2001). That could help to resolve the cyclicity violation, but the problem with Chain Uniformity remains.

([19]) In Bare Phrase Structure, the labelling operation, perhaps confusingly, is generally taken to be the same copy and re-merge operation as movement is. Merge itself creates a set, e.g. {V, D}. In order to label that set, one of its members is copied and re-merged: {V {V, D}}. This is the structure corresponding to something like $[V\ D]_{V'}$ in traditional bracketed notation; the confusing part is that the label itself is a Merged object in the set-theoretic notation. In the bracketed or tree notation, unlike in the set notation, the fact that the label itself is also the product of Merge is not obvious upon visual inspection.

([20]) This toy version of French finite verb inversion is not representative of current thinking on the derivation of French questions; see, for example, Poletto and Pollock (2004) for a full exposition.

([21]) Without challenging Lechner’s conclusions concerning the relative positions of the various interpreted elements in (20), it is worth noting that his proposal raises a host of interesting questions concerning the available interpretations of modals. That is, under what circumstances can they be interpreted in a moved position, and in what circumstances only in their base position? What rules out the availability of two scopal interpretations when V raises above negation, as in (25)?

([22]) A conceptually related framework is proposed in Di Sciullo (2005), in which the concept of asymmetry in grammar is argued to play a central role in the derivation of morpheme order.

([23]) As described in footnote 11, Julien (2002) employs a combination of such remnant-movement and more traditional left-adjoining head movement in her antisymmetric proposal.

Getting Morphemes in Order: Merger, Affixation, and Head Movement