

Contiguity Theory

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Comments very welcome

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Chapter 1: Introduction

Languages are standardly analyzed, in Minimalism and its predecessors, as differing in the types of overt movement that they display. For example, some languages (like English) require subjects to move to a preverbal position, while others (like Italian) allow the subject to remain postverbal:

- (1) **A man** has arrived [English]

- (2) **È arrivato un uomo** [Italian]

is arrived a man

Similarly, some languages (like English) generally require wh-phrases in single-wh questions to move to the left periphery of a clause, while others (like Japanese) allow their wh-phrases to remain in situ:

- (3) **What** did John buy? [English]

- (4) John-wa **nani-o** kaimasita ka? [Japanese]

John-TOP what-ACC bought Q

We find contrasts like these in a wide variety of domains; languages vary in how high they raise their verbs, in whether they have scrambling, in whether they must move focused phrases to designated positions, and so forth.

In its current form, Minimalism offers no real answer to the question of why these different types of movements are distributed as they are among languages. The current state of the art makes use of diacritic features (variously named “strong features”, “edge features”, “EPP features”, etc.) which have no detectable properties other than their ability to trigger overt movement. On this view, the question of why English *what* in (3) must undergo overt movement

is like the question of why English *what* ends with a /t/; it is an idiosyncratic fact which learners of English must learn, not linked to any other observable properties of the language.

This might, of course, be the correct approach; perhaps there are no deeper answers to questions of the form “why does this language have this type of overt movement?” This book is nevertheless an attempt to develop such answers.

I will argue that the grammar begins the construction of phonological structure earlier in the derivation than previously thought, and that the distribution of overt movement operations is largely determined by the grammar’s efforts to construct this structure. Rather than appealing to diacritic features, the explanations will generally be rooted in observable phenomena; there will indeed be parameters distinguishing among various types of languages, but the parameters in question will largely have to do with the organizing principles of metrical and prosodic structure. The distribution of syntactic movements will follow from the settings of these parameters. I will refer to the theory to be developed here as Contiguity Theory.

Contiguity Theory will posit a different kind of relation between syntax and phonology than we standardly find in Minimalism. The basic proposal is, in some ways, parallel to one of the core proposals of Distributed Morphology: just as Distributed Morphology denies the existence of a separate ‘morphology module’ which operates on a morphology-free syntactic representation, I will be arguing that the building of certain aspects of phonological structure in fact begins in the ‘narrow syntax’.

A recurring argument against various imaginable alternative approaches will involve instances of opacity. We will see multiple cases in which, on the account I will develop, the grammar performs an operation motivated by a phonologically driven condition, and then subsequently performs another operation that obscures the motivation for the first. Such cases

are incompatible with a model in which the narrow syntax engages in ‘look-ahead’ at the final phonological representation (or, equivalently, a model in which the output of the syntax is filtered by phonology). Rather, the grammar is building a kind of ‘rough draft’ of the final phonological representation, which can differ from the actual final phonological representation, and it is this rough draft which drives syntactic operations.

Chapter 2 will focus on contrasts like the one in (1-2), and will offer a theory of the distribution of EPP effects; we will see that whether a given language has EPP effects follows from the rules for morphology and stress assignment for its verbs. In chapter 3, I will review and update a proposal I offered in Richards (2010), according to which the grammar is compelled to create prosodic domains connecting wh-phrases with the complementizers where they take scope; one of the goals of that chapter will be to rephrase the Richards (2010) theory in terms of Match Theory, an approach to the mapping of syntactic structure onto prosodic structure developed in Selkirk (2009, 2011) and subsequent work. In chapter 4, I will argue that the prosodic condition of chapter 3 holds, not only of complementizers and wh-phrases, but of Probes and Goals more generally. In chapter 5, I will generalize the prosodic condition still further, applying it not only to Probes and Goals, but to heads in a Selection relation. Chapter 6 will be dedicated to head-movement in declarative tensed clauses, and chapter 7 to infinitival clauses, questions, and V2. Chapter 8 concludes.

Chapter 2: Affix Support and the EPP

As the synonymous examples in (1-2) show, there are languages that exhibit classic EPP effects (represented here by the presence of an expletive, underlined and in boldface), and languages that do not:

- (1) a. **There** arrived a man. [English]
- b. **Il** est arrive un homme. [French]
- (2) a. É arrivato un uomo. [Italian]
- b. Apareció un hombre. [Spanish]
- c. Va venir un home. [Catalan]

We might respond to this variation by declaring the EPP to be a parameter; the specifier of TP must be filled in some languages, but not in others. Alternatively, we might try to develop a version of the EPP that holds in all the languages in (1-2). This is the approach advocated, for example, by Rizzi (1982), who claims that languages like the ones in (2) differ from the languages in (1) just in having phonologically null expletives. Similarly, Alexiadou and Anagnostopoulou (1998) posit a universal EPP, which can be satisfied in some languages by the verb itself.

I will argue in this chapter that the facts in (1-2) follow from a general condition on affixes, which can be satisfied in different ways in different languages. We will see that the contrast in (1-2) can be predicted from this general condition, together with independently observable properties of the languages in question.

1. Tense and stress

The starting point for the approach developed here will be an analysis developed by Oltra-Massuet (1999, 2000) for stress alternations in Catalan verbs, which was later extended by

Guerzoni (2000) to Italian and by Oltra-Massuet and Arregi (2005) to Spanish. These researchers concluded that the facts about verbal stress in these languages could largely be captured by a single generalization: these are all languages in which stress typically appears on the vowel that precedes the Tense morpheme. The generalization is illustrated in (3) for Spanish:

- (3) a. cantá **-ba** -is [Spanish]

sing **ImpInd** 2pl

'You (pl) sang (imperfect indicative)'

- b. cantá **-ra** -is

sing **ImpSubj** 2pl

'You (pl) sang (imperfect subjunctive)'

- c. cantá **-steis**

sing **Perfect**.2pl

'You (pl) have sung'

- d. cantá **-is**

sing **Present**.2pl

'You (pl) sing'

- e. canta **-ré** **-Ø** -is

sing **FUT Pres** 2pl

'You (pl) will sing'

- f. canta **-rí** **-a** -is

sing **FUT Past** 2pl

'You (pl) would sing (conditional)'

In the examples in (3), the Tense morphemes are in boldface, and the vowels preceding these morphemes are marked with an accent (in a departure from Spanish orthography). As the examples show, the account requires a particular morphological analysis of the Spanish verb to succeed; for instance, the Future and Conditional forms in (3e-f) must be seen as having a morpheme in common, glossed as FUT in the examples above, which is not a Tense morpheme in the relevant sense.

Oltra-Massuet (1999, 2000), Guerzoni (2000), and Oltra-Massuet and Arregi (2005) develop their theory of stress in Catalan, Italian, and Spanish in terms of Idsardi's (1992) approach to stress placement. For examples (3a) and (3f) above, for instance, they offer the bracketed grids in (4):

(4)	Line 2	*		*
	Line 1	*)		*)
	Line 0	*	*)	*
		can	ta	ba
				is
		sing		-TENSE -AGR
				can
				ta
				ri
				a
				is
				'FUT'
				-TENSE -AGR

The rules that generate these bracketed grids are given in (5):

- (5) a. Line 0: put a Right bracket to the Left of T
 project the Rightmost * in each foot to Line 1
- b. Line 1: put a Right bracket at the end of the word
 project the Rightmost * in each foot to Line 2

In these terms, the generalization about T in these languages is that it is reliably preceded by a foot boundary.

It will be useful in what follows to assume that the generation of the structures in (4) actually begins in the narrow syntax. As soon as T is Merged in Spanish, a metrical boundary (or, at any rate, an object which will be interpreted by phonology as a metrical boundary) is inserted to its left, and once a word has been completely constructed, another metrical boundary is inserted at its end. I will assume in what follows that the syntax regards a word as 'completely constructed' when it becomes syntactically impossible for any more affixes to be attached to the word via head-movement. For example, Merging a projection headed by a nonaffix as the root of a tree will cause the syntax to recognize the head of the previous root as part of a complete word. In a language like English, the verb may very well be morphologically complete as soon as T is Merged, but it will be important that the syntax is not sufficiently morphologically sophisticated to recognize this, and only recognizes the verb as a complete word after (for example) nonaffixal C is Merged, ending the syntactic possibility of adding new affixes to the verb.

Let us now turn to stress in English and French. English stress is quite complex, but as far as I know, no one has ever claimed that it makes reference to the boundary between the verb and the tense suffix. French stress is comparatively simple; it is reliably final, apart from cases in which the final syllable is a schwa, in which case it is retracted to the penultimate syllable. To capture the French facts in an Idsardi-style approach parallel to the one offered by Oltra-Massuet and Arregi, we could posit the rule in (6):

(6) Line 1: put a Right bracket at the end of the word

project the Rightmost * in each foot to Line 1

The rule in (6) simply places stress on the last syllable (and therefore does not completely capture the French facts, which are sensitive to whether the last vowel is a schwa or not; I leave

this complication aside). On this view, French is like Spanish in that complete words have metrical boundaries associated with them, but unlike Spanish in that T is not preceded by a metrical boundary.

In (1-2), repeated below as (7-8), we saw another phenomenon which divides English and French, on the one hand, from Italian, Spanish, and Catalan, on the other:

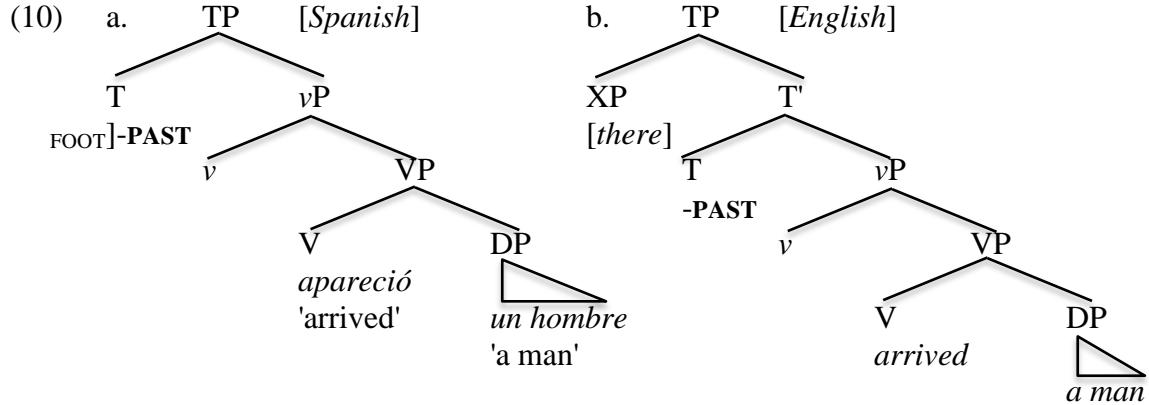
- (7) a. There arrived a man. [English]
b. Il est arrive un homme. [French]
- (8) a. É arrivato un uomo. [Italian]
b. Apareció un hombre. [Spanish]
c. Va venir un home. [Catalan]

In all of these languages, T is reliably preceded by something. In Italian, Spanish, and Catalan, T is always preceded by a metrical boundary; in English and French, it is always preceded by some phrase (sometimes an expletive, as in (7)). The condition in (9) is meant to capture this generalization:

(9) **T-support**

If T is a suffix, it must follow a metrical boundary.

As we have already seen, there are word-internal metrical boundaries preceding T in some languages (like Spanish). In other languages (like English), we find metrical boundaries only on complete words, which are in turn found in specifiers:



What distinguishes a language like Spanish from a language like French, on this view, is that a French verb is not assigned metrical structure until it is morphologically complete. French and English must therefore satisfy T-support by placing a phrase in the specifier of TP; since this specifier consists of at least one morphologically complete word, it contains metrical structure, and T-support is satisfied.

The version of T-support given in (9) tells us nothing about what happens if T is not a suffix. We will see evidence for the following version of T-support:

(11) **T-support (version 2)**

If T is an affix, there must be a metrical boundary in the direction in which it attaches. In section 2 below, we will consider the typology that the version of T-support in (11) predicts; we will see that its predictions are correct for a variety of languages from different families. Section 3 will summarize. In section 4, we will test the predictions of this typology against the database of grammars in the World Atlas of Language Structures; this will allow us to refine the general principle, and to make some discoveries about the kinds of structures to which it may refer.

It will sometimes be important, in what follows, to make a particular choice about which of several affixes is to be regarded as "T". For instance, Irish verbs bear a number of affixes which express information about tense (Bammesberger 1983, Carnie 1995, Duffield 1995):

- (12) a. déan -aimid [Irish]

do 1PL.NONPAST

'we do' (present)

- b. déan -f -aimid

do IRR 1PL.NONPAST

'we will do' (future)

- c. (do) dhein -amar

PAST PAST-do 1PL.PAST

'we did' (past)

- d. (do) dhéan -aimis

PAST PAST-do 1PL

'we did, habitually' (habitual past)

- e. (do) dhéan -f -aimis

PAST PAST-do IRR 1PL

'we would do' (conditional)

The true Tense morpheme to which T-support applies, in the theory developed here, will have to be the preverbal particle *do*, and the mutation that this particle triggers on the following verb-- even though this particle is missing before consonant-initial verbs in most dialects, and the mutation appears only on certain consonants. Irish has several suffixes which also express information about Tense, including agreement suffixes which exhibit allomorphy for tense, and a

suffix *-f*, glossed here as IRR(ealis), which appears in the future and in the conditional (not unlike the morpheme *-ri/re* in the Spanish examples in (3), glossed there as FUT). These suffixes will ultimately play a role in our understanding of Irish syntax, but it will be important that they are not the affixes to which "T-support" in (11) applies. As the theory develops, we will see that the most important property of an affix is actually its relative structural height, rather than its label; all that will really be crucial, in the end, is that the preverbal particle and the mutation it triggers are structurally higher than the suffixes.

Similarly, in order for this theory to account for EPP effects in English, it is important that English tense is invariably a suffix. I will therefore follow Abusch (1985), Copley (2002), and much other work in denying that the English word *will* is a marker of Tense; rather, *would* and *will* must be the past and nonpast versions of a modal auxiliary, generally referred to in the literature as *woll*. On this view, the only English tenses are Past and Nonpast, and both of them are marked with (sometimes null) suffixes.

As we proceed, we will discover a number of differences between the structure that we want the syntax to make reference to and the actual phonological structure of the output. I will attribute these differences to postsyntactic phonological operations, which will in some cases obscure the reasons for the behavior of the syntactic computation. On the approach developed here, these mismatches shed light on the amount of access syntax has to phonological information, and thus ultimately on the architecture of the derivation; crucially, the syntax is not simply 'looking ahead' to the final phonological representation, but is working from a 'rough draft' of the phonology which will later be revised.

2. A typology

We can use the requirement of "T-support" to predict a typology of language types, which will involve at least these parameters:

- (13) a. Tense may be head-initial or head-final
b. Tense may be an affix or not; if it is an affix, it may be a prefix or a suffix (or a variety of other things, but I will concentrate on these two)
c. Tense may be reliably separated from the verb by a metrical boundary (as in Spanish) or not (as in English).

We will be able to use these parameters to predict the distribution of EPP effects, obviating the need for a separate EPP parameter. Note that the parameters in (13) involve independently observable phenomena; of course, we might hope to derive them from still deeper parameters, but all of them must be posited in some form, either as axioms or as theorems.

2.1 Head-initial T

We will begin our study of the typology of EPP effects by considering languages with head-initial T. Section 2.2 will be about languages with head-final T.

2.1.1 Head-initial T: prefix or free-standing

Head-initial prefixal T and free-standing T may be difficult to distinguish in many cases; as it happens, they are predicted to behave in essentially the same way for the theory developed here. Neither type of T is predicted to exhibit EPP in the sense in which we find it in English; that is, neither type of T should be required to have a specifier. If T is free-standing, then T-support will not apply to it at all, since T-support only constrains the behavior of affixes. If T is a prefix, then T-support will not require it to be preceded by any material; if anything, T-support might constrain what kind of material may follow it.

These languages, therefore, should not need anything to precede the verb. And indeed, there are many verb-initial languages with Tense or Aspect morphology that matches this description:

- (14) **Na'e** kai 'e Sione 'a e mango [Tongan: Otsuka 2000, 50]

PAST eat ERG Sione ABS DEF mango

'Sione ate the mango'

- (15) **Tyi** i-kuch-u aj-Maria jiñi si' [Chol: Coon 2010, 355]

PRFV 3.ERG-carry-TRANS DET-Maria DET wood

'Maria carried the wood'

- (16) **D'** inis sé scéal a bheatha di [Irish: Duffield 1995, 177]

PAST tell he story his life to.her

'He told her the story of his life'

- (17) **Wá7=k'a** ka-mays-túm-a ts7a ku=káoh e=ti=n-snúk'w7=a
IMPF=EPIST CIRC-fix-PASS-CIRC this DET=car by=DET=1SG.POSS-friend=EXIS

'My friend could probably fix this car' [St'át'imcets: Davis 2007, 33]

- (18) **E-stil-e** o Petros to grama [Greek: Roussou and

PAST-send-3SG the Petros the letter Tsimpli 2006, 329]

'Petros sent the letter'

- (19) **B-da'uh** Gye'eihlly so'p nài' [San Lucas Quiaviní Zapotec:

PERF-eat Mike soup yesterday Lee 2005, 96]

'Mike ate the soup yesterday'

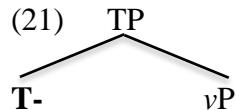
- (20) N-ag-bili ang magsasaka ng bigas [Tagalog¹]

PRF-NOM.TRANS-sell ANG farmer UNM rice

'The farmer sold rice'

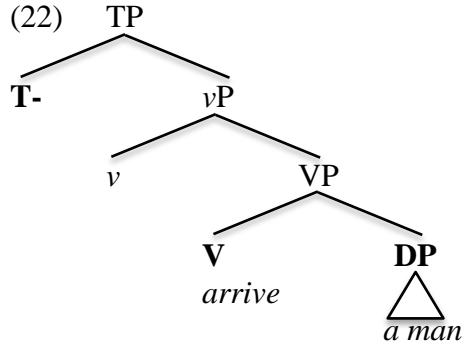
These languages are like Italian, Catalan, and Spanish in lacking traditional EPP effects, but for a different reason; T is not subject to T-support at all (or perhaps has T-support satisfied by material following T). For these languages, it is therefore not necessary that stress be sensitive to the boundary between T and the verb, as it is in Italian, Catalan, and Spanish. And, in fact, several of these languages seem to have rules for stress which are not sensitive to this boundary; Irish stress, for example, is generally initial (Bammesberger 1983, 11), and St'át'imcets stress involves trochaic feet aligned with the left edge of the word (Roberts and Shaw 1994, Caldecott 2007).

If T is a prefix, then T-support will require the prefixal T to precede something containing a metrical boundary. We might expect that this will always hold, given that head-initial T, by definition, will precede its complement (labeled vP in (10)):



In all of the examples of T-support discussed so far, T-Support has been provided by an element which is, or at least can be, string-adjacent to T. Depending on the contents of vP in (21), T may not immediately precede a complete word. In a clause with an unaccusative predicate, for example, the closest word to T might be a verb root:

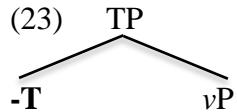
¹ Tagalog also has Aspect morphemes which are infixes, but they are infixes of a type which has been analyzed successfully (by Halle 2001) as involving prefixation, together with metathesis.



Since the verb root *arrive* in (22) is only part of a word, it ought to lack metrical structure in at least some languages. Thus, the T prefix in (22) precedes something with metrical structure (namely, the subject DP), but immediately precedes something which might lack metrical structure. As stated, the requirement of T-support makes reference only to precedence, and not to immediate precedence, and the tree in (22) therefore satisfies the requirement. I will continue to state the requirement this way, though the issue certainly bears further investigation².

2.1.2 Head-initial T: suffix

If head-initial T is a suffix, its need for T-support cannot be satisfied by vP, which follows T:



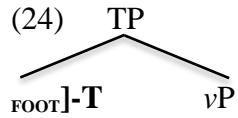
Thus, these are the languages that can in principle show EPP effects, though we have already seen that not all of them do.

2.1.2.1 Head-initial T: suffix with metrical boundary

As we saw in section 1, Oltra-Massuet (1999, 2000), Guerzoni (2000), and Oltra-Massuet and Arregi (2005) have argued that tense suffixes in Italian, Spanish and Catalan are reliably

² As we will see in section 3, McCloskey (1984) has argued that Irish has an EPP effect that requires a phrase to appear immediately after the verb. In principle, we could try to capture this effect by making a different choice than the one in the main text, requiring that T-support be supplied by material adjacent to T. I will offer a different account of the Irish facts in section 3. Further research into verb-initial languages will hopefully shed light on the distribution of the Irish-style EPP requirement, which might offer further evidence bearing on this question.

preceded by a foot boundary. On the theory developed here, it is this foot boundary which satisfies T's need for T-support:



- (25) a. É arrivato un uomo. [Italian]
 b. Apareció un hombre. [Spanish]
 c. Va venir un home. [Catalan]
- arrived a man
 'A man arrived'

These languages have some verbs that are irregular with respect to their placement of stress. The examples in (26), for instance, show a Spanish verb that conforms to the regular pattern, while the examples in (27) show an irregular verb:

- (26) a. temí-Ø [Spanish]
 fear-PERFECT.1SG
 'I feared'
- b. temí-ste
 fear-PERFECT.2SG
 'you feared'

- (27) a. **púse-** \emptyset
put-PERFECT.1SG
'I put'
- b. **pusí-**ste
put-PERFECT.2SG
'you put'

The verb in (26) reliably puts stress just before the tense suffix. By contrast, the verb in (27) sometimes shifts stress to the initial syllable, as in (27a).

This kind of lexical idiosyncrasy has no effect on the syntax; a clause with the Spanish verb *poner* 'to put' does not exhibit an EPP effect in examples like (27a). We might take this fact as further support for a conclusion drawn in section 2.1.1 above; T-Support is concerned, not with ‘immediate precedence’, but simply with ‘precedence’, and any metrical foot within the Spanish verb should be able to Support the tense affix, even if the affix is not adjacent to a foot boundary.

Alternatively, we could take the Spanish facts as evidence for a limit on syntactic access to the final phonological representation. On this view, the syntactic computation cannot take irregular stress shifts into account, perhaps because such shifts take place after the syntactic computation is over. The structure considered by the syntax, we might say, lacks lexically driven irregularities (though this structure must contain representations of properties which generally hold for the members of a class, such as the fact that the tense morphemes in a given language are suffixes).

We can find further evidence for this second conclusion from Russian. Russian appears to lack classic EPP effects:

- (28) Zašli gosti [Russian: Babynyshev 1996, 25]
 came.in guests
 'Guests dropped by'

As we will see, Russian is like Catalan, Spanish, and Italian in that tense morphemes are suffixes attached to material that reliably contains a metrical boundary. It is considerably more complicated to demonstrate this for Russian than it is for Catalan, Spanish, and Italian, just because the rules of Russian stress are quite complex. I will turn first to a general discussion of Russian stress placement, after which we will consider the properties of Russian verbs. The discussion that follows is indebted to Halle's (1997, 2008) work on the language³.

Halle claims that any Russian morpheme can in principle be either lexically accented or unaccented; furthermore, accented morphemes may mark their accent on one of the syllables of the morpheme itself, or may be 'postaccenting', requiring stress to fall on a following syllable. The general rule for stress is that it falls on the first lexically accented syllable, or on the first syllable if there are no lexically accented syllables.

We can illustrate this generalization by considering the noun stems and case suffixes listed in (29):

- (29) a. gorod 'town'
 b. or[ex 'nut'
 c. korol'['king'
 d. -u 'DAT.SG'
 e. -[am 'DAT.PL'

³ I am also deeply grateful to Morris Halle for much helpful discussion of the Russian facts.

The brackets in (29) are meant to indicate the position of lexical accent; *gorod* 'town' in (29a) is lexically unaccented, while *orex* 'nut' is lexically accented on its second syllable, and *korol'* 'king' is postaccenting. Similarly, *-u* 'DAT.SG' is unaccented, while *-am* 'DAT.PL' is accented.

Combining these morphemes yields the forms in (30):

- | | | | | |
|------|----|---------------|-----|---------------|
| (30) | a. | górod-u | a'. | gorod-[ám] |
| | | 'town-DAT.SG' | | 'town-DAT.PL' |
| | b. | or[éx-u | b'. | or[éx-[am] |
| | | 'nut-DAT.SG' | | 'nut-DAT.PL' |
| | c. | korol'[-ú | c'. | korol'[-[ám] |
| | | 'king-DAT.SG' | | 'king-DAT.PL' |

The lexically unaccented noun *gorod* 'town' exhibits a stress shift; the Dative singular form in (30a), which has no lexically accented morphemes in it, has default initial stress, while the Dative plural form in (30a') has stress on the only lexically accented morpheme, which is the Dative plural suffix *-am*. The nouns *orex* 'nut' and *korol'* 'king', which are lexically accented, place stress just on the syllable which receives lexical accent (namely, the second syllable of the noun *orex* 'nut', and the syllable after the postaccenting noun *korol'* 'king'). In particular, we can see in (30b') the behavior of words with multiple lexical accents; stress appears on the first lexically accented syllable.

Halle (2008) formalizes these observations about Russian stress in terms of the approach of Idsardi (1992), which represents stress systems as sets of rules for grouping stress units into metrical feet and for assigning prominence to members of metrical feet. Halle's Idsardi-style rules for Russian stress are given in (31), with relevant examples in (32):

(31) Line 0: put a Left bracket to the Left of accented syllables

put a Right bracket at the end of the word

project the Leftmost * in each foot to Line 1

Line 1: put a Right bracket at the end of the word

project the Leftmost * in each foot to Line 2

(32) Line 2 * *

Line 1 *) *) *) * *)

Line 0 * * *) * * (*) *(* *) *(*(* *)

go ro d-u go ro d-am o re x-u o re x-am

'town-DAT.SG' 'town-DAT.PL' 'nut-DAT.SG' 'nut-DAT.PL'

Having established Halle's basic rules for Russian stress, we can turn our attention to his

observations about verbs. A typical Russian verb appears in (33):

(33) Ona govor -í -l -a

she speak -THEME -PAST -FEM.SG

'She spoke'

The verb in (33) consists of a stem *govor-* 'speak', followed by a theme vowel *i*, a past tense suffix *-l*, and a final suffix *-a* that agrees in number and gender with the subject. Stress in this particular verb is on the theme vowel. Given what we now know about Russian stress, we know that there must be at least one lexically accented vowel in this word; as we have seen, when a word contains no lexical accent, stress appears on the first syllable of the word, and this is not the case for *govorila* in (33). Since a word with lexically accented syllables receives stress on the first of its lexically accented syllables, we also know that *govorila* has lexical accent at least on

its theme vowel, either because the theme vowel itself is lexically accented or because the verb stem is postaccenting.

In fact, Halle (2008) argues that Russian theme vowels are very generally lexically accented. He bases his argument for this conclusion on the behavior of the so-called athematic verbs, a small class of verbs that lack theme vowels. These verbs, he argues, can be shown to fall into the same accentual classes that were developed for nouns in (29) above:

- (34) a. *vz'a-* 'take'
b. [lez- 'climb'
c. nes[- 'carry'
d. -l 'PAST'
e. -o 'NEUT.SG.'
f. -[a 'FEM.SG'

Consider first the verb stem *vz'a-* 'take'⁴. The forms of this verb exhibit a stress shift that demonstrates that the feminine singular suffix *-a* is lexically accented:

- (35) a. *vz'á-l-o* a'. *vz'a-l-[á*
 'took-NEUT.SG' 'took-FEM.SG'

This is the same kind of stress shift that we saw for *gorod* 'town' in (30a-a'), and Halle argues that the same account can cover the facts; the form in (35a) has no lexically accented morphemes in it, and therefore has default initial stress, while the form in (35a') contains the lexically accented feminine singular morpheme, which attracts stress to itself.

As with nouns, we also find accented athematic stems, which override the effects of any lexically accented suffixes:

⁴ Another verb stem, *nača-* 'begin', is lexically unaccented for some speakers, and has lexical accent on the initial syllable for others. Thanks to David Pesetsky and Ora Matushansky for suggesting the use of *vz'a-*.

- (36) a. [léz-l-o a'. [léz-l-[a
 'climbed-NEUT.SG' 'climbed-FEM.SG'
 b. nes[-l-ó b'. nes[-l-[á
 'carried-NEUT.SG' 'carried-FEM.SG'

In an example like (36a'), we see again what happens when multiple syllables are lexically accented; stress appears on the first of the lexically accented syllables.

We can find further evidence that feminine *-a* is lexically accented by considering stress alternations in feminine nouns:

- (37) a. vód-u a'. vod-[á
 'water-FEM.SG.ACC' 'water-FEM.SG.NOM'

The alternation in (37) can be compared to the one in (35); the (a) examples in both show default initial stress in the absence of any lexically accented morphemes, and the (a') examples show the feminine singular ending *-a* drawing stress to itself by virtue of its lexical accent.

The conclusion that feminine *-a* is lexically accented is of interest because, as Halle shows, *-a* never receives stress in verbs with theme vowels⁵. Stress varies in its placement in thematic verbs, but it is never any later than the theme vowel itself:

⁵ Halle does note one lexical exception to this generalization, which is the verb *rodit'* to give birth'

- (38) a. govor -[í] -l -[a]
 speak THEME PAST FEM.SG
 'spoke-FEM.SG'
 b. got[óv -[i] -l -[a]
 prepare THEME PAST FEM.SG
 'prepared-FEM.SG'
 c. regul[írov -[a] -l -[a]
 regulate THEME PAST FEM.SG
 'regulated-FEM.SG'

In claiming that the theme vowel is lexically accented in Russian, Halle is claiming only that stress will never appear later than the theme vowel; recall that stress goes on the first lexically accented syllable in Russian. Whether stress is earlier than the theme vowel will depend on whether the verb stem is unaccented (as in (38a)) or accented (as in (38b-c)), but because the theme vowel is accented, stress will never appear on the feminine suffix *-a*, despite the fact that (as we have seen) this suffix is lexically accented.

If Halle is correct, then the Russian tense suffix (*-l* 'PAST' in the above examples) typically follows something with metrical structure: namely, the theme vowel. We therefore expect, correctly, that Russian will lack EPP effects:

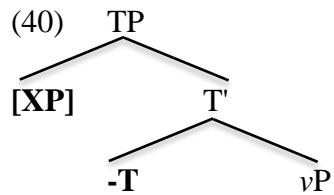
- (39) Zašli gosti
 came.in guests
 'Guests dropped by'

The Russian facts offer support for a conclusion we already reached in the case of Spanish irregular verbs: the level at which T-support applies appears to be one without lexical

idiosyncracies. Russian clauses lack EPP effects very generally, regardless of whether the verb has a theme vowel or not; the syntax treats all verbs as being like the majority of verbs in possessing theme vowels. We might imagine that the syntactic representation of Russian verbs invariably contains a lexically accented theme vowel (or some syntactic precursor of a theme vowel), and that the elimination of theme vowels for certain verbs is done post-syntactically, on a lexically idiosyncratic basis. We can also see in Russian that the project of demonstrating that T is always preceded by metrical material in a given language will sometimes be a difficult one; thanks to the complexity of the Russian stress system, demonstrating that Russian stress is relevantly like Spanish stress is not at all trivial.

2.1.2.2. Head-initial T: suffix without a metrical boundary

We can conclude our discussion of head-initial T by considering the case of suffixal, head-initial T which is not reliably preceded by a metrical boundary within the word. Such an instance of T will need to receive T-support from a phrase in its specifier; in other words, these are the languages that can exhibit EPP of the classic type:



The languages of this type discussed earlier were English and French. Another such language is colloquial Finnish, as described by Holmberg and Nikanne (2002):

- (41) There arrived a man. [English]

- (42) Il est arrive un homme. [French]

- (43) Sitä leikkii lapsia kadulla. [Finnish]

EXPL play childrenin.street

'Children play in the street'

The Finnish case is especially interesting, since Finnish also has a restricted kind of pro-drop (Holmberg 2005, 539):

- (44) Puhu-n englantia

speak-1SG English

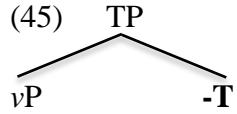
'I speak English'

Finnish illustrates the fact that the theory developed here is not one of pro-drop, but of the EPP⁶; T-support applies at a level at which pro-drop has not yet taken place, and regards pro as an appropriate provider of support for T. We can think of the behavior of pro-drop as another instance of syntax being blind to lexical idiosyncracy; Finnish does have pronounced pronouns as well as the unpronounced ones that are involved in pro-drop, and syntax ignores this distinction, treating all DPs as pronounced.

2.2 Head-final T

Having completed our discussion of head-initial T, let us now turn to head-final T. Miyagawa (2001) has argued convincingly that it is possible for a language with head-final T to have EPP effects; he detects EPP effects in Japanese, which has head-final, suffixal T. We will review his arguments shortly, but assuming that he is correct, his results create a puzzle for the theory under development here. Consider a tree for a Japanese TP:

⁶ For some discussion of pro-drop, see section 6 of chapter 6.



If Miyagawa is right, then the T in this tree must have a specifier. From the standpoint of our theory, this is puzzling; why should T not be able to get Support from its complement?

It will be useful in what follows to assume a version of Kayne's (1994) theory of linearization, in which heads are generated preceding their complements, and come to follow their complements via an operation. Rather than achieving this reordering via movement, as in Kayne (1994) and much subsequent work, I will posit an operation on ordering statements:

(46) **Untethering**

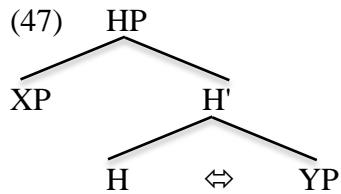
Given two sisters, X and Y, delete all ordering statements which refer to either X or Y. This statement of Untethering presupposes an approach like that of Kayne (1994) (and much subsequent work, including Fox and Pesetsky (2004) and Richards (2010)), in which ordering statements are generated throughout the derivation; each time a new node X is Merged, the derivation generates ordering statements relating X to any other nodes which X asymmetrically c-commands.

Untethering will apply to a head and its complement just after the head has been Merged⁷. At this point in the derivation, Kayne's LCA will not have generated any statements ordering the complement, since the complement is not yet in an asymmetric c-command relation with any material. The head, by contrast, will asymmetrically c-command the interior of its complement; the ordering statements based on these relations are the ones that Untethering will remove. The consequence will be that the head and its complement are no longer ordered. In chapter 5, I will discuss further the circumstances under which Untethering may take place, the

⁷ We will see examples later (for example, in section 8 of chapter 5, and in section 2.3 of chapter 6) of Untethering a pair of non-head sisters.

processes that eventually impose an order on Untethered nodes, and the motivations for the Untethering operation. We will see there that a general consequence of Untethering will be that Untethered heads are realized as final.

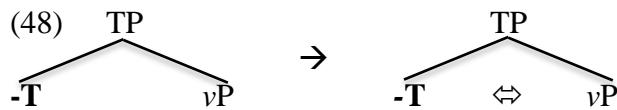
The consequence of Untethering that will be important for us in this chapter is that Untethering removes the ordering statements that order a head with its complement. Later operations, of course, can create new ordering operations involving the Untethered head; for example, if an Untethered head H acquires a specifier after being Untethered, then this specifier will be ordered before H, since the specifier asymmetrically c-commands H. I will represent state of affairs as in the tree below:



The double-headed arrow between H and YP represents the fact that these two sisters are Untethered, and hence unordered with respect to each other. XP, by contrast, was Merged to HP after Untethering of H and YP, and is therefore linearized in the usual way with H (and with YP), both of which it asymmetrically c-commands. In the tree in (47), H may receive Support from XP, but not from YP (even if YP will precede H when they are eventually linearized).

2.2.1. Head-final T: suffix

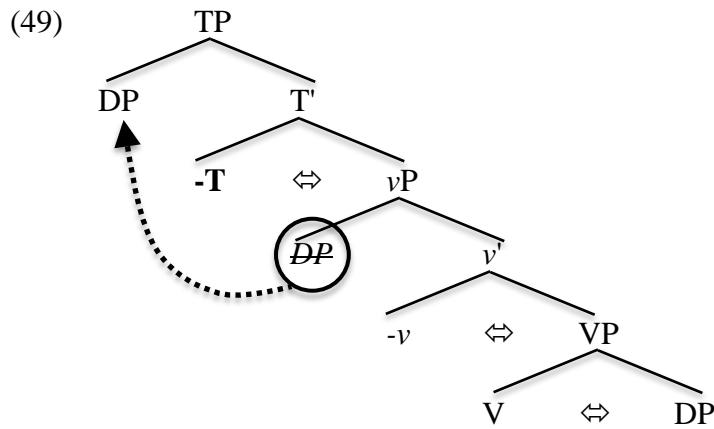
By hypothesis, this type of language undergoes a derivation like the one in (47):



Once T is Merged, it is Untethered, removing the ordering statements it might have participated in. Subsequent operations will be responsible for making T head-final, but at this point in the

derivation it is simply unordered with respect to anything in the tree. Consequently, if the language described in (48) has no metrical boundaries associated with T, then the requirement of T-support is not met.

In order to satisfy the T-support requirement, the grammar must create a new ordering statement in which T is preceded by something with metrical structure. Movement of a phrase to the specifier of TP will achieve this goal:



Movement of DP to the specifier of TP creates a new asymmetric c-command relation between the moved DP and T, and hence triggers the creation of a new ordering statement $\langle DP, T \rangle$. Since DP contains metrical structure (in the form of at least one morphologically complete word), this new ordering statement satisfies T-support. In other words, a language of this type ought to exhibit EPP effects.

Japanese is a head-final language with suffixal tense, and Miyagawa (2001) has argued that Japanese does have EPP effects. His argument is based on scope facts like those in (50-51):

- (50) Zen'in-ga sono tesuto-o uke-nakat-ta
 all-NOM that test-ACC take-NEG-PAST
 'All didn't take that test' $\forall > \neg, * \neg > \forall$

- (51) Sono tesuto-o zen'in-ga uke-nakat-ta
 that test-ACC all-NOM take-NEG-PAST
 'That test, all didn't take' $\forall > \neg, \neg > \forall$

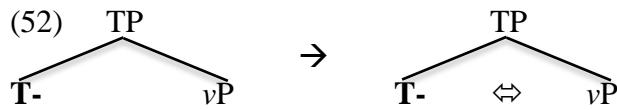
Miyagawa's proposal is that the EPP requires some phrase to occupy a structural position higher than negation, and that reconstruction from this position is impossible. In (50), EPP is satisfied by the subject, which therefore must outscope negation; in (51), by contrast, EPP can be satisfied by the object, leaving the subject free to remain below the scope of negation.

These EPP effects are predicted by the theory developed here. More generally, we expect that languages with head-final, suffixal T will have EPP effects unless T is reliably preceded by a word-internal metrical boundary. Since EPP effects in a head-final language are quite difficult to discover, I will leave for future work the question of whether such EPP effects reliably track the metrical structure of the verb.

One difference between Japanese EPP and English EPP is worth highlighting: English EPP is generally satisfied by the subject, but on Miyagawa's approach, Japanese EPP may be satisfied by any phrase. I develop an explanation for this difference in section 4.2.2 of chapter 4.

2.2.2. Head-final T: prefix

Finally, we can turn to the case of head-final, prefixal T:



In the derivation in (52), T-support could be satisfied by elements internal to vP prior to Untethering, but then ceases to be satisfied after T is Untethered, since T and its complement are no longer ordered. If Kayne (1994) is right that specifiers are generally on the left (a conclusion we will revisit in chapter 4), then this type of T cannot have its need for support satisfied by a specifier. It would therefore need to be reliably followed by a metrical boundary.

Head-final languages with prefixal tense are in fact quite rare. Dryer (1992) notes that only 10% of the OV languages in his sample have tense prefixes, while 30% of the VO languages in his sample have tense prefixes. The account developed here might be part of an explanation for this distribution; a tense prefix in a VO language might or might not be separated from the verb by a metrical boundary, but a tense prefix in an OV language must be. One family of OV languages with prefixal tense is the Athabaskan family, and it has indeed been observed that prefixes in that family are attached to a verb stem that is a domain of its own for stress. Hargus and Rice (2005, 34) comment that "[d]espite the difficulty in hearing stress in some of the [Athabaskan] languages, certain facts about stress have become evident over the years. First and foremost is the attraction of stress to the stem." Hargus (2005, 400) gives the example of Witsuwit'en, which reliably puts stress on the verb stem:

- (53) s- **a-** s- Gúh [Witsuwit'en]

CNJ **PERF** 1SGS catch

'I caught it'

If we interpret these facts about Athabaskan stress as demonstrating that the Athabaskan verb stem is always preceded by a metrical boundary, then this boundary can satisfy the need for T-support.

3. Interim conclusions

We have seen that the distribution of EPP effects in numerous languages may be captured by the requirement of T-support, restated below:

(54) T-support

If T is an affix, there must be a metrical boundary in the direction in which it attaches.

This general requirement allows us to reduce the variation in EPP effects to known and observable parameters: T may be head-initial or head-final; it may be a non-affix, a prefix, a suffix, or some other kind of affix; and it may be, or not be, separated from the verb by a reliably present metrical boundary.

I have not speculated about why T-support should hold. It is tempting to think that syntax is trying to provide T with a potential host (though, in many cases, the potential host ends up not being the actual one). Alternatively, we might imagine that syntax can only represent something as an affix by making it dependent on something else (that is, that syntax cannot simply mark affixes with a diacritic "affix feature", but must manipulate the representation in a way that expresses the dependent nature of the affix directly).

We have seen evidence that the computation that satisfies T-support acts in ignorance of lexically idiosyncratic facts. It is unaware, for example, that certain irregular verbs in Spanish do not always place stress in ways that are compatible with T-support; similarly, it is unaware of the existence of athematic verbs in Russian. Moreover, it appears not to be able to look ahead to later stages of syntactic derivation, as we see in examples like (55):

- (55) Did **there** arrive a man?

If the theory developed here is right, the expletive *there* is inserted to satisfy T-support.

Subsequently, T is moved to C, obviating the original point of inserting the expletive. Instances of opacity like this one suggest that the relevant level at which T-support applies is the narrow syntax; T requires support as soon as it is introduced into the structure. We are thus driven to conclude that the narrow syntax can make reference to, for instance, metrical boundaries (or, at any rate, to objects in a syntactic representation which will be interpreted by the phonology as metrical boundaries).

The discussion up to now has all been about T, but it is very unclear why T should be specifically targeted by this requirement. Suppose we generalize the principle further:

- (56) **Affix Support**

If a head is an affix, there must be a metrical boundary in the direction
in which it attaches.

The only reason that EPP has traditionally been taken to single out T, on this account, is that T tends to be the highest affix that combines with the verb, and its need for support therefore affects the left periphery of TP. Lower affixes might trigger EPP effects in lower positions (sometimes postverbal positions, if the verb has raised to T), but these will be less salient and hence more difficult to discover. Irish offers a nice example of this. We saw above that Irish T is a prefix, and hence does not trigger EPP of the classic type. On the other hand, we also saw that there are suffixes on the Irish verb, and these should trigger EPP effects of their own in the postverbal field (assuming that the verb raises through these suffixes to the Tense prefix). And we do indeed find postverbal expletives in Irish:

- (57) a. Tá sé fíor [go raibh Ciarán i láthair] [Irish: McCloskey 1984,
 is it true that was Ciaran present 452-453]
 'It is true that Ciarán was present'
- b. Th-ioc-f-adh leis a bheith ag cur
 PAST-come-IRR-AGR to.it to.be raining
 'It could be raining'

In the next section, I will test the theory of Affix Support against a wider variety of languages, drawn from the World Atlas of Language Structures.

4. Using WALS

The World Atlas of Language Structures, or WALS (Dryer and Haspelmath 2013) contains information about 2,679 languages. We will see that the information in WALS requires some interpretation; the authors have inevitably had to make some judgment calls about how to treat particular languages.

Among the properties that WALS uses to categorize languages is "Position of Tense-Aspect Affixes". As the last section demonstrated, this is not actually the most useful property to use for our purposes; we need a property like "Position of the highest affix on the verb". Since this is the property that WALS has, however, we will make use of it to test our predictions, and then take a more careful look at interesting cases.

In the following sections I will consider the WALS data for verb-peripheral languages. I will concentrate on these languages because they are the ones in which the theory can be most unambiguously made to fail. Languages with word orders like the ones in (58) are in principle problematic for the account developed here:

- (58) a. S O **PREFIX-V**
 b. V-**SUFFIX** S O

The languages in (58) are both languages in which the affixes on the verb appear to lack Support.

We have already seen ways of accounting for languages of this kind, but it will be important to make sure that some account can be extended to any language with the properties in (58).

By contrast, consider a language with no affixal morphology at all which exhibits EPP effects. Such a language might be seen as offering another kind of counterexample to the theory; it has EPP effects, but no obvious morphology to trigger them. Since we know, however, that null morphology exists in natural language, it is comparatively trivial to posit it in such a case, inventing null suffixes that will be responsible for driving movement to their specifiers. Of course, we hope to then find additional evidence for the existence of such suffixes, but this will involve greater understanding of the language than we will usually have available to us via WALS. I will therefore leave the investigation of this kind of language for future work.

4.1 SOV languages

WALS lists 362 SOV languages with Tense-Aspect suffixes, and 19 SOV languages with Tense-Aspect prefixes (accessed 7/28/2014). As we saw in section 2.2 above, we expect head-final suffixal T to trigger EPP effects (at least when it is not reliably preceded by a metrical boundary), while head-final prefixal T should always have to be followed by a metrical boundary. A list of the 19 SOV languages with Tense-Aspect prefixes in WALS is given below:

(59)

Apache (Western)	Athabaskan	
Chipewyan	Athabaskan	
Navajo	Athabaskan	
Slave	Athabaskan	
Ala'ala	Austronesian	(Oceanic: Papua New Guinea)
Gumawana	Austronesian	(Oceanic: Papua New Guinea)
Iduna	Austronesian	(Oceanic: Papua New Guinea)
Maisin	Austronesian	(Oceanic: Papua New Guinea)
Sinaugoro	Austronesian	(Oceanic: Papua New Guinea)
Tawala	Austronesian	(Oceanic: Papua New Guinea)
Maklew	Bulaka River	(New Guinea)
Seri	Hokan (Seri)	
Kiliwa	Hokan (Yuman)	
Marind	Marind	(New Guinea)
Yaqay	Marind	(New Guinea)
Zimakani	Marind	(Papua New Guinea)
Iwam	Upper Sepik	(Papua New Guinea)
Yelî Dnye	Yele	(Papua New Guinea)
Ket	Yeniseian	

Of these languages, four are Athabaskan; as noted in section 2.2.2 above, the Athabaskan languages conform to the theory developed here, since the tense prefixes are attached to a verb that is reliably separated from them by a metrical boundary. Vajda (2008) argues that Ket verbs are like Athabaskan ones in requiring the verb root to be a metrical unit⁸. The same appears to be true of Seri, a language spoken in Mexico (possibly of the Hokan family); Marlett (2008) argues that stress in this language appears on the penultimate syllable of the verb root (Marlett 2008: 2, 13)

⁸ Thanks to Seth Cable for pointing this out to me.

- (60) a. t- ása 'it stinks'
 REAL- stink
- b. po- m- ása 'it will not stink'
 IRREAL-NEG- stink
- c. i- t- ápx 'S/he is angry with h/'
 3S3O- REAL- be.angry.with
- d. i- t- áxapx -at 'They're angry with h/'
 3S3O- REAL- be.angry.with -PL.SUBJ
- e. i- t- áxapx -olca 'They're being angry with h/'
 3S3O- REAL- be.angry.with -PL.SUBJ/IMPERF
- f. i- t- atólec 'S/he asks h/ for help'
 3S3O- REAL- ask.for.help
- g. i- t- atólej -oj 'They ask h/ for help'
 3S3O- REAL- ask.for.help -PL.SUBJ
- h. i- t- atólejc -am 'They're asking h/ for help'
 3S3O- REAL- ask.for.help -PL.SUBJ/IMPERF

Seri is thus unlike English or French in that as soon as a root is inserted in syntactic structure, it can be assigned a trochaic foot at its right edge. Any affixes added to the verb root are therefore being added to something with prosodic structure, and Affix Support is satisfied. Crucially, for this account to succeed, Affix Support will have to apply at a level at which the verb and its affixes have been joined together via head-movement.

Twelve of the nineteen languages from table (58) are from New Guinea. Two of these can be argued to express tense or aspect, not with prefixes, but with free-standing words that

precede the verb. In Sinaugoro, an Austronesian language of Papua New Guinea, stress is generally word-initial (and also penultimate, unless this would yield stress clash) (Tauberschmidt 1999, 10-11):

- (61) a. ['ya.li.'va.ta] 'banana'
b. ['vo.vo.ka] 'plenty'
c. ['nu.ma] 'house'

Morphology indicating tense and agreement precedes the verb, and is generally stressed as a separate word:

- (62) a. ['ba.-γa. 'ma-ri.γo]
REMOTE-1PL.EXCL at.speaker-come.down
'We came down'
b. ['bo.-γo.-no.-a. 'fou]
REMOTE-2PL-IMPER-different.location wash
'Wash yourselves (over there)'

The stress facts reveal the utterances in (62) to consist of two words: a complex indicating (among other things) tense and agreement, followed by a verb. Both of these words have initial stress. The only exception to the generalization that the pre-verbal inflectional material is treated as a separate word involves cases in which this material consists of a single syllable; monosyllabic inflectional complexes are grouped together with the verb for purposes of stress:

- (63) ['ya.-ma-ri.'γo-ni]
1PL.EXCL-at.speaker-come.down-IMPERFECTIVE
'We are coming down'

As long as we are willing to take the pattern in (62) as representative, and the one in (63) as representing a postsyntactic reaction to an excessively light word, we can remove Sinaugoro from the list of problematic languages; its tense "prefixes" are in fact free-standing words⁹.

Similarly, WALS lists Henderson (1975) as its source for the claim that Yelî Dnye (Yele, Papua New Guinea) has tense/aspect prefixes, but Henderson (1995) disagrees with his previous analysis, saying that "[t]he morphemes appended to the verb root—prefixes and suffixes in many languages—are in Yele separated from the verb root on phonological grounds." Again, if Henderson (1995) is correct, then Yelî Dnye, like Sinaugoro, actually lacks tense/aspect prefixes; what it has are free-standing morphemes that reliably precede the verb, and which were (entirely understandably) previously misanalyzed as prefixes.

In the end, eleven of the languages from table (53) (ten of which, interestingly, are from New Guinea) will require further study to see whether the theory developed here can account for them. The other eight languages in the table, together with the 362 SOV languages with tense suffixes, appear to conform to the theory.

4.2 Verb-initial languages

Of the 64 languages that WALS lists as verb-initial¹⁰ for which Tense/Aspect is listed as a prefix or suffix, 33 are listed as Tense/Aspect-suffixing, and 31 as Tense/Aspect-prefixing. We can compare this with the SVO languages in WALS; WALS describes 93 of these as having Tense/Aspect suffixes, and 78 of them as having Tense/Aspect prefixes (WALS accessed 7/28/2014).

⁹ Another logical possibility is that Sinaugoro should actually be analyzed as being like the Athabaskan languages, with verbal prefixes that are reliably separated from the verb root by a metrical boundary; on such an account, the stress-based diagnostics for word-hood described in the text are actually detecting metrical boundaries. This is not Tauberschmidt's (1999) analysis, however, and I know of no reason to prefer it to Tauberschmidt's.

¹⁰ I include in this category languages that are listed as VSO or VOS, and also languages not so listed which are listed as VS and VO (these are languages in which the verb is initial and the order of S and O is not fixed). I will not include languages which are listed as VS in intransitive clauses and SVO in transitive clauses.

These numbers do not look particularly inviting for the theory being developed here. We predict that EPP effects should be found in languages in which the highest affix on the verb is a metrically dependent suffix. If we use the difference between SVO and verb-initial word orders as a shorthand for the presence or absence of EPP effects, and if we also assume that Tense/Aspect is generally the highest affix on the verb, we should expect there to be some relation between direction of affixation and word order: prefixing languages should tend to be verb-initial, while suffixing languages should tend to be SVO. But, in fact, there appears to be no statistically significant correlation between direction of affixation and word order.

The assumptions leading us to expect that there should be such a correlation are fairly suspect, of course; why should we assume that Tense/Aspect is usually the highest affix on the verb? But the assumptions are necessary for us to be able to use WALS at all; having made them, we can at least let WALS direct our research towards potentially problematic languages.

The 33 verb-initial languages with tense/aspect suffixes therefore require further study. The languages in question are listed below, organized by language family:

(64)

Baure	Arawakan
Garífuna	Arawakan
Goajiro	Arawakan
Ignaciano	Arawakan
Anindilyakwa	Australian (Gunwinyguan)
Warrnambool	Australian (Pama-Nyungan)
Wembawemba	Australian (Pama-Nyungan)
Gude	Chadic
Chumash (Barbareño)	Chumash
Breton	Indo-European (Celtic)
Welsh	Indo-European (Celtic)
Domari	Indo-European (Indic)
Kipea	Macro-Ge (Kariri)
Chontal Maya	Mayan
Zoque (Copainalá)	Mixe-Zoque
Zoque (Ostuacan)	Mixe-Zoque
Nicobarese (Car)	Mon-Khmer
Ik	Nilo-Saharan (Eastern Sudanic)
Karimojong	Nilo-Saharan (Eastern Sudanic)
Yagua	Peba-Yaguan
Costanoan	Penutian
Sahaptin (Northern)	Penutian
Yokuts (Yaudanchi)	Penutian
Bella Coola	Salishan
Chontal (Huamelultec Oaxaca)	Tequistlatecan
Nahuatl (Huasteca)	Uto-Aztecán
Nahuatl (Michoacán)	Uto-Aztecán
O'odham	Uto-Aztecán
Pipil	Uto-Aztecán
Tepehuan (Northern)	Uto-Aztecán
Tepehuan (Southeastern)	Uto-Aztecán
Kyuquot	Wakashan
Makah	Wakashan

In what follows, we will see that 30 of these 33 languages are explicable under the theory developed here. The remaining 3 will still require further study.

4.2.1 Explaining the explicable

The following section will consider the 30 languages from the above list for which explanations suggest themselves. We will see that five of these languages are not in fact clearly verb-initial, and eight of them can be argued not to have real suffixes for tense and aspect. Three languages do have tense/aspect suffixes, but also have prefixes which are arguably structurally higher. Ten of the languages, I will argue, actually exhibit a kind of EPP effect. And, finally, four of these languages are like Seri, discussed in section 4.1 above, in that their verb roots have metrical structure, and are therefore capable of satisfying Affix Support.

4.2.1.1 Not clearly verb-initial (5)

Dryer (2008), in his discussion of the methodology used for classifying languages by word order, declares his decision to rely whenever possible on text counts rather than on descriptions by authors of grammars. He writes, "The rule of thumb employed is that if text counts reveal one order of a pair of elements to be more than twice as common as the other order, then that order is considered dominant...." Thus, in this particular case, Dryer counts a language as verb-initial if it is verb-initial at least two-thirds of the time in text counts.

One of the languages Dryer uses this rule of thumb to classify as verb-initial is Tohono O'odham (formerly known as Papago), a language famous among syntacticians for its freedom of word order:

O'odham (Uto-Aztecán): Hale and Selkirk (1984, 162-163)

- (65) a. Wákial 'at g wísilo cépos

cowboy AUX.3.PERF DET calf brand

'The cowboy branded the calf'

- b. Wísilo 'at cépos g wákial

- c. Cépos 'at g wákial g wísilo

Hale and Selkirk's work on O'odham prosody was part of an argument that O'odham has underlying SOV word order, with a freely available process of extraposition which sets extraposed phrases off in separate prosodic phrases¹¹. Whether or not this is the correct analysis of O'odham word order, O'odham clearly exhibits a freedom of word order which is not characteristic of the verb-initial languages discussed earlier in this chapter (e.g., Irish, Tagalog). I have no theory of word order freedom to offer here, but I will hope that such a theory, once developed, can account for languages like O'odham.

Some other languages which are listed in WALS as verb-initial but described by authors of grammars or other articles as having largely free word order are:

Anindilyakwa (Australian: Gunwinyguan): Leeding (1989)

- (66) a. mwipwina mwitjiyanga akwithangwe kimwingwirthinamwa

that.unseen boat near will.be.sinking

'That boat will be sinking' (p. 454)

- b. ana anhinga ningalyipwarnamwa ngayiwa kilhikatjawa lhikwiniyawa

this food 1.EXCL.SG.am.eating 1.EXCL.SG 1EXCL.SG.will.go-ALL last

'I am eating this food [and] I will be going later' (p. 460)

¹¹ Thanks to Stuart Davis (p.c.) for pointing this out to me.

Ignaciano (Arawakan): Ott and Ott (1967, 91)¹²

- (67) ema achane va?i maeperaika?ini mapera
he person not he.esteeem his.mount

'The man didn't care for his mount'

Northern Sahaptin (Penutian): Rude (1997)

- (68) Tílaaki i-nánan-a k'úsi-na
woman 3NOM-bring-PAST horse-OBJ

'The woman brought the horse'

Yokuts (Yaudanchi) (Penutian): Kroeber (1904, 259)¹³

- (69) ama tanit yiwin an limkin tanji
then there.from wife his prairie.falcon go

'Then the prairie falcon's wife went from there'

Some of these languages may fall under generalizations to follow later, as well, but for the time being, I will simply exclude them from the analysis, hoping that they will be captured by a future theory of free word order.

4.2.1.2 Not clearly Tense/Aspect-suffixing (8)

Four of the potentially problematic languages on the WALS list have tense/aspect morphemes that appear to be second-position clitics rather than true suffixes. Another two languages appear

¹² In fact, Ott and Ott (1967) appear to me to be saying that the order of S, V, and O is completely free. They write (p. 89), "In the following formulas, the tagmemes listed before the P tagmeme are fixed in order. The mutual order of all other tagmemes is optional." Their formula for a declarative transitive clause is then (p. 89) " \pm Intro:intro/Cl 106-107 \pm Neg:neg/Warn:warn +P tr:Vb 11 \pm O:N 3/5/7/9-11/15 \pm S:N 1-2/5 pro 5 \pm T:N 9/18/21/Cl 101-102 \pm L:N 4/11/13-15 \pm Ref:Cl 101 \pm Req:req \pm Hes:pro 10]". In this formula, P is the transitive verb, and the tagmemes listed before it are "Intro" (introductory particles with meanings like "then" and "so") and "Neg" (negation). These are the two tagmemes which should be in a fixed order, by their description; "all other tagmemes", which includes P (the verb), S, and O, are freely ordered.

¹³ Kroeger (1904, 233): "...the order of words in the Yaudanchi sentence is rather shifting. A usual order is quite perceptible, but this is often departed from. As regards the three chief parts of the sentence, the verb most frequently comes first, the subject next, and the object last."

to have free-standing tense/aspect morphemes. Two other languages have, in addition to what look like tense or aspect suffixes, other morphemes indicating tense or aspect which are either prefixes or free-standing words.

The behavior of tense/aspect-cliticizing languages teaches us that Affix-Support distinguishes between clitics and true affixes, applying only to the latter¹⁴. We might understand this, for example, as evidence for a theory of second-position clitics in which such clitics are free-standing in the syntax, and are cliticized postsyntactically, perhaps via "prosodic inversion" as in Halpern (1992) and much subsequent work. As far as Affix-Support is concerned, these clitics are free-standing morphemes.

In the four Tense/Aspect-cliticizing languages, Tense and Aspect morphemes attach to whatever is first in the clause, and while this is often the verb, it need not be, as the following examples show:

Ik (Nilo-Saharan: Eastern Sudanic): Serzisko 1992, cited in Julien (2002, 71)

- (70) a. en-ata **be** ceki-a saatso

see-3P PAST woman-ACC yesterday

'They saw the woman yesterday'

- b. na **be** ceki-a en-ie wici-a ...

when PAST woman-ACC see-SUBJC children-ACC

'When the woman saw the children...'

¹⁴ Alternatively, we might pursue a theory in which clitics and affixes are identical in requiring Support, and differ in that clitics attach to complete words, while affixes attach to parts of words. On this view, the four languages discussed in this section are languages in which tense/aspect clitics sometimes satisfy their need for Support by attaching to a completely inflected verb (which is a complete word, and therefore has the metrical structure necessary to provide Support). An affix in the same position, by contrast, would be attaching to part of a complete word (e.g., to a verb stem, or to a verb stem with some additional affixes), which would not necessarily have the required metrical structure. On this view, the requirement of Affix Support could be thought of as evidence that the narrow syntax does not perfectly represent the distinction between affixes and clitics, and tries to provide them both with metrically complete 'hosts'.

Kyuquot, Makah (both Wakashan)¹⁵: Davidson (2002, 112, 107)

- (71) a. waha•k^w='eyik=id ?a•beyuλ=°iq
go.PERF=FUT=INDIC.1PL tomorrow=ART
'We will go tomorrow'
- b. yu•q^wa•='aλ=(b)it=s dudu•k='aλ
likewise=TEMP=PAST=INDIC.1SG sing=TEMP
'I was singing too'

Northern Tepehuan (Uto-Aztecán): Bascom (1982, 280)

- (72) a. gii=á=n=tá
fell=BASE=I=COMPL
'I fell'
- b. ááni=a=n=t íí
I=BASE=I=COMPL went
'I went'
- c. káši=a=n=t íí
already=BASE=I=COMPL went
'I already went'

Nicobarese Tense morphemes appear to be free-standing:

Nicobarese (Mon-Khmer): Das 1977, cited in Julien (2002, 96)

- (73) cuel iskul cin **min** hureic
go school I FUT tomorrow
'I will go to school tomorrow'

¹⁵ These examples are Makah. Makah and Kyuquot are similar dialects of Nootka.

Kaufman (2010) argues that Garífuna tense/aspect morphemes, analyzed by Taylor (1951) as suffixes, should actually be regarded as auxiliaries. His arguments include the fact that the auxiliaries function for stress like independent words, and the fact that they can take prefixes (as in (74b), where the aspectual auxiliary *a* takes an agreement prefix *n-*):

Garífuna (Arawakan): Kaufman 2010

- (74) a. N-ari-ha **ñá**-dibu

1SG.G-see-VRBL PROG-2SG.D

'I am seeing you'

- b. Ari-ha n-**a** mesu le

see-VRBL 1SG.G-PRF cat DEF.MSC

'I already saw the cat.'

Finally, there are two languages which have, in addition to aspect suffixes, aspectual prefixes or free-standing words:

Chontal Maya (Mayan): Knowles (1984, 228, 231)

- (75) a. **muk'** ?u t'äb-o

PROG A3 climb-IMPERF.INTRANS

'He is climbing'

- b. **mu?** ?u häç'-e?-Ø

PROG A3 hit-IMPERF.TRANS-B3

'He is hitting it'

- c. **?a** k'ot-Ø-on

ASP arrive-PERF.INTRANS-B1

'I already arrived'

- d. **?a** kä k'uš-i-Ø

ASP A1 eat-PERF.TRANS-B3

'I had already begun eating it'

Gude (Chadic): Hoskison (1983, 82)

- (76) **kə** kii Musa faara

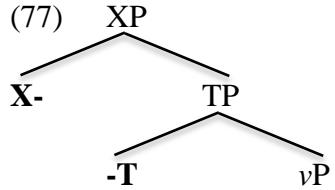
PERF throw-PERF Musa stone

'Musa threw a stone'

4.2.1.3 "Tense/Aspect" arguably not the highest affix (3)

Three of the languages in the problematic list are indeed verb-initial, and do indeed have suffixes that are labelled by grammars as reflecting tense or aspect, but also have verbal prefixes that can be argued to be higher than the problematic tense/aspect suffixes. Recall that the prediction of this theory is just that verb-initial word order should be impossible if the highest affix is a

metrically dependent suffix; lower suffixes might cause phrases to move in the course of the derivation, but the verb may then move past them to pick up the higher affixes:



In the abstract tree in (77), suffixed T might cause movement to the specifier of TP, but the verb may be forced to raise past T to pick up the affixal head X, and since X is a prefix and needs no Affix Support from a specifier, the result will still be verb-initial word order. The three languages in this category are Bella Coola (Salish) and the two Celtic languages Welsh and Breton.

WALS lists Nater (1984, 60) as its source for the claim that tense and aspect morphemes are suffixes in Bella Coola. Nater does list a number of Bella Coola suffixes, some of which have names that look like good names for aspects (including *inchoative*, *habitual*, *predilectional*, and *desiderative*). However, these suffixes often have fairly limited distributions, and combine semantically in idiosyncratic ways, which suggests that they may be derivational, rather than inflectional. Here, for example, is part of Nater's (1984, 72) description of the meaning of the suffix *-anm* 'inchoative':

When affixed to verbo-adjectival statives, -anm is glossed as to become increasingly Xer: scamn to get worse and worse, to wear out (sc bad).... When following a verbal base that describes a seasonal, routinely, or regularly performed activity, -anm means it is time for one to X, one must go Xing now: 7ilhtsayanmts it is (the) time (of the year) for me to (start) pick(ing) berries (7ilh-tsay), 7alhpsanmts I must eat (7alhps) now.

And here is Nater's (1984, 73) description of the habitual suffixes:

The habitual suffixes -t-nm₂ and -nm₂ are affixed to transitive performative bases.

The majority of the resulting complex verbs typically expresses communal-
benefactive activities (often prolonged): to X with or for the benefit
(entertainment) of other individuals... and often describe some household or other
routinely performed act, occupation, profession, or a specific role in a competitive
game or contest.... -t-nm₂ appears only in the following items: tslhtnm "to break
(tslh) the string" = to (be the) win(ner) in a race... sp-alustnm to be splitting wood
(-alus) (sp' to hit something with an object)... -nm₂ is more productive than -t-
nm₂: mnts'-aqw'snm to crush, squeeze berries (to extract the juice) (mnts'aqw's' to
squeeze berries)... qat'iixwnm 'to pull towards oneself (qat') plant tops (-iixw)" =
to be picking elderberries, sp'lxsnm 'to be hitting (sp') the end (-lxs)" = to hit the
Morse key, wire a telegram, (use the) telephone...

These seem like excellent descriptions of derivational morphology; the suffixes are often limited
in the range of verbs with which they combine, and combine with them semantically in
idiosyncratic and non-compositional ways. By contrast, Bella Coola also has aspectual prefixes,
one of which Nater (1984, 96-97) describes as follows:

7alh- stative-progressive ... Before predicates (inflected verbs), 7alh- conveys
progressivity - to be Xing: 7alh7ayutsmtim somebody was telling (7ayutsm) them
to..., 7alhpik'm sparks are flying around √pik' to shine, glitter, spark),
7alhp'uyaax (tree) lies fallen (p'uyaax).

This description of the stative-progressive prefix 7alh- looks much more like a description of an
inflectional affix; there is no mention of lexical idiosyncracy, and the meaning of the prefix

appears to be completely straightforward. In the case of Bella Coola, then, I think we are justified in suspecting that the aspectual prefixes are more inflectional, and hence higher, than the aspectual suffixes. The fact that Bella Coola is verb-initial is therefore expected; its highest affixes are prefixes.

Welsh verbs do have tense suffixes. They are also optionally preceded by particles, boldfaced in the examples below, which indicate, among other things, negation, affirmation, and clause type:

- (78) a. **Mi** welais i Siôn (Roberts (2005, 120))
AFF saw-1SG I John
'I saw John'
- b. **Ni** ddarllenodd Emrys y llyfr
NEG read Emrys the book
'Emrys didn't read the book'
- c. y dynion [**a** ddarllenodd y llyfr]
the men REL read the book
'the men who read the book'
- d. Dw i 'n meddwi [**y** dylech chi ddeud wrtho fo]
am I ASP think DECL ought you say to-3SG he
'I think you ought to tell him'

These particles trigger various changes to the initial consonant of the following verb (known in the Celtic literature as 'mutations'), which become optional if the particles are dropped (though it is apparently becoming common to retain the mutations even if the particles are missing (King 2003, 1985)):

- (79) a. Collodd e'r arian
 lost-3SG he-the money
 'He lost the money'
 b. Gollodd e'r arian?
 SOFT.MUTATION-lost-3SG he-the money
 'Did he lose the money?'
 c. Cholles i ddim byd
 ASPIRATE.MUTATION-lost-1SG I not anything
 'I didn't lose anything'

If we can regard these mutations as mutation-causing prefixes, then the facts are accounted for.

Welsh verbs routinely begin with prefixes; as long as these prefixes are structurally higher than Tense, then the fact that Welsh is verb-initial is no surprise on the theory developed here.

This analysis of Welsh can be extended to the related language Breton. Breton is in fact verb-initial only in embedded clauses; in matrix clauses it is V2 (Schafer 1995, 141, 136):

- (80) a. [Ar vugale] **o** deus gwalc'het ar wetur dec'h
 the children PRT have.3PL washed the car yesterday
 'The children washed the car yesterday'
- b. [Ar wetur] **o** deus ar vugale gwalc'het dec'h
 the car PRT have.3PL the children washed yesterday
 'The children washed the car yesterday'
- c. [Dec'h] **o** deus ar vugale gwalc'het ar wetur
 yesterday PRT have.3PL the children washed the car
 'The children washed the car yesterday'
- d. [Gwalc'hin ar wetur] **o** deus graet
 wash the car PRT have.3PL done
 'They really did wash it'

- (81) a. Kredin ran [**en** deus aret Yann e bark] (Schafer 1995, 136)
 believe do.1SG PRT have.3M plowed Yann his field
 'I believe that Yann has plowed his field'
- b.* Kredin ran [[Yann] **en** deus aret e bark]
 believe do.1SG Yann PRT have.3M plowed his field
 'I believe that Yann has plowed his field'

Just as in Welsh, the Breton verb is preceded by a variety of particles (*o* and *en* in the above examples) which trigger mutations at the beginning of the verb. Again, if we analyze these mutations as prefixes, then we correctly expect Breton to lack EPP effects.

4.2.1.4. Exhibit possible EPP effects (10)

Ten of the languages under investigation here can be seen as obeying the EPP, albeit via unorthodox means. The language that demonstrates this most clearly is Yagua, a Peba-Yaguan language of Peru. The information discussed here is drawn from Payne and Payne (1990).

Yagua does have suffixal tense, and as we will see, it is generally verb-initial, though phrases can be fronted for emphasis. Yagua has two kinds of verbal agreement, which Payne and Payne (1990) refer to as Set I and Set II. In transitive clauses, Set I agrees with the subject, and Set II with the object. Set I morphemes precede the verb, while Set II agreement encliticizes to whatever is immediately before the object (Payne and Payne 1990, 255):

- (82) a. siimiyi Alchíconíí quiivq
sa-jimiyi Alchíco-níí quiivq
3sg.I-eat Alchíco-3sg.II fish
'Alchíco is eating the fish'
- b. siimiyi sinumuníí quiivq
sa-jimiyi sinu-mu-níí quiivq
3sg.I-eat land-LOC-3sg.II fish
'He is eating the fish on land'

In the examples in (82), the object *quiivq* 'fish' controls 3rd person singular Set II agreement, which encliticizes in (82a) to the subject, and in (82b) to a locative. In both examples, the verb begins with a Set I marker agreeing with the subject, which has *sa-* as its underlying form.

Intransitive clauses in Yagua come in two classes. Some have only Set I agreement:

- (83) a. **sa**-muráyá Manúngó
 3sg.I-sing.to.call.spirits Manúngó
 'Manúngó is singing to call the spirits'
- b. Manúngó muráyá
 Manúngó sing.to.call.spirits

Example (83b) illustrates fronting of the subject for emphasis; note that the Set I marker agreeing with the subject vanishes if the subject is fronted. To put this another way, the verb in (83) is always preceded either by a Set I marker or by the subject (but not by both).

Another class of intransitive verbs have only Set II agreement (Payne and Payne 1990, 256):

- (84) múa'y júyñíí
 múa'y júyñ-**níí**
 there fall-3sg.II
 'There he falls'

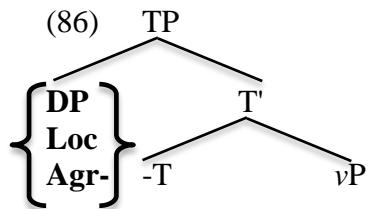
Payne and Payne (1990, 257) note that verbs in clauses with only Set II agreement "...are most commonly preceded by a locative demonstrative diíy 'there (near)', jásiy 'there (yonder),' or múa'y 'there (distant)'. Examples like [(84)] were judged ungrammatical without the initial locative."

Payne and Payne note that there are some examples of this kind that are acceptable without these locatives; one such example is given in (85):

- (85) siimyaasiy sūṣíjyùnī
 siiy-maasiy **sa-jusiy-jù-ní**
 run-go.out 3sg.I-behind-ADLAT-3sg.II
 'He runs out behind him'

In (85), the Set II marker agreeing with the null subject is attached to an adpositional phrase, which itself bears Set I agreement with its null complement. The verb itself is apparently a serial verb. Examples like this, which are apparently in the minority in the class of clauses with main verbs that bear only Set II marking, clearly deserve further study.

Putting this class of examples aside, it looks as though Yagua verbs are generally preceded either by a full DP (as in example (83b) above), or by a locative expression (as in example (84)), or by a Set I agreement morpheme (as in (83a)). We could understand this as meaning that Yagua does in fact have a kind of EPP, which can be satisfied by DPs, expletives, or agreement proclitics:



Here, again, we see that the level at which Affix Support applies is not the final phonological representation. Yagua proclitics are not particularly metrically robust; as a glance through the Yagua examples will show, they are often reduced to a single consonant at the beginning of the verb. If this phonological reduction takes place postsyntactically, however, then the facts are not so difficult to explain; Affix Support makes reference to a representation in which clitics are free-standing morphemes, capable of occupying the specifier of TP and satisfying T's need for Affix Support.

Yagua is one of ten languages in the WALS database that lend themselves to this kind of analysis, though none of them support it as dramatically as Yagua does. In Goajiro (Arawakan) for example, Holmer (1949) recognizes two major types of tensed indicative verb. What he calls the 'finite indicative' is only possible for transitive verbs, and involves obligatory agreement morphemes which precede the verb (Holmer 1949, 148)

- (87) a. **t**-er-e•-či

1SGSUBJ-see-FUT-3MSGOBJ

'I will see him'

- b. **pu**-tūk-ir-e•-ra

2SGSUBJ-sleep-CAUS-FUT-3FSGOBJ

'You will put her to sleep'

What Holmer calls the 'participial' form can appear with both transitive and intransitive verbs, and lacks a pronominal prefix, but must always prefix *a-* (Holmer 1949, 149):

- (88) a. **a**-sə-š taya wə̃

PART-drink-DUR I water

'I drink water'

- b. **a**-ukt-e•-č

PART-die-FUT-3MSG

'He will die'

Thus, all of these verbs are preceded, either by an agreement proclitic, or by the participial-forming *a-*. If these are all proclitics capable of satisfying the EPP, then Goajiro's verb-initial nature is predicted.

In Karimojong (Nilo-Saharan (Eastern Sudanic)), Lesley-Neuman (2007, 15) remarks that "[t]he Karimojong verb has two prefix slots before the stem, and three suffix slots following it. The first prefix slot, occupied by either a pronominal prefix or an infinitive prefix, is obligatory." A couple of examples are given below (Lesley-Neuman 2007, 9, 25):

- (89) a. à-dòŋ-i
 3SG-pinch-IND.ACT.PAST.PROG
 'He was pinching'
 b. àkà-limókìn-ì aeoŋ ij óŋ
 1SG.2SG-tell-IND.FUT I you.SG
 'I will tell you'

Again, if we analyze these morphemes as agreement proclitics, we can understand them as satisfying the EPP, as in Yagua.

Other examples that lend themselves to this kind of treatment are exemplified below:

Barbareño Chumash (Chumash): Beeler 1976, 263-4

- (90) a. k-iwa-uliš
 1-a.while-hold
 'I will hold it for a while'
 b. s-iy-qili-toxš liy'al'ališaw
 3-PL-HABIT-fight every.day
 'They used to fight every day'

Nahuatl (Huasteca) (Uto-Aztecán): Beller and Beller 1979, 288

- (91) **ni-h-cayana-s** no-yoyo
1SG-3INAN-tear-FUT my-clothes
'I will tear my clothes'

Nahuatl (Michoacán) (Uto-Aztecán): Sischo 1979, 354

- (92) **ni-h-koč-ti-aya**
I-him-sleep-CAUS-PAST
'I put him to sleep'

Pipil (Uto-Aztecán): Campbell 1985, 56

- (93) **ti-nech-ita-k**
you-me-see-PAST
'You saw me'

Baure (Arawakan): Danielsen 2007, 256

- (94) a. **ro-moroko-w**
3SG-dry-COP
'It is dry'
b. **ro-moroko-wapa**
3SG-dry-CHANGEOFSTATE
'It is drying'
c. **ro-moroko-pa**
3SG-dry-GO
'It is going to be dry'

In Wembawemba (Australian (Pama-Nyungan)), the obligatory agreement morpheme is not a proclitic, but a second position clitic. Again, as long as the clitic's second position placement is postsyntactic, we can rely on it to satisfy T's need for Affix Support in the narrow syntax (Hercus 1986, 51-3):

- (95) a. dag-in-**anda** ginmer bemben̩gug biøl-u djelig-djelig (p. 51)
hit-PAST-1SG.SUBJ these children stick-ERG yesterday

'I hit these children with a stick yesterday'

- b. wemba-**nda** nja-in manjam djelig-djelig (p. 52)
not-1SG.SUBJ see-PAST him yesterday

'I didn't see him yesterday'

- c. winjar-**ar** njembar-a (p. 53)
who-2SG.SUBJ await-PRES

'Who are you waiting for?'

The Warrnambool language (Australian (Pama-Nyungan)) was closely related to Wembawemba, and is known to us only from nineteenth-century documents. Blake (2003, 38-39), in a study of those documents, concludes that Warrnambool agreement was probably like Wembawemba agreement in the relevant respects:

- (96) a. Parta-n-**u** kuramuk
kill-PAST-1 possum
'I killed a possum'
b. Nhunambi-**war** wakumba-n
those-2PL go.away-PAST
'You all went away'

4.2.1.5 Roots with metrical structure (4)

Four of the languages in the above list are arguably like Seri, Italian, Spanish, and Catalan, in that tense suffixes are reliably preceded by metrical structure, either because the verb root itself has metrical structure or because the tense suffixes are associated with metrical boundaries of their own.

Matras (1999, 13) reports that stress on verbs in Domari (Indo-European (Indic)) is reliably on the syllable before certain suffixes, which include the tense suffixes:

- (97) a. lahed-óm

saw-1SG

'I saw'

- b. lahed-óm-a

saw-1SG-PRET

'I had seen'

Domari verbs, then, are arguably like Spanish, Italian, and Catalan verbs, in that their Tense suffixes are reliably preceded by metrical boundaries.

According to Willett (1991, 21-22), Southeastern Tepehuan (Uto-Aztecán) verbs are stressed on the first syllable of the verb stem, or on the second syllable if this syllable is heavier than the first:

- (98) va-hi-tšu-ñ-?áa.gi-?ñ

RLZ-INC-EXT-1SOBJ-speak-to

'He then began speaking to me'

Willett emphasizes that the rule for stress makes crucial reference to the boundary between the stem and any prefixes. Southeastern Tepehuan is therefore like Seri; the verb stem itself has metrical structure, and can satisfy T's need for Affix Support via head-movement.

Finally, Wichmann (1995, 189) describes a shared innovation among the Zoquean languages, one which distinguishes them from their Mixe relatives; the Zoquean languages reliably place stress on the "rightmost lexical morpheme of the word string", with the effect that verbs are always stressed on the last syllable of the stem. Copainalá and Ostuacan Zoque (Mixe-Zoque), then, are like Seri and Southeastern Tepehuan, and unlike languages like French and English, in that the verb stem may be associated with metrical structure immediately upon insertion, and hence can satisfy T's need for Affix Support.

4.2.1.6 The mysteries (3)

Three languages require further study. They are listed below:

(99)

Kipea	Macro-Ge (Kariri)
Costanoan	Penutian
Chontal (Huamelultec Oaxaca)	Tequistlatecan

These are all languages for which I have not yet found enough information to determine whether they conform to the theory developed here.

4.2.2 Overview

I began the discussion of the verb-initial languages by noting that the numbers looked unfortunate for the theory developed here. That theory predicts that there should be some correlation between whether the structurally highest affix on the verb is a prefix or a suffix and whether the language exhibits EPP effects or not. The numbers WALS offered us seemed not to bear out that theory; in particular, there was a surprisingly large number of languages that were

described as verb-initial and tense-suffixing. I have tried to show that in fact, these languages are consistent with the theory developed here. We have seen instances of languages which are arguably not truly verb-initial; languages in which tense and aspect morphemes are not truly suffixes (but rather clitics, or free-standing morphemes); languages in which the verb appears to raise past the Tense/Aspect suffix to a higher prefix; languages in which Affix Support is satisfied by an agreement clitic; and languages in which the potentially offending suffix receives Affix Support from a verb-internal metrical boundary. 30 of the potentially problematic 33 verb-initial languages have been explained. The 33 languages are listed again here, ordered by solution:

(100)

Kipea	Macro-Ge (Kariri)	??mystery
Costanoan	Penutian	??mystery
Chontal (Huamelultec Oaxaca)	Tequistlatecan	??mystery
Ik	Nilo-Saharan (Eastern Sudanic)	clitic tense
Tepehuan (Northern)	Uto-Aztecán	clitic tense
Kyuquot	Wakashan	clitic tense
Makah	Wakashan	clitic tense
Warrnambool	Australian (Pama-Nyungan)	EPP-satisfying agreement clitic
Wembawemba	Australian (Pama-Nyungan)	EPP-satisfying agreement clitic
Baure	Arawakan	EPP-satisfying proclitics
Goajiro	Arawakan	EPP-satisfying proclitics
Chumash (Barbareño)	Chumash	EPP-satisfying proclitics
Karimojong	Nilo-Saharan (Eastern Sudanic)	EPP-satisfying proclitics
Yagua	Peba-Yaguan	EPP-satisfying proclitics
Nahuatl (Huasteca)	Uto-Aztecán	EPP-satisfying proclitics
Nahuatl (Michoacán)	Uto-Aztecán	EPP-satisfying proclitics
Pipil	Uto-Aztecán	EPP-satisfying proclitics
Garífuna	Arawakan	free-standing aspect morpheme
Gude	Chadic	free-standing aspect morpheme
Chontal Maya	Mayan	free-standing aspect morpheme
Nicobarese (Car)	Mon-Khmer	free-standing aspect morpheme

Ignaciano	Arawakan	not V-initial
Anindilyakwa	Australian (Gunwinyguan)	not V-initial
Sahaptin (Northern)	Penutian	not V-initial
Yokuts (Yaudanchi)	Penutian	not V-initial
O'odham	Uto-Aztecán	not V-initial
Breton	Indo-European (Celtic)	prefixes higher than T/Asp
Welsh	Indo-European (Celtic)	prefixes higher than T/Asp
Bella Coola	Salishan	prefixes higher than T/Asp
Domari	Indo-European (Indic)	tense attached to metrically structured verb
Zoque (Copainalá)	Mixe-Zoque	tense attached to metrically structured verb
Zoque (Ostuacan)	Mixe-Zoque	tense attached to metrically structured verb
Tepehuan (Southeastern)	Uto-Aztecán	tense attached to metrically structured verb

The status of clitics has played an important role in the above explanations. We have seen evidence that Affix Support applies to a representation in which clitics are free-standing words. Tense/Aspect clitics proved not to be subject to Affix Support (in section 4.2.1.2), and agreement proclitics and second position clitics were capable of providing Affix Support for other morphemes (in section 4.2.1.4). Again, we can take this as evidence that Affix Support is not concerned with the final phonological representation, but with an earlier representation in which cliticization has not yet applied.

4.3 Final Score

The theory developed here appears to make accurate predictions for 431 of the 445 verb-peripheral languages in WALS for which Tense/Aspect is listed as a prefix or a suffix:

- (101) *accounted for:* 362 SOV languages with tense suffixes,
 8 SOV languages with metrically independent tense prefixes,
 31 verb-initial languages with tense prefixes, and
 30 "explicable" verb-initial languages with tense suffixes.

still mysterious: 11 SOV languages with tense prefixes, and
 3 verb-initial languages with tense suffixes.

The theory therefore accounts for roughly 97% of the verb-peripheral languages in the database. Moreover, the rates of success for SOV and for verb-initial languages are not statistically significantly different ($p \approx 0.4$).

I mentioned in section 2.2.1 above a prediction for verb-final, tense-suffixing languages; we predict that such languages should have EPP effects of the kind that Miyagawa (2001) discovered for Japanese, unless their suffixes receive Affix Support from word-internal metrical boundaries. Since such effects are quite difficult to discover, I will leave this prediction untested for now.

Another task for future work will be to subject the "unproblematic" languages in the database (that is, the SOV languages with tense suffixes, and the verb-initial languages with tense prefixes) to the same kind of scrutiny that I have used on the "problematic" languages. Readers of section 4.2 above might be forgiven, at this point, for wondering whether the various proposals for accounting for "problematic" verb-initial languages might not just be properties of verb-initial languages generally. In fact, they appear not to be; the WALS database does contain verb-initial tense-prefixing languages which lack the various characteristics described in section 4.2. Consider, for example, the Austronesian language Rukai (Zeitoun 2007, 26):

- (102) a. o-kane velevele tamatama
 DYN.FIN-eat banana middle.aged.man
 'The middle-aged man is eating/ate a banana'
- b. o-kane tamatama velevele
 DYN.FIN-eat middle.aged.man banana
 'The middle-aged man is eating/ate a banana'

Zeitoun (2007) confirms that Rukai is indeed a verb-initial language (unlike the languages in 4.2.1.1), with true tense prefixes (4.2.1.2) which appear to be the highest affixes on the verb (4.2.1.3). It lacks any agreement morphology on the verb that could plausibly be taken to offer Support to affixes (4.2.1.4), and stress is generally word-initial, rather than being conditioned by any metrical boundaries (4.2.1.5). If Rukai were a tense-suffixing language, the theory as it stands would be unable to account for it. As it happens, the language is tense-prefixing, and the Tense morpheme can therefore receive Support from material in its complement.

I have not yet considered the "unproblematic" languages in depth, in part because I believe they should not raise many new theoretical problems, though they certainly might change the statistical conclusions. For instance, recall from section 4.2.1.1 above that I excluded from consideration some of the languages described in WALS as verb-initial, arguing that they were in fact languages with relatively free word order. Careful study of the 31 languages described by WALS as verb-initial and prefixing might turn up further examples of this type; this would change the numbers listed in (93), but would pose no new problem for the theory developed here.

5. Supporting X from outside XP

I have assumed without discussion in this chapter that affixes must be Supported within their maximal projection; all the examples discussed have either involved Support, on the one hand,

by a metrical boundary within the word of which the affix is a part, or on the other hand, by the complement or specifier of the affix.

Kučerová (2005, 2009) discusses a class of auxiliaries in Czech that cannot be initial:

- (103) a. ***Jsem** mluvil s Lucií. [Czech]

AUX-PAST.1SG talked.PCPL with Lucie

'I talked to Lucie'

- b. Včera **jsem** mluvil s Lucií.

yesterday AUX-PAST.1SG talked.PCPL with Lucie

'Yesterday I talked to Lucie'

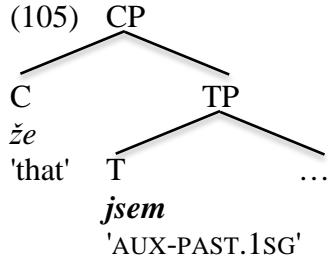
Contrasts like the one in (103) are certainly reminiscent of Affix Support, and Kučerová posits a condition not unlike Affix Support that requires that the tree be extended beyond T (her T-Extension Condition). She crucially notes, however, that her condition can be satisfied by a complementizer, since examples like (103a) become well-formed if embedded:

- (104) Petr ví, že **jsem** mluvil s Lucií.

Petr knows that AUX-PAST.1SG talked.PCPL with Lucie

'Petr knows that I talked to Lucie'

If we are to understand Kučerová's examples in terms of Affix Support (perhaps as being triggered by an affix in the auxiliary), then examples like (104) apparently require us to regard structures like (105) as providing the auxiliary with support:



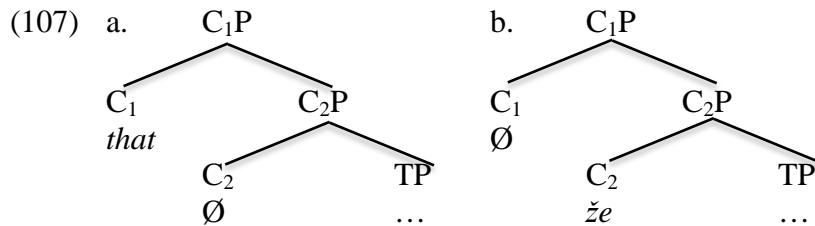
In a sense, it should not be surprising for examples like (105) to be well-formed. The derivation of (105) involves an operation of External Merge, immediately after the affix in T is introduced, of a morphologically complete word that precedes T. We could stipulate, of course, that the structure is nevertheless unacceptable because the Merged word is not in TP, but the Czech data suggest that we ought not to make such a stipulation.

Some distinction must nevertheless be drawn, however, between Czech and a language like English:

- (106) *I think that arrived a man.

English *that*, unlike Czech *že*, seems to be unable to supply Support to T. Why is this?

I will have to leave the answer to this question a mystery for now. One possibility is that the difference between English and Czech has to do with the fine structure of their CP domains¹⁶. Assuming that CP may safely be 'split' into at least two projections, it might be that English *that* heads a higher CP projection, while Czech *že* heads a lower one:



¹⁶ Another possible kind of account might make use of Pesetsky and Torrego's (2001) proposal that English *that* actually moves from T to C; on this account, English C is occupied by an affix, which acts as a landing site for this head-movement, and which would be unacceptable as a Supporter at the point at which it is Merged. For this account to be correct, it would be crucial that Czech *že* differ from English *that* in this regard.

If C_2 is reliably null in English, then the fact that it is null ought to be the kind of fact that the grammar has access to (not unlike the fact that T is reliably a suffix in English), and hence the grammar should not regard C_2 as adequate Support for T. Note that C_2 differs in this regard from, for example, pro-dropped subjects in Finnish (see section 2.1.2.2); Finnish DPs are sometimes overt and sometimes (when pro-dropped) null, while C_2 is, by hypothesis, always null. At the moment, however, I have no evidence that English *that* and Czech *že* are realized in different functional heads, and I will therefore leave the matter here.

6. Conclusion

I began this chapter by considering some variation in the distribution of classic EPP effects:

- (108) a. There arrived a man. [English]
b. Il est arrive un homme. [French]
- (109) a. É arrivato un uomo. [Italian]
b. Apareció un hombre. [Spanish]
c. Va venir un home. [Catalan]

I have argued that this variation masks a deeper uniformity; affixal heads, very generally, are subject to a universal requirement of Affix Support:

(110) **Affix Support**

If a head is an affix, there must be a metrical boundary in the direction in which it attaches.

We have seen that objects that can satisfy this requirement include maximal projections, word-internal metrical boundaries, and agreement clitics.

Affix Support has different effects in different languages, and the classic EPP represents one way in which it can be satisfied. Cross-linguistic variation is a matter of parameters

referring to directly observable properties: whether an affix is a prefix or a suffix, how stress is assigned within the verb, the presence or absence of obligatory agreement proclitics, and head direction.

At what point in the derivation does Affix Support apply? We have seen evidence from a variety of sources that Affix Support should not constrain the final phonological representation. Lexical idiosyncracies, such as irregular stress placement in certain Spanish verbs, or in athematic Russian verbs (both from section 2.1.2.1) are apparently invisible to Affix Support; moreover, Affix Support seems to apply before clitics have become metrically dependent.

We have also seen evidence that Affix Support applies at intermediate points in the syntactic derivation. This was the case in examples like the ones in (111):

- (111) a. Did **there** arrive a man?
- b. Th-ioc-f-adh **leis** a bheith ag cur [Irish]
PAST-come-IRR-AGR to.it to.be raining
'It could be raining'

The examples in (111) both feature expletives that are inserted to satisfy Affix Support for morphemes which subsequently undergo head-movement past them. In the English example in (111a), the suffix in T triggers insertion of the expletive, and then undergoes head-movement to C; in Irish, one of the suffixes on the verb forces insertion of an expletive, and then the verb moves past this expletive to a higher head.

We cannot account for these facts by confining Affix Support to a representation in which head-movement has not applied (perhaps by making head-movement post-syntactic, and applying Affix Support in the syntax). As we saw in the discussion of Seri in section 4.1, and of Southeastern Tepehuan and the Zoquean languages in section 4.2.1.5, there are languages in

which it is the verb itself that bears the metrical structure necessary to satisfy Affix Support; these are languages in which the rules for stress placement make crucial reference to the verb stem, and in which metrical structure can therefore be assigned to the verb stem as soon as it is inserted in the structure. Affix Support must refer to a representation that is the result of head movement, since it is the movement of the verb in languages like Seri that provides support to the affixes.

The Irish and English data in (111) lend themselves to an account in terms of opacity arising from a cyclic derivation. Given that Affix Support sometimes appears to drive movement operations that affect the semantic representation (that is, given that A-movement sometimes has effects on binding and scope), we must apparently equate this cyclic derivation with the narrow syntax. On this view, Affix Support applies in the narrow syntax; a particular affix may force insertion of an expletive into its specifier, with subsequent head-movement erasing the configuration that triggered insertion of the expletive.

This account requires us to posit a narrow syntax that contains certain kinds of information about phonology. In particular, the syntactic representation must contain information about properties which hold generally of classes of heads; it must know, for example, that certain heads are generally prefixes or suffixes, and it must be aware of generalizations about word-internal metrical boundaries that make reference to particular syntactic categories (generalizations like "the Tense suffixes in this language are generally preceded by a metrical boundary"). On the other hand, lexically idiosyncratic information (like "this particular Russian verb lacks a theme vowel") is apparently absent in the narrow syntax.

We are thus left with a picture of the derivation that resembles the Distributed Morphology notion of Late Insertion, with an additional wrinkle. In a model that incorporates

Late Insertion, the syntactic tree is to be built without any phonological information in it; a terminal node like T, for example, is simply a syntactic object. Now, where does this syntactic object come from?

It could be, of course, that this terminal node is drawn from some universal bank of possible syntactic terminal nodes. This would be consistent with believing, for example, that every language has the same terminal nodes in its trees. But this is not obviously true, given the wide cross-linguistic variety of richness of morphology; it seems reasonable to think that languages could vary in whether, for example, their trees contain a T node at all (or an Evidential node, or an Honorific node, just to name two other nodes that are not obviously universal).

We might entertain the possibility, then, that construction of the syntactic tree, even prior to lexical insertion, does involve some consultation of the lexicon, just in order to find out which syntactic nodes to insert. If Late Insertion is on the right track, then this "shallow" lexical access might not extend to actually picking particular lexical items; the grammar simply checks the lexicon to make sure that it ought to insert, for instance, heads with the label 'T'. What the facts discussed here seem to lead us to conclude is that in the course of checking to make sure that the lexicon contains nodes with the label T, the grammar also accesses, and inserts into the representation, facts which typically hold of such nodes. In Spanish, for instance, the grammar apparently inserts into the syntactic representation the information that T is a suffix preceded by a metrical boundary¹⁷.

The result is a narrow-syntactic representation that contains certain types of phonological information--but, crucially, only those types of phonological information that are entirely predictable from the syntax (for instance, the fact that if a Spanish morpheme has the syntactic

¹⁷ See Bye and Svenonius (2010) for another model in which lexical access takes place in two stages (though they argue that the first stage should lack any phonological information).

label T, it is a suffix preceded by a metrical boundary). Information that is not predictable from the syntax (for instance, the segmental information associated with particular lexical items) is not present in the syntax, and the syntax therefore cannot make reference to it.

Also introduced in this chapter was the operation of Untethering, which will play a crucial role in coming chapters. Untethering applies immediately after a head has been Merged, and eliminates the ordering statements that order the head with its complement:

(112) Untethering

Given two sisters, X and Y, delete all ordering statements which refer to either X or Y. We will see in chapter 4 that Untethered heads typically become final. Untethering was an important part of the account of EPP effects in head-final languages; it prevented suffixal T from relying on any part of its complement for Support, thus allowing head-final languages to exhibit EPP effects.

Chapter 3: Match Theory and Contiguity

In Richards (2010) I proposed a way of predicting whether a given language would move its wh-phrases or leave them in situ. The basic idea was that wh-phrases must universally be connected prosodically with the C that Agrees with them¹⁸ and that movement is one way of creating the relevant prosodic connection; whether a language moves its wh-phrases or not, on this account, follows largely from how its prosody is organized. In this chapter I will modify this proposal, both to improve its coverage of a certain class of languages that were poorly covered by the original proposal, and to make it compatible with a recent theory of prosody known as Match Theory. In Chapter 4, I will go on to propose that the condition described here holds, not only for C and wh, but for Probes and Goals more generally.

Section 1 will be a review of Richards (2010). In section 2, I will modify this proposal to make it compatible with Match Theory, an approach to prosody developed in Selkirk (2009, 2011) and subsequent work. One of the tasks of this section will be to develop a version of the conditions on the prosody of wh-questions, and the prosodic means of satisfying these conditions, which can be expressed in Match Theory. Section 3 will offer a second means of satisfying the prosodic conditions on questions, based on facts from Basque and Georgian. Section 4 will conclude.

1. Prosody and wh-questions

The central proposal of Richards (2010: chapter 3) is that wh-questions are universally subject to the following prosodic requirement:

¹⁸ For a similar idea, see Hirotsu (2005).

- (1) Given a wh-phrase α and a complementizer C where α takes scope, α and C must be separated by as few Minor Phrase boundaries as possible, for some level of Minor Phrasing.

Language variation involves two binary parameters: languages may have head-initial or head-final C, and they may place prosodic boundaries that define a level of phrasing sometimes called the Minor Phrase at either left or right edges of maximal projections. In positing this second parameter, I followed Selkirk (1984) and much subsequent work; the job of section 2 will be to change the proposal to make it consistent with Match Theory, which denies the existence of parameters of this kind.

Consider, for instance, a language in which the complementizer is initial, and Minor Phrase boundaries are placed at Right edges of maximal projections:

- (2) C DP) DP) whP

I proposed that a language like this can satisfy the requirement in (1) by creating a higher level of Minor Phrasing, on which C and the wh-phrase are not separated by any Minor Phrase boundaries. I offered the following general algorithm for creating such larger Minor Phrases:

- (3) a. For one end of the larger Minor Phrase, use a Minor Phrase boundary which was introduced by a wh-phrase.
 b. For the other end of the larger Minor Phrase, use any existing Minor Phrase boundary.

Applying the algorithm in (3) to the representation in (2), we can create a larger Minor Phrase that has the right edge of the wh-phrase as one of its edges, and the beginning of the sentence as the other edge:

(4) C DP) DP) whP)

The language in (4) can therefore satisfy the requirement in (1) by manipulation of prosody, creating a Minor Phrase that contains both the C at the beginning of the sentence and the wh-phrase. I argued that Chichewa was an example of a language of this type.

By contrast, imagine a language which, like Chichewa, has head-initial C, but has Minor Phrase boundaries at Left edges of maximal projections:

(5) C (DP (DP (whP

A language like this could not connect a wh-phrase with the complementizer at the beginning of the clause using the algorithm in (3). By promoting the boundary projected by the left edge of the wh-phrase to the higher level of phrasing, the language would succeed only in connecting the wh-phrase prosodically to the end of the sentence, which is not where C is in this language:

()

(6) C (DP (DP (whP

This kind of language therefore cannot satisfy the prosodic conditions on wh-questions simply by manipulating prosody; it must, instead, move its wh-phrases:

(7) (whP C (DP (DP)

By moving the wh-phrase to the beginning of the clause, the language causes the wh-phrase and the complementizer to be in the same Minor Phrase. A language of this kind therefore exhibits obligatory wh-movement. I argue in Richards (2010) that Tagalog is this type of language.

The other two logically possible languages in this typology both have head-final C. The first is the mirror image of Chichewa; a language in which C is final and Left edges of maximal projections are associated with Minor Phrase boundaries:

- (8) (DP (whP (DP C

Like Chichewa, this language can leave wh-phrases in situ, connecting them with clause-final C by directly changing the prosodic representation:

([])

- (9) (DP (whP (DP C

By projecting onto a higher level of phrasing the Minor Phrase boundary projected by the wh-phrase, this language creates a larger Minor Phrase that contains both the wh-phrase and C. I argue in Richards (2010) that Japanese is a language of this kind.

Finally, we can imagine a language that is the mirror image of Tagalog. Such a language would have head-final C, and would mark Right edges of maximal projections with Minor Phrase boundaries:

- (10) DP) whP) DP) C

We would expect this kind of language to be like Tagalog, in that it should not be able to simply leave wh-phrases in situ and connect them with the clause final C prosodically. Simply applying the algorithm for creating larger Minor Phrases would not improve the structure prosodically:

[])

- (11) DP) whP) DP) C

Thus, we expect this language to employ movement to improve the prosodic structure of the question. If we assume for now¹⁹, following Kayne (1994), that specifiers are uniformly on the left, then the language cannot move the wh-phrase to the end of the clause, following C; such a

¹⁹ We will revisit this conclusion in section 7 of chapter 5.

move would be prosodically perfect but is apparently syntactically ruled out. The best this language can do, then, is to arrange for the wh-phrase not to be separated from C by any phrases:

- (12) DP DP whP C

In (12), the wh-phrase is only separated from C by one Minor Phrase boundary, namely the one it projects itself. Apparently this is the best this kind of language can do, and the requirement that the language make the number of Minor Phrase boundaries between the wh-phrase and C as small as possible is therefore satisfied. I argue in Richards 2010 that Basque is a language of this kind.

In general, then, the proposal in Richards 2010 yields a typology with four kinds of languages. The two binary parameters, again, are whether C is on the left or the right edge of the clause, and whether Minor Phrase boundaries are associated with left or right edges of maximal projections. If these parameters have different values for directionality (that is, if C is on the left and prosodic boundaries are on the right, or if C is on the right and prosodic boundaries are on the left), then wh-phrases may be left in situ, connected to the C by the creation of a larger Minor Phrase that contains them both. On the other hand, if the parameters both make reference to the same direction (that is, if C is on the left and prosodic boundaries are also on the left, or if C is on the right and prosodic boundaries are also on the right) then the language must use movement operations to get the wh-phrase as close to C as possible. The canonical examples of the four types of languages are in the table in (13):

(13)	C to Right of TP	C to Left of TP
Prosodic boundaries on Right of XPs	Basque	Chichewa
Prosodic boundaries on Left of XPs	Japanese	Tagalog

In Richards 2010 I review arguments, mainly drawn from existing literature, that the prosodic systems of these languages are indeed organized as described here, and try to extend the account to deal with wh-questions in a number of other languages²⁰. I will not try to review this work here, instead referring interested readers to Richards 2010.

2. Match Theory

The account developed in Richards 2010, and outlined above, assumes an *End-based* theory of prosody. In such an approach, the basic parameter differentiating between languages is one that determines which edge of certain maximal projections is to be mapped onto a prosodic boundary. In a language like Japanese, for example, Selkirk and Tateishi (1988) argue that prosodic boundaries appear at Left edges of maximal projections, where they are signalled by phenomena like initial low boundary tones (Initial Lowering) and reset of downstep. Conversely, Bresnan and Kanerva (1989) and Kanerva (1989, 1990) argue that Chichewa phrase boundaries are at the Right edge of the Chichewa maximal projection, where they determine the distribution of phenomena like Penultimate Lengthening. Some researchers have also argued that there are languages in which both edges can be mapped onto prosodic boundaries: see, for example, de Lacy (2003) on Maori, Selkirk (2011) on Xitsonga, Elfner (2012) on Connemara Irish, and Yasin (2012) on Jordanian Arabic. On this type of approach, languages can vary greatly in their prosodic structures, and prosodic structure is often quite different from syntactic structure.

Some recent work (Selkirk 2009, 2011, Elfner 2012, Clemens 2014, Bennett et al to appear) develops a different approach to prosody, called *Match Theory*. A central proposal of Match Theory is that prosodic structures are more cross-linguistically uniform than they were previously thought to be on end-based theories. In fact, to a first approximation, prosodic structure is essentially isomorphic with syntactic structure, with differences between the two

²⁰ See Giblin and Steddy 2014 for an application of this theory to the prosody of wh-questions in Telugu.

structures requiring motivation and explanation. On a theory of this kind, what needs to be specified about a language like Japanese is not the position of its prosodic boundaries; it generally has such boundaries both at left and at right edges of all maximal projections, as does every language. All that needs to be stated about Japanese is that certain prosodic phenomena (Initial Lowering, downstep reset) are associated specifically with left edges of prosodic phrases—and, hence, typically with left edges of maximal projections. The right edges of maximal projections are also mapped onto prosodic boundaries, on Match Theory, but happen not to be associated, in Japanese, with any prosodic phenomena.

Match Theory is clearly attractive, if only on grounds of parsimony. An end-based theory of Japanese prosody, for example, specifies both that Japanese maps left edges of maximal projections onto prosodic boundaries and that Japanese prosodic phenomena are associated with the left edges of the resulting phrases. Match Theory eliminates the first of these specifications, leaving only the conditions on the placement of prosodic phenomena. If such a theory is consistent with all the prosodic facts to be explained, it is clearly to be preferred over its End-based predecessor.

In what follows, I will first sketch the ideas of Match theory a little more formally. Next, I will offer a version of the proposal developed in Richards (2010), updated for compatibility with Match theory. We will then consider a particular instance in which the Match-theoretic version of the proposal is clearly preferable; Match theory allows us to extend the Richards (2010) account to cover Constant's (2014) discoveries about the nature and distribution of English contrastive topics. Finally, I will consider what the theory predicts about languages in which prosodic phenomena are associated with both sides of prosodic phrases.

2.1 A sketch of Match Theory

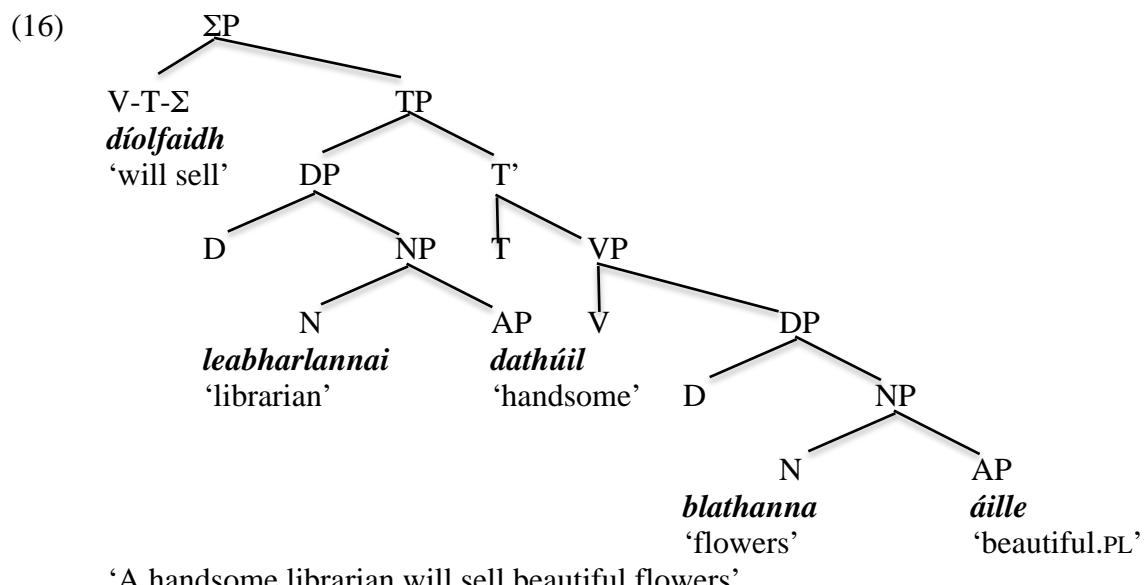
At the heart of Match Theory is a set of mapping principles between syntactic and prosodic structure that can be stated informally as in (14):

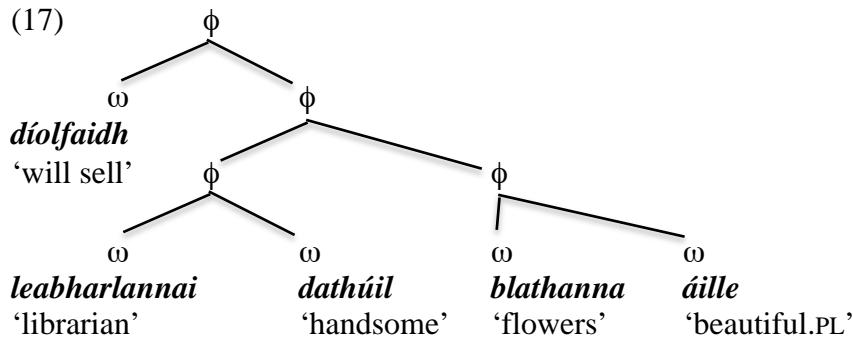
- (14) a. Every syntactic (possibly complex) head corresponds to a prosodic word ω .
- b. Every XP corresponds to a phonological phrase ϕ .
- c. Every clause corresponds to an intonational phrase i .

A more formal statement of (14b) is given in (15) (from Elfner 2012, 28):

- (15) Given a maximal projection XP in a syntactic representation S, where XP dominates all and only the set of terminal elements $\{a, b, c, \dots n\}$, there must be in the phonological representation P corresponding to S a ϕ -phrase which includes all and only the phonological exponents of $a, b, c \dots n$.

Elfner (2012) makes use of conditions like (14-15) in her proposals about the prosody of Connemara Irish, mapping syntactic structures like the one in (16) onto prosodic structures like the one in (17):

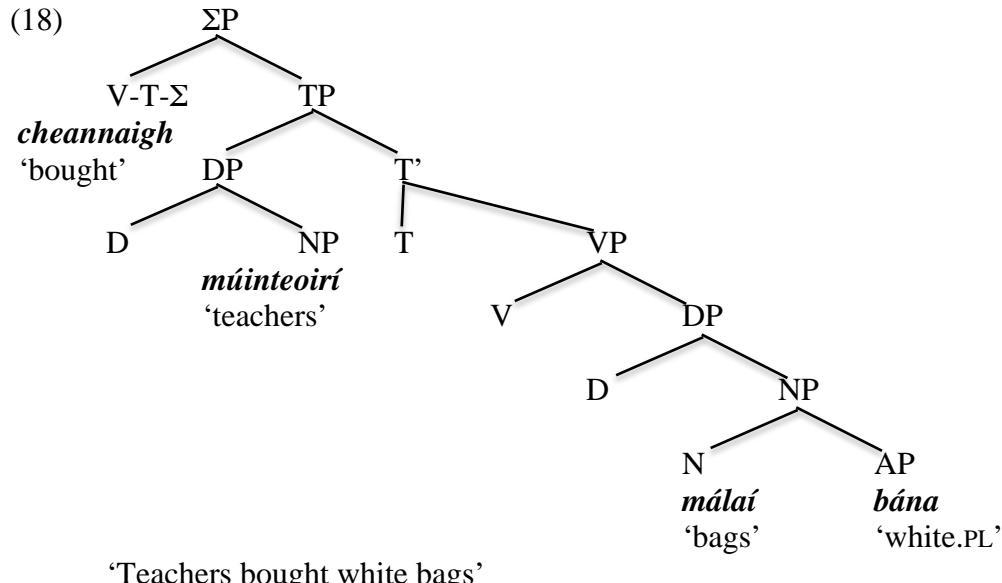




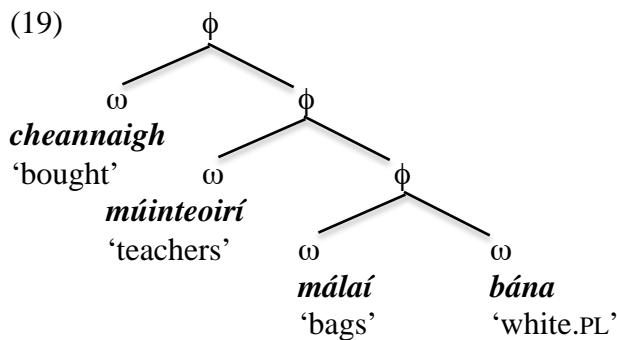
One major difference between (16) and (17) has to do with the treatment of phonologically null material; such material may occupy syntactic structure in (16), but is pruned from the tree in (17), so that a given phonological string can be exhaustively dominated, at most, by a single node²¹. The phonological string *leabharlannai dathúil* ‘handsome librarian’, for example, is both an NP and a DP in (16), but is exhaustively dominated by only a single ϕ in (17). I will return to Elfner’s arguments for structures like (17) in section 2.4 below; briefly, her arguments are based on the distribution of rising and falling boundary tones that mark the left and right edges of ϕ.

Elfner also argues that the rules in (14) can be overridden by other requirements. For instance, (18) differs minimally from (16) in that the subject consists of an unmodified noun:

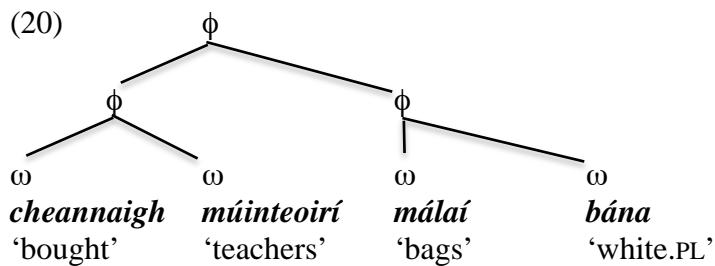
²¹ In lacking non-branching nodes, the tree in (17) resembles the kind of tree that could be constructed in Bare Phrase Structure, with the additional condition that terminal nodes, rather than being syntactic terminals, are phonological words. Match Theory also posits a condition requiring branching to be maximally binary, which is claimed to be violable. In syntax, the requirement that non-terminal nodes have precisely two daughters is taken to be an effect of binary Merge; to the extent that a similar requirement constrains the prosodic trees posited in Match Theory, we are entitled to wonder whether the requirement has a similar explanation. Note that the requirement cannot simply follow from the fact that the prosodic tree is derived from a binary-branching syntactic one; it is important in Elfner’s account, for example, that some of the syntactic structure is pruned, in a way that generates a new (binary-branching) prosodic tree. We might view this reasoning as an argument for building the prosodic tree in parallel with the syntactic one (via a similar operation of binary Merge), rather than deriving one tree from the other.



The general principles in (14-15) would lead us to expect a syntactic tree like (18) to be mapped onto a prosodic tree like the one in (19):



Elfner's diagnostics for prosodic structure, however, reveal that (18) is in fact mapped onto the tree in (20):

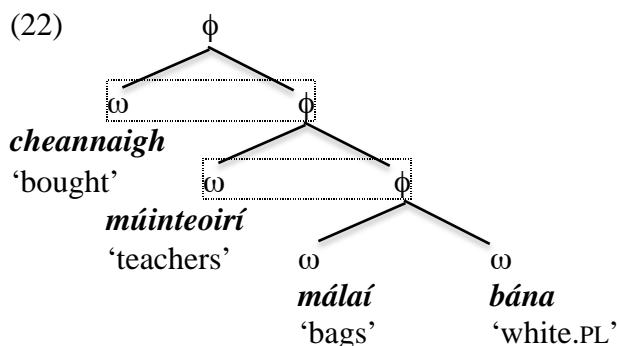


We will review Elfner's arguments for (20) over (19) in section 2.4 below; for the time being, let us assume that she is correct. Elfner attributes the preference for (20) over (19) to Selkirk's (2011) constraint STRONG-START:

- (21) STRONG-START (Selkirk 2011):

Assign one violation mark for every prosodic constituent whose leftmost daughter constituent is lower in the Prosodic Hierarchy than its sister constituent immediately to its right: $*(\kappa_n \kappa_{n+1} \dots)$

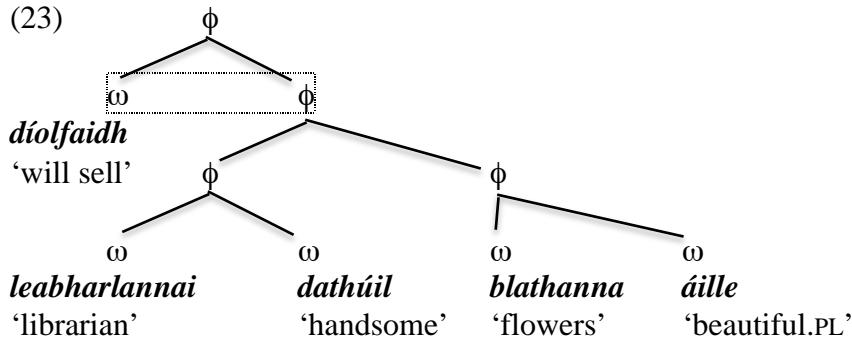
STRONG-START prefers pairs of sisters in which the left sister is at least as high on the Prosodic Hierarchy as the right sister. The tree in (19) contains two violations of this constraint, boxed in the tree below:



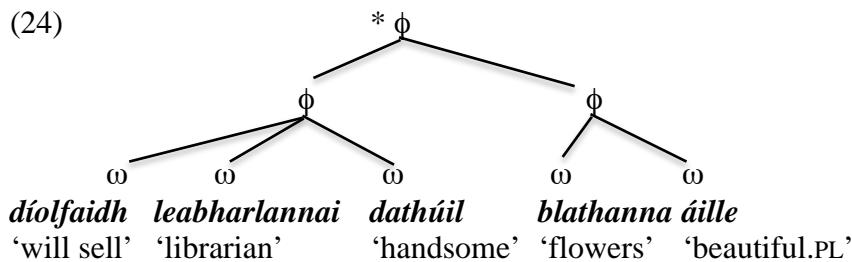
Both of these pairs of sisters consist of a leftmost sister which is a prosodic word, and a rightmost sister which is a \emptyset . In the tree in (20), by contrast, these violations are avoided; every pair of sisters in this tree are of the same prosodic type.

Elfner claims that STRONG-START is outranked, at least in Irish, by a constraint requiring branching to be maximally binary²². The prosodic tree in (17), repeated as (23), violates STRONG-START:

²² Interestingly, the principles in (14-15) for mapping syntactic structures onto prosodic structures will generally map any pronounced head with pronounced specifier and complement onto a ternary-branching node. The maximal projection of the head will be a \emptyset , and since X' levels are not mapped onto any prosodic category, this \emptyset will



The two daughters of the root ϕ violate STRONG-START, since the leftmost daughter is a prosodic word and the rightmost daughter is a ϕ . The violation of STRONG-START is tolerated, however, since repairing it, as in (20), by phrasing the subject together with the verb would yield a ternary-branching node:



The tree in (24) obeys STRONG-START, but at the cost of creating a ternary-branching node. Since the requirement of binary branching outranks STRONG-START, Elfner proposes, the tree in (24) is rejected in favor of the one in (23). What makes the example in (18) different, on this account, is the fact that its subject consists of a single word, which makes it possible to satisfy STRONG-START while still maintaining binary branching.

Match Theory, then, posits a set of violable constraints on the relationship between syntactic trees and prosodic phrasing. The default relationship between syntactic and prosodic

immediately dominate the prosodic objects representing the head, the specifier, and the complement (perhaps a ω and two ϕ nodes). If ternary-branching nodes are in general dispreferred, then we expect such structures to be ruled out. Perhaps a version of the Doubly Filled Comp Filter could follow from this: the head, the specifier, and the complement should not all be pronounced. The challenge would then be to account for the various straightforward counterexamples to the Doubly Filled Comp Filter as instances of various imaginable repair strategies that convert the ternary-branching structure into something more prosodically acceptable (and to explain why these repair strategies are not universally available).

structures is one of identity, but this relation can be complicated by various other conditions on prosodic structure, such as the requirement that terminal nodes have phonological content, and constraints like STRONG-START.

2.2 Richards (2010) and Match Theory

The central idea of Richards (2010) is that the grammar seeks to create prosodic structures in which a wh-phrase is separated by as few prosodic boundaries as possible from the C which Agrees with it. One method of doing this is by directly manipulating the prosodic structure of the sentence, but the idea is that these manipulations are only possible if they resemble the kinds of prosodic structures the language generally employs. A language like Japanese, for example, can create a ϕ that begins at the left edge of the wh-phrase and ends at the complementizer where the wh-phrase takes scope, because, in an End-based theory like the one Richards (2010) uses, Japanese ϕ routinely begins at left edges of maximal projections. Basque ϕ , by contrast, does not routinely begin at left edges of maximal projections, and the distribution of Basque wh-phrases is therefore constrained in ways that do not apply in Japanese.

In Match theory, a ϕ in any language ought to have, to a first approximation, the same boundaries; there is no way of appealing to edges of ϕ -phrases that appear in some languages but not others. What remains in Match theory are the phenomena to which Edge-based theory appealed as diagnostics for the use of one or another edge; in Match theory, as in Edge-based theory, Japanese is a language with a number of prosodic phenomena (such as Initial Lowering and downstep reset) which appear at the left edges of maximal projections. The new version of the proposal will therefore make use of these.

In the previous chapter, I claimed that, for example, the presence of metrical boundaries reliably associated with particular syntactic categories had to be represented in the narrow

syntax; this was important for accounting for the cross-linguistic distribution of EPP effects.

Similar, in this chapter, I will claim that some representation of prosodic phenomena is present in narrow syntax, though (as in the previous chapter), this representation may not be fully explicit about the phonetics of particular tonal morphemes. The fact that Japanese has Initial Lowering, for example, will be represented in the narrow syntax as a prosodic effect associated with left edges of maximal projections; whether the syntax also has access to the information that the prosodic effect in question consists of a low tone is a question I will leave for future work. I will refer to boundaries that have prosodic effects associated with them as *prosodically active*.

Part of the condition on wh-prosody will resemble the one in Richards (2010):

- (25) Given a wh-phrase α and a complementizer C where α takes scope, α and C must be dominated by a single ϕ .

I will refer to the relation that holds, in a prosodically well-formed wh-question, between the wh-phrase and the complementizer as *prosodic contiguity*; I will say that the wh-phrase must be *prosodically contiguous* to the complementizer (and I will often shorten this, saying simply that the wh-phrase and the complementizer must be *contiguous*).

The following operation, which I will refer to as Grouping, will be one way of achieving Contiguity between C and the wh-phrase:

- (26) **Grouping**

Given a wh-phrase α and a C with which α is in a Probe-Goal relation, create a ϕ which dominates C and has α at one of its edges.

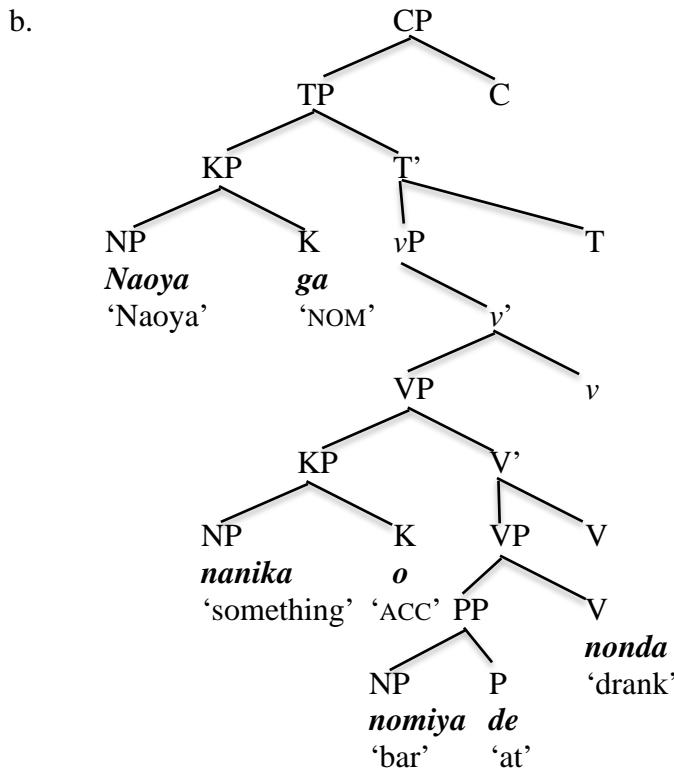
This statement of Grouping makes no reference to prosodic properties of languages, and therefore does not distinguish between, for example, languages like Japanese and languages like Basque. We will see how to make this distinction shortly.

Grouping alters prosodic structure, but not linear order. One could imagine a version of Grouping which did both; Grouping would be then responsible for creating a ϕ with the relevant properties, possibly moving wh-phrases in order to do so. I will, instead, represent the grammar as performing syntactic movement operations, sometimes driven by the need to make Grouping succeed in creating prosodic representations of the right kind. Distinguishing between these two approaches would partly be a matter of fleshing out what exactly would be meant by a movement operation performed by Grouping; such movement could not affect only the prosodic tree, since wh-movement has effects on semantics as well.

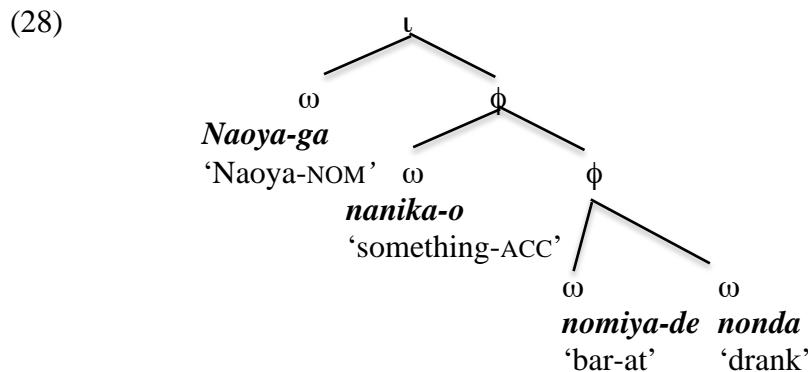
Consider the prosody of a Japanese sentence like (27a), with the syntactic tree in (27b). I have represented the Japanese verb, not especially crucially, as not undergoing head-movement at all. I have also chosen to place the locative adjunct in a separate VP-shell²³. Finally, I have represented Japanese nominal as KP, with K headed by the Case morpheme, and have left out DP:

²³ These decisions are linked; if the verb did not move, and if the locative adjunct were an adjunct in the same VP that contains the object, then that VP would contain three pronounced objects (the verb, the direct object, and the locative), and would be rendered by the Match Theory algorithms as a ternary-branching ϕ . There are various ways of avoiding this conclusion, of which I have chosen the one involving Larsonian VP-shells; another possibility, of course, is that we should embrace the ternary-branching structure, at least for the narrow-syntactic representation. I leave for future work the question of whether there is some more insightful way of making the choice.

- (27) a. Naoya-ga nanika-o nomiya-de nond.
 Naoya-NOM something-ACC bar-at drank
 ‘Naoya drank something at the bar’



How should a syntactic tree like (27b) be mapped onto a prosodic tree? In Match Theory as described above, the result should be something like the following:

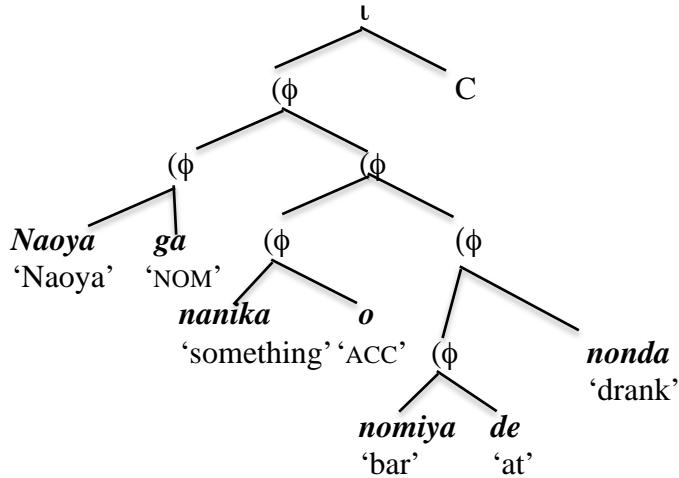


The literature on Match Theory offers compelling arguments for the existence of trees like (28) as final phonetic representations of prosody. The tree does, however, involve a great deal of

‘pruning’ of syntactic structure, on the basis of distinctions that are arguably not yet made in the narrow syntax. For example, the particular complementizer in (27) is phonologically null, but there appear to be overt complementizers in Japanese (e.g., *ka* ‘INTERROGATIVE’). The fact that this particular complementizer is null is therefore a lexically idiosyncratic fact, and I argued in the last chapter that such facts are not represented in the narrow syntax. Similarly, Japanese lacks overt determiners, and I have therefore omitted a DP layer on the nominal, but it does have overt demonstratives (e.g., *kono* ‘this’), and if these are afforded their own functional projection, that too is apparently a projection which is optionally phonologically contentful. Finally, the tree in (28) reflects the fact that the case morphemes are not prosodic words. I know of no evidence that these morphemes are suffixes on the noun (they do not, for example, interact morphophonologically with the noun), so while they are clearly prosodically dependent on the noun in some way, they might very well be enclitics rather than suffixes. Recall that it was important in the last chapter (see, in particular, sections 4.2.1.2 and 4.2.1.4) that there are clitics whose special status as clitics manifests itself only postsyntactically. If Japanese case morphemes are clitics of this kind, then we might expect them to be represented within narrow syntax as full words.

Pursuing the idea that the narrow syntax begins the construction of a prosodic representation, then, we might expect the tree in question to be even more isomorphic to syntactic structure than is standard in Match Theory; once the syntactic derivation is over, the prosodic tree can be ‘pruned’ in the various ways we have explored, to improve its status as a phonological object. Within the narrow syntax, I will assume a prosodic tree like the following:

(29)



The tree in (29) approximates the syntactic structure more closely than the one in (28); the only ‘pruned’ material consists of affixal terminal nodes (which are represented in the syntax as affixes, according the preceding chapter) and non-branching nodes. Also represented in (29) are the prosodically active edges, annotated as parentheses to the left of each ϕ , which will eventually be mapped onto phenomena like Initial Lowering.

I will assume throughout that prosodic trees like the one in (29) are generated by the narrow syntax, as the derivation proceeds (rather than, as is standardly assumed, being created only after the narrow-syntactic derivation is finished). I think it would be possible, through a sufficiently clever system of diacritics, to represent the information in such a tree on a syntactic tree directly, by marking which syntactic nodes are to be mapped onto prosodic nodes. Just to avoid the confusion that I think such diacritics will be likely to cause, I will instead write as though the prosodic tree and the syntactic tree are separate entities, both generated during the narrow-syntax portion of the derivation, and related to each other in ways that we will explore.

Next, we can consider a corresponding prosodic tree for the wh-question in (30):

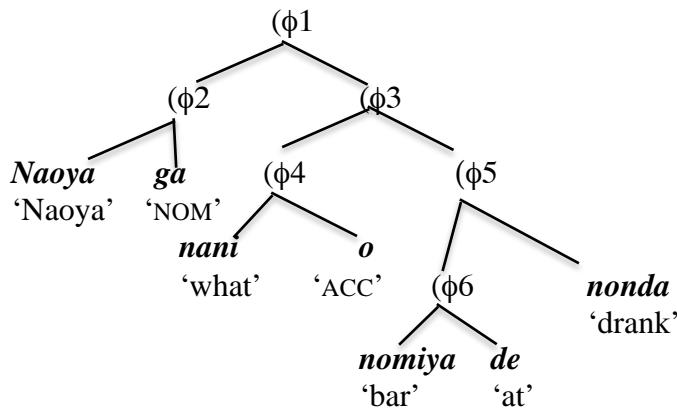
- (30) Naoya-ga nani-o nomiya-de nond^a no?

Naoya-NOM what-ACC bar-at drank Q

‘Which drink did Naoya drink at the bar?’

Prior to Merge of C, the TP of this sentence ought to have a prosodic structure like:

- (31)



Here I have numbered the ϕ nodes, just to make the following discussion easier. Once C is

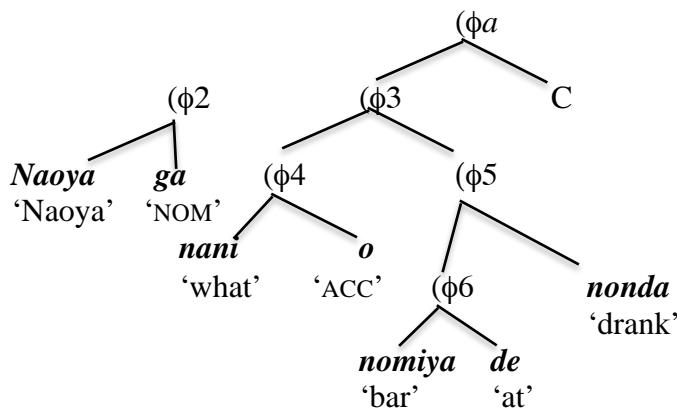
Merged, the derivation will apply Grouping, the statement of which is repeated in (32):

- (32) **Grouping**

Given a wh-phrase α and a C with which α is in a Probe-Goal relation, create a ϕ with which dominates C and has α at one of its edges.

Grouping applies to C and the tree in (31) to yield (33):

- (33)

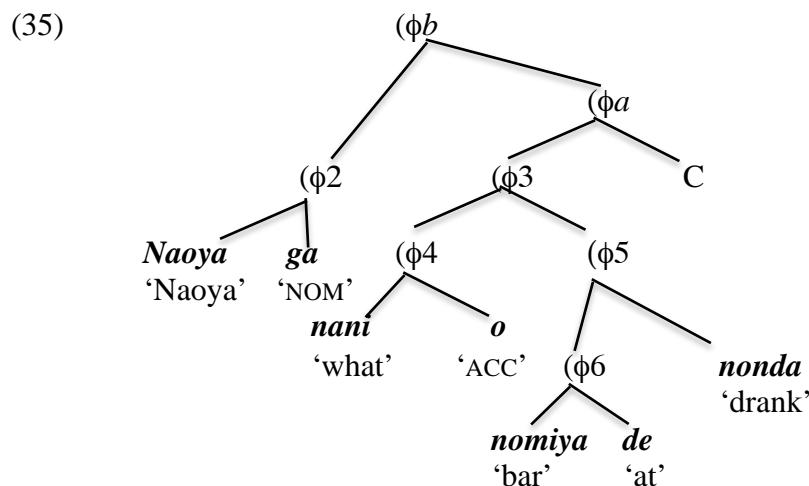


Grouping changes the tree in (31) in a way that maximally preserves the existing structure. It does this by taking the largest ϕ that begins with the wh-phrase (which is $\phi 3$), and creating a new $\phi, \phi a$, which dominates C and $\phi 3$. The new ϕa contains both the wh-phrase and the C that Agrees with it, and the requirement of Contiguity between C and wh is therefore satisfied. There are other imaginable ways this result could have been achieved; for example, the syntax could have created a binary foot containing only C and $\phi 4$, destroying $\phi 3$ as well as $\phi 1$ and leaving $\phi 5$ unattached. Assuming that destruction of existing structure is to be avoided, however, the structure in (33) is the optimal one.

Now that CP is complete, the CP node must be mapped onto ϕ in a way that obeys the general Match condition on the representation of phrases (from Elfner 2012, 28):

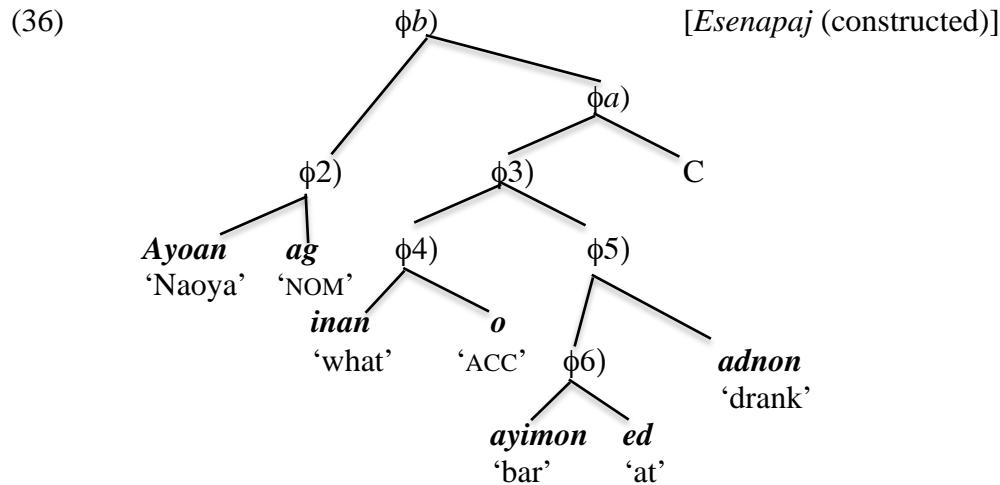
- (34) Given a maximal projection XP in a syntactic representation S, where XP dominates all and only the set of terminal elements $\{a, b, c, \dots n\}$, there must be in the phonological representation P corresponding to S a ϕ -phrase which includes all and only the phonological exponents of $a, b, c \dots n$.

Since all of the material in (33) is dominated by CP, all that remains is to create a new ϕ , here labeled ϕb , which dominates both of the already-constructed ϕ :



In the tree in (35), the prosodic effects of wh-in-situ in Japanese (e.g., in Tokyo Japanese, a boosted pitch peak on the wh-word and pitch compression in subsequent material) can be applied to ϕa , the projection created by Grouping, within which C and wh are Contiguous.

Imagine, by contrast, a language identical to Japanese except that its prosodically active boundaries fall at the right edge of every ϕ (we could call the fictional language Esenapaj), and imagine that we use Grouping to create a prosodic tree with the same constituent structure as the one in (35):



In (36), as in (35), there is a ϕa over which we could define special prosodic phenomena connecting the wh-phrase with the complementizer. How are we to distinguish Japanese from Esenapaj (or, more importantly, from Basque?)

One difference between the trees in (35) and (36) has to do with the position of the wh-phrase within ϕa , the ϕ created by Grouping. In the Japanese tree in (35), the wh-phrase is adjacent to the prosodically active edge of ϕa ; any boundary tones associated with this edge, for example, will generally fall on the wh-phrase. In the Esenapaj tree in (36), by contrast, the wh-phrase is not in any prosodically distinguished position within ϕa ; it is not near the prosodically active edge of ϕa , and boundary tones for ϕa should therefore fall on C, not on the wh-phrase.

We can take advantage of this contrast by restating the Contiguity requirement on wh-questions as follows:

(37) ***Contiguity***

Given a wh-phrase α and a complementizer C where α takes scope, α and C must be dominated by a single ϕ , within which α is *Contiguity-prominent*.

And the definition of *Contiguity-prominence* will be:

(38) α is *Contiguity-prominent* within ϕ if α is adjacent to ϕ 's prosodically active edge.

I hope that *Contiguity-prominence* will turn out to map reasonably cleanly onto prosodic prominence more generally, but demonstrating this mapping is beyond the scope of this book, so I will continue to use the technical term *Contiguity-prominence*.

The definition of Grouping given above stipulates that the ϕ created by Grouping must have the wh-phrase at one of its edges. The notion of Contiguity-prominence allows us to omit this part of the definition of Grouping: Grouping will create a ϕ that allows the wh-phrase to satisfy Contiguity, and such a ϕ will necessarily have the wh-phrase at an edge:

(39) ***Grouping***

Given a wh-phrase α and a C with which α is in a Probe-Goal relation, create a ϕ which dominates C and α .

The definitions above have the consequence that languages like Japanese and Chichewa may leave wh-phrases in situ; these are both languages in which Grouping will create a ϕ that has wh-phrases adjacent to its prosodically active edge (the left edge, in Japanese, and the right edge, in Chichewa), and in which C and wh may therefore be Contiguous. I have left open the question of what a language like Basque, which is like Japanese in having final C but unlike it in

lacking prosodically active left edges, ought to do to create prosodically well-formed wh-questions. I return to this question in section 3 of this chapter.

Match theory has at its heart the idea that prosodic structure is, at least in principle, an accurate reflection of certain kinds of syntactic relations. In particular, it claims that the results of Merge operations (at least, the ones that create maximal projections) are to be mapped onto prosodic units of certain kinds. The proposal offered above can be thought of as an extension of this basic idea; not only are the outputs of Merge mapped onto prosodic structure, but the prosody also contains structural units which represent the effects of Agree.

I have tried to show that the central idea of Richards (2010) can be rephrased in the vocabulary of Match theory. I have not, however, shown that there are any actual advantages to the shift from Edge-based theory to Match theory. The next section will discuss one such possible advantage.

2.3 Constant (2014)

Constant (2014) examines the prosody and semantics of Contrastive Topics, in English and in Mandarin Chinese. A classic use of Contrastive Topics is in partial answers to questions; we can understand them as a way for a speaker to define a part of some question that has been asked as the part that the speaker chooses to address right away. Contrastive Topics, Constant says, denote what the question being addressed is about, and imply that there are other questions about different topics that are still left open. Speakers tend to deploy them either when they do not wish to fully answer the question, or when they are in the course of answering a complex question with multiple statements.

Constant's (2014) first illustration of the use of Contrastive Topics involves a potluck dinner. He asks us to imagine a conversation in which one person seeks to find out from another

which dishes were brought to the potluck by which people. Such a conversation might contain the following exchange:

(40) A: What about Persephone and Antonio? What did *they* bring?

B: Persephone brought the gazpacho. Antonio, I'm not sure about.

The first sentence of B's response is a partial answer to A's question; we can understand B as having decided to begin by answering the question *What did Persephone bring?* In B's response, *Persephone* is a Contrastive Topic, communicating both that this sentence represents a partial answer to A's question and that this particular partial answer will focus on Persephone. *Gazpacho*, on the other hand, is an Exhaustive Focus, which provides the answer to the particular part of A's question that B has chosen to respond to in this sentence.

Much of Constant's work centers on the prosodic properties of Contrastive Topics; for other literature in this area, see Jackendoff (1972), Büring (2003), and references cited there.

Another of Constant's examples is given in (41):

(41) A: Did Persephone and Antonio bring vegetarian dishes?

B: Persephone brought one...

In B's response, *Persephone* is again a Contrastive Topic, implying that the answer to A's question is a partial one. This response has a distinctive intonational contour, which Constant annotates as follows:

(42) [PERSEPHONE] brought one...

L*+H

L-H%

In (42), *Persephone* receives a particular level of stress (represented by small capitals) and a pitch rise that begins with its stressed syllable. Another rise appears, in this case, at the end of the sentence; this second rise is aligned with an Intonational Phrase boundary²⁴.

This second rise is not necessarily at the end of the sentence. Consider the exchange in (43), part of a larger conversation about people and what they ate:

- (43) A: What about Persephone? What did she eat?

B: [PERSEPHONE] ... ate [the BEANS].

L*+H L-H% H* L-L%

B's response in (43) differs from (42) in containing an Exhaustive Focus, *the beans*, which answers the question under discussion. *Persephone* is, again, a Contrastive Topic, indicating that B's response represents an answer to part of a larger, more complex question (in this case, the question of what various people ate). In (43), the second rise associated with the Contrastive Topic appears, not at the end of the sentence, but on the Contrastive Topic itself. Moreover, the Contrastive Topic in this case is followed by an Intonational Phrase break (indicated here, as in Constant (2014), with ellipses). Constant notes that this option is not always available; it is impossible, for example, if the Contrastive Topic is contained in an island:

- (44) A: What about Mary and Fred? Did *they* bring anything tasty?

B: The dish that [MARY]_{CT} brought ... was [SUPERB]_{Exh.}

L+H* L-H% H* L-L%

- (45)* B: The dish that [MARY]_{CT} ... brought was [SUPERB]_{Exh.}

L+H*L-H% H* L-L%

²⁴ For more discussion of the ToBI system for transcribing prosody, used here, see Veilleux et al (2006).

Here the second rise, and the associated pause, cannot occur immediately after the Contrastive Topic itself; we can contrast (45) with (43), in which placing the rise and the pause immediately after the Contrastive Topic is indeed possible, and in fact preferred for some speakers.

Constant argues that L-H% is the phonological exponence in English of a morpheme associated with Contrastive Topics, which cliticizes to an Intonational Phrase break (and which is related to matrix C in a way that respects island effects, which accounts for the contrast in (44-45)). He offers an account of the distribution of such phrase breaks, one part of which is a condition requiring that the L-H% morpheme not be separated from matrix C by any Intonational Phrase boundaries, other than the one to which it attaches.

This condition is part of an account of the contrasting patterns of intonation in (46-47):

- (46) A: What about FRED? What did you give HIM?

B: I gave [FRED]_{CT} ... [the BEANS]_{Exh}

L+H* L-H% H* L-L%

- (47) A: What about the BEANS? Who did you give THOSE to?

B: I gave [FRED]_{Exh} [the BEANS]_{CT} ...

H* L- L+H* L-H%

We can see from (46) that putting an Intonational Phrase break between the objects is possible, but in (47), no such break may appear:

- (48) *B: I gave [FRED]_{Exh} ... [the BEANS]_{CT}

H* L- L+H* L-H%

The ill-formedness of (48) is one of the kinds of examples ruled out by Constant's requirement that no Intonational Phrase break appear between C and the L-H% Contrastive Topic morpheme.

Finally, Constant notes that Contrastive Topics may also be moved overtly in English.

(49) is an acceptable alternative to B's response in (47):

- (49) B: [The BEANS]_{CT}, ... I gave [FRED]_{Exh.}

L+H*L-H% H* L-L%

The behavior of English Contrastive Topics, as described by Constant, is reminiscent of the behavior of wh-phrases in Chichewa. Chichewa wh-phrases, like English contrastive topics, may either remain in situ or be fronted:

- (50) a. Wa-á-pátsa bambo **chi-yáani** ? [Chichewa:

1SUBJ-TAM-give 1.father 7-what Cheng and Downing 2011, 4]

'What has s/he given to father?'

- b. Kodí ndi **yani** a-méné mkángó ú-kú-sáutsa? [Chichewa:

Q COP who SUBJ-REL 3.lion 3SUBJ-PRES-bother Mchombo

'Who is (it that) the lion (is) bothering?' 2004, 45]

Moreover, Chichewa wh-in-situ is associated with a prosodic boundary following the wh-phrase.

Chichewa VP is typically phrased as a unit, but when a wh-phrase is in situ inside VP, a boundary will be introduced after the wh-phrase. The boundaries, in this case, can be diagnosed by Penultimate Lengthening in the word before the boundary:

- (51) a. (anáménya nyumbá ndí mwáálá)

s/he.hit house with rock

'S/he hit the house with the rock'

- b. (anáménya **chiyáani**)(ndí mwáálá)?

s/he.hit what with rock

'What did she hit with the rock?'

We might, then, try to develop the same account of the English Contrastive Topic that is developed in Richards (2010) for Chichewa wh-phrases: these are both constructions involving phrases that must be related prosodically with a C that is to their left, and which have prosodically active boundaries to their right. Both constructions therefore allow the affected structures to remain in situ, with changes to the prosodic structure that are effectively the mirror image of those just discussed for Japanese; a new ϕ is created, with head-initial C as one of its edges and the operator at the other edge, in a Contiguity-prominent position within the new ϕ . Alternatively, of course, the operator may move to become closer to C, again making it easy to place them in the same ϕ .

The difficulty in making this move, in the End-based approach to prosody that Richards (2010) assumes, is that English wh-phrases are unlike Chichewa wh-phrases (or, for that matter, English Contrastive Topics); in non-echo questions, they are required to move. Richards (2010) therefore classifies English together with Tagalog, not with Chichewa; we are to see English as a language in which, in general, left edges of maximal projections are associated with prosodic structure, and the prosodic conditions on questions therefore cannot be met while leaving the wh-phrase in situ. In an End-based approach to prosody, it is impossible to describe English as a language in which wh-phrases behave like their Tagalog counterparts while contrastive topics pattern with Chichewa.

Match theory, together with Constant's (2014) observations about the prosody of contrastive topics, offers a way out of this difficulty. On Match theory, the property that unites English with Tagalog is not about the actual conditions on construction of prosodic material, which are supposed to be roughly invariant. Rather, English is like Tagalog, and unlike Chichewa, in generally having prosodically active left edges of maximal projections; this will be

the start of the account, under Match theory, for the fact that English wh-phrases must move. Contrastive topics have a special status, on this kind of account, because of one of Constant's observations about them; they are associated with a boundary tone that docks on a prosodic boundary to the *right* of the contrastive topic (L-H%). While English may in general make left edges prosodically active, then, Contrastive Topics have prosodically active boundaries to their right. Once we say this, everything follows: English is in general expected to pattern with Tagalog, but English contrastive topics are associated with special tonal morphology which makes their right edges active, and are therefore entitled to behave like Chichewa wh-phrases. The fact that this kind of account can be constructed under Match theory, but not under the End-based theory, represents an argument for choosing Match theory.

2.4 Bilaterally active languages

One of the inspirations for the invention of Match theory has been the discovery of languages in which both edges of maximal projections are associated with prosodic phenomena. Such languages are not strictly incompatible with an Edge-based approach to prosody, unless we commit ourselves to a parameter space that forces languages to make a choice between left and right edges of maximal projections for defining prosodic boundaries. Still, once we have found languages that map both left and right edges of maximal projections onto prosodic boundaries, we are entitled to wonder whether the same might not be true of all languages, and this idea is one of the cornerstones of Match theory.

If there are indeed languages in which both sides of maximal projections can be prosodically active, then Contiguity Theory will need to be able to accommodate this. The definition of *Contiguity-prominence* offered above, for example, presupposes that only one edge of a given maximal projection is prosodically active (emphasis added):

- (52) α is *Contiguity-prominent* within ϕ if α is adjacent to ϕ 's prosodically active edge.

On the other hand, the discussion of Contrastive Topics in the previous section arrived at the conclusion that, while English is a language that generally makes left edges of maximal projections active, there is (following Constant 2014) a Contrastive Topic morpheme that attaches to right edges of Intonational Phrase boundaries, rendering these edges active and capable of offering Contiguity-prominence. If the consequence of adding this morpheme to a projection is to make both edges of that projection prominent, then Contiguity-prominence will need to be stated somewhat differently:

- (53) α is *Contiguity-prominent* within ϕ if α is adjacent to a prosodically active edge of ϕ .

I will assume this version of Contiguity-prominence in what follows.

It may be worth emphasizing, though, that the prosodic structure referred to in this theory is the one created in the narrow syntax. I offered the hypothesis in section 2.2 above that the trees standardly assumed in Match Theory might involve some post-syntactic ‘pruning’ of the prosodic tree structure, prompted by phonological information to which the narrow syntax has no access (such as the fact that particular morphemes are lexically idiosyncratically null), and that the prosodic structure constructed in the syntax might resemble the syntactic structure more closely than Match Theory standardly assumes.

Consider, for example, Elfner’s (2012) description of Connemara Irish, in which she argues that Irish associates prosodic phenomena with both edges of prosodic phrases. For the account under development here to succeed, we need to be able to group Irish with Tagalog as a language with active left edges, since Irish and Tagalog are alike in requiring overt wh-movement:

- (54) a. *Bhuail Cathal cad? [Irish: Carnie 1995, 194]

PAST.hit Cathal what

‘What did Cathal hit?’

- b. Cén fear a^N bhfaigheann tú an t-airgead uaidh?

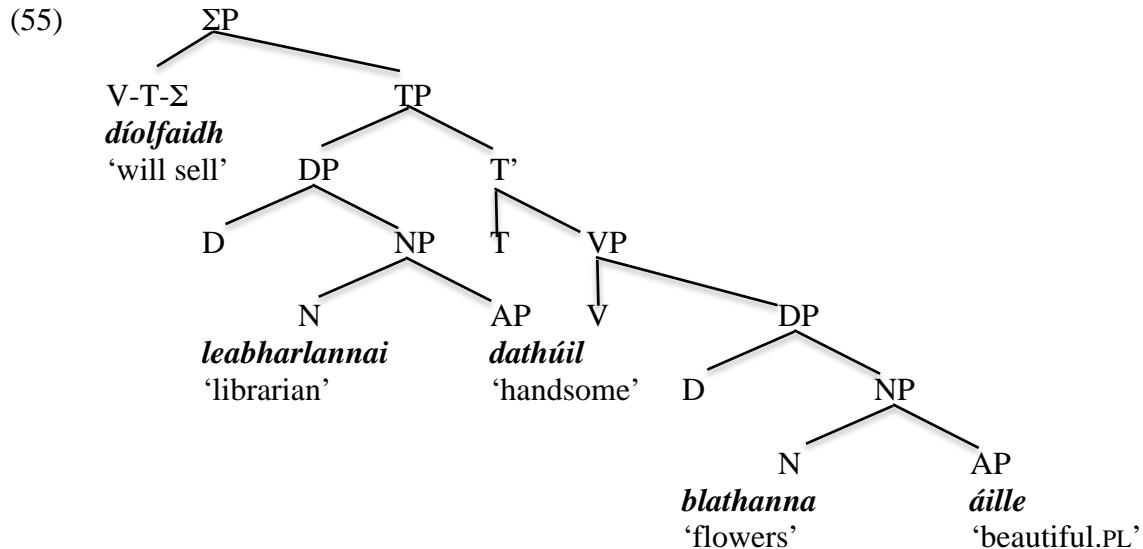
which man C get.PRES you the money from.him

‘Which man do you get the money from?’ [Irish: McCloskey 1979, 52]

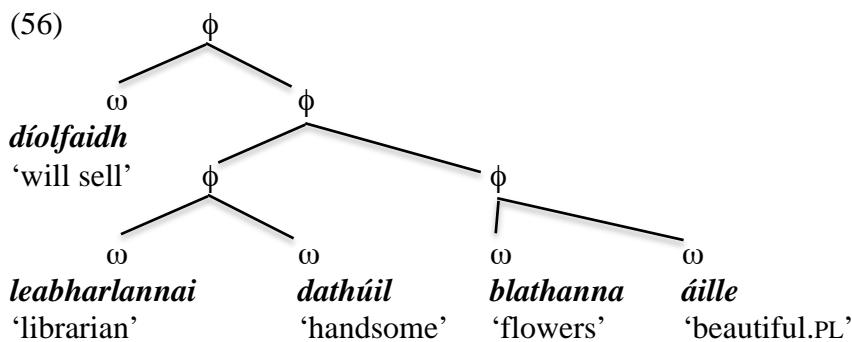
Let us therefore carefully consider Elfner’s discoveries about Irish prosody.

Elfner’s diagnostics for phrase edges are a pitch rise, associated with certain left edges of prosodic domains, and a pitch fall, associated with certain right edges. She argues that reference to both left edges and right edges is crucial for a successful description of the facts.

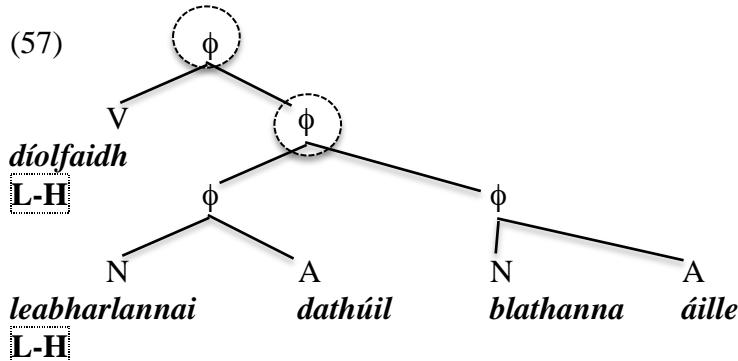
In particular, Elfner claims that pitch rises are associated with *non-minimal* φ--that is, with φ that dominates another φ. Consider, for example, the sentence discussed in examples (16-17) above, repeated here as (55-56):



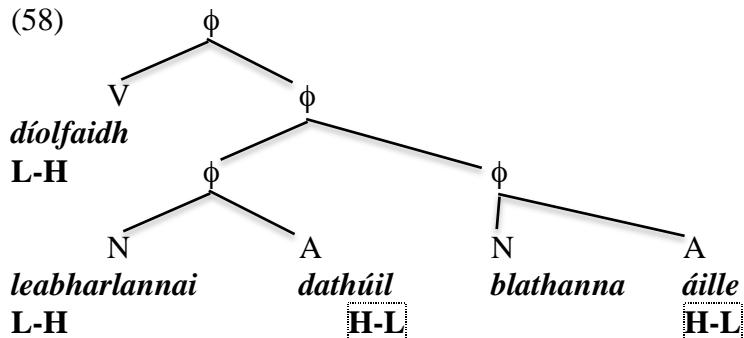
'A handsome librarian will sell beautiful flowers'



The prosodic tree in (56) is derived from the syntactic tree in (55) via the Match conditions already discussed. Pitch rises then appear at the left edge of each non-minimal ϕ (circled):



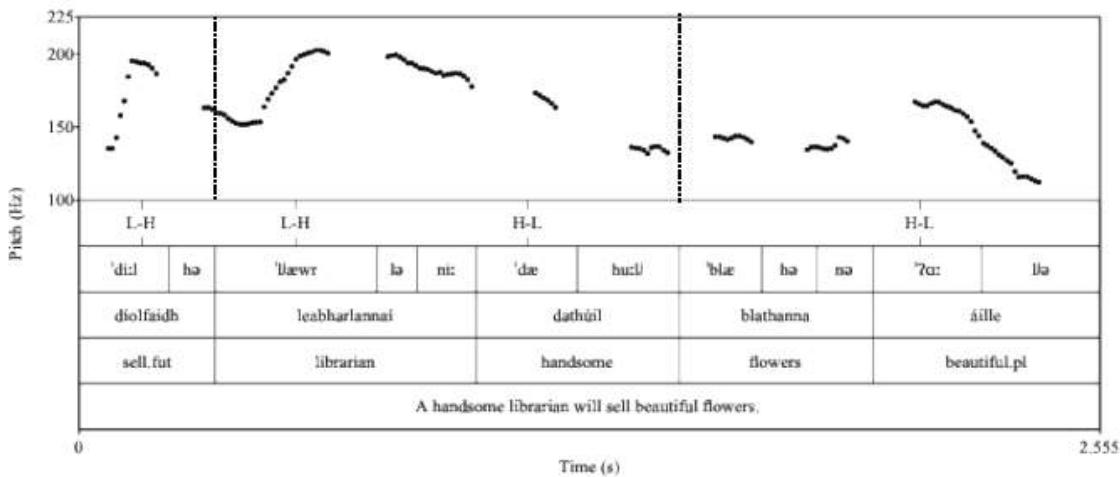
Pitch falls, by contrast, appear at the end of every ϕ , according to Elfner:



Since most instances of ϕ in this example have the same right edge, the tree in (58) has only two pitch falls, one at the end of the sentence (effectively appearing at the right edges of three ϕ at once) and another at the end of the subject DP *leabharlannai dathúil* ‘handsome librarian’. As Elfner notes, it is impossible to determine, based on this kind of example, whether pitch falls are associated with right edges of every ϕ (as she concludes), or only of minimal ϕ . I return to this point below.

A pitch track for (58) is given in (59) (Elfner 2012, 61):

(59)



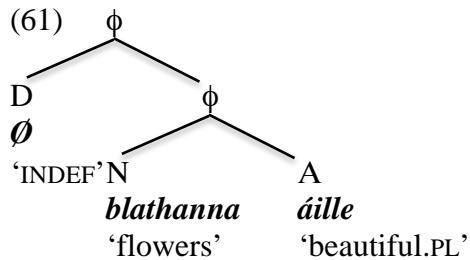
As (59) shows, the example has pitch rises on the stressed syllables of the verb and the noun of the subject; it has pitch falls on the stressed syllables of the adjectives modifying the two DPs. Importantly for Elfner, there is no pitch rise on the head noun of the object (*blathanna* ‘flowers’).

In Elfner's account, this is because this noun is at the left edge only of the minimal ϕ *blathanna áille* 'beautiful flowers', and pitch rises are attached only to non-minimal ϕ .

The distinction between minimal and non-minimal ϕ is therefore crucial for Elfner's account. The distinction rests, however, on contrasts that ought to be unavailable in the narrow syntax. For example, Irish does have overt definite determiners:

- (60) an leabharlannai dathúil
 the librarian handsome
 'the handsome librarian'

The fact that the determiners on the DPs in (59) are phonologically null, and thus not represented in the prosodic tree, is therefore a lexically idiosyncratic fact, of the kind which I have claimed is not present in the representation manipulated by the narrow syntax. In the syntax, the direct object in (57) ought to have a prosodic structure like that in (61):

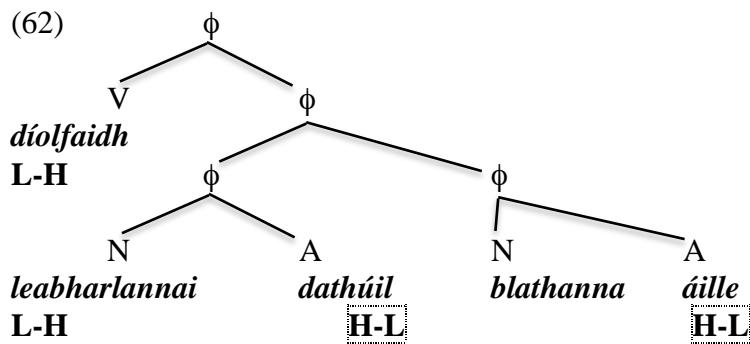


I proposed above that the 'pruning' of structures like (61) to a single binary-branching ϕ was a post-syntactic operation, triggered by the late introduction into the structure of the information that the indefinite determiner is phonologically null. As far as the syntax is concerned, then, the string \emptyset *blathanna áille* 'beautiful flowers' ought to be a non-minimal ϕ .

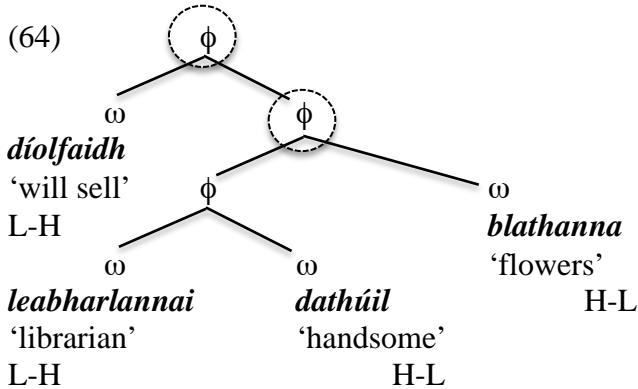
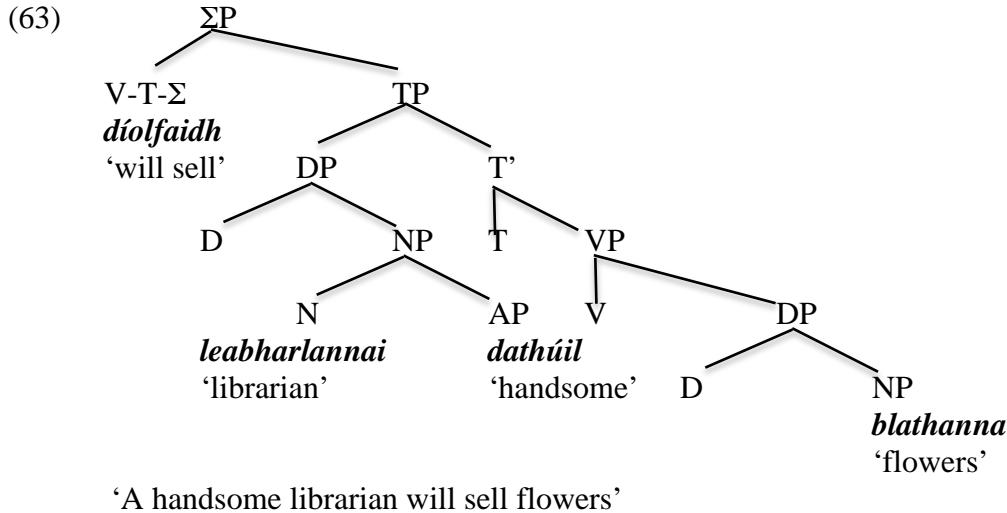
If my claim about post-syntactic pruning is correct, then there are (at least) two imaginable ways of representing Elfner's generalization about Irish L-H. One is that left edges only become prosodically active post-syntactically, once the distribution of minimal ϕ becomes

clear. Another is that left edges are very generally active within the narrow syntax, and that certain L-H sequences are eliminated post-syntactically once the correct set of minimal ϕ nodes has been identified. The second of these possibilities is reminiscent of the treatment of lexical idiosyncrasy in the preceding chapter, where (for example) Finnish pro-dropped subjects (in section 2.1.2.2) and Yagua agreement proclitics (in section 4.2.1.4), despite their prosodic impoverishment, were treated like full DPs for purposes of Affix Support, only to be deprived of their prosodic structure postsyntactically. Let us assume a similar treatment of minimal ϕ in Irish; Irish left edges of ϕ are universally prosodically active, with minimal ϕ receiving their special status only postsyntactically. Since Irish has obligatory overt wh-movement, this is welcome news: Irish, like Tagalog, is a language with active left edges of ϕ .

Now we can turn to the status of phrase-final falls. As noted above, Elfner claims that phrase-final H-L is associated with every ϕ :



As also noted above, Elfner is forthright about the fact that trees like (62) are equally compatible with a description of phrase-final H-L which associates it just with minimal ϕ . Her argument that H-L appears at the end of every ϕ rests on the status of examples like (63-64), with non-branching objects:



The H-L of interest here is the one at the end of the sentence, on the object *blathanna* ‘flowers’.

This H-L appears at the end of two ϕ (circled): the root ϕ , and the daughter ϕ of the root. Neither of these is an instance of minimal ϕ ; each has a ϕ as a daughter. Elfner concludes that H-L cannot be limited to minimal ϕ .

Here there are at least two possible options that would be consistent with the approach developed here thus far. One would take advantage of the fact that, while the string *blathanna* ‘flowers’ is not a ϕ in the tree in (64), this tree is the result of postsyntactic pruning; the prosodic tree in the narrow syntax would contain more instances of ϕ , including one immediately dominating the object noun and its determiner (which is phonologically null, but this is irrelevant for the syntax). In such a tree, the association of H-L with right edges just of minimal ϕ could be

maintained; the distribution of H-L would then crucially have to be unaffected by postsyntactic pruning (unlike the distribution of L-H, as we have seen). On this view, making sure that Irish wh-movement is obligatory would be a matter of making sure that the prosodically active right edge of minimal ϕ was never relevant for wh-movement: perhaps a fully articulated structure for the Irish DP would yield the result that any (syntactically) minimal ϕ would always be smaller than the kinds of phrases that can undergo wh-movement.

Another option would depict the sentence-final H-L in (64) as a boundary tone for some higher prosodic level, perhaps ι . Having done this, we could restrict ϕ -level H-L to right edges of minimal ϕ , as produced by postsyntactic pruning. Such H-L would then be unable to appear in the narrow syntax, since the objects to which it applies would not yet have been created, and the obligatory nature of wh-movement in Irish would follow from the fact that Irish ϕ , as far as the syntax is concerned, is prosodically active only on its left edge. I will assume this latter approach in what follows.

The behavior of “bilaterally active” languages like Irish clearly bears further investigation. More study of such languages might uncover, for example, languages in which the choice between left and right boundaries depends on the syntactic label of the projection in question (in which case we might expect the relevant boundary to depend on which phrase is Agreed with by C). We might discover that ‘prosodic activity’ in the relevant sense must manifest itself only in certain phenomena, but not others (for instance, that boundary tones are relevant, but that final lengthening never is). I will have to leave this larger issue open for further study. In the rest of the discussion below, I will generally talk as though languages are prosodically active only on one edge, as far as the syntax is concerned, but we should bear in mind that this may well be a simplification.

2.5 Interim conclusions: the nature of Grouping

The main point of the chapter thus far has been to show that the theory of Richards (2010), constructed using an End-based approach to prosody, can be changed in ways that make it compatible with Match theory. In section 2.3, I discussed one advantage gained by changing to Match theory; it allows the theory under construction here to cover the facts about the prosody and syntax of English Contrastive Topics discussed by Constant (2014). I will assume Match theory in what follows.

I will crucially assume that the prosodic trees standardly offered in Match theory are produced, in part, by various postsyntactic operations driven by purely phonological requirements. For instance, syntax constructs its prosodic tree in ignorance of lexically idiosyncratic facts, which means that the syntax will often assume that elements that are in fact phonologically null or prosodically weak are fully-fledged prosodic objects; postsyntactic ‘pruning’ will be responsible for eliminating some of the prosodic nodes posited by the syntax in such cases.

I will assume the general prosodic condition on wh-questions given in (65):

- (65) *Contiguity*

Given a wh-phrase α and a complementizer C where α takes scope, α and C must be dominated by a single ϕ , within which α is *Contiguity-prominent*.

And the notion of *Contiguity-prominence* that has been relevant for us thus far has been:

- (66) α is *Contiguity-prominent* within ϕ if α is adjacent to a prosodically active edge of ϕ .

One technique for satisfying (65) has been the operation of Grouping, described in (67):

(67) ***Grouping***

Given a wh-phrase α and a C with which α is in a Probe-Goal relation, create a ϕ which dominates C and α .

Like its analog in Richards (2010), the operation of Grouping can successfully create Contiguity just when the prosodically active edge of the wh-phrase is on the opposite side of the wh-phrase from C; wh-in-situ is therefore limited to such languages, which can apply Grouping to obey (65) without needing to move the wh-phrase. In the next section, we will turn to another method for creating Contiguity.

3. Basque and Georgian: Contiguity-adjunction

Basque is perhaps the language that sits least comfortably in the typology of Richards (2010); it is the one language in which, on Richards' account, there is no way to remove all the prosodic boundaries from between C and the wh-phrase. My response to this problem in Richards (2010) was to phrase the condition on the prosody of wh-questions as an economy condition; the grammar must keep the number of boundaries between the wh-phrase and C as small as possible.

In what follows we will discuss the Basque facts in more detail, and then turn to prosodic facts from Georgian, a language with the same kind of wh-questions that we find in Basque. The Georgian facts will allow us to see that Richards' (2010) treatment of Basque is a misanalysis; it is in fact the case, arguably even in Basque, that the grammar must conspire to create a ϕ which contains both C and the wh-phrase. We will discover a new way of creating such a ϕ , which I will refer to as *Contiguity-adjunction*.

Elordieta (1997) claims that (in the terms developed here) there are two kinds of prosodically active edges of ϕ found in Lekeitio Basque; one is to the right of lexically accented words, and the other is just before the verb. The prosodic activity in question consists of a

phrase-final pitch fall, with the high point of the fall on the stressed syllable of the relevant word (H^*L). Elordieta illustrates the effects of lexical accent with minimal pairs like the one in (68):

(68) a.		b.	H^*L
	[[lagunen] dirua]		[[lagúnen] dirua]
	friend-GEN.SG. money		friend-GEN.PL. money
	'the friend's money'		'the friends' money'

The genitive singular and genitive plural forms of the word for 'friend' are segmentally identical, but differ in that the plural is lexically accented while the singular is not. This makes the ϕ edge following the possessor in (68b) active, associating this edge with H^*L .

If we abstract away from the effects of lexical accent, the only obligatorily prosodically active ϕ -boundary to be found in a Basque sentence is the one before the verb. Sentences such as (69), which consist entirely of unaccented words, need contain only one H^*L :

(69)	H^*L	
	↓	
	[Sure [erriko [alkatia]]] [Iruña-ra] [allaga da]	(Gussenhoven 2004)

our town's mayor Iruña-at arrived AUX

'The mayor of our town has arrived in Iruña'

This makes Basque very different from Japanese, in which (following Selkirk and Tateishi 1988 and much subsequent work) left edges of ϕ are very generally prosodically active. In Basque, by contrast, prosodic activity is confined to right edges of certain maximal projections (namely, those headed by lexically accented words), and also to the ϕ -boundary just before the verb. In the theory developed in Richards (2010), this prosodic difference has a syntactic consequence. Japanese, unlike Basque, can leave wh-phrases in situ, connecting them to the clause final complementizer via direct manipulation of the prosody (in the terms developed here, the

operation of Grouping can create a ϕ with the wh-phrase at its active edge and the complementizer at the other). Basque's prosodic properties do not allow it to do this.

What Basque in fact does is to place the wh-phrase as close as possible to the complementizer:

- (70) a. Mirenek séin ikusi rau? (*Ondarroa Basque: Arregi*
Miren-ERG who-ABS see-PRF AUX 2002)
'Who has Miren seen?'
- b. * Séin Mirenek ikusi rau?
who-ABS Miren-ERG see-PRF AUX
- c. Jon señek ikusi rau?
Jon-ABS who-ERG see-PRF AUX
'Who saw Jon?'
- d. * Señek Jon ikusi rau?
who-ERG Jon-ABS see-PRF AUX

In the theory in Richards 2010, (70) is simply the best that Basque can do; there is only one prosodically active boundary (in Richard's (2010) terms, only one Minor Phrase boundary) between the wh-phrase and C, and since this number cannot be reduced any further, the word orders in (70) are the most prosodically acceptable ones available.

Suppose we consider the question, however, of why exactly the boundary between the wh-phrase and the verb is prosodically active. We have seen that Basque realizes prosodic activity in two positions; after lexically accented words, and after the phrase that immediately precedes the verb. As it happens, the wh-words in (70) satisfy both of these criteria: wh-words happen to be lexically accented in Basque (Elordieta 1997, 44; 2003, 94), and they are also

immediately preverbal. Which of these properties is responsible for the prosodically active boundary after the wh-phrase? If this particular prosodically active boundary is present because of a lexically idiosyncratic property (lexical accent) rather than a syntactic one (being immediately preverbal), then we might hope, following the reasoning from the previous chapter, that the boundary is in fact not yet active in the representation that the syntax manipulates.

Evidence that this idea is on the right track comes from Georgian. Georgian is like Basque in that wh-phrases must immediately precede the verb (King 1996):

- (71) a. nino **sad** Cavida?

Nino where 3.go

'Where did Nino go?'

- b. **sad** Cavida nino?

where 3.go Nino

- c. ***sad** nino Cavida?

where Nino 3.go

- d. * nino Cavida**sad**?

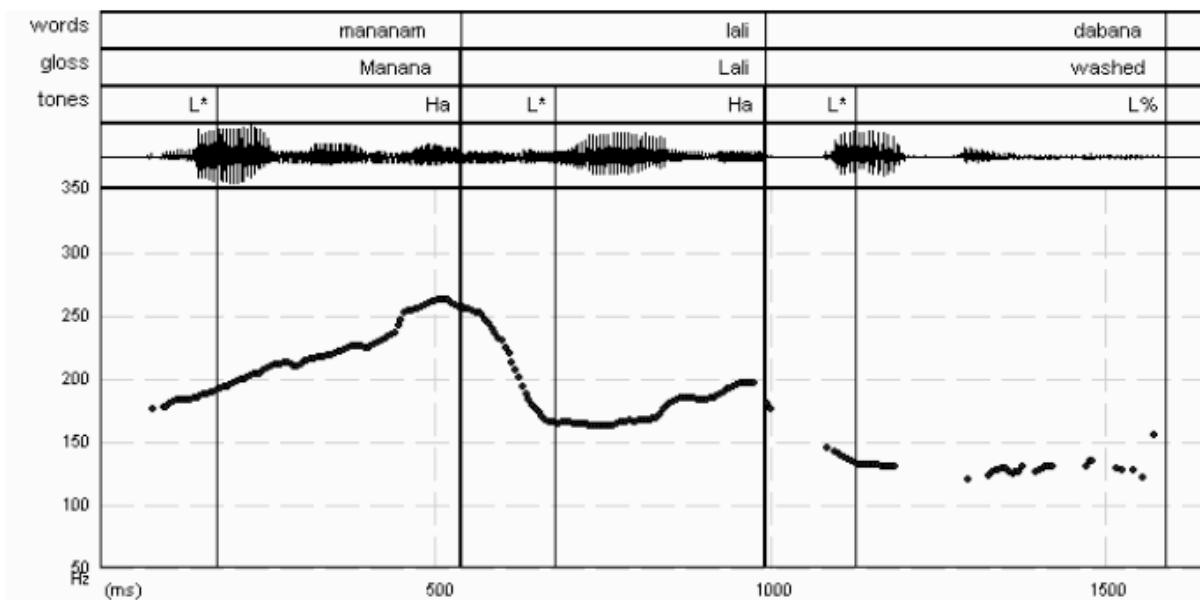
Nino 3.go where

Some work has been done on Georgian prosody (Jun et al 2007, Skopeteas et al 2009, Vicenik and Jun 2014, and references cited there). Jun et al (2007), for example, note that prosodic phrases of a certain size end with a High tone in ordinary wide-focus sentences:

- (72) Manana-m Lali dabana [Georgian: Jun, Vicenik, and Löfstedt 2007]

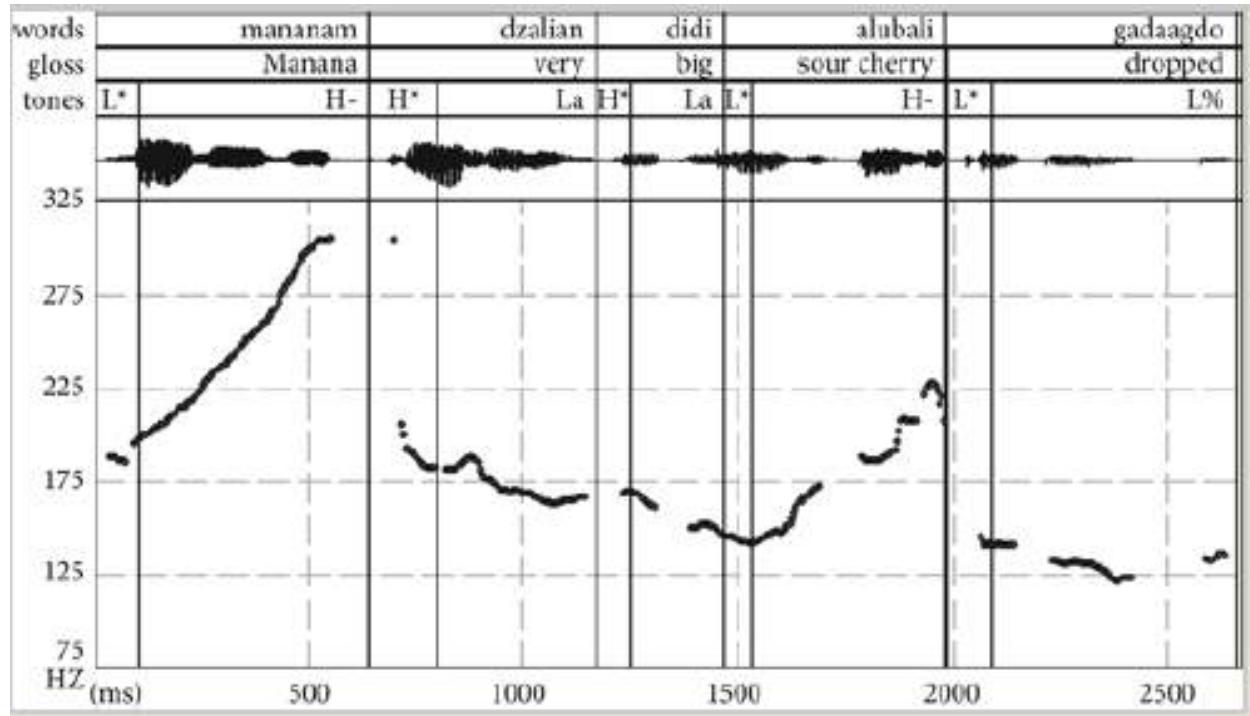
Manana-ERG Lali washed

'Manana washed Lali'



In (72), each of the DPs constitutes a prosodic phrase of its own; we can see that each ends in a High tone (and that each stressed syllable has a Low tone, leading to a rapid fall after each High, as stress is apparently generally initial in Georgian). Example (73), from Vicenik and Jun (2014, 163), shows the intonation of a more complex example:

- (73) Manana-m dzalian didi alubali gadaagdo
 Manana-ERG very big sour.cherry dropped
 'Manana dropped the very big sour cherry'



Examples like (73) demonstrate that the High tones appearing in (72) do not necessarily appear on every word of the Georgian sentence; the modifiers *dzalian* ‘very’ and *didi* ‘big’ in (73) lack such High tones, and we are therefore entitled to regard these tones as boundary tones for some type of phrase. Vicenik and Jun (2014) do offer examples of modifiers which have the phrasal High tones, but they describe the kind of pitch track given in (73) as the one that “typically” appears for this type of syntactic structure (p. 162). We can therefore follow Vicenik and Jun in regarding these High tones as the markers of a type of prosodically active right boundary of a phonological phrase.

I should emphasize that I have glossed over several interesting aspects of Vicenik and Jun’s proposal. For example, in their analysis, the high boundary tone on the direct object is marking prosodic phrases of different size in (72) and (73); they describe the direct object in (72)

as an Accental Phrase, while the direct object in (73) is an Intermediate Phrase. I will direct interested readers to their work for a full discussion of the various kinds of prosodic phrases they posit, and the ways in which these phrases may be marked. What is most important for us is their insight that Georgian boundary tones mark right edges of prosodic phrases.

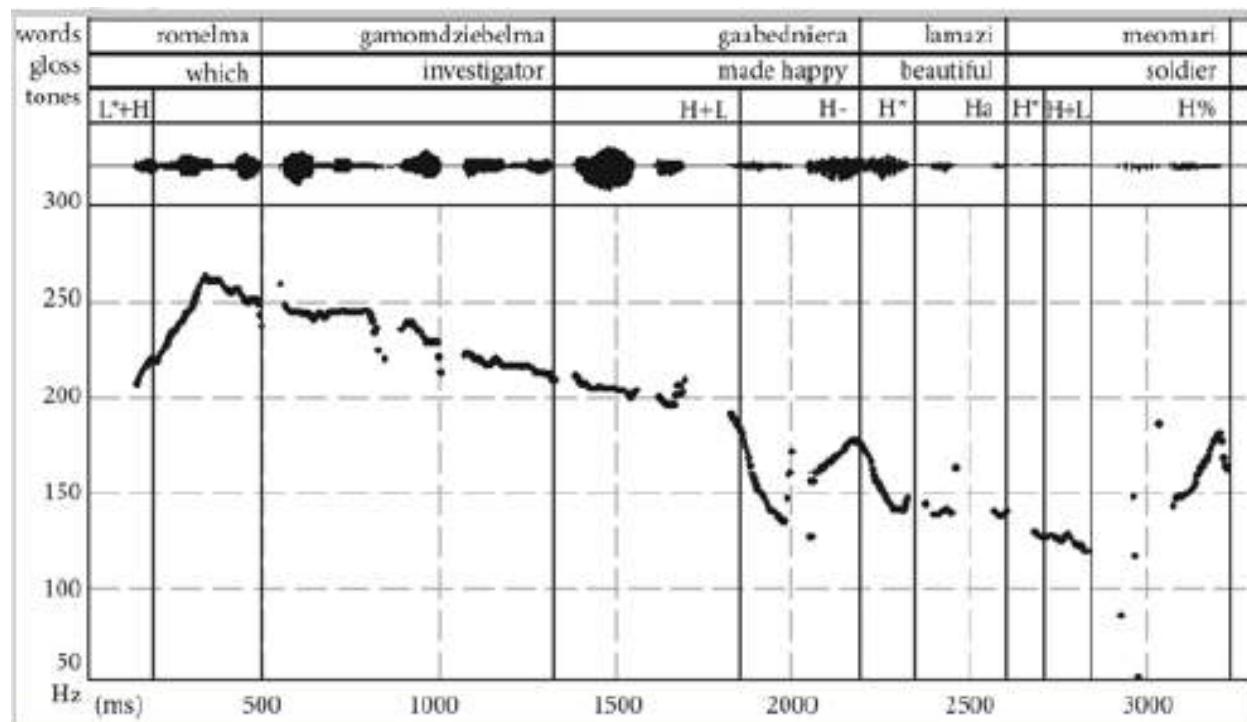
This observation allows us to understand why Georgian behaves like Basque with respect to the placement of its wh-phrases; both Georgian and Basque are head-final languages with prosodically active right edges of ϕ . In fact, Georgian prosody is more transparently organized in this way than Basque prosody is, as there is apparently no influence of lexical accent in Georgian.

It is especially interesting, therefore, that the high tone that would ordinarily end the preverbal phrase is eliminated when that phrase is a wh-phrase (or, as Vicenic and Jun (2014, 164) put it, "the verb and preceding wh-phrase are typically grouped into a single phrase"):

- (74) romel-ma gamomdziebel-ma gaabedniera lamazi meomari?

which-ERG investigator-ERG made.happy beautiful soldier

'Which investigator made the beautiful soldier happy?'



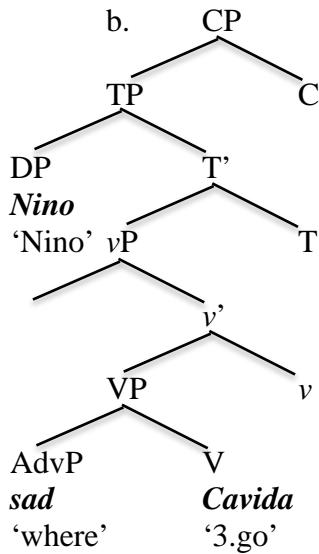
In the pitch track above, the wh-phrase lacks the final High tone and following fall which is characteristic of preverbal DPs, and which we have taken to be a signal of the presence of a prosodically active boundary.

The Georgian facts suggest that the prosodic condition on wh-phrases may be stated more absolutely than it was in Richards (2010); languages must not merely ‘do their best’ to put C and wh-phrases in the same ϕ , but absolutely must do so. Grouping, as stated, will not accomplish this. Consider how Grouping would apply to a Georgian wh-question:

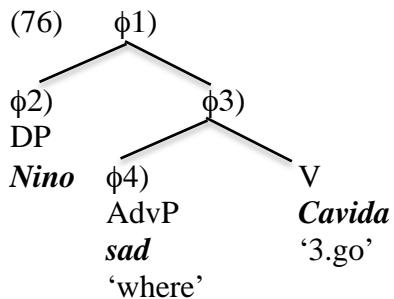
- (75) a. nino sad Cavida?

Nino where 3.go

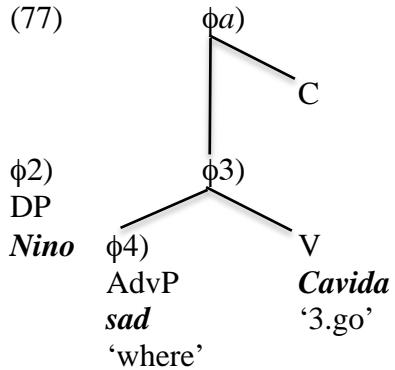
'Where did Nino go?'



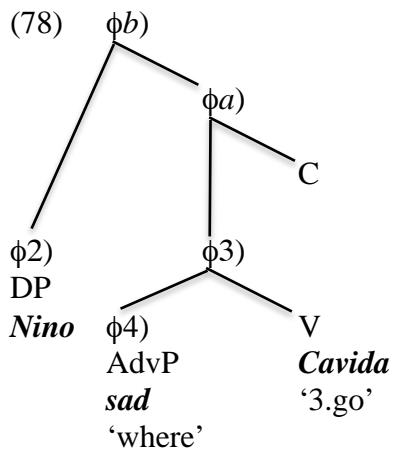
Before Merge of C, the syntactic tree in (75b) would be associated with the prosodic tree in (76) (as usual, we are considering here the prosodic tree prior to post-syntactic pruning of phonologically null material, and I have again numbered each ϕ to make discussion easier):



Once C is Merged, it would undergo Grouping with the wh-phrase, yielding the tree in (77):

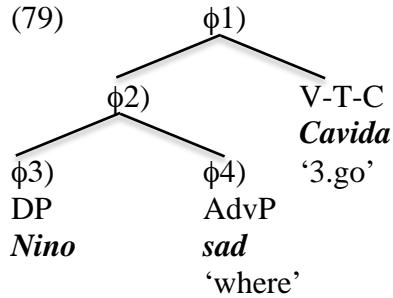


Finally, CP would be mapped onto another ϕ , yielding (78):



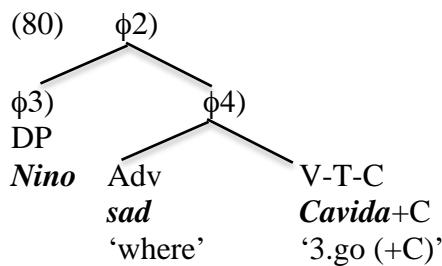
The wh-phrase *sad* ‘where’ and the C are both contained in ϕ_a , as well as in ϕ_b , but the wh-phrase is not Contiguity-prominent in either of these, by our current definition of Contiguity-prominence; it is separated from the prosodically active right edges of these ϕ by the verb, as well as by C itself.

Head-movement of V to C would not change the situation in any useful way. If such movement moved the verb to a position c-commanding all other overt material in the sentence, it would license the creation of a prosodic tree like the one in (79):



Here, again, *sad* ‘where’ is not Contiguity-prominent in a ϕ that contains C; the only ϕ containing them both is ϕ 1, and the adverb is not adjacent to the right edge of ϕ 1.

The tree in (79) highlights an interesting property of these examples. The wh-phrase is not Contiguity-prominent, precisely because of the element it is seeking Contiguity with. In (79), for example, it is the V-T-C complex itself that prevents the wh-phrase from being adjacent to the right edge of ϕ 1. Suppose we exploit that fact by countenancing another kind of deviation from strict Match, which I will call *Contiguity-adjunction*. If the V-T-C complex in (79), instead of being a daughter of ϕ 1, were a daughter of ϕ 4, then Contiguity between C and the wh-phrase would hold within ϕ 4. In (80) below, I have made the V-T-C complex a daughter of ϕ 4 (and have pruned ϕ 1, since it now has only a single daughter):



In (80), the wh-phrase and C are both dominated by ϕ 4. Since ϕ 4 is also the prosodic projection of the wh-phrase itself, the wh-phrase is Contiguity-prominent within ϕ 4. Recall that a wh-phrase is Contiguity-prominent in a particular instance of ϕ if the wh-phrase is adjacent to the prosodically active edge of that ϕ . In this case, the smallest ϕ containing the wh-phrase and C is

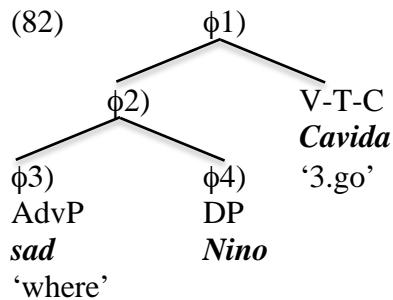
the ϕ projected by the wh-phrase itself; the requirement of Contiguity-prominence thus reduces to a requirement that the wh-phrase be adjacent to its own edge, which will always be the case.

I will refer to the operation that yields (80) as *Contiguity-adjunction*:

(81) ***Contiguity-adjunction***

Take a pair of adjacent prosodic nodes, and make one of them a daughter of the other.

I have specified in (81) that the nodes participating in Contiguity-adjunction must be linearly adjacent, but this can be taken as a similarity between Contiguity-adjunction and Grouping; both affect the prosodic tree, but not the linear order of the terminals. Consider, for example, a tree in which scrambling has reversed the order of the wh-phrase and the subject:



In (82), Grouping, as before, cannot relevantly improve the prosody of the structure; ϕ_1 dominates both C and the wh-phrase, but the wh-phrase is not Contiguity-prominent within ϕ_1 , since it is not adjacent to ϕ_1 's prosodically active right edge. Contiguity-adjunction cannot work either; the wh-phrase and C are not adjacent (or, to put the issue another way, Contiguity-adjunction would alter the linear order²⁵), and Contiguity-adjunction of the V-T-C complex to the subject *Nino* would not improve the prosody of the wh-question. Finally, one could imagine first Contiguity-adjoining the V-T-C complex to the subject, and then Contiguity-adjoining the

²⁵ Contiguity-adjoining the wh-phrase to the C-T-V complex would presumably put the wh-phrase in immediately preverbal position, which is in fact where it is. As stated, Contiguity-adjunction in such a case would make the wh-phrase ϕ a daughter of the V-T-C ω , violating the prosodic hierarchy; I will leave aside for now the question of whether it is worth trying to circumvent this problem.

subject to the wh-phrase. Such a derivation would indeed create a prosodically acceptable wh-question, and we will therefore need to rule it out. In section 2 of chapter 5, I will develop a general condition requiring every operation to be motivated by needs of its participants, and this condition will rule out this kind of derivation (the subject, for example, has no independent reason to adjoin to the wh-word).

Richards (2010) posited a prosodic requirement on wh-questions which had an Economy flavor; the idea was that prosodic boundaries between the wh-phrase and its C should be kept to a minimum, and that there were languages, like Basque, in which at least one such boundary would unavoidably remain. The above analysis of Georgian allows us to reject this aspect of the previous analysis; the prosodic condition on wh-questions is absolute, and universally obeyed, in the narrow syntax. What distinguishes Basque from Georgian, on this theory, is a kind of derivational opacity. The narrow syntax of both languages creates a prosodic structure in which the wh-phrase and C are Contiguous, but Basque phonology demands that lexically accented words be followed by prosodic boundaries. Since wh-words in Basque are lexically accented, a late PF operation in Basque will destroy the Contiguity relation created by the syntax. As in the preceding chapter, we can see that the requirements of Contiguity Theory, despite their frequent reference to phonological phenomena, are requirements imposed in the narrow syntax, and need not hold of the final phonological representation.

4. Krachi

Georgian and Japanese exploit different aspects of the definition of Contiguity-prominence to create prosodic contiguity: Japanese uses Grouping to align the wh-phrase with a prosodically active edge of a newly created ϕ , while Georgian instead uses Contiguity-adjunction to place C within the ϕ projected by the wh-phrase. In this section I will argue that there is no need to

invoke a parameter determining how a given language should put wh-phrases in a Contiguity-prominent position; a given language will use whichever mechanism will allow it to satisfy Contiguity requirements.

Work by Kandybowicz and Torrence (2011) on the Kwa language Krachi makes a particularly clear argument for this conclusion. They demonstrate that Krachi uses, in the terms developed here, both Grouping and Contiguity-adjunction to form its wh-questions.

Kandybowicz and Torrence (2012) establish that in general, Krachi patterns with Chichewa in the typology outlined in section 1 above. Like Chichewa, it generally allows wh-phrases to be either moved or in situ²⁶:

- (83) a. ɔʃ̩i w ε-mò **bwatéo momo?**

woman AGR-kill.PST chicken which

'Which chicken did the woman slaughter?'

- b. **Bwatéo momo** jí ɔʃ̩i w ε-mò?

which chicken FOC woman AGR-kill

'Which chicken did the woman slaughter?'

Krachi is also like Chichewa, Kandybowicz and Torrence argue, in that it generally has prosodically active right edges of ϕ ; in the case of Krachi, these edges are marked with a Low boundary tone (I refer interested readers to Kandybowicz and Torrence (2012) for the arguments for this conclusion). Thus far, the account developed above for Chichewa generalizes to Krachi; Krachi is a generally head-initial language which can satisfy the prosodic conditions on wh-questions by Grouping, creating a ϕ with the complementizer at one edge and the wh-phrase at

²⁶ Note that the particle *jí* must follow the moved wh-phrase, and cannot appear when the wh-phrase is not moved:

(i) *Jí ɔʃ̩i w ε-mò ne?
FOC woman AGR-kill.PST what

'What did the woman slaughter?'

We could view *jí* as a kind of Agreement morpheme, indicating whether its specifier is occupied or not.

the other, and thus aligning the wh-phrase with the prosodically active right edge of the newly created ϕ , making the wh-phrase Contiguity-prominent.

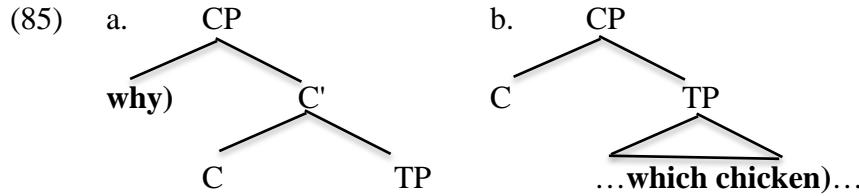
This general picture is complicated by the behavior of *nání* 'why', which must be clause-initial:

- (84) a. **Nání** jí ɔfíw ε-mò bwatéo?
 why FOC woman AGR-kill.PST chicken
 'Why did the woman slaughter the chicken?'
 b. * ɔfíw ε-mò bwatéo **nání?**
 woman AGR-kill.PST chicken why

Kandybowicz and Torrence (2012) claim, following a long literature on the cross-linguistic behavior of words meaning 'why' (including Rizzi (2001) and Ko (2005)), that *nání* must be clause-initial because it must be base-generated in the specifier of CP. What makes *nání* particularly interesting, however, is that it is prosodically as well as syntactically anomalous; not only must it be clause-initial, but it lacks the usual low tone at its right boundary.

We can understand Krachi as a language that can use either the Japanese or the Georgian strategy for satisfying the prosodic conditions on wh-questions. In head-final languages like Japanese and Georgian, wh-phrases routinely precede the complementizer with which they must become Contiguous. The choice of how to make the wh-phrase Contiguity-prominent within the newly created ϕ is therefore entirely determined in these languages by the directionality of prosodically active edges. Japanese, which has prosodically active left edges, elects to use Grouping, aligning the wh-phrase with the prosodically active left edge of the newly created ϕ ; Georgian, on the other hand, has prosodically active right edges, and must therefore use Contiguity-adjunction to make C part of the ϕ projected by the wh-phrase.

Krachi, by contrast, is head-initial, and the ordering of wh-phrases with C is variable:



As Kandybowicz and Torrence (2012) show, Krachi generally has prosodically active right edges. The wh-word *nání* 'why' is generated in the specifier of CP, and Grouping of the wh-phrase with C will therefore not work in this case: a new ϕ dominating the wh-phrase and C would not have the wh-phrase at its prosodically active right edge, and the wh-phrase would fail to be Contiguity-prominent. The only way to create Contiguity between the wh-phrase and C, therefore, is the Georgian strategy of Contiguity-adjunction, prosodically adjoining C to the wh-phrase. This operation apparently has the phonetic consequence of loss of the Low boundary tone that would ordinarily follow *nání* 'why'.

The Krachi case is of interest partly because it demonstrates particularly clearly that the parameter distinguishing languages should not be thought of as one determining which strategy a language will use to create Contiguity. Rather, the point of variation between languages has to do with which edge of maximal projections is standardly associated with a prosodic boundary; the grammar will then use whichever strategy is appropriate to create Contiguity, given a particular configuration.

The Krachi facts also illustrate the point that wh-phrases are subject to conditions other than the general prosodic requirement that they be Contiguous with the complementizer. Krachi *nání* 'why' must be generated in the specifier of CP, not because of the Contiguity requirement, but for reasons presumably having to do with its meaning. Similarly, if English were capable of Merging direct objects in the specifier of CP, then wh-phrase direct objects could be Merged

there, satisfying Contiguity immediately upon Merge. I assume that such a derivation is ruled out by conditions on selection. Whether these conditions are purely syntactic conditions, or are to be implemented as conditions on the prosodic relation between the direct object and the head that selects it, is a question I will leave to future research.

5. Limited Grouping

One of the goals of Richards (2010) is to offer a natural place for languages in which overt wh-movement is optional:

- (86) a. Wa-á-pátsa bambo **chi-yáani** ? [Chichewa:
1SUBJ-TAM-give 1.father 7-what Cheng and Downing 2011, 6]

'What has s/he given to father?'

- b. Kodí ndi **yani** a-méné mkángó ú-kú-sáutsa? [Chichewa:
Q COP who SUBJ-REL 3.lion 3SUBJ-PRES-bother Mchombo
'Who is (it that) the lion is bothering?' 2004, 45]

- (87) a. Tu as vu **qui**? [French]

you have seen who

'Who did you see?'

- b. **Qui** tu as vu?

who you have seen

In Richards (2010), these are languages with initial complementizers and prosodically active right edges of ϕ . The prosodic conditions on wh-questions can therefore be satisfied in two ways; the wh-phrase can be left in situ, and connected with C via the process we now know as Grouping, or it can be moved to become adjacent with C, making Contiguity-adjunction possible. As long as we do not posit any blanket preference in the grammar for or against

movement as a way of creating prosodically acceptable questions, we correctly expect that both options should be available.

Languages of this kind often exhibit constraints on wh-in-situ which are not found in languages like Japanese, in which wh-in-situ is the only prosodically acceptable option. For example, French wh-in-situ appears to be unable to cross tensed clause boundaries (Chang 1997, Bošković 1998, Reglero 2005):

- (88) *Peter a dit que John a acheté **quoi**?

Peter has said that John has bought what

'What did Peter say that John bought?'

Uribe-Etxebarria (2002) and Reglero (2005) note that in some dialects of Spanish, wh-in-situ is possible just in case it is utterance-final or followed by a pause:

- (89) a. Tú le diste la guitarra **a quién**?
you CL gave the guitar to whom
b. Tú le diste **a quién** *(#) la guitarra?
you CL gave to whom the guitar

Cheng and Downing (2011) discuss an interesting difference between Zulu and Chichewa, both Bantu languages with optional wh-in-situ. Zulu, they point out, is more restricted in the positions that wh-in-situ can occupy, in that postverbal wh-in-situ must generally immediately follow the verb:

- (90) a. Bá-m-níkée-**ni** úSíphó? [Zulu]
2s-1o-give-what AUG.1Sipho
'What did they give to Sipho?'
b. *Bá(-m)-níkée úSípho **iini**

As they point out, this condition does not hold in Chichewa:

- (91) Wa-á-pátsa bambo **chiyáani?**

1s-TAM-give 1.father 7.what

'What has s/he given to father?'

Buell (2009) notes that even in Zulu, not all instances of wh-in-situ must be immediately postverbal:

- (92) Ba-nik-e uSipho **mali-ni** [Zulu]

2-give-PERF AUG.1Sipho **9.money-what**

'How much money did they give Sipho?'

The facts are apparently fairly complicated, and in need of further study²⁷.

In the account developed here, conditions like these lend themselves to explanations in terms of restrictions on Grouping. Grouping, as defined, can be fairly destructive of existing prosodic structure, requiring the ‘pruning’ of material which must be excluded from the Grouped constituent. Contiguity-adjunction of C to a moved wh-phrase, by contrast, yields a structure which is almost isomorphic to its input. For languages like the ones discussed here, which have the option of using either Grouping or Contiguity-adjunction to create Contiguity between C and a wh-phrase, it is perhaps not surprising that some languages impose limits on what kinds of prosodic structures can undergo Grouping.

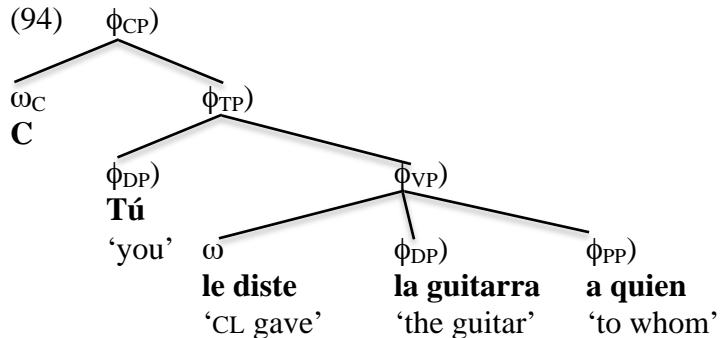
Consider, for example, a representation for the Spanish wh-question in (89a), repeated as

- (93a):

²⁷ Many thanks to Claire Halpert for very helpful discussion of Bantu languages in general and Zulu in particular.

- (93) a. Tú le diste la guitarra **a quién?**
 you CL gave the guitar to whom
 b. Tú le diste **a quién** *(#) la guitarra?
 you CL gave to whom the guitar

(93a) might have a prosodic tree resembling the one in (94):



The prosodic tree in (94) incorporates various guesses about things like the position of the Spanish verb and the proper representation of clitics, none of which are crucial at this point. The point about (94) is just that it is a structure in which no operation of Grouping need apply; C and the wh-phrase *a quien* ‘to whom’ are Contiguous within ϕ_{CP} , the domain that CP is mapped onto by regular principles of Match Theory. Since the wh-phrase is final in the sentence, it is adjacent to the prosodically active right boundary of ϕ_{CP} , and is therefore Contiguity-prominent. We might imagine, then, that Spanish wh-in-situ is subject to a requirement that it must be possible without any operation of Grouping; material following the wh-phrase must be prosodically extraposed, as in (93b).

A logical next question is how to distinguish languages like Spanish from languages like French, or languages like Zulu from languages like Chichewa, since not all optional wh-in-situ languages exhibit the same constraints. The nature of the dislocation process that makes (93b) possible might be a reasonable starting point for inquiry. Perhaps such processes are

independently more freely available in some languages than in others, for reasons we would then seek to discover, and a language may only require such operations if they are independently possible. I will have to leave the matter here, pending further study.

6. Conclusion

We have arrived at a condition on the prosody of wh-questions, based on Selkirk's (2009, 2011) Match theory of prosody, which derives the results of Richards (2010) (and, in fact, has a better coverage of the facts in languages of the Basque type). The universal condition is given again in (95):

(95) ***Contiguity***

Given a wh-phrase α and a complementizer C where α takes scope, α and C must be dominated by a single ϕ , within which α is *Contiguity-prominent*.

And *Contiguity-prominence* has now been defined as follows:

(96) α is *Contiguity-prominent* within ϕ if α is adjacent to a prosodically active edge of ϕ .

One operation we have concentrated on for satisfying (95) has been the operation of Grouping, described in (97):

(97) ***Grouping***

Given a wh-phrase α and a C with which α is in a Probe-Goal relation, create a ϕ which dominates C and α .

Another useful operation is described in (98):

(98) ***Contiguity-adjunction***

Take a pair of adjacent prosodic nodes, and make one of them a daughter of the other.

In general, (95-98) leave us with the prediction that if typical prosodically active edges of ϕ in a language lie on the same side of the wh-phrase as the complementizer, then the wh-phrase must

be made more or less adjacent to the complementizer, with no phrases intervening between them. In C-final languages like Georgian and Basque, this has the consequence that wh-phrases must be placed as far right in the clause as possible, just before the verb; in C-initial languages like Tagalog, it means that wh-phrases must undergo overt wh-movement to the left periphery of the clause. On the other hand, if prosodically active edges are on the opposite side of the wh-phrase from the complementizer, then the wh-phrase may remain in situ, becoming prosodically contiguous with the complementizer via manipulation of prosody alone; this is the case in C-final languages like Japanese, and in C-initial languages like Chichewa.

The next chapter will be devoted to expanding the requirement of Prosodic Contiguity from wh-questions to relations between Probes and Goals more generally.

Chapter 4: Probe-Goal Contiguity

In the previous chapter I revised the proposal of Richards (2010) to offer a universal requirement on the prosody of wh-phrases, repeated here in (1):

(1) ***Contiguity***

Given a wh-phrase α and a complementizer C where α takes scope, α and C must be dominated by a single ϕ , within which α is Contiguity-prominent.

The goal of this section is to generalize this condition to hold of relations between Probes and Goals more generally, as follows:

(2) ***Probe-Goal Contiguity***

Given a Probe α and a Goal β , α and β must be dominated by a single ϕ , within which β is Contiguity-prominent.

Generalizing Contiguity in this way raises the issue of how to treat Goals that are in Contiguity relations with multiple Probes. Consider, for example, the status of *what* in an example like (3):

(3) ***What*** do you think that John bought __?

What must satisfy Probe-Goal Contiguity with the most deeply embedded v , which I assume Agrees with *what* for ϕ -features, and also with (at least) matrix C. We will see that the condition of Probe-Goal Contiguity must be satisfied within each *phase*; once a phase has undergone Spell-out, the Contiguity relations created in that phase are forgotten. In (3), *what* must be Contiguous with v within the vP phase, but is then free to move higher in the tree, breaking the previously created Contiguity relation. This will have consequences for our understanding of the architecture of the grammar, providing further support for a claim made in the previous chapters; the conditions discussed here, although they make reference to

phonological objects like metrical boundaries and prosodic phrase boundaries, are enforced in the narrow syntax, without look-ahead to the phonology.

The operations for creating larger ϕ within which Contiguity relations can be created will be the ones we are now familiar with for wh-phrases, suitably generalized:

(4) ***Grouping***

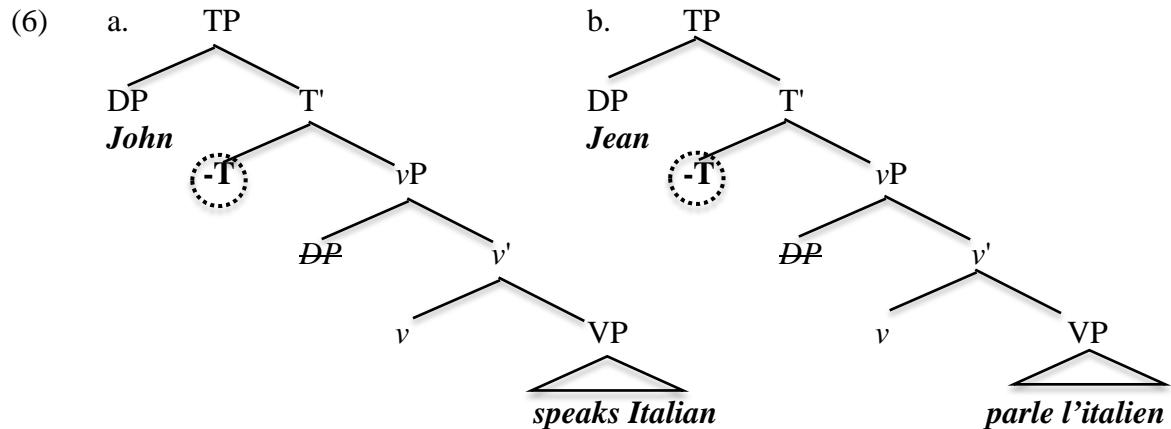
Take a pair of prosodic nodes α, β , and create a ϕ which dominates them both.

(5) ***Contiguity-adjunction***

Take a pair of adjacent prosodic nodes, and make one of them a daughter of the other.

1. English and French

In chapter 2, we learned that English and French are both languages in which T is reliably a suffix, without its own metrical boundary, and that Affix Support therefore requires the specifier of TP to be filled:

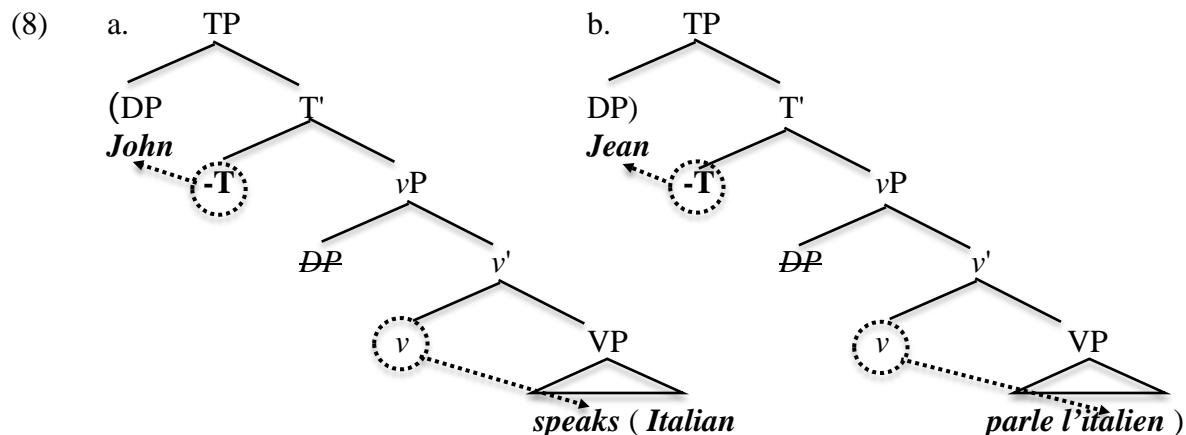


French and English both have head-initial complementizers, and French allows wh-in-situ in non-echo questions, while English does not:

- (7) a. **Who** did you see?
 b. Tu as vu **qui**?
 you have seen who

Given the theory of wh-movement in Richards (2010), reviewed in the preceding chapter, this leads us to hope that French has prosodically active Right edges of ϕ (that is, that French is like Chichewa), and that English has prosodically active Left edges of ϕ (that is, that English is like Tagalog). Much work on French prosody (see, for example, Selkirk 1986) has indeed concluded that French has prosodic activity at Right edges. No one has ever claimed, as far as I know, that English has prosodic activity at Left edges; I will offer a suggestion shortly about why that might be.

I will assume that T Agrees with the subject in both English and French, and that v Agrees with the object. In (8), I have annotated the trees in (6) for these Agree relations, and also used parentheses to indicate the position of prosodically active boundaries of DP:

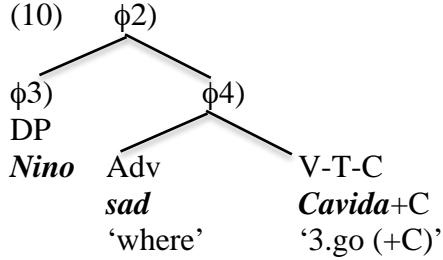


Let us consider first the English tree in (8a).

In (8a), v is to the left of its Goal, and prosodically active boundaries are generally also on the left. We know what happens in the domain of wh-questions when the Probe and the Goal are separated by a prosodically active boundary: the wh-phrase is compelled to be adjacent to C, with no phrases intervening between them:

$$(9) \quad \text{DP }) \quad \text{wh }) \quad \text{C} \quad [\text{Georgian, Basque}]$$

One proposal of the previous chapter was that a configuration like the one in (9) makes it necessary to use Contiguity-adjunction to establish Contiguity between C and the wh-phrase:



In (10), the V-T-C complex has become a daughter of the ϕ projected by the wh-phrase, ϕ_4 ; the wh-phrase is Contiguity-prominent within ϕ_4 , since it is (tautologically) adjacent to the prosodically active edge of this ϕ . Contiguity-adjunction can only apply without altering word order when the two nodes participating are linearly adjacent; consequently, there can be no maximal projections linearly intervening between the wh-phrase and C.

Similarly, we now expect that in English, v and the object will have to be adjacent:

- (11) John speaks (*often) Italian.

This may or may not be enforced by movement of the direct object past intervening material (see Postal 1974, Lasnik and Saito 1991, Koizumi 1993, Johnson 1993 for discussion). Note that Contiguity-adjunction will have the consequence that no ϕ -boundary intervenes between the verb and the object; perhaps this is why English does not typically have an actual prosodic break between the verb and the direct object (and hence is not generally analyzed as having prosodically active left edges of ϕ).

More generally, what we expect is that Probes will have to be adjacent to Goals that follow them in English:

- (12) a. [For Mary to be about to leave] would make me nervous.
 b. * [For probably Mary to be about to leave] would make me nervous.

- (13) a. Now John is happy.
b. * Is now John happy?

The pair in (13) illustrates an interesting property of Contiguity relations, which we will return to; they appear to be *persistent*, in the sense that the Contiguity relation between T and the subject must still hold after T moves to C in (13b). Contiguity is therefore unlike, for example, checking; it is not sufficient for Contiguity to hold at some point in the derivation. It will turn out to be relevant, I will claim, that T and C are phasemates; the Contiguity relations created by T are respected just within the smallest phase that contains T.

Let us now consider the French tree in (8b). Here the situation is the reverse of the English one; no prosodically active boundary intervenes between *v* and the object, but there is a prosodically active boundary between T and the subject. French should therefore be unlike English in that *v* and the object may be separated by adverbs, but T and the subject may not be:

- (14) a. Jean (*souvent) parle (souvent) l'italien.
b. John (often) speaks (*often) Italian.

Facts like those in (14) are at the heart of the argument (Emonds 1978, Pollock 1989) that the French verb raises higher than the English verb. In Contiguity theory, these facts about adverb distribution are related to a prosodic difference between the two languages, which also expresses itself in the fact that French, unlike English, allows wh-in-situ in non-echo questions.

If the appearance of verb movement in French is related to the fact that T must be adjacent to the subject, then we expect the verb movement facts to change when the subject is not present. This is indeed the case:

- (15) a. Jean **parle pas** l'italien
 Jean speaks not the Italian
 'Jean doesn't speak Italian'
 b. * Jean **pas parle** l'italien
 Jean not speaks the Italian
 c. **Pas parler** l'italien ...
 not to.speak the Italian
 'To not speak Italian...'
 d. * **Parler pas** l'italien ...

French verbs, famously, behave differently in infinitival clauses; negation, for example, cannot precede the tensed verb (for reasons we now understand; negation cannot intervene between T and the subject), but can (and in fact must) precede the infinitival verb. In (15c), since the subject is missing, there is no Contiguity relation between T and the subject for the negative adverb to break.

- As we expect, even in infinitives, the French verb need not be adjacent to its object:
- (16) (à peine) **parler** (à peine) l'italien ...
 hardly to.speak hardly the Italian
 'To hardly speak Italian...'

That is, French infinitival clauses are not simply identical to English finite clauses. Since French has prosodically active Right edges of ϕ , it is possible to make the object and v Contiguous across an arbitrary distance, regardless of whether the verb is finite or non-finite.

2. Irish (Zapotec, Kaqchikel, Garífuna...)

Several VSO languages have been described as requiring V, S, and O to be adjacent:

- (17) a. Chuala (* **ar** **ndóigh**) mé an t-amhrán sin

heard **of course** I that.song

'I of course heard that song' [Irish: Adger 1997]

- b. Phleanáil an múinteoir (* **fosta**) an rud amach

planned the teacher **also** the thing out

'The teacher also planned out the thing'

- (18) Ù-dàù (* **chílə'z**) Juàany bèjl

ASP-eat **slowly** Juan fish

'Juan ate the fish slowly' [San Dionicio Ocotepec Zapotec: Broadwell 2002]

- (19) (**Iwir**) x-r-oqotaj (***iwir**) ri tz'i' (* **iwir**) ri me's

yesterdayASP-3SG.ERG-chase **yesterday** the dog **yesterday** the cat

'The dog chased the cat yesterday' [Kaçchikel: Broadwell 2000]

- (20) Ru-tu (***yahaun**) Maria (***yahaun**) fein (**yahaun**) l-un John

give-3SG.FEM.T here Maria here bread here 3SG.MSC.G-to John

'Maria gives bread to John here' [Garífuna: Kaufman 2010]

McCloskey (1996) demonstrates that this is not quite true for Irish, as there is a rather small set of adverbs that can intervene between the subject and the object:

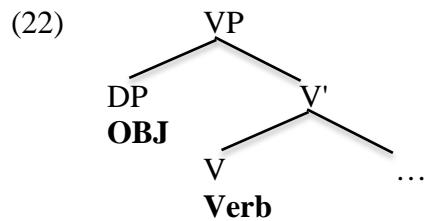
- (21) a. Deireann siad **i gcónai** paidir roimh am lui
say they **always** prayer before time lie
'They always say a prayer before bed-time' [Irish: McCloskey 1996, 259]
- b. Chuala Róise **go minic roimhe** an t-amhrán sin
heard Róise **often** **before.it** that.song
'Róise had often heard that song before'
- c. Ní chluinfeadh aon duine **choíche arís** Ciarán ag gabháil cheoil
NEG hear.COND any person **ever** **again** Ciarán making.music
'No-one would ever again hear Ciarán making music'
- d. Níor shaothraigh Eoghan **ariamh** pingin
NEG earned Owen **ever** penny
'Owen never earned a penny'

In what follows I will concentrate on Irish, hoping that the account can be generalized to the other VSO languages in (44-46).

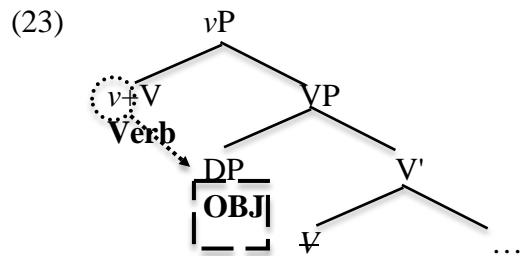
Irish is a complementizer-initial language with obligatory overt wh-movement. This leads us to expect that Irish is like Tagalog (and English), in that it has prosodically active boundaries to the left of ϕ (see the previous chapter, particularly section 2.4, for some discussion of Irish prosody). We therefore predict that Irish probes, just like English probes, should have to be adjacent to following Goals; the only way for a Probe to be Contiguous with a following Goal will be via Contiguity-adjunction, which requires adjacency. Assuming that T and v are both in or near the Irish verb at the beginning of the sentence, adjacency (hence, Contiguity) seems to hold between T and the subject, but not between v and the object.

Let us consider a derivation for the Irish examples. The derivation will be intended to capture three facts about adverb placement in Irish: first, that adverbs can appear between the subject and the object, but not between the verb and the subject; second, that the adverbs that can appear between the subject and the object can also be final; and finally, that the class of adverbs that can appear between the subject and the object is quite small (prior to McCloskey 1996, it was generally thought that the subject and the object had to be adjacent in Irish).

The derivation might begin by constructing a VP, perhaps the highest VP in a series of Larsonian shells:

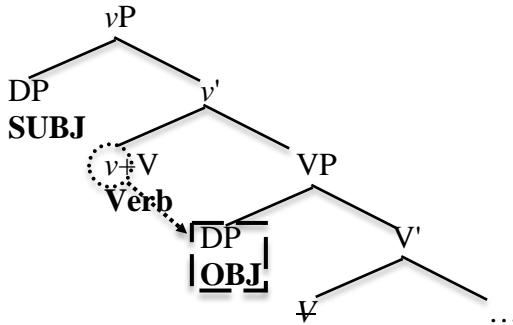


The next step is to Merge *v*, which Agrees with the object, establishing Contiguity. The object and *v* are then required to be adjacent. The verb also raises to *v*, for reasons we will discuss in chapter 6:



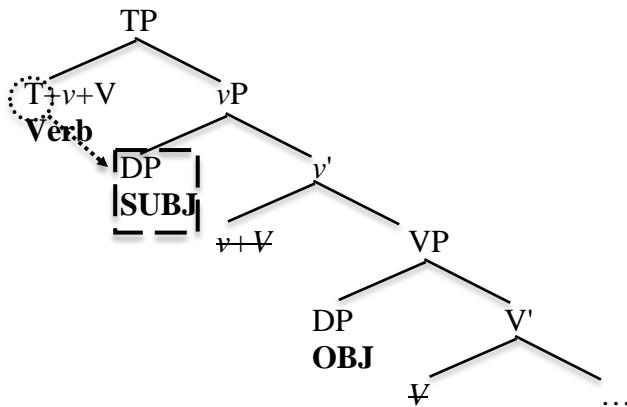
Next, the subject is Merged in the specifier of vP:

(24)



Now T Merges, and causes the verb to raise (again, for reasons we will discuss later). Since T is not a suffix in Irish, it has no need of Affix Support, and hence does not cause the subject to raise to its specifier (see Chapter 2). At this point in the derivation, Contiguity between *v* and the object is broken; the subject intervenes between them:

(25)

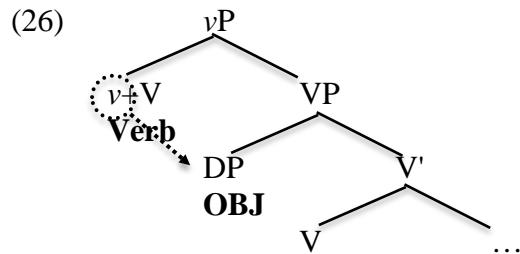


T Agrees with the subject, establishing a Contiguity relation with it; no adverbs may appear between them.

We have seen that Contiguity relations can be broken without ill effect; this is what happens to the relation between *v* and the object in (25), when the verb moves past the subject. On the other hand, the Contiguity relation between T and the subject holds at the end of the derivation. Apparently it is not always crucial that Contiguity relations survive to the final representation.

We are now in a position to account for the three facts about Irish adverbs that I listed before discussing the derivation in (22-25). Adverbs can appear between the subject and the object, but not between the verb and the subject, because the Contiguity relation between T and the subject still holds at the end of the derivation, while the Contiguity relation between *v* and the object has been broken. Apparently the grammar does not keep track of broken Contiguity relations; once *v* and the object have been separated by the subject, there is nothing preventing adverbs from being inserted between the participants in the broken Contiguity relation. This is the case even though the adverbs in question could appear in sentence-final position (James McCloskey, p.c.); the grammar apparently has no compunctions about making a broken Contiguity relation even worse by adding intervening material, even when that material could equally well be placed in other positions. Finally, recall that there is a portion of the derivation during which Contiguity between *v* and the object holds (steps (23-24)), and perhaps this is why the set of adverbs that can intervene between the subject and the verb is rather small; if adverbs are Merged during the derivation (rather than being Merged all at once at the end of the derivation), then any adverbs that need to be Merged in the portion of the derivation during which *v* and the Object are Contiguous will be unable to appear before the object.

We can contrast Irish, in this regard, with French. French has prosodically active Right boundaries of ϕ , and therefore French Probes can precede their Goals at an arbitrary distance:



In French, adverbs can be freely Merged between v and the object; Contiguity can still be maintained by Grouping, creating a new ϕ with v at one edge and the object at the other (prosodically active) edge. It is perhaps not surprising, then, that French objects are unlike Irish objects in that they can be immediately preceded by a wider variety of adverbs:

- (27) a. Phleanáil an múinteoir (* **fosta**) an rud amach [Irish]

planned the teacher **also** the thing out

'The teacher also planned out the thing'

- b. Je lis (**aussi**) le livre [French]

I read also the book

'I am also reading the book'

We may be able to use adverbs as a kind of 'clock'; if adverbs are Merged at the same points in the derivation in different languages, then the conditions on where they may occur may sometimes teach us about points in the derivation during which Contiguity relations held (including Contiguity relations which do not survive to the end of the derivation).

In the previous section, we saw that Contiguity relations were *persistent*, in the sense that a Contiguity relation, once created, had to be maintained even after one of the participants in the Contiguity relation had undergone movement. This was why English T must remain Contiguous with the subject even after undergoing T-to-C:

- (28) Is (*now) Mary eating chocolate?

What distinguishes between this case and the Irish case, in which the Contiguity relation between v and the object is broken by head-movement of the verb past the subject, and never subsequently repaired?

I suggest that the relevant distinction between the cases has to do with phase boundaries²⁸. English T and C are both in the CP phase, and Contiguity relations created by T are therefore still respected when C is Merged. On the other hand, Irish *v* and T are not in the same phase; once the Irish *vP* has been completed, the Contiguity relations created during that phase are ‘forgotten’ for purposes of subsequent operations.

3. Danish (Norwegian, Swedish)

Danish resembles English in many ways. Like English, it has suffixal, metrically dependent T, which means that the specifier of TP must be filled by a phrase (that is, Danish exhibits EPP effects). Also like English, it is reliably head-initial, and does not freely allow wh-in-situ; we therefore hope that it is like English (and Tagalog) in generally making left edges of ϕ prosodically active. More generally, we expect Danish Probes to have to be linearly adjacent to following Goals.

Danish does differ from English, as we will see, in having more widespread V2. We will return to the question of how to account for V2 phenomena in chapter 7, where we will attribute the V2 phenomenon to special properties of C.

If we concentrate first on non-V2 clauses, however, Danish is just like English, and we predict that the verb and the object must be adjacent, which is correct:

²⁸ Thanks to Gary Thoms for this suggestion.

- (29) a. ...at Johann ofte **spiser** tomater
 that Johann often eats tomatoes
 ‘...that Johann often eats tomatoes’
- b. *... at Johann **spiser**ofte tomater
 that Johann eats often tomatoes
 ‘...that Johann often eats tomatoes’

In (29), *v*-Object Contiguity prevents Merge of the adverb *ofte* 'often' between the verb and the object, just as it would in the corresponding English sentences.

Turning to Danish V2, we see another good example of head movement destroying Contiguity relations created in previous phases:

- (30) a. [Om morgen'en] drikker Peter ofte [kaffe]
 in morning.the drinks Peter often coffee
- b. [Kaffe] drikker Peter ofte [om morgen'en]
 coffee drinks Peter often in morning.the
 ‘Peter often drinks coffee in the morning’

In (30a), whatever triggers V2 has forced the verb to move past the subject, breaking the Contiguity relation between *v* and the object.

In (30b), we can see that the broken *v*-Object Contiguity relation is in fact of so little importance in the CP phase that even though repairing the relation is clearly possible, there is no requirement that the repair take place. In both of the examples in (30), the Contiguity relation between *v* and the object is broken in the course of the derivation, but in (30b), Contiguity could be satisfied for both the subject and the object:

- (31) Kaffe drikker-v-T Peter...
 coffee drinks Peter

Here the object is Contiguous with *v*, and since the subject and T are adjacent, they can be made Contiguous as well. From the standpoint of Contiguity, then, the final representation in (30b) is perfect. But the fact is that while (30b) is possible, many other word orders are also possible, including the one in (30a). We therefore arrive again at a conclusion we first visited in the discussion of Irish in the previous section; Contiguity relations established in a given phase are forgotten in higher phases.

We can contrast the behavior of Danish V2, in this regard, with that of scrambling in languages like Basque and Georgian, which seems considerably more 'altruistic':

- (32) a. Mirenek séin ikusi rau? (*Ondarroa Basque*: Arregi 2002)
 Miren-ERG who-ABS see-PRF AUX
 'Who has Miren seen?'
 b. * Séin Mirenek ikusi rau?
 who-ABS Miren-ERG see-PRF AUX
 c. Jon señek ikusi rau?
 Jon-ABS who-ERG see-PRF AUX
 'Who saw Jon?'
 d. * Señek Jon ikusi rau?
 who-ERG Jon-ABS see-PRF AUX

The Basque wh-phrase must be immediately preverbal, for reasons that we now understand. Following Arregi (2002), I have assumed that this word order is created by scrambling, a process which is independently available in Basque. Why is Basque scrambling any more concerned

with Contiguity between C and the wh-phrase than Danish V2-driven movement is with Contiguity between *v* and the object?

In the account developed here, the relevant difference is one between the *vP* phase and the *CP* phase. Contiguity relations created in one phase need not be respected in another; in particular, we have now seen several cases of Contiguity relations involving *v* which are destroyed by operations in the *CP* phase. The Contiguity relations that are created in the *CP* phase, by contrast, will tend to be more ‘durable’, just because it is less common for elements in the *CP* phase to later be affected by Probes in a higher *vP* phase. In the particular case of Basque, Contiguity relations triggered by matrix C will survive to the final syntactic representation, because there are no higher heads that can destroy them. The logic determining which Contiguity relations survive to the end of the derivation is just the logic of the syntactic cycle.

We have seen that Danish *v* must be Contiguous with a following object (though this Contiguity relation can be broken, for instance, by V2-triggered movement of the verb). Similarly, Danish T must be Contiguous with a following subject:

- (33) a. Næste eftermiddag laa **stenene** endnu urørte. [Danish:
next afternoon lay the.stones still unmoved Svenonius
‘The next afternoon the stones still lay unmoved’ 2002, 221]
- b. * Næste eftermiddag laa endnu **stenene** urørte.
next afternoon lay still the.stones unmoved

As we saw before, Danish patterns with English in this regard²⁹:

²⁹ Some English speakers accept examples like the one in (i):
(i) Could maybe John help you with that?

- (34) a. Why are **the stones** still here?
b. * Why are still **the stones** here?

Danish differs in this respect from its relatives Norwegian and Swedish. Svenonius (2002) notes that Norwegian subjects can be separated from a preceding tensed verb by adverbs, with consequences for interpretation that Svenonius describes in terms of topichood for the subject:

For me and for several other English speakers I have consulted, such examples are only well-formed with focus on *John*; putting focus anywhere else in the sentence makes it unacceptable. We find similar apparent violations of Contiguity in other domains:

- (ii) I think we should talk to maybe John (or possibly Bill)
(iii) I think we should hire maybe John (or possibly Bill)

I suspect that what is happening here is that *maybe* is modifying the focused DP (perhaps modifying a focus projection dominating these DPs, if there is such a projection). This seems to be consistent with my intuitions about what the sentences mean. Consider (iv):

- (iv) I'm talking to maybe the only person who really understands quantum physics.

In (iv), it seems to me that the speaker's doubt, expressed by *maybe*, about the truth of the statement can only be a doubt about whether the conversational partner is in fact the only person who understands quantum physics; it cannot be a doubt about whether a conversation is in fact taking place. It differs, in that regard, from the minimally different example in (v):

- (v) Maybe I'm talking to **the only person who really understands quantum physics**.

In (v), it is possible that I am not sure I am actually in a conversation (perhaps I am dreaming). I think this reading is unavailable in (iv). If this is correct, we might take it as evidence that *maybe* is effectively capable of modifying a DP, and hence that examples like (i) are not counterexamples to the general ban on adverbs intervening between the subject and a preceding T in English; *maybe* in (i), on this view, is part of the subject. The topic is in need of further study, however, particularly given the effects of topic and focus in the Norwegian and Swedish cases to be discussed next. Many thanks to my Spring 2010 MIT Syntax seminar participants for much helpful discussion of these facts.

- (35) a. Røykeforbudet brøt **en student** kanskje allerede i går.
the.smoking.ban broke a student maybe already yesterday
'A (specific) student might have violated the smoking ban
as early as yesterday'
- b. Røykeforbudet brøt kanskje **en student** allerede i går.
the.smoking.ban broke maybe a student already yesterday
'Some student (or other) may have violated the smoking ban
as early as yesterday'
- c. Så provoserer fortsatt **Salomes mannshunger** dagens publikum
so provokes still Salome's man-hunger the.day's audience
'Then Salome's hunger for men still provokes today's audiences'

Svenonius cites Holmberg (1993) as noting that Swedish subjects may also be separated from the preceding verb, as long as they are focused:

- (36) a. I år ska **Lisa** faktiskt köpa institutionens julgran.
 this year will Lisa in.fact buy the.department's Christmas.tree
 ‘(Lisa isn't usually a very helpful person, but...)
 this year Lisa is in fact going to buy the department's Christmas tree’
- b. I år ska faktiskt **Lisa** köpa institutionens julgran.
 this year will in.fact Lisa buy the.department's Christmas.tree
 ‘(We have some news about the Christmas tree purchase. And we believe
 that you will be surprised, because...)
 this year it will in fact be Lisa that's buying the department's
 Christmas tree’
- c. Har **någon student** möjligen last boken?
 has any student possibly read the.book
 'Has any student possibly read the book?'
- d. Har möjligen **NÅGON STUDENT**last boken?
 has possibly any student read the.book
 'Has ANY STUDENT possibly read the book?'
- e. ?? Har möjligen **någon student** last boken?

Norwegian and Swedish, then, appear to be unlike Danish in that considerations of topic and focus allow them to create word orders that should be blocked by the theory developed here.

Svenonius 2002 suggests that the Norwegian and Swedish examples require no dramatically special prosody. Nevertheless, it is interesting that Norwegian and Swedish are unlike Danish in marking focus via "tonal morphemes" which attach to the Right edge of the focused phrase (Kristoffersen 2000, Gussenhoven 2004, Bruce 2007, Grønnum 1992). In the

majority dialect of Swedish, for example, Bruce (2007) tells us that focus is signalled by a high tone, realized on the word immediately following focus:

(37)

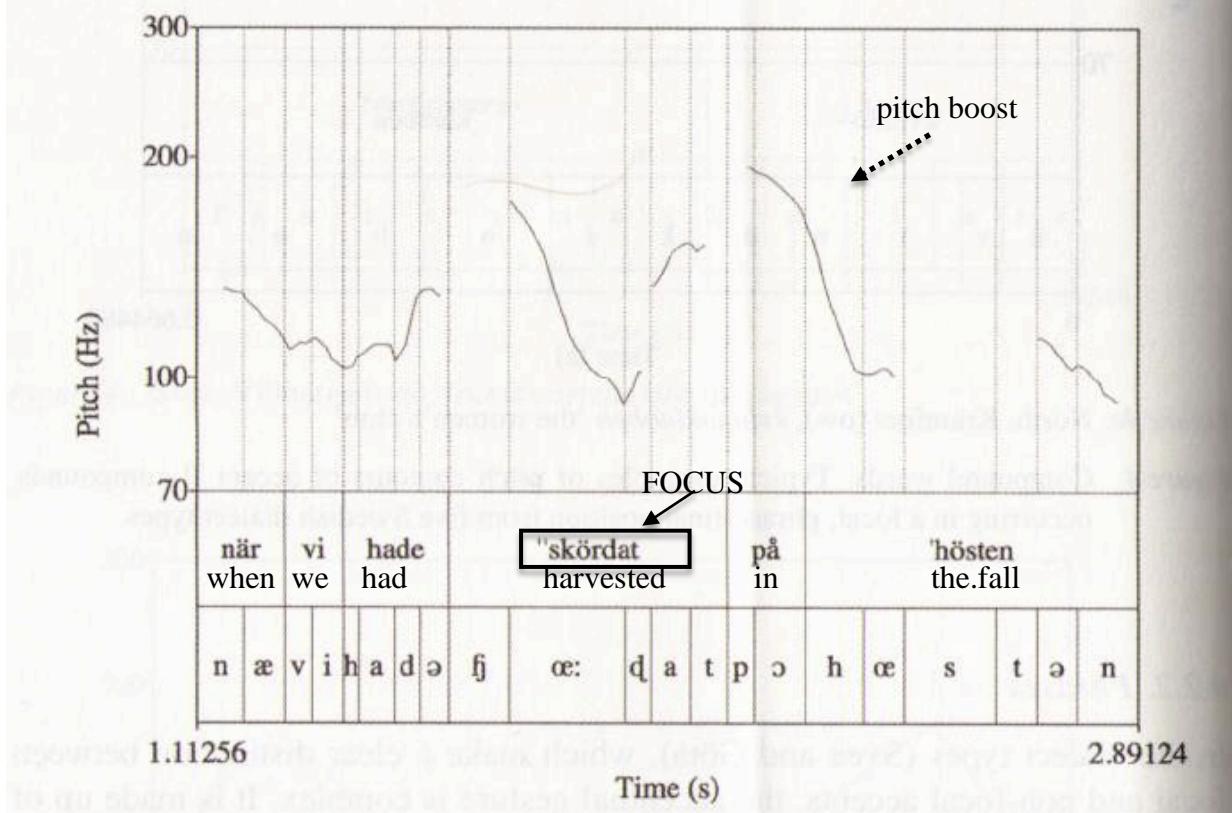


Figure 5a. Svea, Kårsta (om) (focal accII+accI), *när vi hade skördat på hösten* ‘when we had harvested in the fall’

Danish focus, by contrast, involves expanding the pitch range of the focused element (Grønnum 1992, Kristofferson 2000, Gussenhoven 2004), with no particular attention paid to its Right edge. One possibility, then, is that this difference between the Scandinavian languages can be related to the properties of Contrastive Topic in English, discussed in section 2.3 of the previous chapter. In that section we reviewed Constant’s (2014) proposal that English Contrastive Topics are invariably associated with a tonal morpheme that appears to the right of the Topic; I suggested that this morpheme renders a Right edge of a ϕ prosodically active, essentially giving English contrastive topics the status of Chichewa wh-phrases (that is, they may either move or remain in

situ). Perhaps Norwegian and Swedish topic/focus-marking has a similar effect, giving the subject a prosodically active Right edge to its right that it can use to become Contiguity-prominent, and thereby making it possible for phrases to intervene between the subject and a linearly preceding Probe³⁰.

The effects of information structure on word order and prosody are the subject of a rich and developing literature, and are beyond the scope of this book. I therefore leave the problem here, in the hope of returning to it in future work.

Putting aside the effects of topic and focus in Norwegian and Swedish, then, we have seen in Danish another example of the effects of Contiguity requirements, and of their behavior through the derivation. Not only does Danish exhibit Contiguity-driven adjacency requirements in the places where the theory predicts that it should, but we see again in Danish evidence that Contiguity relations do not survive outside the phase. In Danish non-V2 clauses, the verb and the following object must be adjacent, an effect I have ascribed to Probe-Goal Contiguity. Once the verb is driven by V2 to raise, however, the Contiguity relation between *v* and the object is broken, and the grammar apparently 'forgets' it; subsequent operations are not motivated to recreate Contiguity between *v* and the object, even if they can.

4. Affix Support and Contiguity

This chapter and chapter 2 introduce two separate motivations for movement: Affix Support and Probe-Goal Contiguity. There can be cases in which movement is driven by both of these; English T, for example, is both a suffix and a Probe, and movement of the subject into its

³⁰ This kind of explanation will have to be limited in scope somehow. An English contrastive topic which is a direct object, for example, must still immediately follow the verb:

- (i) A: How did John and Mary do on the job market?
B: *Well, they hired immediately MARY...

This might follow if the Contrastive Topic tonal morpheme is assigned at some fairly late point in the derivation, perhaps by a head in the C domain (rather than being present on the contrastively topicalized phrase from the beginning of the derivation).

specifier satisfies both its need for Affix Support and its need for Probe-Goal Contiguity. We should not be surprised, however, to find instances of Probes which are not affixes, and perhaps also of affixes which are not Probes. The following sections will discuss two aspects of these two triggers for movement: the first will be about the different landing sites for the different kinds of movement, and the second about the special behavior of heads which are subject to both kinds of requirements.

4.1 Landing sites

Tagalog wh-movement offers a good example of a non-affixal Probe. Tagalog has an embedded interrogative complementizer *kung*:

- (38) Hindi ko alam [**kung** darating ang estudyante] [Tagalog]
 not NG.I know C[+wh] NOM.will.come ANG student
 'I don't know whether the student will come'

Tagalog embedded wh-questions, like matrix wh-questions, have obligatory overt wh-movement, for reasons discussed both in the previous chapter and in Richards (2010). However, such wh-movement lands to the right of *kung*:

- (39) Hindi ko alam [**kung** kailan darating ang estudyante] [Tagalog]
 not NG.I know C[+wh] when NOM.will.come ANG student
 'I don't know when the student will come'

Similarly, we find overt wh-movement to a position just to the right of an overt interrogative C in Quiegolani Zapotec:

- (40) **Pe** [dxiin zhe] r-laa de? [Quiegolani Zapotec, Black 2000:123-124]
 Q work WH HAB-do 2SG
 'What work are you doing?'

This is what we expect. Since Tagalog *kung* and Quiegolani Zapotec *pe* are not affixes, they are not subject to Affix Support, and hence have no need of specifiers. All that is necessary is for the wh-phrase to be close enough to the complementizer for Contiguity to hold. Since Tagalog (and hopefully also Quiegolani Zapotec) is a language with prosodically active left edges of ϕ , moving the wh-phrase to a position just to the right of the complementizer makes Probe-Goal Contiguity possible; the wh-phrase and C need merely be adjacent, so that Contiguity-adjunction can apply³¹.

4.2 Multitasking

In this section we will see some evidence for a requirement which I will call Multitasking, which requires that a head which is subject to both Probe-Goal Contiguity and Affix Support should satisfy both of these conditions with a single operation, if there is such an operation available. The initial argument for Multitasking will come from a typological observation about languages with V2.

4.2.1 Multitasking and V2

There appear to be virtually no V2 languages that allow wh-in-situ as an option in ordinary interrogative clauses. That is, there are almost no languages that are like Modern French in having both wh-in-situ and wh-movement as options, and like German in having V2 in ordinary main clauses.

I know of one exception to this generalization, which is the Nilotc language Dinka. I will return to the Dinka facts shortly, which will in the end support the account offered here of the general phenomenon. An important difference between Dinka and the other languages discussed here will be the fact that the phrase in initial position in Dinka controls ϕ -feature

³¹ See Sabbagh (to appear) for a different account of the Tagalog facts.

agreement on the auxiliary or verb in second position; this difference will be crucial in explaining Dinka's status as an exception.

Leaving Dinka aside for the moment, then, it is generally the case that V2 languages have overt wh-movement. For the Germanic languages, it is perhaps unsurprising that they share both of these properties; since the languages are related, they share many properties. There are at least three cases, however, of languages that are outliers in their language families both in having V2 and in requiring overt wh-movement. These three languages are Karitiana, Kashmiri, and Ingush.

Karitiana is a Tupi language, which means that its closest relatives are generally head-final and have wh-in-situ. Storto (1999, 2003) argues, however, that Karitiana is unlike its relatives in being V2:

- (41) a. Omenda \emptyset -*naka-hyr̩y-* \emptyset Gokyp
 noon 3-DECL-sing-NONFUT Gokyp
 'Gokyp sang at noon'
- b. Gokyp \emptyset -*naka-hyr̩y-* \emptyset omenda
 Gokyp 3-DECL-sing-NONFUT noon
- c. *Gokyp omenda \emptyset -*naka-hyr̩y-* \emptyset
 Gokyp noon 3-DECL-sing-NONFUT
- d. ? \emptyset -*naka-hyr̩y-* \emptyset Gokyp omenda
 3-DECL-sing-NONFUT Gokyp noon

The Karitiana verb can be preceded by an adjunct (as in (41a)) or the subject (as in (41b)), but not both (as in (41c)); verb-initial word order, as in (41d), is possible only under certain discourse conditions, when all the elements of the sentence are old information.

Moreover, Karitiana wh-phrases obligatorily appear at the left periphery of the clause:

- (42) a. **Mora** i-'y-j ohy? [Karitiana: Storto 2003, 418-9]
 WH 3-eat-IRR potato
 'Who will eat potatoes?'
- b. **Mora** -mon [taso ti-'y-t]?
 WH COP man OBJFOC.PTCP-eat-NONFUT
 'What did the man eat?'
- c. **Tikat** a-ama-j leite-ty?
 when 2SG-buy-IRR milk-OBL
 'When will you buy milk?'

Kashmiri is like Karitiana, both in being an outlier in its immediate family, and in having both V2 and obligatory wh-movement (the Indo-Aryan languages, like the Tupi languages, are

typically head-final and can leave wh-phrases in situ, at least in monoclausal questions).

Kashmiri V2 is exemplified in (43):

- (43) a. Aslam-an *dits* Mohn-as kita:b Ra:m-ini khətrī ra:th [Kashmiri:
Aslam-ERG gave Mohan-DAT book Ram-DAT for yesterday Manetta 2010,
'Aslam gave Mohan a book for Ram yesterday' 3]
b. Mohn-as *dits* Aslam-an kita:b Ra:m-ini khətrī ra:th
c. Kita:b *dits* Aslam-an Ra:m-ini khətrī ra:th
d. Ra:th *dits* Aslam-an Mohn-as Ra:m-ini khətrī

In (44), we can see that wh-phrases in Kashmiri precede the verb in its V2 position:

- (44) a. **Kəm'** he:v Shi:la-s nev kita:b ra:th? [Kashmiri: Manetta 2010, 4]
who showed Sheila-DAT new book yesterday
'Who showed a new book to Sheila yesterday?'
b. Raj-an **kəmis** he:v nev kita:b
Raj-ERG who.DAT showed new book
'To whom did Raj show his new book?'

Interestingly, Kashmiri wh-questions are often V3, as we see in (44b); Manetta (2010, 4)

describes the phrase preceding the wh-phrase as a "contrastive topic".

Ingush is a Nakh-Daghestanian language. Like Kashmiri and Karitiana, its closest relatives are generally head-final and wh-in-situ. Ingush is SOV in embedded clauses, but most matrix clauses are verb-second:

- (45) Cuo *diicar* suona jerazh [Ingush: Nichols 2011, 679]
3s.ERG AGR.tell.WITNESSED.PAST 1s.DAT 3p
'She told them (stories) to me'

Ingush wh-phrases must move to the preverbal position:

- (46) **Maca** aara-vealar yz? [*Ingush*: Nichols 2011, 684]

when out-AGR.go.WITNESSED.PAST 3s

‘When did he go out?’

Ingush is like Kashmiri in that wh-questions are often V3:

- (47) Gourazh **mycha** uutta-ju uqaza? [*Ingush*: Nichols 2011, 684]

horse.PL where stand.PLURACT-AGR.CAUS.PRES here

‘Where can we put our horses?’

I have not yet offered a theory of V2; this will be the topic of section 1.1 of chapter 7.

But the heart of the account will be the claim that in V2 clauses, C is occupied by a (null) suffix.

This suffix requires something in its specifier, because of Affix Support, and also triggers

movement of the verb to itself, creating a V2 configuration.

We have seen some evidence that V2 languages typically do not allow wh-in-situ.

Restating that generalization in terms of the theory sketched here, we seem to find that in

languages in which C is an affix in need of Affix Support, C never satisfies Probe-Goal

Contiguity without movement; when C has a Goal in such a language, that Goal must always

move to the specifier of C.

We could generalize this observation as follows (for similar conditions, see Pesetsky and Torrego 2001, Kotek 2014, van Urk and Richards to appear):

- (48) **Multitasking**

At every step in a derivation, if two operations A and B are possible, and the conditions satisfied by A are a superset of those satisfied by B, the grammar prefers A.

We can think of (49) as a preference for satisfying multiple conditions at once; a head that is both a Probe and an affix will satisfy Affix Support and Probe-Goal Contiguity with the same phrase, when possible. In the particular case just considered, an affixal C that is a Probe (that is, a C that is responsible both for inducing V2 and for Agreeing with a wh-phrase) will obligatorily move its Goal into its specifier, rather than satisfying its need for Support with some other phrase.

An argument for the Multitasking approach to wh-movement in V2 languages comes from Dinka, which is a straightforward counterexample to the descriptive generalization offered above. Dinka is a V2 language³²:

- (50) a. [Cân] **à-cé** Bòl γóoc álèth róok.
 Can 3SG-PRF Bol buy.DTR clothes town.LOC
 'Can bought Bol clothes at the town'
- b. [Álèth] **áa-cíi** Cân ké γóoc Bòl róok.
 clothes 3PL-PRF.NS Can.GEN PL buy.DTR Bol town.LOC
 'Can bought Bol clothes at the town'
- b. [Rók] **à-cíi** Cân álèth γóoc Bòl.
 town 3SG-PRF.NS Can.GEN clothes buy.DTR Bol
 'Can bought Bol clothes at the town'

The Perfect auxiliary *cé*, boldfaced in the examples above, must be preceded by a single phrase (bracketed above). Despite being a V2 language, however, Dinka does allow wh-in-situ, as well as overt wh-movement:

³² I am very grateful to Abiar Makgoor Guöt for helping me to understand something about her language. Thanks, also, to Coppe van Urk; much of what is presented here represents work done together with him (see van Urk and Richards to appear), though he should not be held responsible for any of the conclusions. Thanks also to the Fall 2012 24.942 class at MIT, and to audiences at ACAL 44, NELS 43, and MIT for discussion.

- (51) a. **Yenjó** cíi Bôl tñj?

what PRF.NS Bol.GEN see

‘What did Bol see?’

- b. Bôl cé **ñjó** tñj?

Bol PRF what see

‘What did Bol see?’

Overtly moved wh-phrases and wh-in-situ are not morphologically identical; moved wh-phrases obligatorily bear a phrase-initial morpheme *ye*. Still, the existence of the option in (51b) is surprising, given what we have now seen about V2 languages more generally. Why does Dinka allow wh-in-situ?

I think the answer to this may have to do with another property distinguishing Dinka from the other V2 languages discussed here: Dinka auxiliaries bear morphology agreeing with the phrase in initial position. In the examples in (50), for instance, plural *álèth* ‘clothes’ in (50b) triggers the use of the 3rd person plural morpheme *áa* on the verb, while singular *Càn* in (50a) and *rók* ‘town’ in (50c) trigger the 3rd person singular morpheme *à*. When the phrase in initial position is 1st or 2nd person, the morpheme in question is null:

- (52) [yêen] Ø-**cé** Bôl γóɔc álèth rók.

I 1/2-PRF Bol buy.DTR clothes town.LOC

‘I bought Bol clothes at the town’

Dinka C is thus unlike the other instances of V2 C discussed here, in that it always bears a ϕ -probe; in other words, Dinka C in a wh-question, unlike its counterparts in the V2 languages discussed above, probes both for [wh] and for [ϕ]. Wh-movement will satisfy Probe-Goal Contiguity for [wh]; movement of any ϕ -bearing phrase will satisfy Probe-Goal Contiguity for

[\emptyset]; and either type of movement will provide Affix Support, as in other V2 languages. Either movement is therefore an option, by Multitasking.

What about cases in which a wh-phrase itself bears \emptyset ? Should we expect Multitasking to force Agreement with, and therefore movement of, such a phrase, banning wh-in-situ?

Here I would like to exploit another morphological fact about Dinka, which is that the \emptyset -agreement under discussion in fact cannot be morphologically overt in questions; this was shown in (51) above, repeated here as (53):

- (53) a. **Yenjó Ø-cíi Bôl t̪iŋ?**

what AGR-PRF.NS Bol.GEN see

‘What did Bol see?’

- b. **Bôl Ø-cé njó t̪iŋ?**

Bol AGR-PRF what see

‘What did Bol see?’

Bans on \emptyset -agreement with wh-phrases are well-attested in the literature, where they often go by the name of Anti-agreement: see Ouhalla 1993, Richards 2001, Schneider-Zioga 2007, Baker 2008, Henderson 2013, and literature cited there for discussion. If this particular type of \emptyset -agreement cannot take a wh-phrase as its Goal³³, then we arrive at the desired result: C in examples like the ones in (53) must Agree with the wh-phrase (for [wh]) and with the subject (for [\emptyset]), and can move either to its specifier. Interestingly, the \emptyset -morphology always vanishes in questions, regardless of which phrase undergoes movement. I will have to regard this, on the account to be offered here, as a consequence of multiple agreement operations: C in a example

³³ There are other types of \emptyset -agreement with wh-phrases in other positions in the Dinka clause; see van Urk and Richards (to appear), van Urk (in preparation) for discussion. Anti-agreement must clearly be a property, not of a language, but of a particular agreement morpheme.

like (53b) Agrees both with the subject and with the wh-phrase, and the resulting morphological spellout is null, regardless of which phrase moves.

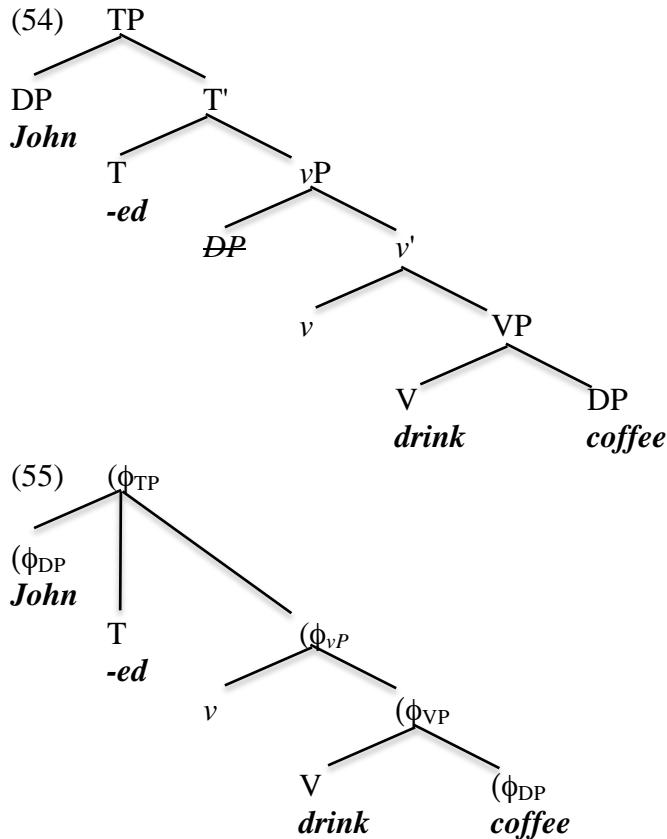
Dinka is a V2 language with the option of wh-in-situ, and therefore a counterexample to the typological generalization with which this section began. I have argued, however, that Dinka fits quite well into the Multitasking account of this generalization; what makes Dinka unlike the other V2 languages discussed here is that Dinka C always bears ϕ -agreement, which wh-phrases crucially cannot control. An interrogative C in a language like German has only a single phrase to Agree with, and is therefore compelled by Multitasking to move that phrase for Affix Support; an interrogative C in Dinka can Agree with multiple phrases, and wh-in-situ is therefore possible.

4.2.2 Multitasking and EPP

Another place where we can see the effects of Multitasking involves a contrast noted in section 2.2.1 of chapter 2. The theory developed in that chapter accurately predicted that both English and Japanese would exhibit EPP effects. Both languages have Tense suffixes that are not attached to any material containing reliable word-internal metrical boundaries. In the case of Japanese, the operation of Untethering applies to T, deleting all ordering statements that apply to it, with the result that T is not preceded (or followed) by any material at all. T must therefore, in Japanese as well as in English, seek Support from another phrase, which must appear in its specifier.

As also noted in section 2.2.1, the two languages differ in how they provide Support for T. In English, the phrase which Supports T is typically the subject; this is the classic EPP effect. In Japanese, by contrast, any phrase may Support T; according to Miyagawa (2001), movement to the specifier of TP is one of a variety of operations in Japanese that have traditionally been described together as 'scrambling'.

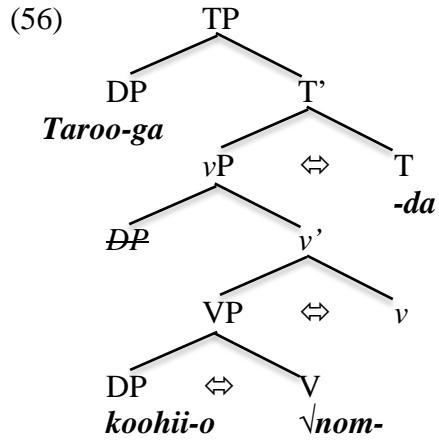
As long as Untethered T in Japanese has not yet had its order determined when the grammar is seeking to create Contiguity relations, this contrast between English and Japanese can be predicted by Multitasking. Movement of the subject to the specifier of TP in English not only satisfies Affix Support for T, but also creates Probe-Goal Contiguity for T. The syntactic tree in (54) can be mapped onto the prosodic tree in (55):



In the tree in (55), in which TP is simply mapped onto a ϕ , Probe-Goal Contiguity already holds between T and the DP *John*: these two are dominated by a single ϕ , ϕ_{TP} , within which *John* is Contiguity-prominent (since *John* is adjacent to the prosodically active edge of ϕ_{TP}). The resulting ϕ_{TP} is ternary-branching, which may raise problems of its own (perhaps solved by Grouping, or by postsyntactic operations), but as far as Probe-Goal Contiguity is concerned, the

tree is perfect. Raising the subject to the specifier of TP therefore satisfies both Affix Support and Probe-Goal Contiguity.

Consider, by contrast, the corresponding Japanese tree in (56), in which all of the heads have been Untethered:



In (56), the subject has been moved to the specifier of TP, creating a linearization statement establishing that this DP precedes T (along with everything else that the subject asymmetrically c-commands), and thereby satisfying Affix Support. Since T is still Untethered, however, there is still much about the word order in (80) that has not yet been determined; for example, it is not yet clear whether T precedes or follows its complement. This indeterminacy makes it impossible to create a ϕ within which Probe-Goal Contiguity can be satisfied; as yet, there is no particular string that can definitely be said to be dominated by such a ϕ . Probe-Goal Contiguity therefore cannot be established until after the Untethered heads have had their order determined. As a result, Multitasking gives no privileged status to movement of the subject in (56); any phrase which is capable of providing Support for T ought to be capable of moving to the specifier of TP. We thus arrive at the desired result: English T must use its Goal for Support, but Japanese T need not.

The theory thus predicts that while initial heads may have EPP effects of a familiar kind, final heads in need of Affix Support will be satisfied by movement of any phrase to their specifier, even if the heads are Probes. We might therefore expect scrambling to be fairly widespread in head-final languages; more specifically, we expect to find scrambling in any head-final language in which the verb bears suffixes that require Affix Support. For discussion of the correlation between head-finality and scrambling, see Corver and van Riemsdijk 1996. This cannot be the final word on scrambling, of course, since scrambling is attested in languages which are not head-final as well (and since the properties of scrambling vary considerably among head-final languages).

The account of Japanese EPP satisfaction offered here will complicate our attempts to discover EPP effects in other languages. For instance, the proposal of chapter 2 predicts that German should exhibit EPP effects, a prediction which has been argued forcefully against by Wurmbrand (2006). Wurmbrand shows very convincingly that the nominative argument in German never need occupy the specifier of TP. Central to her argument is the well-formedness, and the interpretation, of examples like (57):

- (57) [Jede Übung gelungen] ist mindestens einem Kind
every.NOM exercise managed AUX at.least one.DAT child
'At least one child (has) managed to do every exercise' $\exists > \forall; * \forall > \exists$

The nominative argument in (57) is contained in a phrase (perhaps a vP) which has moved to the specifier of CP, satisfying the V2 requirement. The nominative DP therefore cannot have moved to the specifier of TP (and Wurmbrand offers arguments against analyzing the bracketed constituent as a TP, for which I refer interested readers to her work). In fact, Wurmbrand argues, the nominative DP in (57) cannot even be raising to the specifier of TP covertly, since it must be

outscoped by the dative argument. She concludes that the nominative argument never occupies the specifier of TP at all, at any point in the derivation. She then goes on to claim, after plausibly rejecting some alternative analyses, that German simply lacks EPP effects.

The prediction of the theory developed here, by contrast, is that German will have EPP effects. However, German is like Japanese in having a head-final, suffixal T which is not reliably preceded by a word-internal metrical boundary, and should therefore also be like Japanese, on the theory developed here, in allowing any phrase to satisfy EPP for T. In Wurmbrand's example in (57), for instance, we might think that the Dative argument is providing Support for T, or perhaps the bracketed phrase lands in the specifier of TP prior to moving further up the tree. The German facts, then, seem to be at least consistent with Contiguity Theory, as developed here. Whether the full distribution of EPP effects in the Germanic languages is compatible with the predictions of this theory is a question I will leave for later research.

4.2.3 Multitasking and overt wh-movement

Finally, Multitasking reestablishes a typological prediction from Richards (2010) which was endangered by the proposals of chapter 2. The theory of wh-movement in Richards (2010) was concerned only with what this chapter has named Probe-Goal Contiguity, specifically for the relation between C and the wh-phrase. One of the predictions of that theory was that head-final C would never trigger overt wh-movement to the left periphery of the clause; such movement would never improve the status of Probe-Goal Contiguity, since it would only move the wh-phrase further away from C.

In chapter 2, I introduced another possible trigger for phrasal movement, in the form of Affix Support. We have seen that head-final affixes are indeed capable of driving movement to

their specifiers; Japanese T, for instance, requires a specifier, a fact I have tried to link to Affix Support. Now that there are two potential triggers for phrasal movement, however, we should reconsider the status of head-final C; head-final C should be unable to trigger movement for Probe-Goal Contiguity, but what about Affix Support?

We have seen in this section that (for reasons having to do with Multitasking) head-final affixes may require Support, but this Support can be provided by any phrase in the sentence, even if the affix in question is a Probe. Consequently, even if head-final interrogative C is an affix, it can indeed trigger movement to its specifier, but the movement will not be limited to wh-phrases. The generalization that head-final C never triggers overt wh-movement to the left can still be derived.

5. Conclusion

In this chapter I extended a proposal from Richards (2010). The original proposal was only concerned with prosodic conditions on wh-questions; I argued here that the proposal can be extended to constrain relations between Probes and Goals more generally. The proposed constraint is repeated in (58):

- (58) ***Probe-Goal Contiguity***

Given a Probe α and a Goal β , α and β must be dominated by a single ϕ , within which β is *Contiguity-prominent*.

Contiguity-prominence is defined as follows:

- (59) α is *Contiguity-prominent* within ϕ if α is adjacent to a prosodically active edge of ϕ .

And we have seen two operations for manipulating the prosody in a way that satisfies (58), given below:

(60) ***Grouping***

Take a pair of prosodic nodes α , β , and create a ϕ which dominates them both.

(61) ***Contiguity-adjunction***

Take a pair of adjacent prosodic nodes, and make one of them a daughter of the other.

Taken together, we have seen that this constraint and the associated rules for satisfying it capture a number of adjacency requirements from English, French, Irish, and Danish, including some of the core motivation for positing differences in verb movement between English and French.

The requirement of Probe-Goal Contiguity interacts with the requirement of Affix Support, introduced in chapter 2:

(62) ***Affix Support***

If a head is an affix, there must be a metrical boundary in the direction in which it attaches.

We saw evidence that the grammar prefers operations which satisfy multiple requirements (for instance, operations which satisfy both Affix Support and Probe-Goal Contiguity, as opposed to operations which satisfy only one or the other):

(63) ***Multitasking***

At every step in a derivation, if two operations A and B are possible, and the conditions satisfied by A are a superset of those satisfied by B, the grammar prefers A.

Some of the discussion in this chapter has centered on how Contiguity relations are treated during the syntactic derivation. We have seen that Contiguity relations must be created and maintained within a phase, but that Contiguity relations created in previous phases are ‘forgotten’ in subsequent phases, and can be freely broken by subsequent operations.

In Richards (2010), I was concerned only with prosodic properties of wh-questions, and in that domain, Probe-Goal Contiguity appears to be almost exceptionless. The fact that Contiguity relations from previous phases are not respected in subsequent ones is part of an explanation for why this is true in the domain of wh-questions, but straightforwardly false in a variety of other domains. Contiguity between *v* and the object, for example, frequently fails to hold, as we saw in Irish and Danish. In the theory developed here, it is the syntactic cycle that explains why Contiguity is respected more robustly for C and wh-phrases than for *v* and objects; the Contiguity relation between *v* and the object is created earlier in the derivation than the Contiguity relation between C and a wh-phrase, since *v* is lower in the syntactic tree than C. Because the Contiguity relations established in the *vP* phase need not be respected in the CP phase, the Contiguity relation between *v* and the object is less likely to survive to the end of the derivation than the Contiguity relation between C and a wh-phrase.

This account can only be constructed, crucially, if the conditions proposed here apply during the narrow syntax. What we have seen is that prosodic conditions applying to structurally low positions in the tree (for instance, the Contiguity relation between *v* and the object) are less likely to survive to the final representation than prosodic conditions applying to structurally high positions in the tree (for instance, the Contiguity relation between C and the wh-phrase). If Probe-Goal Contiguity applies during the syntactic derivation, then we can describe this ranking of prosodic conditions via the logic of the syntactic cycle; prosodic conditions imposed lower in the tree are imposed earlier in the derivation, and hence are more likely to be overruled or erased by subsequent operations. If, on the other hand, we insist on banning any reference to phonological notions in the narrow syntax, then the syntactic cycle cannot explain why some Contiguity relations appear more robust than others.

Chapter 5: Selectional Contiguity

In what follows we will discover a problem with Affix Support, which we will fix by generalizing Probe-Goal Contiguity still further, so that it applies, not only to Probes and Goals, but also to heads related by selection. The resulting principle will turn out to have many other applications.

1. Generalizing Contiguity

The problem with Affix Support has to do with isolating head-initial languages. Consider what the theory thus far predicts about such languages; in particular, let us consider both a sentence with an overt morpheme in Tense and a sentence in which Tense is null:

- (1) a. **TENSE** S V O
 S V O

In both examples, Affix Support is irrelevant, since we are imagining a language in which Tense is not an affix. Probe-Goal Contiguity is also satisfied, regardless of which edge of the subject is associated with a prosodic boundary, since Tense and the subject are linearly adjacent. At this point, then, we predict that this kind of language should have the word orders in (1), undisturbed by any movement at all.

Baker (2003) points out that there are in fact no languages of this kind. There are languages that allow the word order in (1a), but in such languages, the word order when there is no free-standing Tense morpheme is VSO. Baker's example of this type of language is Welsh:

	TENSE	S	V	O
(2) a.	Naeth	y	dyn brynu	car
	did	the	man buy	car

'The man did buy a car'

	V	S	O
b.	Brynodd	y	dyn
	bought	the	man

'The man bought a car'

Thus, there are languages, like Welsh, in which the sentence-initial position is at least sometimes occupied via head-movement, as in (2b). This leaves open the possibility that this position is always filled by movement, and that the auxiliary in (2a) begins the derivation to the right of the subject; that is, it is possible that the sentences in (2) have the abstract derivations in (3):

(3) a.	TENSE	S		V	O
b.	V	S			O

But there are no languages like the one in (1), in which there is no reason to think that Tense, when present, is moved from a lower position.

Note that in the derivation in (3a), Tense and the verb are adjacent prior to movement, and we have seen that it is particularly straightforward to create Contiguity relations between adjacent elements. In (1a), by contrast, Tense and the verb are never adjacent at any point in the derivation. We might hope rule out the language in (1), then, by generalizing Contiguity somewhat further:

(4) ***Generalized Contiguity***

If α either Agrees with **or selects** β , α and β must be dominated by a single prosodic node, within which β is Contiguity-prominent.

Generalized Contiguity is a more general version of Probe-Goal Contiguity, requiring the creation of Contiguity relations, not only between Probes and Goals, but between heads related by selection. If we thought that selection involved a Probe-Goal relation (see Bošković and Takahashi 1998, Hornstein 1999), then Generalized Contiguity could be stated more simply; I will leave the principle as it is, just to avoid prejudging the issue of how selection and Agree should be related.

In what follows, I will sometimes refer to Contiguity relations between heads in a selection relation as Selectional Contiguity, not because Selectional Contiguity is a separate principle from Probe-Goal Contiguity, but just to make it clearer why Contiguity has to hold between two particular points in the tree. I hope that the terminology will not be confusing; again, the proposal is that Selectional Contiguity and Probe-Goal Contiguity are two aspects of a single requirement, Generalized Contiguity, stated in (4).

Throughout the discussion of Selectional Contiguity, I will concentrate on relations between heads in the extended projection of the verb. As stated, we would expect Selectional Contiguity to constrain relations between, for instance, v and the subject as well. Since it is difficult to determine exactly which head in the subject is selected by v , I leave this aspect of Selectional Contiguity for future work, concentrating on the cases in which the participants in selectional relations are clear.³⁴

³⁴ See Sailor and Mahajan (2013) for a Contiguity-theoretic approach to word order within VP.

The idea of a unified principle of Generalized Contiguity will meet several kinds of challenges in this chapter, involving apparent differences between Probe-Goal Contiguity and Selectional Contiguity. One goal of the chapter will be to derive these differences from independently required differences between phrasal Goals and the heads that participate in selection. First, we will see that Selectional Contiguity always requires adjacency between the participants in a selection relation; we have already seen that Probe-Goal Contiguity sometimes requires adjacency, but sometimes not, depending on the position of prosodically active boundaries. Second, we will see examples in which a Selectional Contiguity relation, though it may be created in the course of the derivation, does not survive to the final representation, even though the participants in the relation are not separated by a Spell-out boundary. Third, we will see some evidence that Selectional Contiguity is typically created earlier in the derivation than Probe-Goal Contiguity. The following sections will discuss these differences in the abstract; with section 2, we will begin looking at concrete cases.

1.1 Selectional Contiguity and adjacency

Because selection is always a relation between heads, Selectional Contiguity will always require two heads to be Contiguous. Our previous discussions of Contiguity have always involved a head interacting with a ϕ . One definition that will have to be extended slightly in what follows is that of *Contiguity-prominence*, repeated in (5):

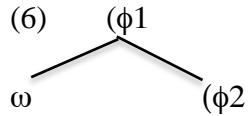
(5) ***Contiguity-prominence***

α is *Contiguity-prominent* within ϕ if α is adjacent to a prosodically active edge of ϕ .

This definition of Contiguity-prominence was concerned only with prominence of ϕ , since up to this point we have only been concerned with making Goals of Agree prominent. Now that we

are extending Contiguity to heads, we will need to change the definition in (5) slightly to make it clear under what circumstances heads can be Contiguity-prominent.

The definition in (5) has the consequence that in a tree like the one in (46), ω is Contiguity-prominent, and ϕ_2 is not, within ϕ_1 :



In what follows, it will be useful to extend the definition of *Contiguity-prominence* so that ω is not Contiguity-prominent in the tree above. To the extent that *Contiguity-prominence* is to be related to notions like prosodic prominence, or sentential stress, this seems like a desirable result; it seems to very generally be true that main stress does not appear on a head which has a phrasal sister.

The revised definition of *Contiguity-prominence* follows:

(7) ***Contiguity-prominence***

For a particular node F, an element X dominated by F

has *Contiguity-prominence within F* just in case:

- (i) X has no sister which is higher on the prosodic hierarchy ($\omega < \phi < i$) than X,

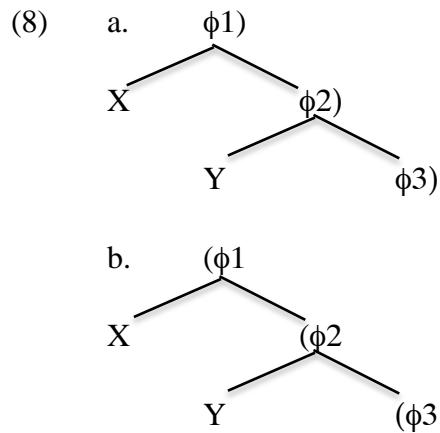
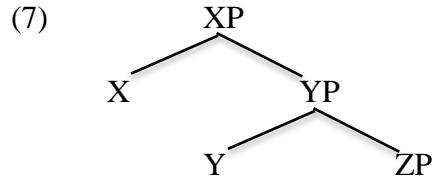
and

- (ii) X is not linearly separated from a prosodically active edge of F.

The added clause (i) will have the desired effect of disqualifying ω from Contiguity-prominence, in a tree like (6); ω has a sister, ϕ_2 , that is higher on the prosodic hierarchy. I have also rephrased clause (ii), previously stated as a requirement that X be *adjacent to a prosodically active edge*; it now says that X must be *not linearly separated from a prosodically active edge*,

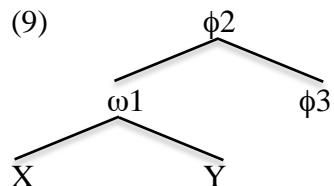
for reasons that will soon become clear (the reasons will have to do with the status of F when F has no prosodically active edges).

We can now consider an abstract tree involving a head X which selects a head Y. The tree in (7) would have corresponding prosodic trees in (8a) or (8b), depending on which edge of ϕ is prosodically active:



Since X selects Y, X and Y must be made Contiguous. In both (8b) and (8c), ϕ_1 dominates both X and Y, but in neither is Y Contiguity-prominent; it has a ϕ sister in both (and in (8b), its sister intervenes between it and the prosodically active edge of ϕ_1).

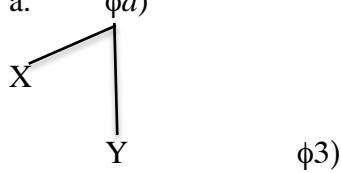
Contiguity-adjunction of X to Y will create a structure in which X and Y are Contiguous, regardless of the distribution of prosodically active edges:



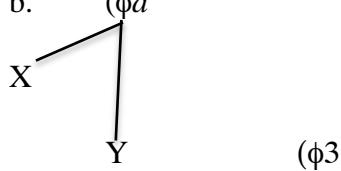
In (9), X has been Contiguity-adjoined to the ω projected by Y. Y is Contiguity-prominent within ω_1 , as it is not separated from a prosodically active edge of ω by any material. In fact, ω has no prosodically active edges; that distinction is reserved for ϕ . Contiguity between X and Y can therefore be established by Contiguity-adjunction, just in case X and Y are linearly adjacent.

Can Selectional Contiguity be created by Grouping? Grouping of X and Y would convert the trees in (8a-b) into (10a-b)³⁵:

(10) a.



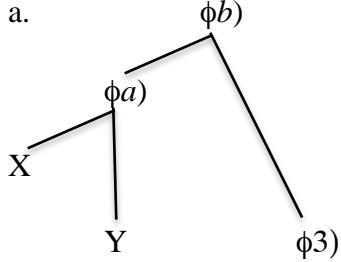
b.



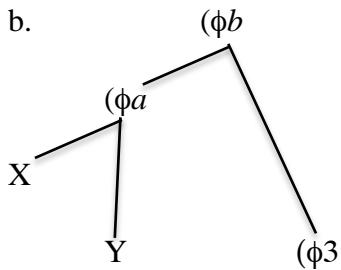
The requirement that XP Match a ϕ would then trigger the creation of a new ϕ , ϕ_b , dominating both ϕ_a and ϕ_3 :

³⁵ Since the newly created node consists entirely of non- ϕ , another possibility is that the new node should be something other than a ϕ itself (perhaps a ω). It would certainly be possible to redefine Grouping in a way that would make this possible (and would make Grouping essentially identical to Contiguity-adjunction, just for this case). I will defer exploration of these possible changes for now.

(11) a.

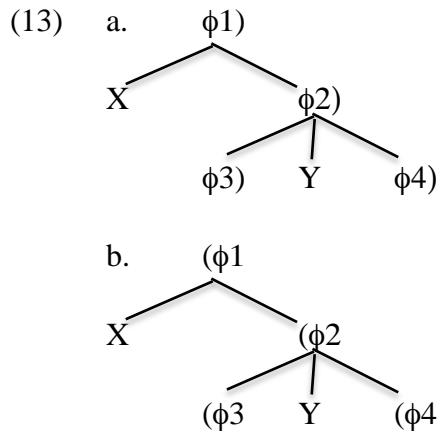
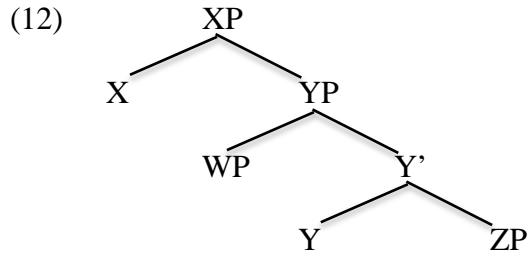


b.



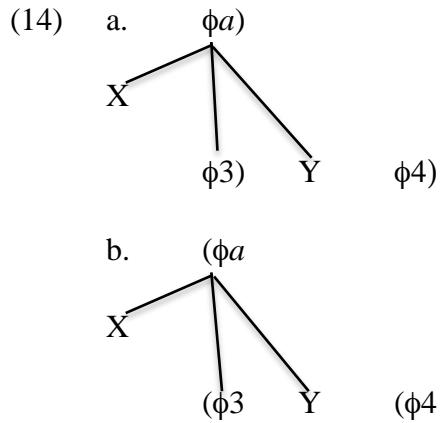
Y is Contiguity-prominent in (11a), but not in (11b); in neither tree does it have a ϕ sister, but it is adjacent to the prosodically active edge of ϕ in (11a). We thus arrive at the conclusion that in languages with prosodically active right edges of ϕ , Selectional Contiguity between adjacent heads can be created either by Contiguity-adjunction or by Grouping. This conclusion will play no role, as far as I can see, in anything that follows in this book, but may be worth bearing in mind in future work.

We should make sure that the Grouping option does not lead to the consequence that Selectional Contiguity can be established between non-adjacent heads; we will see later that this consequence would be undesirable. Consider what would happen if Y had a specifier linearly intervening between X and Y . The tree in (12) would then have corresponding prosodic trees like the ones in (13):



In the trees in (13), X and Y cannot be Grouped in a way that makes them Contiguous.

Grouping would yield the trees in (14):



In neither ϕa is Y Contiguity-prominent; Y has a ϕ sister, and therefore cannot be Contiguity-prominent, regardless of how close it is to the prosodically active edge of ϕa . Selectional Contiguity thus requires heads in a selection relation to be linearly adjacent, regardless of which

prosodic edge is active³⁶. We have seen that Selectional Contiguity can in principle be created either via Contiguity-adjunction or via Grouping; I will leave for future work the question of whether this optionality has any interesting consequences.

1.2 Selectional Contiguity and Opacity

There are many cases in which Selectional Contiguity appears to be violated on the surface.

Consider, for example, the relation between C and T in (15):

- (15) I think [**that** John jump-ed].

On conventional assumptions, there is no point in the derivation at which C and T are linearly adjacent in (15). It could be, of course, that we should conclude from this that conventional assumptions are mistaken; Pesetsky and Torrego (2001), for example, propose that *that* in (15) is the result of head-movement from T to C, which would certainly allow Selectional Contiguity to be satisfied, at least in the course of the derivation.

I will take a different tack. In the previous chapter, it was important that Contiguity relations are ‘forgotten’ once a phase has undergone Spell-out; we saw that in Danish and Irish, Probe-Goal Contiguity between *v* and the object can be freely broken by operations triggered by heads outside the *vP* phase. The facts in Danish were particularly compelling, since we could see there that *v*-Object Contiguity must in fact be established within the *vP* phase, and also that operations that could straightforwardly repair this relation in higher phases (in particular, movement of the object into the initial position in a V2 clause) need not do so.

In dealing with examples like (15), I will follow this general line from the previous chapter, taking advantage of the fact that C is a phase head. We will see that the narrow syntax

³⁶ For other principles positing prosodic consequences for selection, see Selkirk’s (1984) Sense Unit Condition, Henderson’s (2012) COMPLEMENT- ϕ , and Clemens’ (2014) ARGUMENT- ϕ . Chomsky’s (2013, 2014) treatment of specifiers also shares with the theory developed here the idea that specifiers are potentially disruptive and may need to be moved (in Chomsky’s proposal, the specifier makes it difficult to determine the label for the maximal projection). Proposals that selection requires linear adjacency include Holmberg 2000 and Philip 2013.

should try to construct Selectional Contiguity between C and T, but in the end, the only domains for which Contiguity is actually required to hold are Spell-out domains. Failure to make C and T Contiguous therefore does not doom the derivation.

A recurring question in this chapter will have to do with the status of Contiguity relations within a phase. We have already seen some evidence bearing on this question, in section 2.1 of the previous chapter:

- (16) *Is **now** John happy?

Movement of T to C in (16a) breaks the Contiguity relation between T and the subject, and the result is an ill-formed sentence. In this chapter, we will see more examples of Contiguity relations that are established and later broken; the eventual conclusion will be that while the grammar must attempt to repair Contiguity relations (that have not been ‘forgotten’ via Spell-out) if it can, the only actual requirement is that the Contiguity relations be created in the first place; they need not survive to the final representation, even if all the heads involved are phasemates. The ill-formedness of (16) will have to do, in the account to be developed here, with the existence of a possible repair for the broken Contiguity relation (in this particular case, Untethering of the adverb and later Retethering of it in sentence-final position). Some of the examples to follow have no such possible repair, and these will therefore be examples in which Contiguity can be broken without making the sentence ill-formed, as long as the relevant Contiguity relation was formed at some point in the derivation.

1.3 Selectional Contiguity and Timing

We will see some evidence, especially in section 3 below, that Selectional Contiguity relations are typically created earlier in the derivation than Probe-Goal Contiguity relations; in particular, Selectional Contiguity must apparently be established before Untethering if possible, while

Probe-Goal Contiguity must wait until after Untethering. I will suggest below that this difference has to do, not with a difference between different kinds of Contiguity, but between Selection and Agree; Selection happens earlier in the derivation than Agree, perhaps merely because it generally takes place over a shorter distance.

2. Moving Obstacles

With this much of a preliminary understanding of the workings of Selectional Contiguity, let us consider some phenomena we can explain with it. We can appeal to Selectional Contiguity, for example, to deal with the fact that the Haitian Creole subject precedes free-standing Tense/Aspect markers:

- (17) Boukinèt te  renmen Bouki [Haitian Creole: Degriff 2005, 302]
- Boukinèt ANT love Bouki
'Boukinèt loved Bouki'

Movement of the subject in (17) is not driven by Affix Support for *te* 'ANT', since *te* is not an affix; it is also not driven by Probe-Goal Contiguity between *te* and the subject, since these are adjacent (and hence easily made Contiguous) before the subject raises. Rather, movement of the subject takes place so that *te* and the head it selects can be Contiguous.

This way of describing the Haitian Creole facts seems to invoke a case of "altruistic" movement; the subject moves in order to avoid disrupting a Contiguity relation between *te* and the head it selects. In this section I will consider some cases that suggest that in fact, movement is unable to be "altruistic"; Generalized Contiguity can drive movement of one of the participants in the Contiguity relation, but it cannot drive movement of obstacles to Contiguity.

Consider these facts about Quotative Inversion and Locative Inversion in English:

- (18) a. "Hi," said John.

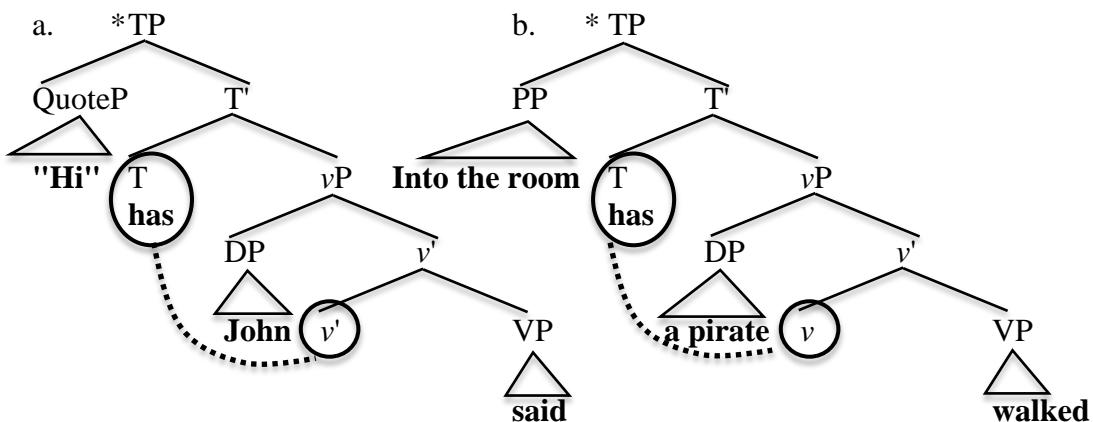
- b. * "Hi," has John said.

- (19) a. [Into the room] walked a pirate.

- b. * [Into the room] has a pirate walked.

(18a) and (19a) are well-formed examples of Quotative Inversion and Locative Inversion, respectively. The (b) examples above are ill-formed, and we could use Selectional Contiguity to rule them out; the subject intervenes between the auxiliary and the verb, and hence between two heads which are in a selection relation, as we can see in the simplified structures in (20):

- (20)



In the trees in (20), Selectional Contiguity between T and v is blocked by the intervening subject.

Quotative Inversion and Locative Inversion differ in two ways which I would like to relate to each other. One is that Locative Inversion, unlike Quotative Inversion, involves "presentational focus" on the subject (see Bresnan 1994, Doggett 2004, Wu 2008 for discussion). Bresnan (1994) notes, for example, that (21b) is an odd response to (21a), while (21c) is a natural one:

- (21) a. I'm looking for my friend Rose.

- b. # Among the guests of honor was sitting Rose.

- c. Rose was sitting among the guests of honor.

Bresnan attributes the contrast in (21b-c) to the fact that locative inversion requires focus on *Rose*, which is incompatible with a discourse beginning with (21a).

The other special property of locative inversion, pointed out by Pesetsky (1994), is that the inverted subject must be on the right periphery of the VP (more specifically, it must be to the right of unfocused material) (Pesetsky 1994, exx. 19-20):

- (22) a. To the stockholders were sent out [several brochures]
b. * To the stockholders were sent [several brochures] out
- (23) a. In this room were assigned to him [several important cases].
b. ??In this room were assigned [several important cases] to him.

Quotative inversion, by contrast, seems not to exhibit such a requirement:

- (24) a. "Hi," blurted out [John]
b. ?"Hi," blurted [John] out
- (25) a. *"Hi," said to him [an important lawyer]
b. "Hi," said [an important lawyer] to him

To my ear, (24b) is not as bad as (22b), and the facts in (25) are the opposite of those in (23).

It appears that the subject in locative inversion, though not the subject in quotative inversion, bears a particular kind of focus that requires it to be shifted to the right periphery of the VP. I will not try to develop a theory of this shift; like the facts about focus and topic in Mainland Scandinavian which made an appearance in section 2.3 of the last chapter, a full explanation of the facts will have to wait for a complete theory of how information structure can affect word order. Leaving the nature and exact cause of this rightward shift mysterious, then, we can expand the range of facts considered in examples (18-19), as follows:

- (26) a. "Hi," said John.
- b. * "Hi," has John said.
- c. * "Hi," has said John.
- (27) a. [Into the room] walked a pirate.
- b. * [Into the room] has a pirate walked.
- c. [Into the room] has walked a pirate.

The facts in the (a-b) examples are familiar, and were discussed before; the (b) examples, but not the (a) examples, violate Selectional Contiguity, since the subject intervenes between a pair of heads in a selection relation. In (27c), we can see that locative inversion has the option of repairing this violation of Selectional Contiguity by subjecting the subject to rightward shift, a process which we now know independently is available for locative inversion. (26c) shows that quotative inversion lacks this option; again, we have confirmed independently that quotative inversion and locative inversion differ in this regard.

The data in (26-27), then, seem compatible with Selectional Contiguity, together with an independently confirmed difference between quotative inversion and locative inversion having to do with the availability of rightward shift for the subject. What they also tell us, however, is that Selectional Contiguity by itself does not license movement of the offending obstacle, at least when the obstacle is the subject. We now know that rightward shift of the subject is one of the options allowed by grammar in general, since we find it in (27c). However, quotative inversion is still forbidden to make use of this option to fix the violation of Selectional Contiguity. In other words, subjects which block Selectional Contiguity may be moved out of the way via independently available processes, but they are not driven to move simply by the fact that their presence violates Selectional Contiguity. Movement of subjects is not 'altruistic'.

Let us capture this state of affairs via the condition in (28), which we could think of as a version of Lasnik's (1995) *Enlightened Self-Interest*:

(28) **Ban on Altruism**

Any operation affecting the position of α must place α in a new relation that satisfies a constraint.

The Ban on Altruism prevents intervening subjects from moving simply in order to create a Contiguity relation between two other elements (such as the auxiliary and verb in the Quotative Inversion examples under discussion here); such movement would not create any new relation in which the subject itself participates. In the Locative Inversion case, by contrast, the subject has some independent, as yet poorly understood reason to shift to the end of the clause, possibly for reasons having to do with presentational focus; the Ban on Altruism therefore allows it to shift, since it can satisfy the conditions on focus by so doing.

We can apply the Ban on Altruism to partly explain the behavior of participle agreement in French and Italian. Participles in these languages can agree only with objects that undergo some kind of movement:

- (29) a. *Joseph a écrit cette lettre [French]

Joseph has written.FEM this.FEM letter.FEM

'Joseph wrote this letter'

- b. Joseph l'a écrite.

Joseph her-has written.FEM

'Joseph wrote it (lit. 'her')'

- c. Les lettres ont été écrites

the.PL letters have been written.PL

'The letters have been written'

- d. Quelle lettre Joseph a-t-il écrite?

which.FEM letter.FEM Joseph has-he written.FEM

'Which letter did Joseph write?'

- (30) a. *Giuseppe ha scritti questi libri [Italian]

Giuseppe has written.PL these books

'Giuseppe wrote these books'

- b. Giuseppe li ha scritti.

Giuseppe them has written.PL

'Giuseppe wrote them'

- c. I libri sono stati scritti

the.PL books are been.PL written.PL

'The books have been written'

- d. *Quanti libri ha scritti Giuseppe?

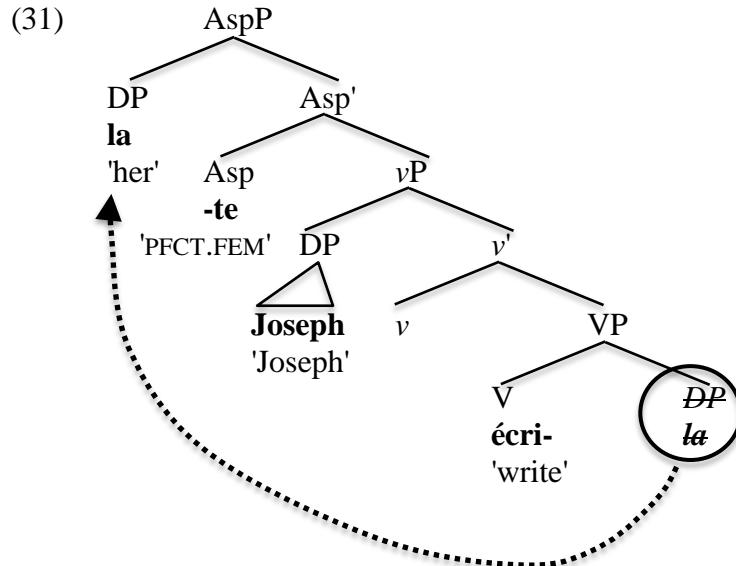
how.many books has written.PL Giuseppe

'How many books has Giuseppe written?'

Participles in French and Italian cannot agree with objects that are left in situ (as the (a) examples above show), but can agree with objects which have undergone some types of movement, including cliticization (as in the (b) examples) and passive (as in the (c) examples), and, in French but not in Italian, wh-movement (as in the (d) examples). If we think of participle agreement as triggering a movement to a position which creates a violation of Selectional Contiguity³⁷, then we can partly capture the restrictions on agreement; agreement is possible, but, thanks to the Ban on Altruism, must be rescued by some form of movement which satisfies an independent condition on the object.

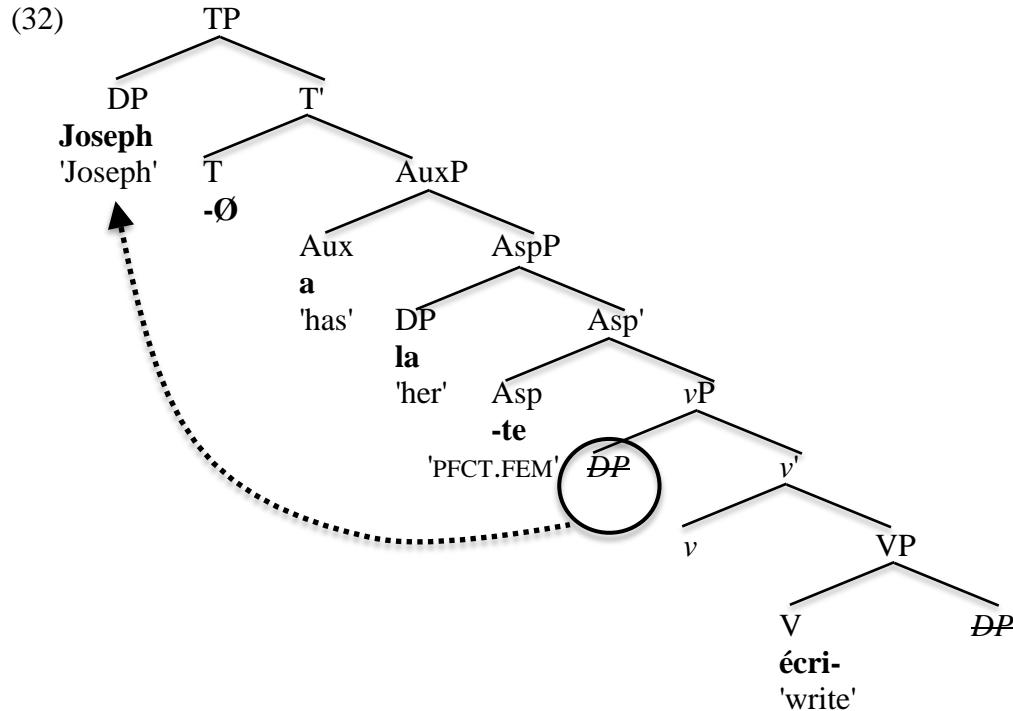
³⁷ There could also be languages in which a Probe responsible for object agreement did not trigger movement to such a position; such a Probe could, for example, appear structurally low enough that the object would not need to move at all to satisfy Contiguity. We are thus not committed to the claim that object agreement will always exhibit the restrictions found in French and Italian. Thanks to Ian Roberts for raising this point.

In French, for example, we might posit agreement on a Asp(ect) head, which pulls the object up into its specifier to satisfy Affix Support³⁸:

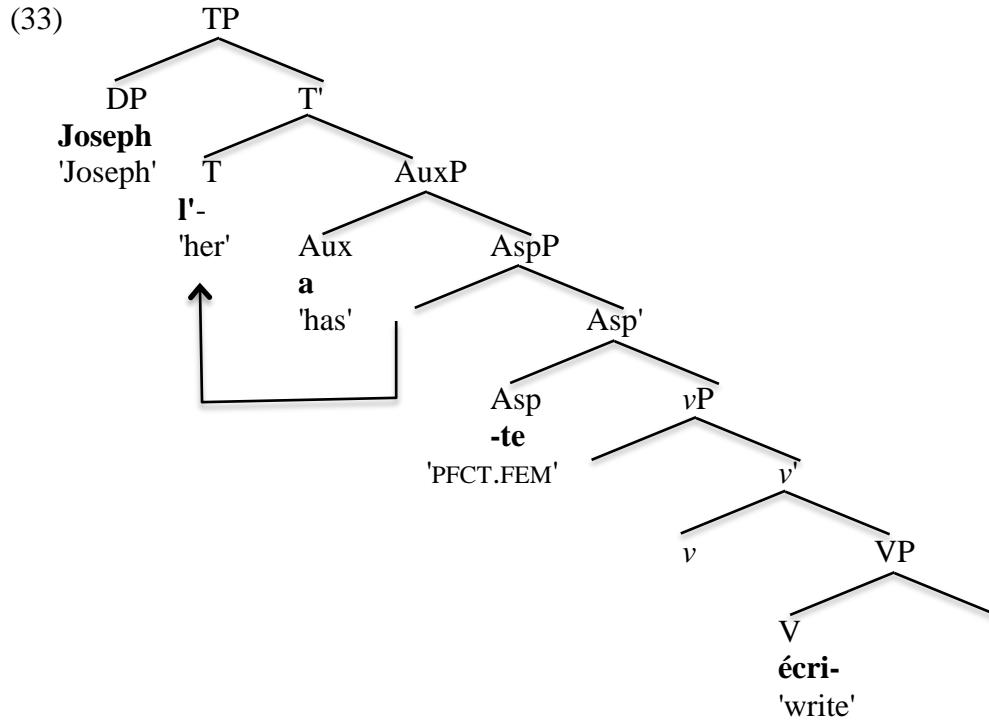


The derivation continues by Merging an auxiliary and a T head, and moving the subject into the specifier of T to satisfy T's need for Affix Support:

³⁸ Interestingly, movement for participle agreement in Italian cannot be driven by Affix Support, since participle agreement in Italian is reliably preceded by a metrical boundary. Rather, Italian participle agreement will have to be driven by Probe-Goal Contiguity, which will trigger movement of the object past the subject in order to make the object and the participle head Contiguous. We thus arrive at the conclusion that French and Italian participle agreement should involve movement to slightly different locations; participle agreement in Italian will drive movement to the specifier just under the agreeing head, while participle agreement in French involves movement to the specifier of the agreeing head. I hope that this conclusion can be useful in accounting for the differences between participle agreement in these languages (for instance, the fact that A-bar movement licenses participle agreement in French but not in Italian), but I will leave the development of such an account for future work.



If the object DP *la* 'her' were to remain in the specifier of AspP, the derivation would violate Selectional Contiguity; the auxiliary *a* and the Asp head *-te* have not been Contiguous at any point in the derivation. Since this object is a clitic, it is able to repair the Contiguity violation via cliticization:



We thus arrive at the result that French participle agreement crucially depends on movement of the object; if the object simply remains in the position associated with participle agreement, then it will trigger a violation of Selectional Contiguity.

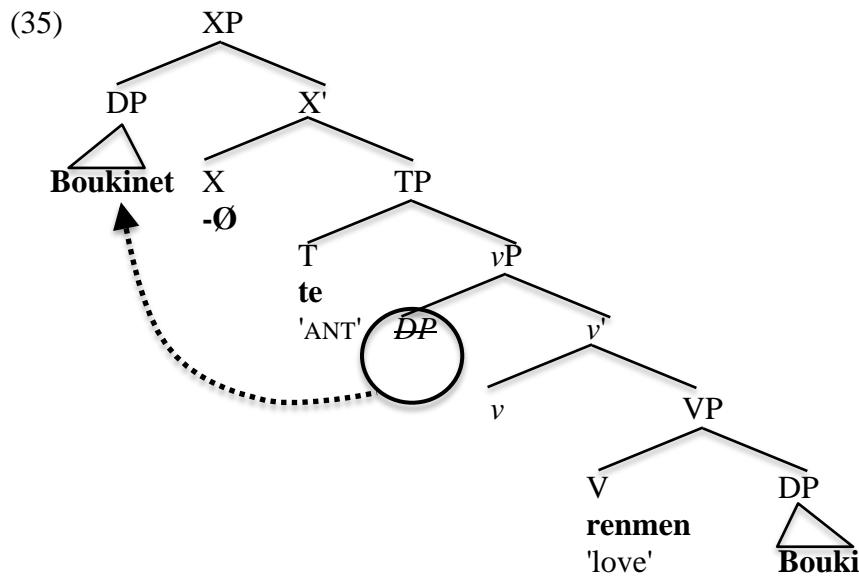
The French facts also demonstrate, however, the importance of the Ban on Altruism.

Participle agreement can only be licensed by types of object movement which are already independently available: cliticization, passivization, wh-movement, and so forth. Again, Selectional Contiguity does not simply trigger movement of the offending obstacle, at least when the obstacle is in a Contiguity relation that might be disrupted by its movement. Rather, the grammar must find some independently available way of moving the obstacle out, which satisfies some condition to which the obstacle itself is subject.

We can now return to the Haitian Creole case, repeated in (34):

- (34) Boukinèt te renmen Bouki [Haitian Creole: Degriff 2005, 302]
 Boukinèt ANT love Bouki
 'Boukinèt loved Bouki'

I said earlier that the subject moves out from between the Tense/Aspect marker *te* and its complement in order to avoid a violation of Selectional Contiguity. While this is true, the preceding discussion allows us to be slightly more precise: Selectional Contiguity makes movement of the subject necessary (which is why, as Baker observed, there are no languages in which the subject in such a construction can simply remain in situ), but it cannot, strictly speaking, drive movement of the subject. The theory we have developed forces us to posit another head in Haitian Creole which is responsible for driving movement of the subject:



From the grammar's perspective, the subject moves to the specifier of XP because X is a (null) suffix in need of Affix Support. This movement averts a violation of Selectional Contiguity between T and *v*, but as we have just seen, movement of DP obstacles to Contiguity cannot be triggered simply by the need to create Contiguity relations.

This way of accounting for the Haitian Creole facts leaves open the possibility that languages could use other means of avoiding the Contiguity problem that Haitian Creole faces. That is, we might find languages with free-standing Tense/Aspect markers in which the word order facts are different from those we find in Haitian Creole; the fact that Haitian Creole uses a null affix to move the subject out of the way is a contingent fact about Haitian Creole. And, indeed, we do find languages with free-standing Tense/Aspect morphemes which appear to be using a different mechanism to create Contiguity:

- (36) Ne inu kofe kono a Mele [Niuean: Massam 2001]

PAST drink coffee bitter ABS Mele

'Mele drank bitter coffee'

- (37) Tyi i-kuch-u si' aj-Maria [Chol: Coon 2010]

PRFV A3-carry-TRANS wood DET-Maria

'Maria carried wood'

Niuean and Chol are like Haitian Creole in that their Tense/Aspect morphemes are not affixes (and are typically adjacent to the verb, satisfying Selectional Contiguity), but are unlike it in that their basic word order is not SVO³⁹.

I will discuss the facts of Niuean and Chol word order in section 6; for now, the only point I want to make is that a theory in which languages with the morphological properties of Haitian Creole will always be SVO is an undesirable theory. We want languages to vary in how they satisfy Selectional Contiguity in this context.

³⁹ Another, potentially relevant difference between Haitian Creole on the one hand and Niuean and Chol on the other is that the latter two languages are morphologically ergative, which Haitian Creole is not. If this split between ergative and non-ergative languages with morphologically isolating verbal morphology is a reliable one, then we could imagine taking the split as evidence bearing on the nature of XP in (35); perhaps X is involved in licensing structural case on the subject. Some facts about word order in ergative languages will be discussed in section 6 of this chapter; we will see there why Niuean and Chol cannot be SVO.

In this section we have discussed a few potential uses of Selectional Contiguity. I have claimed that the narrow syntax tries to create Selectional Contiguity between all relevant heads in the workspace, but that the only pairs of heads for which Contiguity must actually hold are heads within the same Spell-out domain; this was the account of why, in a language like English, C and T regularly fail to be Contiguous. We have also noted a general principle about movement operations, which I named the Ban on Altruism; the need to create a Contiguity relation between α and β cannot trigger movement of an obstacle γ which blocks Contiguity. To put the same point slightly differently, it appears that movement is not purely 'altruistic'; phrases do not move in order to create Contiguity relations that they do not participate in.

3. Verb-initiality and wh-movement

In the last section we saw that in a language like English, C may simply fail to establish Selectional Contiguity with T, since they are separated by a Spell-out domain. In this section we will discuss a limitation on this strategy, which will demonstrate that Contiguity between C and T must be created if possible.

Potsdam (2009), building on work by Greenberg (1963), Keenan (1978), and Hawkins (1983), states the following generalization (his Universal 12'):

- (38) If a language has dominant verb-intial (V1) word order in declarative sentences, it can put interrogative phrases first (Wh1) in interrogative questions.

The generalization in (38) is a refinement of Greenberg's (1963) Universal 12, which stated that verb-initial languages invariably have overt wh-movement. As Keenan (1978) and Potsdam (2009) note, this generalization is falsified by languages like Malagasy, which are verb-initial but have the option of wh-in-situ:

- (39) a. Manasa inona i Be? [Malagasy: Paul 2003]

wash what Be

'What is Be washing?'

- b. Iza no manasa lamba?

who NO wash clothes

'Who is washing clothes?'

In terms of the approach to wh-movement developed in Richards (2010) (and reviewed in section 1 of chapter 3), Potsdam's generalization may be restated as in (40):

- (40) If a language has dominant verb-initial (V1) word order in declarative sentences, its interrogative complementizers are head-initial.

How verb-initial languages create their wh-questions will then depend on how their prosody is organized. Verb-initial languages with active left edges of ϕ will be like Tagalog, in that they require wh-phrases to move; languages with active right edges of ϕ will be like Chichewa, allowing wh-phrases to either move or remain in situ. If (40) is correct, then we expect never to find verb-initial languages which require the wh-phrase to remain in situ; leftward movement will always improve matters for Probe-Goal Contiguity between C and the wh-phrase, if the C in these languages is always initial⁴⁰.

There are generally head-initial languages, like Chinese, in which interrogative complementizers are head-final:

⁴⁰ As Potsdam (2009) and Richards (2010) both point out, this generalization is only true if we are willing to describe any process that dislocates wh-phrases to the left periphery of the clause as 'wh-movement'; the Malagasy question in (52b), for example, has been argued to involve a pseudoclefting construction, rather than simple wh-movement (see Paul 2001, Potsdam 2006). I have no theory to offer of why some languages must use clefting or pseudoclefting structures to move their wh-phrases (see Oda 2002, Potsdam 2009 for proposals).

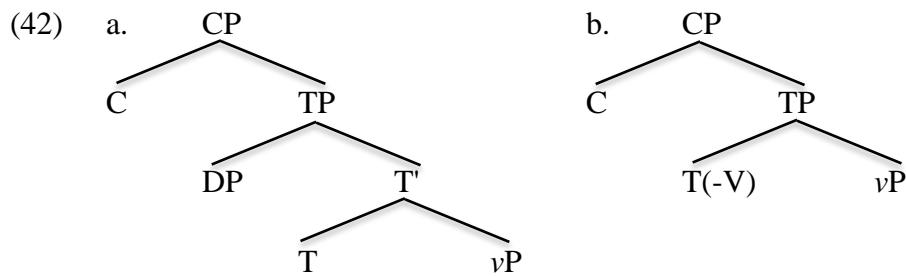
- (41) Ni hui shuo zhongwen ma?

you can speak Chinese C_{INT}

‘Can you speak Chinese?’

(40) claims that verb-initial languages will never be like Chinese in this way; their complementizers always precede TP.

Why should (40) be true? That is, why should it be possible for C to be final in a tree with the verb-medial structure in (42a) (as in Chinese), but not with the verb-initial one in (42b)?



Starting in chapter 2, I have been assuming with Kayne (1994) that heads begin the derivation preceding their complements, and that a syntactic operation is responsible for converting initial heads into final heads. Potsdam’s generalization can thus be viewed as an instance of a constraint on that operation.

The operation I have proposed, called *Untethering*, eliminates the ordering statements that apply to a particular pair of sisters. Untethering of C and TP in (42a), for example, would delete all of the ordering statements that are responsible for establishing that C precedes TP, leaving the sisters unordered with respect to each other. This proposal has been useful for accounting for the behavior of final heads. In section 2.2.1 of chapter 2, for example, I proposed that an Untethered suffixal head will require a specifier, which will precede the Untethered head and give it Affix Support. In section 4.2.2 of chapter 4, we saw that an Untethered head, since its order with respect to its complement has not been determined, cannot yet enter into Contiguity

relations with any Goals with which it Agrees, as there is not yet any way to determine which material ought to be part of the new ϕ that would be constructed to connect the Untethered head with its Goal. This was important for explaining why Untethered heads, unlike ordered ones, can satisfy Affix Support freely with any phrase, not necessarily with phrases with which the head Agrees (in apparent violation of Multitasking).

I have still left many questions open about Untethering, of course. What triggers it? And, assuming that heads must eventually be pronounced in an order, what is the timing and nature of what we might call Retethering, the operation that reestablishes an order between sisters? We will begin to see evidence bearing on these questions in what follows, particularly in section 5 below, so I will defer further discussion for now.

Returning to the trees in (42), the idea is that in (42a), the grammar may choose to Untether C, and then, later, Retether it in final position. This would be the derivation of an example like (43):

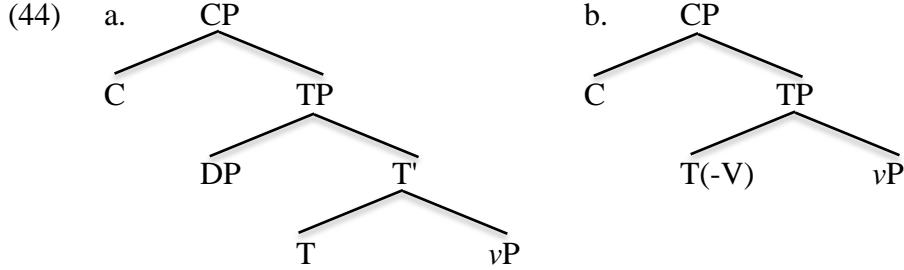
(43) Ni hui shuo zhongwen ma?

you can speak Chinese C_{INT}

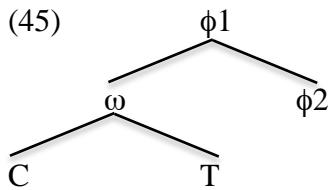
'Can you speak Chinese?'

In (43), the interrogative complementizer *ma* becomes final, by hypothesis, via Untethering and Retethering. C never becomes Contiguous with T in this derivation, but since Spell-out will separate C from T in any event, this lack of Contiguity is not fatal.

Why is such a derivation impossible in languages in which T lacks a specifier? What distinguishes between the trees in (42), repeated here as (44)?



In (44a), as we just saw, Selectional Contiguity never holds between C and T (and this state of affairs is made palatable, in the end, by Spell-out of TP). In (44b), by contrast, C and T can become Contiguous as soon as C is Merged, via Contiguity-adjunction of C to T:



Contiguity-adjunction places C under the ω projected by T, within which T is Contiguity-prominent; C and T are therefore Contiguous.

Our goal is to prevent Untethering from altering the order of C and TP in (44b), and to allow it in (44a). In (44a), not only is TP the sister of C in the syntactic tree, but the ϕ projected by TP is the sister of C in the prosodic tree; the syntactic and prosodic trees are isomorphic. In (44b), by contrast, this isomorphy fails to hold; the sister of C in (45) is not the ϕ projected by TP, but T itself. Suppose we define Untethering in a way that takes advantage of this contrast:

(46) Prosodic Untethering

Given two sisters *in the prosodic tree*, X and Y,

delete all existing ordering statements which make reference to either X or Y.

The consequence of (46) will be that, while Untethering could apply to C and T in (46), the ordering of C with the syntactic contents of TP (including any wh-phrases in the clause) would

be unchanged by such an operation; Untethering of C and T would still leave ω preceding $\phi 2^{41}$.

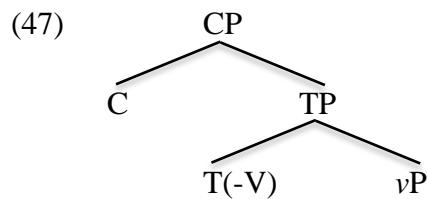
Since ω is a projection of T, ω and $\phi 2$ cannot be Untethered; if they could be, then T and its complement would have been Untethered before C was Merged.

Our previous discussion of Untethering has concentrated on examples in which the Untethered sisters were represented in the prosodic tree roughly as they were in the syntactic tree. Potsdam's cases allow us to consider examples in which this is false, and show us that it is the prosodic tree to which Untethering ought to apply (perhaps because this is the tree in which facts about linear order are represented). Potsdam's generalization follows: there can be no verb-initial language with final C, and hence no verb-initial language with obligatory wh-in-situ.

4. Interlude: the timing of Untethering (and Retethering)

Thanks to the conclusions of the last section, we are now in a position to sketch more clearly the order in which relations are created in the grammar. It was important in the last section that certain Contiguity relations can block Untethering from taking place; in section 3.2.2 of the last chapter, by contrast, I offered an account in which Untethering had to take place before the creation of a different class of Contiguity relations. Let us consider these cases together.

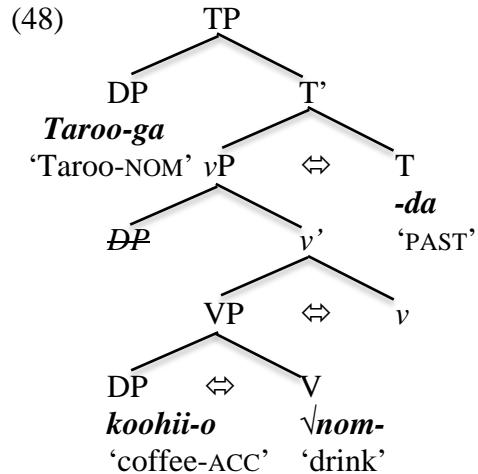
The discussion in the previous section centered on trees like the one in (44b) above, repeated here as (47):



⁴¹ Untethering could, however, alter the relative order of C and T. In chapter 2, I assumed that the distinction between prefixes and suffixes is stipulated in the lexicon; we might consider rejecting this assumption, and allowing Untethering to be responsible for converting affixes into prefixes. Making such a move consistent with the rest of the theory presented here would not be at all trivial, and I will therefore leave it for future work. See Myler (2009) for an approach to affixation that might make this use of Untethering attractive.

I concluded that in a tree like (47), Untethering of C cannot alter the order of C and its complement, because of the Contiguity relation between C and T.

In section 3.2.2 of the previous chapter, I discussed trees like (48), in Japanese:



The discussion, in this case, was about why Japanese is like English in requiring T to have a specifier, but unlike it in allowing any phrase to move to the specifier of TP (rather than, as English does, more or less restricting movement to the specifier of TP to the subject). The idea was that Multitasking in English forces Affix Support and Probe-Goal Contiguity for T to be satisfied by a single movement, namely that of the subject. In Japanese, by contrast, the Untethering of T makes it impossible for T to enter into Probe-Goal Contiguity relations at all; since T's order with respect to its complement is undetermined, there is no way to determine what material should be dominated by a new ϕ to be created by Grouping T with its Goal (or, for that matter, to determine whether T and the subject are adjacent, which would allow Contiguity-adjunction between them). This account rests crucially on the assumption that T does not attempt to create Probe-Goal Contiguity with the subject until after T has been Untethered.

I think that this array of facts is consistent with a view of the grammar in which dependencies are created in order of increasing length. In the tree in (47), C-T Contiguity can be

created immediately upon Merge of C; C can be introduced into the prosodic tree via Contiguity-adjunction with T, creating Contiguity between them right away. I will discuss the motivations for Untethering more in the next section, but the hypothesis will be that Untethering is triggered by something about the relation between sisters. The idea that Selectional Contiguity in (47), which can be created immediately on Merge, is ordered before Untethering, which takes place after Merge has created a sisterhood relation, thus seems not unreasonable. Similarly, the fact that in Japanese, T is Untethered, as the result of a computation involving T and its complement, before T begins to satisfy Probe-Goal Contiguity, which involves the creation of a Probe-Goal relation between T and the subject, seems to be part of the same general pattern; T is closer to its complement than it is to the subject.

It is also important for the account of the Japanese facts that T is still Untethered when it Agrees with the subject. At some point, of course, T will have to be put in an order, if only for purposes of pronunciation. We will begin seeing evidence on the timing of Retethering in chapter 7, where it will be useful to imagine that the process occurs once a phase has been completed, as part of the process of getting the syntactic representation ready for Spell-out to the phonological component.

5. The Final-over-Final Constraint

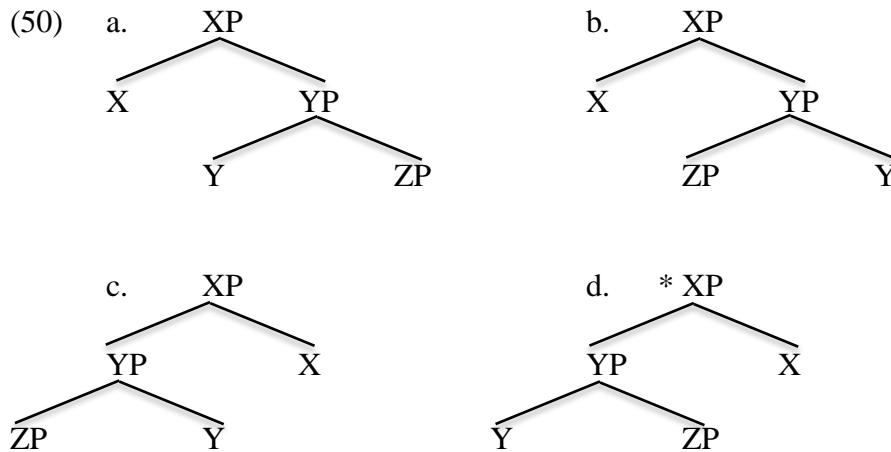
In this section we will continue our investigation of the nature and timing of Untethering. The starting point will be a generalization discovered by Biberauer, Holmberg, and Roberts (to appear), about the kinds of mixed head direction that we find in languages⁴². Biberauer et al state their generalization informally as follows:

⁴² Many thanks to Theresa Biberauer, Anders Holmberg, Ian Roberts, and Michelle Sheehan for very helpful discussion.

(49) **Final-over-Final Constraint (FOFC)**

A head-final phrase αP cannot dominate a head-initial phrase βP , where α and β are heads in the same extended projection.

The FOFC rules out certain types of patterns of head-direction; a head-initial phrase may not be dominated by a head-final phrase. Crucially, the FOFC is not a biconditional: head-final phrases can be dominated by phrases of any head direction. We can illustrate the effects of the FOFC schematically in (50):



The FOFC allows languages with uniformly initial heads (as in (50a)), and languages with uniformly final heads (as in (50c)). It also allows languages with mixed headedness in which projections with final heads are dominated by projections with initial heads, as in (50b). What it rules out is the tree in (50d); projections with initial heads can only be dominated by projections with initial heads.

Biberauer et al (to appear) offer numerous arguments for this generalization. For instance, they note that if we let X in the above trees be the auxiliary, Y the verb, and ZP the object, we arrive at the prediction that the word order Verb-Object-Auxiliary should be ruled out, as this corresponds to the tree in (50d). They point out that this is the one word order which is absent in the Germanic languages, for instance:

- (51) a. ... that John has read the book [English: Aux V O]
- b. ... da Jan wilt een huis kopen [West Flemish: Aux O V]
 that Jan wants a house to.buy
 '...that Jan wants to buy a house'
- c. ... dass Johann das Buch gelesen hat [German: O V Aux]
 that Johann the book read has
 '...that Johann has read the book'
- d. **UNATTESTED:** V O Aux

Another case of the same ban comes from Finnish, as discussed by Holmberg (2000). According to Holmberg, the Auxiliary-Verb-Object word order that we find in English is also typical in Finnish. However, if the matrix clause is a wh-question or contains a focused phrase, then word order becomes more free:

- (52) a. Milloin Jussi olisi kirjoittanut romaanin? [Aux V O]
 when Jussi would.have written INDEF.novel
 'When would Jussi have written a novel?'
- b. Milloin Jussi olisi romaanin kirjoittanut? [Aux O V]
 when Jussi would.have INDEF.novel written
- c. Milloin Jussi romaanin kirjoittanut olisi? [O V Aux]
 when Jussi INDEF.novel written would.have
- d. *Milloin Jussi kirjoittanut romaanin olisi? [*V O Aux]
 when Jussi written INDEF.novel would.have

The word order freedom that we find in Finnish wh-questions is constrained by the FOFC; the one missing word order, in (52d), is the same one which is missing in the Germanic languages in (51).

Biberauer et al (to appear) discuss many other applications of the FOFC; I will direct interested readers to their work for further discussion. One other property of the FOFC that they note is that it cannot simply apply to the whole tree. Consider, for example, the relation between German D and V:

- (53) Sie hat [[das Buch] gelesen] [German]
she has the book read
'She read the book'

The German sentence in (53) contains a head-initial DP *das Buch* 'the book', which is dominated by a head-final VP. The structure therefore violates the FOFC, which bans head-final phrases that dominate head-initial phrases. Biberauer et al suggest that the FOFC applies only within extended projections; that is, it applies to the extended projection of the noun, and also to the extended projection of the verb, but does not constrain relations between heads in different extended projections. Depending on where we think phase boundaries are, we might achieve some of the desirable results of this proposal by saying that FOFC applies only within a Spell-out domain; I return to this possibility below.

In the account developed here, the effects of the FOFC will be the result of conditions on the Untethering operation that begins the conversion of initial heads into final heads⁴³. We have investigated the properties of Untethering in some detail, but I have not yet offered any account of the forces that trigger it.

⁴³ There have been many attempts to derive the effects of the FOFC, which I will not try to discuss; for some relevant discussion, see Hawkins 1994, Holmberg 2000, Philip 2013, Sheehan 2013, Cecchetto 2013, Biberauer, Holmberg, and Roberts to appear, and much other work.

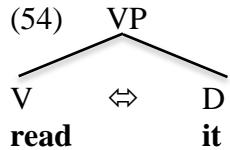
I will argue that Untethering is driven by two kinds of forces, both of which must be present for Untethering to take place. The first will be a family of considerations having to do with linearization and Contiguity, to be discussed in more detail below. When a head H is newly Merged, for example, to a structure dominated by the projection of an Untethered head H', the grammar is motivated to Untether H, as a way of creating Selectional Contiguity between H and H'.

We will see, however, that not every language makes the same use of Untethering, even under the same syntactic conditions; the kinds of motivations alluded to above must be necessary, but not sufficient, for Untethering to take place. I will therefore posit another factor, also necessary but not sufficient to trigger Untethering, involving the distribution of prosodic prominence. Here I am inspired by the line of research developed in Christophe et al (1997), Christophe et al (2003), and Nespor et al (2008). Headedness in a projection correlates reliably with the placement and realization of phrasal stress; in particular, as remarked in the introduction to this chapter, main prominence is generally attracted to the nonhead in a head-complement pair. The above researchers have discovered that infants make use of prosodic cues to determine head direction; given stimuli from head-initial and head-final languages from which all segmental information has been removed, infants between 6 and 12 weeks of age can distinguish between a head-initial and a head-final language (Christophe et al (2003)). In Contiguity Theory, facts like these could be embodied in a parameter that has consequences for the syntax, governing where prosodic prominence is best realized. See Tokizaki (2011), Tokizaki and Kuwana (2013) for a proposal along these lines. I will offer no proposal of my own that is more specific than the general idea sketched here; the point is just that a given set of conditions on

linearization and Contiguity will trigger Untethering in some languages but not others, and I will attribute this variation to a parameter regulating the distribution of prosodic prominence⁴⁴.

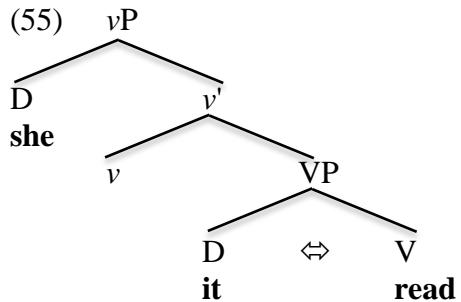
The discussion of the FOFC below will uncover some of the conditions that contribute to the triggering of Untethering. In the trees to follow, I will continue to represent the results of Untethering with a double-headed arrow \Leftrightarrow , indicating that the sisters can be freely ordered. This is intended simply as a useful mnemonic for properties of the set of ordering statements available for a particular tree.

Let us consider a derivation. The derivation begins by Merging two heads:



The tree in (54) comes, in a sense, pre-Untethered; since neither head in (54) asymmetrically commands the other, the sisters are unordered. The sisters will eventually be Retethered, imposing an order on them.

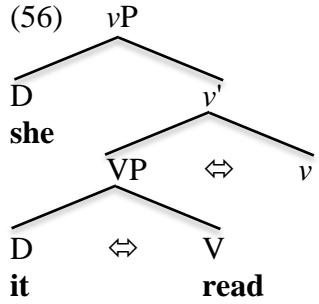
Next we can Merge v , along with v 's thematic specifier:



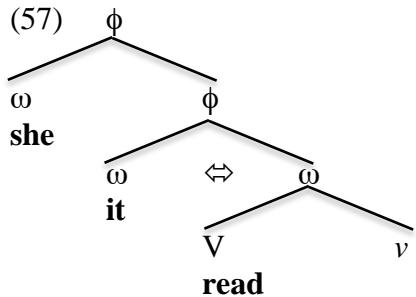
At this point in the derivation, v precedes its complement, and the order of V and D cannot be determined. The creation of Selectional Contiguity between v and V is therefore impossible at this point, since it is unclear whether it will be possible for them to be adjacent. If the conditions

⁴⁴ For more serious discussion of sentential stress, see Arregi 2002, Kahnemuyipour 2004, Wagner 2005, and much other work.

on the distribution of prosodic prominence in the language will allow v to be Untethered, however, the situation will change: whether V is initial or final, v will be able to be adjacent to it:



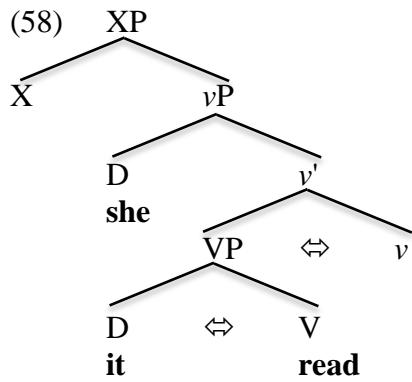
The syntactic tree in (56) could then be mapped onto the prosodic tree in (57), with v and V Contiguous thanks to Contiguity-adjunction of v to V:



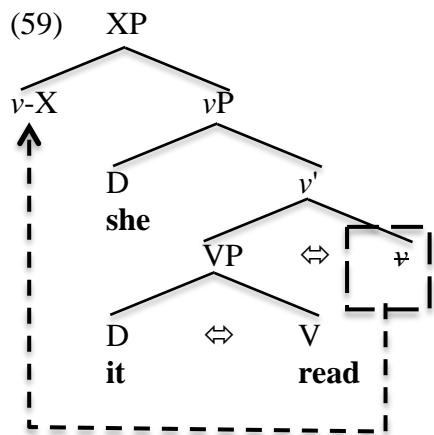
In (57), the relative order of the verb and its complement has still not been determined, nor has the relative order of v and its complement. It has, however, been determined that V and v will be adjacent, whether head-initial or head-final. In section 4.2.2 of chapter 4, I proposed that an Untethered head cannot enter into a Probe-Goal Contiguity relation; the idea there was that because the ordering of the Untethered head has not been determined, it is not yet clear which material would be included by any Grouping operation that would create Contiguity between the Untethered Probe and its Goal. In (56-57), however, although v and V are both Untethered, there is no indeterminacy about how much intervening material could appear between them; the two heads must be adjacent for Selectional Contiguity to hold between them. Contiguity can

therefore be created between them right away (though, as always, the Contiguity relation thus created may not survive to the end of the derivation).

In its Untethered state, v cannot yet create a Probe-Goal Contiguity relation with the object, and its need for Affix Support, if it has such a need, is satisfied by the subject. Let us now continue the derivation in (57), Merging some new head X, and considering the ways in which Selectional Contiguity can be satisfied:

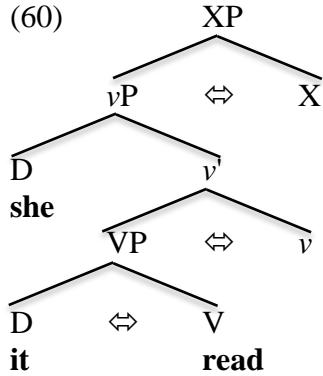


X and v are now subject to Selectional Contiguity. This requirement could be satisfied in a number of ways, including head-movement of v into X, if X is an affix:



This move will break the Contiguity relation between v and V , but we already have evidence that Contiguity relations can be broken if necessary; I return to this point below. Alternatively, if

considerations of distribution of prosodic prominence allow it, we could create Selectional Contiguity between X and *v* by Untethering X:

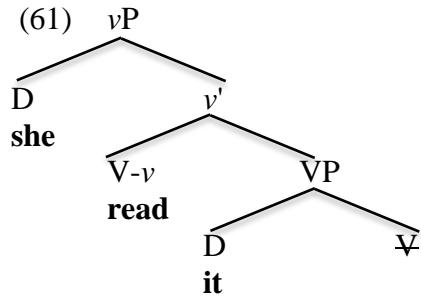


When the time comes to Retether the heads in (60), considerations of Contiguity will favor making the heads final; if they become initial, the relation between X and *v* will be broken. Thus, in this derivation in which *v* and V are final, the new head X can be either initial (as in (59)) or final (as in (60)).

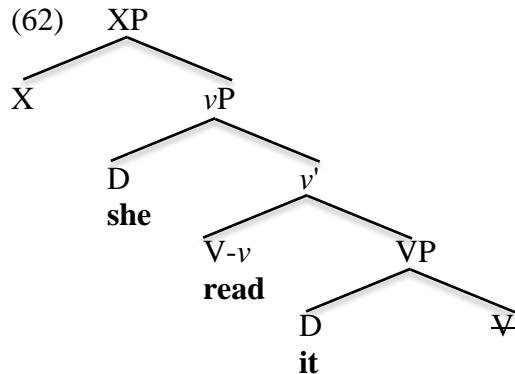
As mentioned above, the step in (59) is one in which the Selectional Contiguity relation between *v* and V, previously established by making *v* final, is broken by movement of *v* to X. The resulting word order has a projection with an initial head that dominates a projection with a final head. If such word orders are possible even when the initial and final heads are phasemates (and the literature on the Final-Over-Final Constraint suggests that they are), then we are led to the conclusion that Selectional Contiguity relations need not survive to the final representation; it is enough for Contiguity to have been established, even if the relation is later unavoidably broken. This is the first such case we have seen in which the broken Contiguity relation is not later repaired. I assume that the failure to repair Contiguity in this kind of case can be related to

the constraints on head-movement; heads in a broken Selectional Contiguity relation are fairly limited in what they can do to repair the broken relation⁴⁵.

Let us now consider a different derivation, in which the lower heads are initial:



In (61), V and v have become Contiguous via head-movement. Now we Merge X:

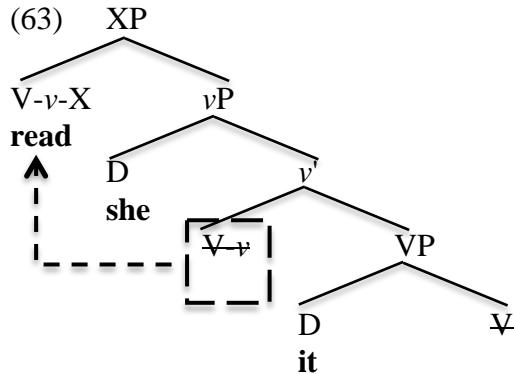


X must become Contiguous with v. There are several imaginable ways of achieving this. For instance, if X is an affix, then the verb could move up to X:

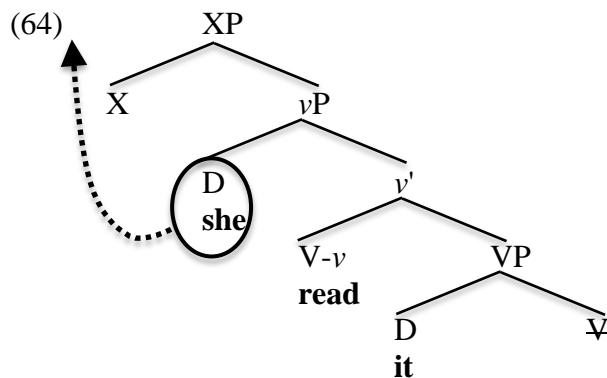
⁴⁵ We might also imagine appealing to the fact that heads in the clausal spine, in many languages, trigger morphological changes in the heads that they select:

- (i)
 - a. John **has eat-en**
 - b. John **is eat-ing**

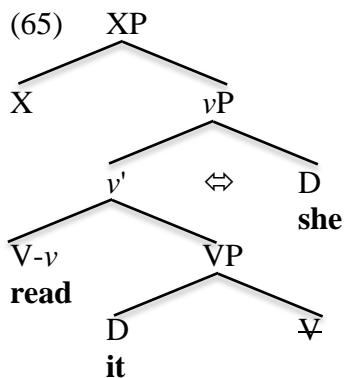
If these morphological changes are the consequence of an Agree relation between heads, then perhaps the features transmitted via this Agree operation are enough to maintain Selectional Contiguity in some sense, even if actual adjacency no longer holds.



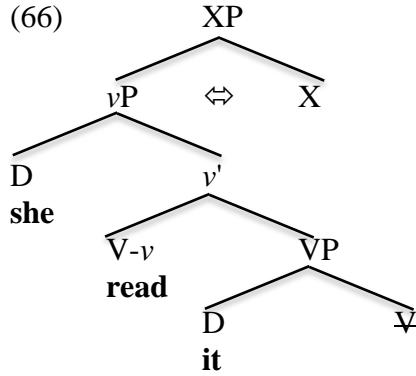
Alternatively, we might wait for the specifier of vP to move into some higher position (perhaps the specifier of X, if X needs a specifier):



Another logically possible alternative would be to Untether the specifier of vP (though the Ban on Altruism would require this option to be independently motivated):



One type of operation that should not take place, however, is Untethering of X. Untethering of X will not contribute to Selectional Contiguity between X and v, and is therefore unmotivated:



In other words, projections with initial heads cannot be dominated by projections with final heads. At the same time, we saw in (59-60) that projections with final heads may be dominated by projections with initial or final heads. This is the FOFC.

In the account developed here, the effects of the Final-over-Final Constraint follow from the fact that Untethering must be motivated. So far, we have seen two kinds of Untethering: pairs of sisters that are heads enter the derivation Untethered, since they cannot be ordered by Kayne's (1994) Antisymmetry, and a head which seeks to become Selectionally Contiguous with another head can also Untether, assuming that the conditions on the distribution of prominence in the language in question allow it to do so. Consequently, head-finality may start at the bottom of a tree (where a pair of heads are sisters), and propagate upward through the tree (creating Selectional Contiguity as it goes), but once it stops propagating upward, no higher heads can be final. This is the insight embodied in the FOFC.

This account inherits from the original Final-over-Final Constraint the problem of demarcating the domains in which the above reasoning holds. We saw earlier that the FOFC cannot simply apply to the whole tree; Biberauer et al (to appear) suggest that it applies within extended projections of lexical heads.

In the explanation of the FOFC effects developed here, it would be natural to identify the domain over which these effects hold as the Spell-out domain. And, indeed, Biberauer et al (to

appear) point out that morphemes that one might be tempted to analyze as interrogative complementizers are among the heads that seem to violate FOFC fairly frequently, appearing in final position even in languages that are head-initial in projections below C:

- (67) Ni yao kan zhe-ben shu ma? [Mandarin Chinese]
you want read this-CL book C_{INT}
'Do you want to read this book?'

Examples like (67) would be apparent exceptions to a FOFC that applied to the entire tree. In this particular case, Biberauer, Holmberg, and Roberts conclude that morphemes like *ma* should not be analyzed as complementizers (and see Bailey (2013) for arguments for this conclusion). Since the account of the distribution of overt wh-movement developed in Richards (2010) and in chapter 3 of this book depends on analyzing *ma* as a complementizer, I will continue to regard it as one, and seek a different explanation for the apparent FOFC violation in (67).

Let us consider how the version of FOFC derived here should apply to interactions between phase heads and the heads they select. We have seen, in section 3 of this chapter, that C does seek Contiguity with T; in a verb-initial language, in which C and T can become Selectionally Contiguous as soon as C is Merged, Untethering of C is blocked. Thus, any pair of heads in a selection relation should seek Selectional Contiguity. What distinguishes phase heads like C is the fact that Spell-out will ultimately rescue the relation between C and T, even if Selectional Contiguity fails to hold.

With this in mind, let us consider possible relations between C and T, beginning with the behavior of declarative complementizers. Recall that for C to undergo Untethering, two conditions must hold: language-particular conditions on the position of sentential stress must favor orders in which C is final, and making C final must contribute to a Contiguity relation in

which C participates. We therefore have four cases to consider: sentential stress might, or might not, favor Untethering, and Untethering might, or might not, contribute to Contiguity. The four cases are outlined and discussed in example (68):

(68) a. **Stress bans Untethering of C, and T is initial**

In a language of this kind, there is no motivation for C to Untether, and it should remain initial. English is an example of such a language.

b. **Stress bans Untethering of C, and T is final**

In a language like this, although Untethering C would assist in the creation of C-T Contiguity, conditions on the placement of sentential stress militate in favor of C becoming initial, and C must therefore remain initial. Contiguity between C and T will fail, but will be rescued by Spell-out of CP. German is a language like this, with initial C and final T.

c. **Stress favors Untethering of C, and T is initial**

This language is the inverse of case (b) above; as in (b), only one of the two necessary conditions holds for triggering Untethering of C. C should therefore remain initial. We will see reasons to think that Chinese may be an example of such a language.

d. **Stress favors Untethering of C, and T is final**

Here, finally, C can be Untethered; both of the conditions for Untethering of C hold, and C can become final. Japanese is an example.

Declarative C should therefore be final only in one of the four imaginable cases above, namely (68d). I have written (68) as though the four cases represent four different kinds of languages, but we might expect to find languages in which, for example, the conditions on the distribution of sentential stress treat different instances of C differently (perhaps some instances of C are

more capable of bearing stress than others). Such a language, if it had final T, might exhibit behavior (68b) in some cases (initial C) and behavior (68d) in others (final C). We will see later that Bangla is a language of this kind.

In (68), we have derived the conclusion, for declarative complementizers, that if T is initial, C must also be initial (68a-b), and that if T is final, C may be either initial or final (68c-d). Again, this is what the FOFC predicts, and Biberauer, Holmberg, and Roberts demonstrate that the proposal is correct for declarative complementizers.

Now let us consider the behavior of interrogative complementizers. These differ from declarative complementizers in that they must create Contiguity, not only with T, but also with a wh-phrase (or, perhaps, with an operator responsible for forming yes/no questions). Such complementizers therefore have another potential motivation for Untethering: like declarative complementizers, they should only be able to Untether if the conditions on sentential stress are appropriate, but if this condition is met, they can Untether either for Contiguity with T or for Contiguity with wh. Running through (68) again, then, an interrogative complementizer ought to be identical to a declarative one in cases (68a-b): if the conditions on sentential stress forbid Untethering the complementizer, then it cannot Untether, regardless of the potential benefits for Contiguity. In case (68d), in which both Contiguity with T and the conditions on stress favor Untethering, C should Untether, as before. The interesting case is (68c), in which the conditions on stress favor Untethering but Untethering will not contribute to C-T Contiguity. Just as in the case of interrogative complementizers, C could in principle Untether in such a case, as a part of the process of becoming Contiguous with a wh-phrase. Interrogative C should therefore be unlike declarative C in that, under the right conditions on sentential stress, it should be able to be final even when T is initial. And this is what we find:

- (69) Ni yao kan zhe-ben shu **ma?** [Mandarin Chinese]
 you want read this-CL book C_{INT}
 'Do you want to read this book?'

Importantly, Selectional Contiguity between C and T is never established at all in (69); this is not fatal, since C is a phase head and Spell-out will separate it from TP in any event. The ‘escape hatch’ for FOFC violations that I have just created for interrogative complementizers is therefore a fairly narrow one; a non-phase head should not be able to take advantage of it. T, for example, must be Selectionally Contiguous with the head it selects, even if it has Probe-Goal Contiguity with the subject.

We also expect a selected C to have to be Contiguous with its selector. A head-final V, for example, could straightforwardly select a head-final C:

- (70) Otoko-no ko-ga [otoosan-ga kuru **to**] **kiita.** [Japanese]
 male-GEN child-NOM father-NOM come C heard
 'The boy heard that his father will come'

Head-final V could also select head-initial C, but only if CP extraposes rightward, making V and C Contiguous⁴⁶:

- (71) Der Junge **hört**, [**dass** sein Vater kommen wird] [German]
 the boy hears C his father come will
 'The boy hears that his father will come'

There are also languages like Bangla, as mentioned above, in which both of the above options are available, with some complementizers initial and others final:

⁴⁶ Interestingly, it will be important that the verb and CP not begin the derivation as sisters; if they did, the verb and C would be adjacent as soon as V was Merged, and the reasoning in section 3 of this chapter would prevent V from being Untethered (just as C cannot be Untethered if it selects a TP with no specifier intervening between C and T).

- (72) a. Chele-Ta **Sune**-che [je or baba aS-be]] [Bangla]

boy-CLASS hear-3SG.PAST C his father come-will

'The boy heard that his father will come'

- b. Chele-Ta [or baba aS-be **bole**] **Sune**-che

boy-CLASS his father come-will C hear-3SG.PAST

'The boy heard that his father will come'

Bangla conditions on sentential stress, by hypothesis, treat the complementizers *je* and *bole* differently; the latter may become final to become Contiguous with final T, but the former may not, forcing extraposition of CP⁴⁷. Bangla actually exhibits a third possibility; *je* may host a phrase in its specifier, in which case its projection precedes the verb. For some speakers (Ishani Guha, p.c.), such clauses must undergo dislocation:

- (73) a. [Robi **je** kalke aSbe], Benu ta-i bollo

Robi C tomorrow will.come Benu that-EMPH said

'[That Robi will come tomorrow, Benu said'

- b. [kalke **je** Robi aSbe], Benu ta-i bollo

tomorrow C Robi will.come Benu that-EMPH said

'[That Robi will come tomorrow, Benu said'

In (73), the fronted CP is doubled by a demonstrative *ta-i* 'that-EMPH'. Some speakers can drop this demonstrative, but must set the fronted CP off prosodically; Hsu (2014) argues that the

⁴⁷ Hsu (2014) makes the important observation that *je* and the matrix verb need not be adjacent:

(i) John bollo **Meri-ke** / **regegiye** [je chatro du-to esche]
John said **Mary-ACC/angrily** C student 2-CL came
'John said **to Mary/angrily** that the two students came'

In the theory developed here, we should understand such examples as cases, not unlike their English translations, in which Selectional Contiguity holds at one point in the derivation between V and C, but is later broken by another operation, perhaps one which seeks to place embedded clauses at the periphery of the embedding clause.

Understanding the nature of this later operation, and perhaps the conditions on clausal embedding which it satisfies, is a natural next step for future research.

fronted clause is a separate Intonational Phrase. The fronted CP in (73) cannot satisfy Selectional Contiguity between *je* and the higher verb, regardless of whether the CP remains preverbal or extraposes to postverbal position, since there is no way for *je* and the higher verb to be adjacent. Dislocation of the clause, with a pronominal copy (optional for some speakers) left in preverbal position, solves the problem: the pronominal copy, or a pro-dropped version of it, can apparently stand in for CP for purposes of Contiguity with matrix V⁴⁸.

Turning to head-initial V, we expect it to be straightforwardly compatible with initial C:

- (74) The boy **heard** [that his father will come]

If a CP with final C were to be selected by head-initial V, however, Contiguity could not be established between V and C. We might expect CP, under such circumstances, to front to some position preceding V; this movement would obstruct Contiguity, either between V and *v*, or between *v* and the subject, depending on where exactly the clause landed.

Perhaps this is why, in generally head-initial languages with final interrogative C, we often find initial subordinating morphemes in subordinate questions (Biberauer, Holmberg, and Roberts to appear):

⁴⁸ Biberauer, Holmberg, and Roberts (to appear), citing Koptjevskaja-Tamm (1988, 1993) and Givón (2001), note that verb-final languages also frequently nominalize their embedded clauses, and suggest that nominalization serves as a way of making embedded clauses compatible with the FOFC while leaving them in preverbal position (because, for Biberauer, Holmberg, and Roberts, the FOFC applies over extended projections of a given lexical head, and adding a nominalization layer to an embedded clause prevents the FOFC from considering together material from the matrix and embedded clauses). In the proposal developed above, we could analyze such examples as adding another phase boundary between V and the embedded CP.

- (75) a. Tân mua gì **thέ?** [Vietnamese]

Tan buy what **C_{INTERR}**

‘What did Tan buy?’

- b. Anh đã nói [**rắng** cô ta không tin]

PRN ANT say **C_{DECL}** PRN NEG PRT believe

‘He said that she didn’t believe him’

Vietnamese would fall together with Chinese in the discussion above, as a language in which Untethering of C, although permitted by the conditions on sentential stress in the language, cannot be licensed by Contiguity with T, and is only possible for interrogative complementizers as a way of becoming Contiguous with wh-phrases. Duffield (2013) discusses examples which suggest that there may be multiple heads in the CP domain, at least in Vietnamese; the final yes-no question marker *không*⁴⁹ is supplemented, in embedded clauses, by a clause-initial subordinating morpheme:

- (76) a. Chị có mua cái nhà **không?**

PRN ASR buy CLS house **C_{yes/no}**

‘Did you [elder sister] buy (the) house?’

- b. Cô gái hỏi [**liệu** cô có thể đi đến bữa tiệc được **không**]

PRN girl ask **C** PRN ASR possibility go arrive party can **C_{yes/no}**

‘The girl asked if she could go to the party’

We can view the initial embedding morpheme *liệu* in (76b) as a way of making Contiguity between embedded C and matrix V straightforward. Perhaps there are two C heads in the complementizer field, or perhaps the embedded CP has *liệu* as a Merged specifier, which

⁴⁹ When not in final position, this morpheme (or a homophonous one) indicates negation.

satisfies the Selectional Contiguity requirements of matrix V by making V adjacent to an interrogative morpheme.

The above discussion of phase heads and the FOFC has centered entirely on complementizers. We hope that other phase heads will behave the same way; *v*, for example, should exhibit the same range of behavior as C. An additional complication with *v*, which does not arise with the instances of C just discussed, is that it is apparently often an affix, though perhaps just as often a null one. Assuming that affixal *v* and V must be in the same position, we expect affixal *v* not to introduce any new violations of FOFC.

On the other hand, if there are examples in which *v* is not an affix and is participating in Contiguity, not just with V, but also with some other phrase (for example, if *v* Agrees with objects), then we might expect to find instances of final heads in and above the *v* level, above an initial V.

Erlewine (to appear) argues that this is correct for Mandarin Chinese, concentrating on sentence-final particles like *le* ‘currently relevant state’ and *éryi* ‘only’:

- (77) a. Wǒ xǐhuan mùgūa **le**
I like papaya LE
'I (now) like papaya' (presupposition: I didn't like papaya before)
- b. Wǒ ài nǐ **éryi**
I love you ONLY
'I only love [you]_F'

Erlewine offers several compelling arguments that these particles are at the edge of the *vP* level, rather than at the *CP* level; for instance, he shows that they interact scopally with negation in the way that we would expect, given that position. As Erlewine points out, these particles are

excellent candidates for vP-level correlates of the final interrogative C that we also find in Mandarin; like the final C, they are around the position of a phase head, and are final in apparent violation of the FOFC. Given the generally isolating status of Chinese, it seems not unreasonable to hope that Chinese *v* is not an affix, and that at least some of these particles are heads in the clausal spine, enabled by the vP phase boundary to appear in final position⁵⁰.

To review, then: pairs of heads enter the derivation effectively Untethered, since they are not in any asymmetric c-command relation, and a head may Untether to become Selectionally Contiguous with an Untethered head. Phase heads (such as interrogative complementizers) may also Untether for Probe-Goal Contiguity; this option is blocked for non-phase-heads, since Selectional Contiguity must ultimately succeed for heads that are not phase heads.

All of these options are constrained by conditions, about which I will have nothing to say, on the placement of prominence in the sentence. Indeed, if they were not, we would expect every language to be head-final, since such languages straightforwardly succeed in making all the heads in the clause Selectionally Contiguous.

6. Ergativity and verb-peripherality

Selectional Contiguity promises to account for why there should be languages like English, in which the subject is compelled to move to the specifier of TP. The principle of Affix Support offers one level of explanation for this; English subjects must raise to the specifier of TP because

⁵⁰ We might hope to generalize this approach to the other types of apparent FOFC violations that Biberauer, Holmberg, and Roberts discuss, involving DPs and PPs:

- (i) a. Johann hat [einen Mann] gesehen
 Johann has a man seen
 'Johann has seen a man'
 b. Johann ist [nach Berlin] gefahren
 Johann is to Berlin gone
 'Johann has gone to Berlin'

In DP, for example, I would need to posit a null phase head with a projection dominating DP, which is enabled to become final because of its Probe-Goal relation with some element inside DP. We might imagine a Kase head, for example, which Agrees with the interior of the nominal, perhaps generating case and phi-feature concord within the nominal as a result.

English T is a metrically dependent suffix, and moreover a Probe which Agrees with the subject. But why should T Agree with the subject? If T must find Support, why not provide it with any randomly selected phrase?

If transitive subjects are universally generated in the specifier of vP for reasons having to do with UTAH, then Selectional Contiguity gives us a reason for languages to have T Agree with the subject and force it to move into the specifier of TP. If the subject remains in its Merged position, then it will disrupt Selectional Contiguity between v and the head that selects it. Moving the subject out of its initially Merged position avoids this disruption.

Movement of the subject is not the only imaginable way of creating Selectional Contiguity, however. As we have already seen in this chapter, another way to achieve Contiguity would be to make all the relevant heads final, thereby making them string-adjacent. Alternatively, we could imagine a language moving the verb past the subject while leaving the subject in situ; serious discussion of head-movement will have to wait for the next two chapters, but if head-movement is licit in such cases, it ought to be able to create Selectional Contiguity. A language which leaves the subject in its base position, then, could create Selectional Contiguity either by being head-final or by moving the verb to a position preceding the subject. We would therefore expect such languages to be either SOV or verb-initial.

Interestingly, ergative languages, when they have a dominant word order, are almost invariably either SOV or verb-initial (Trask 1979, Mahajan 1994, 1997). The exceptions, as we will see, involve ergative languages that are V2. If ergative languages are languages in which the subject remains in situ in the specifier of vP, then the requirement that such languages be verb-peripheral can be made to follow from Selectional Contiguity. The head which selects v must become Contiguous with v , either via Untethering and Retethering in a final position

(yielding an SOV structure) or by head-movement of the verb past the subject (creating a verb-initial structure)⁵¹. Crucially, we do not predict that verb-peripheral languages will invariably be ergative. The position of the verb will ultimately be driven by independent properties of the language in question (including the conditions on Untethering, hopefully to be related to distribution of prominence, and the distribution and nature of any affixes on the verb). What we have derived is a requirement that these heads will have to have the properties which place the verb in peripheral position if the subject is to remain in situ.

As mentioned above, there is one class of counterexamples to the generalization that ergative languages are verb-peripheral: there are ergative languages with verb-second word order. As we saw in the previous chapter, Kashmiri is such a language:

- (78) a. Aslam-an *dits* Mohn-as kita:b Ra:m-ini khətrī ra:th [Kashmiri:
 Aslam-ERG gave Mohan-DAT book Ram-DAT for yesterday Manetta 2010,
 'Aslam gave Mohan a book for Ram yesterday' 3]
 b. Mohn-as *dits* Aslam-an kita:b Ra:m-ini khətrī ra:th
 c. Kita:b *dits* Aslam-an Ra:m-ini khətrī ra:th
 d. Ra:th *dits* Aslam-an Mohn-as Ra:m-ini khətrī

There is good reason to think, however, that Kashmiri is underlyingly head-final, with only C in head-initial position. In Kashmiri sentences containing auxiliaries, the verb surfaces in final position:

- (79) Hu:n-ti ***chu*** behna broñh panin ja:y goð sa:f ***kara:n***
 dog-FOC AUX seat before self's place first clean ***do***
 'Even the dog cleans his place before sitting'

⁵¹ Here I crucially assume that heads cannot lower to the verb past the subject; for one theory of lowering which would block lowering past the subject, see Bobaljik (1995). In the theory of head-movement developed in the next two chapters, it will follow that raising is preferred to lowering in such contexts.

Kashmiri verb-second clauses are thus remarkably like their German counterparts, and may be given the same kind of account; Kashmiri verbs are underlyingly final, and a V2 requirement, perhaps imposed by C, forces the highest verbal element to move to a position preceding its complement.

Kashmiri offers yet another instance of the kind of opacity that we have seen several times in the course of this study. Selectional Contiguity is not a requirement on the output; it is a requirement that must be satisfied as quickly as possible once selection takes place, but the Contiguity relation it creates need not survive to the end of the derivation. In the Kashmiri case, most of the heads of the clause become final, thereby satisfying the need for Contiguity between them; this Contiguity is sometimes subsequently broken by the V2 requirement, but the fact that Contiguity held at an earlier point is enough to make the Kashmiri derivation well-formed⁵².

We can now return to the facts of Niuean and Chol, languages which were first mentioned in section 2 above:

- (80) Ne inu kofe kono a Mele [Niuean: Massam 2001]

PAST drink coffee bitter ABS Mele

'Mele drank bitter coffee'

- (81) Tyi i-kuch-u si' aj-Maria [Chol: Coon 2010]

PRFV A3-carry-TRANS wood DET-Maria

'Maria carried wood'

In section 2, Niuean and Chol were contrasted with Haitian Creole. The point was that any language must have some means of satisfying Selectional Contiguity for the heads on either side of the subject, and that while Haitian Creole accomplishes this by moving the subject to a high

⁵² Note that in this particular case, if the C responsible for V2 is a phase head, the effects of Contiguity breaking will be masked by Spell-out, since the moved head and the head it selected will not be spelled out in the same phase.

position, there are languages (like Niuean and Chol) which do not do this, and instead apparently rely on some kind of movement of the predicate.

In this section we have seen why Niuean and Chol, unlike Haitian Creole, are not SVO; they are ergative languages, hence incapable of moving the ergative subject to the high position that Haitian Creole is making use of. What do they do instead?

Niuean and Chol are both languages in which VSO and VOS word order are both possible:

- (82) a. Kui kai he tama e niu [Niuean: Clemens 2014, 151]

PERF eat ERG child ABS coconut

'The child ate coconut'

- b. Kui kai niu e tama

PERF eat coconut ABS child

'The child ate coconut'

- (83) a. Tyi i-kuch-u aj-Maria jiñi si' [Chol: Coon 2010, 355]

PERF A3-carry-TRANS DET-Maria DET wood

'Maria carried the wood'

- b. Tyi i-kuch-u si' aj-Maria

PERF A3-carry-TRANS wood DET-Maria

'Maria carried wood'

The following two chapters will be devoted to understanding the forces that drive head-movement, and will offer an account of why some languages are verb-initial (see section 7 of chapter 6, in particular). The VSO word order is therefore not difficult to account for; we can

posit movement of the verb past the subject, to some affixal head below the Aspect morpheme at the beginning of the sentence. How are we to derive VOS word order?

Clemens (2014) offers an account of the Niuean facts that fits well into a Contiguity-theoretic approach. She notes, first of all, that in both Niuean and Chol, VOS word order is confined to examples in which the object lacks a determiner or a case marker (in fact, in Niuean, though not in Chol, sentences with VOS word order have the case-assignment properties of intransitive clauses, with absolute subjects). She also discovers, in a careful study of Niuean prosody, that the object and the verb in VOS word order are prosodically united, in a way that does not hold, for example, of the subject and the verb in VSO word order.

Clemens proposes the condition in (84):

(84) **ARGUMENT CONDITION ON PHONOLOGICAL PHRASING (ARGUMENT- ϕ)**

A head and its internal argument(s) must be adjacent sub-constituents of a ϕ -phrase.

(Clemens 2014, 141)

As Clemens notes, ARGUMENT- ϕ bears a family resemblance to Selectional Contiguity. Her idea is that ARGUMENT- ϕ is responsible for VOS order; when the verb moves past the subject, ARGUMENT- ϕ motivates movement of the object past the subject, to repair the prosodic relation between them. In particular, her proposal, couched in Optimality-theoretic terms, is that ARGUMENT- ϕ outranks the ordinary conditions on how syntactic structure is to be mapped onto word order, forcing phonology to pronounce the object adjacent to the verb, despite the fact that the verb has moved past the subject.

ARGUMENT- ϕ is responsible for the prosodic effects of VOS word order that Clemens discovers; the verb and its object are compelled to be within a single ϕ . In terms of the theory

developed here, we can understand Clemens' observations as the result of Contiguity-adjunction of the verb to the object.

Clemens also offers an account of the different treatments of DP objects and NP objects. She proposes that DP is a phase, and that Phase Impenetrability is to be implemented as in Chomsky (2001), with Spell-out applying to a phase once the next higher phase head is Merged. Consequently, she suggests, a DP object undergoes Spell-out just when *v* is Merged. This timing makes it possible for the verb and the object to participate in selection prior to Spell-out of DP, but then destroys the evidence for this relation when *v* is Merged. Consequently, the verb and a DP object are not constrained by ARGUMENT- ϕ . When the object is an NP, however, the verb and the object are still in a computationally accessible selection relation when the verb moves past the subject, and ARGUMENT- ϕ can trigger the creation of VOS word order.

Contiguity Theory ought to be able to adopt this theory wholesale, substituting Selectional Contiguity for ARGUMENT- ϕ . We can view movement of the object past the subject, as Clemens does, as a repair for the broken Selectional Contiguity relation between the verb and the object; likewise, we can adopt her proposal about why NP and DP objects are treated differently. A salient question, which arises for Clemens as well, is why repairs like this are not found in every verb-initial language: why does Irish not move the object past the subject, for example? Perhaps the answer to this question lies in an understanding of the distribution of bare NP objects in the world's languages; if we can develop an account of why Irish lacks such objects, then perhaps we will have explained why it lacks VOS word order. Alternatively, we might imagine that Irish does indeed move the object past the subject, but then later moves the subject again, recreating VSO word order; we have already seen evidence for EPP positions after the verb in Irish (see section 3 of chapter 2). On the third hand, we might appeal to the fact that

Niuean and Chol are both ergative languages, unlike Irish; a clearer picture of the syntax of ergativity might help us to understand the distribution of VOS word order better. I will leave the matter here, pending further research.

7. Second interlude: Untethering and the derivation

The properties of Untethering have played an important role in the last few sections. In particular, we have seen that Untethering can be blocked from reordering a head with its complement, if that head is already in a Contiguity relation with another head; this was the account of Potsdam's generalization in section 3.

Previous chapters have occasionally relied on Kayne's (1994) idea that specifiers are reliably to the left of their sisters. Now that we are assuming Untethering as a possible operation, we should make sure that the particular specifier positions alluded to in previous chapters are still required to be on the left; if Untethering could move these specifiers to the right, then some of the results of the previous chapters could be lost.

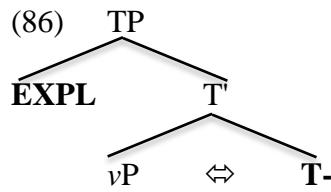
In section 2.2.2 of Chapter 2, it was important that expletives cannot be Merged on right-branching specifiers. The argument had to do with languages in which T is a head-final prefix. Such languages are comparatively rare, but it appears to be possible that all such languages satisfy Affix Support via word-internal metrical boundaries in the verb:



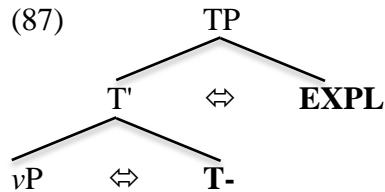
Prior to Untethering, T's need for Affix Support is satisfied by vP, but after T becomes final, it is on the right periphery of the clause. Such languages therefore have, possibly invariably, reliable metrical boundaries within the verb which can provide Support for T; the languages of this kind that we discussed were the Athabaskan languages, Ket, and Seri.

If the head-final T in (85) could be followed by an expletive, of course, then there would be no need for a word-internal metrical boundary. I assumed, following Kayne (1994), that an expletive on a right-branching specifier was ruled out by general principles of linearization. I think that this is still a safe assumption, even after we introduce Untethering.

Consider the derivation that a language like the one in (85) would have to undergo in order to have an expletive on a right-branching specifier. First the expletive would have to be Merged on the left:



Next, the expletive can Untether, in an attempt to satisfy Affix Support for T:



The representation in (87) may satisfy Affix Support once the Untethered material has been Retethered in final positions (though (87) itself presumably does not satisfy Affix Support, since it is still unclear whether the expletive follows T). A plausible problem with this derivation, it seems to me, has to do with the step in (86). The Merge of the expletive in (86) satisfies no immediate requirement: Affix Support, for example, is not satisfied in (86). If we deny the grammar the ability to look ahead in the derivation, then the step in (86) might be rendered impossible, since Merging the expletive appears unmotivated at this point. I drew the tree in (86) as though Merge of the expletive followed Untethering of T, but allowing the expletive to be Merged before T becomes final would not help matters; since T is a prefix, its need for Affix

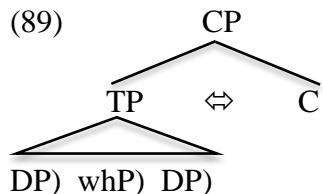
Support prior to Untethering is satisfied by its complement vP , and Merge of the expletive is again unmotivated. We thus derive the result that expletives cannot occupy right-branching specifiers.

In section 1 of Chapter 3, it was important that wh-movement cannot be to the right. The potentially problematic case here involved languages like Basque and Georgian, in which C is final, and in which right edges of ϕ are active:

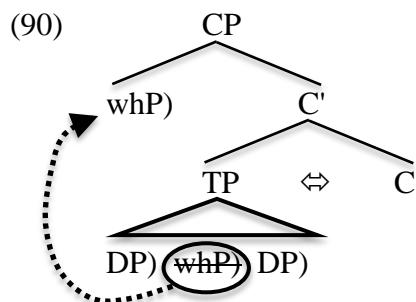
- (88) DP) whP) DP) C

Movement of the wh-phrase to a right-branching specifier of C would create Contiguity between the wh-phrase and C, yet it appears that this option is impossible.

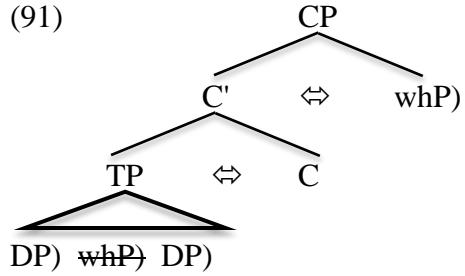
Here, again, it seems to me that a plausible account can rely on the grammar's inability to look ahead in the derivation. Imagine, first of all, a derivation in which the wh-phrase does not seek Contiguity with C until after C has been Untethered:



Wh-movement, at this point, would have to be to the left:

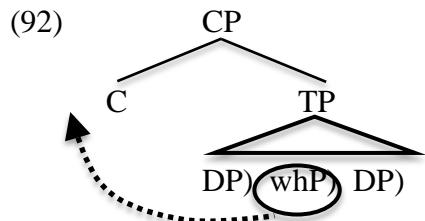


The wh-phrase could then, in principle, Untether, and eventually Retether to the right:



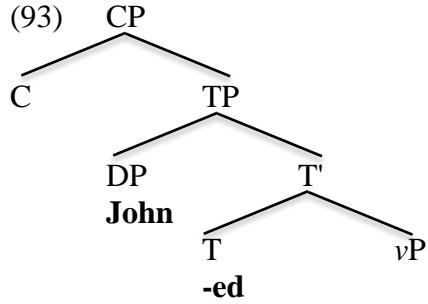
The intermediate stage in (90) is again unmotivated; this movement operation does not create Contiguity. Assuming that the grammar cannot look ahead, we should expect it to be unable to take this step.

Allowing wh-movement before Untethering C would not help matters:



While wh-movement in (92) would indeed make Contiguity possible between C and the wh-phrase, it would also prevent the C from later Untethering. C and the wh-phrase would have to be made Contiguous via Prosodic Adjunction, and this would prevent C from Untethering from TP; in the prosodic tree, C would then have the wh-phrase as its sister, rather than the ϕ corresponding to TP. Languages like Georgian and Basque, in which C is final, therefore cannot be using this derivation.

We arrive at the conclusion that Affix Support and Probe-Goal Contiguity cannot, by themselves, drive the creation of specifiers on the right, at least in these comparatively simple cases. Could Selectional Contiguity trigger the creation of final specifiers? Note that if it can, this type of operation will have to be constrained; for example, making the specifier of TP final in the English example in (93) would create Contiguity between C and T, but is apparently blocked:



In the particular example in (93), the subject is presumably blocked from becoming final by the Ban on Altruism: shifting the subject to the right makes Contiguity between C and T possible, but does nothing for the subject.

I will conclude, then, that if specifiers can be on the right, the operations that put them there cannot be driven by the motivations we have considered so far. This is not to say that there cannot be specifiers on the right; we have already seen that notions like focus and topic, in particular, seem to be able to drive movement operations that Contiguity Theory cannot currently capture. I will have to leave for future work the project of developing a better understanding of the forces that drive rightward movement.

8. Adverbs

In chapter 4, we saw that one of the consequences of Probe-Goal Contiguity can be that the Probe and the Goal must be linearly adjacent; for example, no adverbs may intervene between them:

- (94) a. *She read **quickly** the book
 b. * Is **now** John eating the chocolate?

In (94a), the adverb *quickly* disrupts Probe-Goal Contiguity between *v* and the object; in (94b), the adverb *now* disrupts Contiguity between T (moved to C) and the subject. Both cases exemplify the fact that in English, which has prosodically active left edges of ϕ , Goals must generally be adjacent to Probes that precede them.

This chapter has been concerned with extending Contiguity to include Selectional Contiguity. But we seem to find many examples of adverbs intervening between heads that ought to be related by selection:

- (95) She has **quickly** read the book

In (95), the adverb *quickly* intervenes between the auxiliary *has* and the participle *read*. If these heads (or subparts of these heads) are in a selection relation, then Selectional Contiguity ought to have to hold between them, and the fact that adverbs can intervene between them is a surprise.

We might imagine, of course, that Selectional Contiguity is simply wrong, or at least that it should not be grouped together with Probe-Goal Contiguity as two aspects of a single, generalized Contiguity requirement. But there do in fact seem to be domains in which adverbs are prevented from appearing by Selectional Contiguity. For instance, German verbs and auxiliaries in final position cannot be separated by adverbs (Haider 2005, 39):

- (96) a. ... daß die Theorie **wohl** **tatsächlich schlecht** formuliert worden sein mag
that the theory possibly indeed badly formulated been be may
'...that the theory may possibly have indeed been badly formulated'
b. *... daß die Theorie **wohl** **tatsächlich** formuliert **schlecht** worden sein mag
c. *... daß die Theorie **wohl** **tatsächlich** formuliert worden **schlecht** sein mag
d. *... daß die Theorie **wohl** **tatsächlich** formuliert worden sein **schlecht** mag

None of the adverbs in (96) can appear in any of the positions occupied by *schlecht* 'badly' in

(96b-d)⁵³.

Even in English, not all adverbial phrases can intervene between auxiliaries and verbs (a fact referred to by Haider (2000, 2004) as "edge effects")⁵⁴:

⁵³ Sheehan (to appear a) discusses the generality of this behavior in head-final languages, arguing persuasively that certain apparent exceptions are in fact only apparent.

- (97) a. She has **quickly** read the book
 b. * She has **more quickly than I have** read the book
 c. She has read the book **more quickly than I have**

In principle, then, it seems that we do want Selectional Contiguity to block adverbs from intervening between heads in a selection relation, at least some of the time. Let us try to understand why Selectional Contiguity relations are sometimes broken by adverbs.

We can start by discussing a little more systematically the behavior of adverbs. I will assume that adverbs are adjuncts; they are not Merged because of a selection relation with any other head. There are clearly conditions, which I will leave unexplored, on which adverbs may modify which parts of the structure; I will follow Ernst (2002) in hoping that these conditions may ultimately be made to follow from facts about the meanings of adverbs and the constituents that they modify. Apart from these conditions, I will posit no specific requirements at all on the possible syntactic positions or points in the derivation at which adverbs may be Merged, other than the very general conditions imposed by the theory developed here.

Adverbs are constrained, on this view, mainly by the requirement that they respect Contiguity relations. Bearing this in mind, let us now consider how to derive the contrast in (94-95). Consider, for example, a derivation that begins with the construction of the TP in (98):

- (98) [TP John is eating the chocolate]

There is no reason not to choose, at this point, to Merge an adverb modifying the TP:

- (99) [TP **now** John is eating the chocolate]

⁵⁴ Haider (2004) also points out similar effects in nominals:

(i) eine **viel größer** (*als ich dachte) Summe
 a much bigger than I thought sum
 'a much bigger (*than I thought) sum'

I will continue to concentrate on the properties of the clausal spine, leaving the internal structure of DPs for another time; ultimately, I would hope that the contrast in (i) may be related to the one in (97), with the AP intervening between heads in the functional spine of the nominal. See Sheehan (to appear b) for a different approach.

Contiguity between T and the subject, in (99), could be established by Grouping, creating a ϕ corresponding to the projection of T immediately dominating the subject, within which the subject would be Contiguity-prominent. If C were declarative, (99) would therefore be a well-formed structure. Suppose we imagine a derivation, however, in which C is a matrix interrogative, and triggers head-movement to itself (for reasons we will explore in the next two chapters):

- 
- (100) [CP *is* [TP **now** John *is* eating the chocolate?]]

Head-movement of T to C threatens to break the Probe-Goal Contiguity relation between T and the subject. One way of preserving this relation, of course, would be to Untether the adverb, and Retether it in final position:

- (101) [CP *is* [TP John *is* eating the chocolate **now**?]]

Once the adverb is final, T and the subject are adjacent, and can become Contiguous via Contiguity-adjunction. The same strategy is presumably available for examples like (102a), converting them to (102b):

- (102) a. She has **quickly** read the book
b. She has read the book **quickly**

The Ban on Altruism would seem to require, however, that Untethering adverbs is not actually driven by the need to create Selectional Contiguity relations in which the adverb itself does not participate. We will revisit this conclusion in chapter 6, and eventually alter the Ban on Altruism so that it no longer has this effect on adverbs; adverbs will be capable of altruism to a greater extent than the kinds of phrases we have concentrated on so far.

Putting this issue aside for the time being, let us consider the status of examples like (102a) above. How is Selectional Contiguity satisfied in such examples?

One possible answer, of course, is Selectional Contiguity is in fact not satisfied. On this view, Selectional Contiguity is a desideratum, but in a derivation in which it cannot be satisfied, it is not satisfied. See Preminger (2011) for compelling arguments for an approach of this kind to feature-checking.

I think that if we reject this approach for Contiguity, however, we can account for Haider's (2000, 2004) "edge effects", alluded to above:

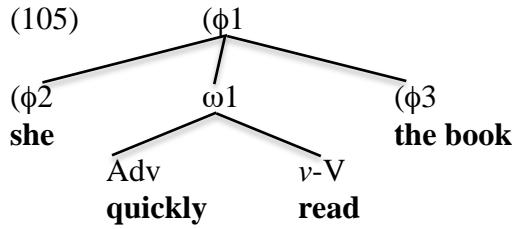
- (103) a. She has **quickly** read the book
b. * She has **more quickly than I have** read the book
c. She has read the book **quickly**
d. She has read the book **more quickly than I have**

If (103a-b) both simply involve violations of Contiguity, then it is not clear why they differ in grammaticality. In both cases, Contiguity may be straightforwardly satisfied by placing the offending adverb at the end of the sentence, but this is merely optional for the simple adverb *quickly*, while it is obligatory for the longer adverbial phrase in (103b).

Haider observes that the condition on preverbal adverbs is not that they must consist of a single word (Haider 2004, 782):

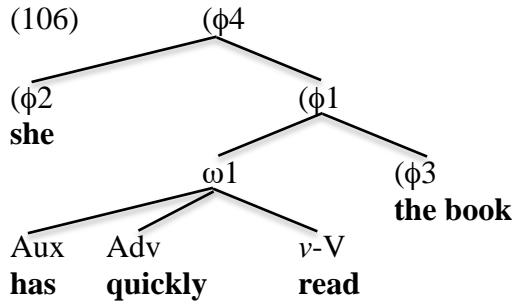
- (104) He has [(**much more**) **carefully** *(**than anyone else**)] analyzed it
- Descriptively, the generalization is that adverbials in this position in English can contain adverbs (which can themselves be modified by adverbs, recursively), but cannot contain other kinds of material (like the post-head material in (104)).

I think we can get a natural account of this generalization by positing Contiguity-adjunction of adverbs to the heads that they modify⁵⁵. An example like (103a), for instance, will involve Contiguity-adjunction of *quickly* to *read* (or some head contained in *read*), yielding a vP with a prosodic structure like:



Subsequent operations will raise the subject and introduce the auxiliary *has*, which can

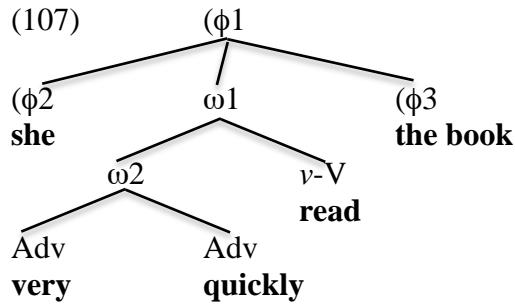
Contiguity-adjoin to ω_1 :



In the prosodic tree in (106), *has* and *v* are Contiguous in ω_1 ; both nodes are dominated by ω_1 , and since ω_1 has no prosodically active edges, *v* is not separated from any prosodically active edges of ω_1 . Selectional Contiguity between the auxiliary and *v* (or, more generally, between *v* and whatever head we take to select *v*) is therefore satisfied, despite the intervening adverb.

The assumption that adverbs can Contiguity-adjoin to the heads that they modify will also allow for certain kinds of phrasal adverbs to appear in the relevant positions. An AdvP like *very quickly*, for example, could appear in a vP like the one in (107), after first Contiguity-joining *very* to *quickly*:

⁵⁵ For a related idea in the nominal domain, see Belk and Neeleman (2014), who discuss a phenomenon they call *AP adjacency*, which requires adjectives to be string-adjacent to nouns that they modify.



The vP in (107) could then proceed through the derivation like the one in (106), eventually yielding a string like *She has very quickly read the book*.

By contrast, consider ill-formed examples like the one in (108):

(108)* She has [more quickly than I have] read the book.

In (108), the clause *than I have* must be at least a ϕ , and therefore cannot Contiguity-adjoin to the adverb *quickly*, since the result would be a ω dominating a ϕ , violating the prosodic hierarchy. The Contiguity-adjunction escape hatch therefore cannot save (108).

Nor can it save examples like (109):

(109) *She has read quickly the book.

In (109), the adverb *quickly* blocks a Probe-Goal Contiguity relation between v and the object. Contiguity-adjunction of the adverb to the object, if it were possible, would allow the Contiguity relation to be created; the left edge of the object would no longer be separated from the v - V complex, and the verb could therefore itself undergo Contiguity-adjunction to the object, creating Contiguity. Contiguity-adjunction of the adverb to the object must therefore be ruled out. I suggest that we rule it out by allowing adverbs (or, perhaps, modifiers more generally) to Contiguity-adjoin only to elements that they modify; thus, an adverb may Contiguity-adjoin to another adverb, or to the verb, or an auxiliary, but not to a direct object, as in (109). Further arguments for this restriction will have to wait for a serious investigation of the prosody of modifiers, a task beyond the scope of this book. I think that a logical first move in such an

investigation would be to explore the possibility that Generalized Contiguity constrains, not only the participants in Agree and Selection, but also the participants in modification; but for the time being, I will leave the topic here⁵⁶.

We have seen that English has at least two ways of fixing Contiguity violations imposed by intervening adverbs. One is to Untether the adverb, and Retether it in final position; the other is to Contiguity-adjoin the adverb to a head that it modifies. This approach accounts for some of Haider's observations about differences between English and German with respect to the behavior of adverbs. German is unlike English, first, in that adverbs in preverbal positions are not constrained in how much material they can contain (Haider 2004, 782):

- (110) Er hat es [sehr viel sorgfältiger als jeder andere] analysiert

he has it very much more.carefully than any other analyzed

'He has analyzed it much more carefully than anyone else'

I agree with Haider in relating this to the fact that German TP and VP are both head-final.

Contiguity between the auxiliary and the verb holds (since both are final) at an early point in the

⁵⁶ We do not expect to find Haider's edge effects for adverbs between the subject and T, which are in a Contiguity relation in which the subject is Contiguity-prominent by virtue of being at the left edge of TP (and which therefore is immune to disruption by intervening material). It is not clear to me that this expectation can be tested, however. Most adverbs that can comfortably appear in this position are independently unable to be complex in the relevant ways:

- (i) a. John probably has left
- b. Probably John has left
- (ii) a.*John [more probably than I have] has left
- b.*[More probably than I have] John has left

Adverbs like *frequently*, by contrast, are able to be part of complex structures, but are independently somewhat degraded in the relevant position:

- (iii) a. ?He frequently has been here
- b. He has frequently been here
- c. He has been here frequently

To my ear, (iiiia) involves some kind of focus on the adverb. Perhaps this is related to the fact that the phrasal version is also unacceptable in this position, at least without parenthetical intonation:

- (iv) a. *He [more frequently than me] has been here
- b. *He has [more frequently than me] been here
- c. He has been here [more frequently than me]

derivation, but then the auxiliary is compelled by the V2 requirement to move into second position in the clause, and this movement breaks its Contiguity relation with the verb:



- (111) Er hat es [sehr viel sorgfältiger als jeder andere] analysiert *hat*
he has it very much more.carefully than any other analyzed *has*
'He has analyzed it much more carefully than anyone else'

On this account, the relation between the auxiliary and the verb in (111) is much like the relation between the verb and the object in a V2 Danish example like (112):



- (112) [Om morgen] drikker Peter ofte *drikker* kaffe [Danish]
in morning.the drinks Peter often *drinks* coffee
'In the morning, Peter often drinks coffee'

In both the German (111) and the Danish (112), the V2 requirement compels the breaking of a Contiguity relation that holds at an earlier stage in the derivation. In the corresponding English examples, by contrast, an adverb that intervenes between heads in a selection relation can only have been inserted there before the Contiguity relation between them was created, and the heads in question are not separated by a Spell-out boundary; this imposes conditions on the size of the adverb.

Similar reasoning can help account for some interesting properties of German extraposition. Haider (2000, 2004) points out that final verbs and adverbs in German must be adjacent; not only can they not be separated by adverbs, as we have seen, but they also cannot be separated by extraposed material:

(113) a. *...daß sie nicht mehr gerechnet **damit** hat

that she not any.more reckoned with.it has

'...that she has not reckoned with it any more'

b. *... daß er dem Kollegen leider nicht gesagt [**wie es funktioniert**] hat

that he the colleague unfortunately not said how it works has

'...that he unfortunately has not told his colleague how it functions'

I continue to have nothing to say about what would drive rightward movement in these examples, but as long as extraposition takes place after heads have Untethered, the theory can correctly block it in these cases; extraposition would break up the existing Contiguity relation between the auxiliary and the verb. As we expect, such extraposition becomes well-formed if the V2 requirement breaks up the Contiguity relation independently by topicalizing the VP:

(114) a. [Gerechnet **damit**] hat sie nicht mehr

reckoned with.it has she not any.more

b. [Gesagt [**wie es funktioniert**]] hat er dem Kollegen leider nicht

said how it works has he the colleague unfortunately not

And in English, of course, extraposition to postverbal positions is comparatively unconstrained:

(115) A man will arrive [**who claims to be from Mars**]

Since English is not head-final, extraposition of the relative clause does not break any Contiguity relations.

The behavior of adverbs seems to be constrained in ways that corroborate our previous conclusions about the nature of the derivation. Adverbs may freely intervene between elements that are not yet in a Contiguity relation, or between elements that were previously in a Contiguity relation that has since been broken. If Contiguity relations have not been ‘forgotten’ by virtue of having been created in a preceding phase, they are then repaired. We have seen two ways that adverbs which find themselves in positions that block the creation of Contiguity relations can be dealt with, at least in English: they can be extraposed to the right, perhaps via Untethering and Retethering, or they can undergo Contiguity-adjunction to a head that they modify. In the next chapter, we will see some evidence that these operations are in fact obligatory, when adverbs threaten to block Contiguity relations; that is, adverbs are required to be Altruistic, in a way which will require us to revise the Ban on Altruism.

9. Conclusion

This chapter introduced a more generalized version of Contiguity, which constrains not only relations between Probes and Goals, but also relations between heads connected by selection:

(116) Generalized Contiguity

If α either Agrees with or selects β , α and β must be dominated by a single prosodic node, within which β is *Contiguity-prominent*.

A major theme of the chapter has had to do with differences between Contiguity relations driven by Agree (Probe-Goal Contiguity) and Contiguity relations driven by Selection (Selectional Contiguity). I have tried to get these differences to follow, either from differences between phrases (which may be Goals) and heads (which may be selected), or between the operations of selection and Agree themselves.

One difference between Selectional Contiguity and Probe-Goal Contiguity is that Selectional Contiguity invariably requires adjacency, while Probe-Goal Contiguity only requires adjacency some of the time. The relevant difference here, for us, has to do with a difference between heads and phrases; heads are more constrained in the ways in which they can be

Contiguity-prominent:

(117) ***Contiguity-prominence***

For a particular node F, an element X dominated by F

has *Contiguity-prominence within F* just in case:

- (i) X has no sister which is higher on the prosodic hierarchy ($\omega < \phi < i$) than X,

and

- (ii) X is not linearly separated from a prosodically active edge of F.

The addition of (i) to the definition of *Contiguity-prominence* guarantees that a head cannot be prominent if it has a phrasal sister within its ϕ ; this, in turn, means that if any complete ϕ linearly intervenes between two heads in a Selection relation, Contiguity cannot hold between them (because any node created to dominate the two heads will necessarily also include the intervening ϕ , preventing either head from being Contiguity-prominent).

A second difference between Selectional Contiguity and Probe-Goal Contiguity had to do with methods for rescuing broken Contiguity relations; in fact, we saw well-formed examples in which Selectional Contiguity relations between phase-mate heads failed to survive to the end of the derivation. I suggested that the difference here had to do with the fact that the phrases that participate in Probe-Goal Contiguity can move more freely to repair broken Contiguity relations than can the heads that participate in Selectional Contiguity.

Finally, I offered an argument (in section 3) that Selectional Contiguity relations are typically created earlier than Probe-Goal Contiguity relations. I proposed that this difference should be related to a more general difference between selection and Agree; selection relations are created earlier in the derivation than Agree relations, perhaps simply because they are typically shorter.

Two additional principles came in to play. The first arose in section 2:

(118) ***Ban on Altruism***

Any operation affecting the position of α must place α in a new relation that satisfies a constraint.

This principle prevents movement (or Untethering) for ‘altruistic’ reasons. Phrases that block Contiguity relations, for example, may be moved out of the way, but only if the movement involved is triggered by some new relation in which the offending obstacle participates. In the next chapter, we will see that this principle needs to be weakened so that it does not apply to adverbs, which are indeed required to be altruistic.

The second principle is one of several new observations about the nature of Untethering:

(119) ***Prosodic Untethering***

Given two sisters *in the prosodic tree*, X and Y,

delete all existing ordering statements which make reference to either X or Y.

Prosodic Untethering effectively prevents heads which have successfully created Selectional Contiguity relations from becoming head-final; such heads are, in the prosodic tree, Contiguity-adjoined to other heads, and hence Untethering will not reorder them with their complements.

The principle was central to the account of why verb-initial languages never require wh-in-situ.

Finally, we have developed a view about the timing of Untethering which captures the distinctions we have needed to make so far. The generalization seems to be that the grammar creates dependencies, in general, in increasing order of length; Untethering, which affects a pair of sisters, is therefore constrained to apply quite soon after a new head is Merged, since the head and its sister are structurally very close. The only kinds of operations that precede Untethering are ones that can apply immediately on Merge; the example given in section 3 above was the formation of Selectional Contiguity between linearly adjacent heads. Other operations, which require a head to search into the interior of its complement, follow Untethering in the derivation.

Chapter 6: Head-movement

The preceding chapters have developed two conditions on the interaction between syntax and phonology, and have also made a number of observations about the conditions on how these requirements may be satisfied. In this chapter we will continue to flesh out the approach, demonstrating more fully how the various principles developed in the preceding chapters interact with each other. We will see that the system yields the right results for head-movement of auxiliaries and main verbs in a variety of languages.

In many cases, we will see that head-movement is driven by the same conditions that have driven the other operations discussed so far: Contiguity and Affix Support. An important difference between heads and phrases, however, is that heads may be affixes, which must attach to an appropriate host. The grammar is responsible for making certain that all affixes have hosts. Having performed all the legitimate head-movements driven by the considerations above, the grammar will then perform, at Spell-out, the following operation to attach affixes to hosts:

(1) ***Prosodic Lowering***

An affix dominated by ω is realized on the closest host c-commanded by ω *in the prosodic tree*.

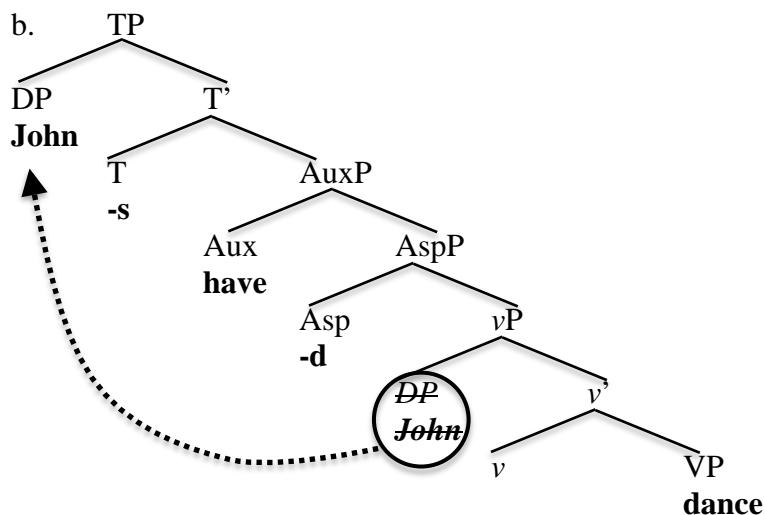
Prosodic Lowering, like Prosodic Untethering in the last chapter, encodes an observation about the kinds of structures to which the operation applies; it appears to be sensitive, not to the syntactic tree itself, but to the prosodic tree that is derived from the syntactic one. In general, the effect of Prosodic Lowering will be to lower affixes to the nearest possible host (Chomsky 1957, Hale and Keyser 2002, Bjorkman 2011, and much other work), but there will be instances in which the prosodic tree gives an affix no host to which it can lower, and in such cases a verb or auxiliary will move to host the affix.

The account to be developed here will assume Bjorkman's (2011) approach to the syntax of auxiliaries; section 1 will present her approach. The remainder of the chapter will consist primarily of case studies. We will see how the account developed thus far accounts for the distribution of head-movement in tensed clauses in English, Danish, French, Icelandic, Spanish, Italian, and Irish. The case studies will necessarily touch on head-movement driven by all the various requirements just discussed, though I will try to arrange them in a way that allows us to discuss motivations for head-movement in an organized fashion. Many of the head-movements to be considered in this chapter will end at T. In chapter 7, we will go on to consider head-movement to C in interrogative and V2 clauses, movement to *v*, and also the behavior of infinitival clauses.

1. Bjorkman (2011)

Bjorkman (2011) offers a compelling argument against a standard approach to the syntactic representation of auxiliaries. The kind of approach that she argues against can be exemplified in (2b), a tree for (2a):

- (2) a. John has danced.



In (2b), the auxiliary *have* is represented as a head in the functional spine of the clause, which I have labeled Aux. It selects a particular functional category, in this case the Perfect Aspect head *-d*.

Bjorkman argues that this type of approach to auxiliaries is untenable, and that we should rather regard auxiliaries as a kind of repair, introduced into the structure when morphology is unable to realize affixes on a host. The correct tree for (2a), she argues, contains no dedicated ‘AuxP’ projection; rather, the projection I have labeled ‘AspP’ should be responsible for influencing the morphological form of the verb, for introducing the semantics of aspect, and also for hosting an auxiliary, inserted for purely morphological reasons.

Bjorkman’s argument for this conclusion comes from a pattern of auxiliary use that she refers to as ‘the overflow pattern’. One language in which the overflow pattern arises is the Bantu language Kinande. Kinande verbs may be marked for tense, including four ‘distances’ of past tense:

- (3) a. tu-**kábi**-húma
 1PL-PAST1-hit
 ‘We hit (just now)’
- b. tú-**lyá**-humá
 1PL-PAST2-hit
 ‘We hit (earlier today)’
- c. tw-**á**-húma
 1PL-PAST3-hit + ‘tone pattern A’
 ‘We hit (recently)’
- d. tw-**a**-huma
 1PL-PAST3-hit + ‘tone pattern B’
 ‘We hit (long ago)’

Kinande verbs expressing the present tense are morphologically unmarked for tense. Such verbs may be inflected for a variety of aspects:

- (4) a. tu-**ká**-húma
 1PL-IMPF-hit
 ‘We hit (habitually or progressively)’
- b. tu-**nému**-húma
 1PL-PROG-hit
 ‘We are hitting’
- c. tu-**limu**-húma
 1PL-INCP-hit
 ‘We are starting to hit’
- d. tu-**kiná**-humá
 1PL-CONT-hit
 ‘We are still hitting’

Kinande verbs, then, can be inflected either for tense or for aspect. They cannot, however, bear inflection for both categories; to express both tense and aspect, an auxiliary must be used:

- (5) a. tw-**á**-bya i-tu-**nému**-húma
 1PL-PAST3-be + ‘tone pattern A’ LNK-1PL-PROG-hit
 ‘We were recently hitting’
- b. tw-**a**-bya i-tu-**ká**-húma
 1PL-PAST3-be + ‘tone pattern B’ LNK-1PL-IMPF-hit
 ‘We hit (habitually or progressively, long ago)’

Bjorkman discusses other overflow patterns in Arabic and Latin.

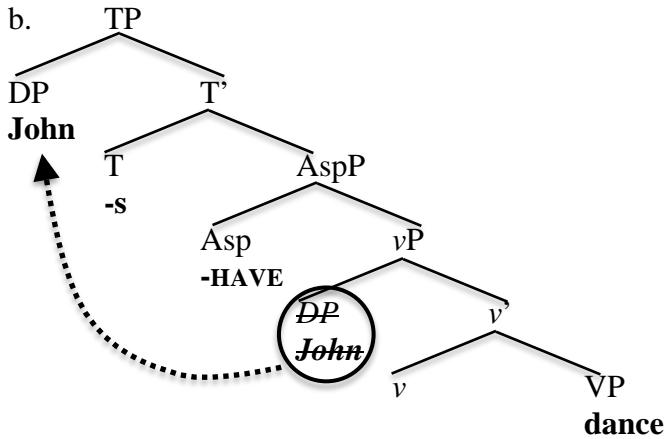
She notes that the overflow pattern is hard to reconcile with the kind of tree given above in (2a). In English, we can think of auxiliaries as selecting a particular category; *have* in (2), for

example, selects for a particular value of Aspect. But if Tense and Aspect are separate heads, and if selection is strictly local, it is hard to see what the Kinande auxiliary in (5) could select. It does not select for Tense; verbs can be inflected for Tense without an auxiliary, as in (3). Similarly, it does not select for Aspect, since we find Aspect morphology on verbs without auxiliaries, as in (4). Rather, the auxiliary would have to, in some sense, select particular combinations of Tense and Aspect, which is not how selection is typically understood as working.

Bjorkman argues that all of the verbs in (3-5) are the result of a tree with functional heads representing both Tense and Aspect, both of which seek to be realized on the verb. When Aspect is contentful, Tense cannot be realized on the verb, and an auxiliary is introduced to bear the stranded features. The conditions on what features can be realized on the verb can vary from language to language; in English, for example, contentful Aspect can never be realized on the verb, and always requires an auxiliary (such as *have* in (2)). This is not to say that the features of Aspect never have any morphological consequence for the verb; Bjorkman posits an Agree relation between the Aspect head and the verb, which is responsible for the participial morphology on it.

In the particular implementation of Bjorkman's proposal that I will make use of in this book, auxiliaries will be introduced into the structure as affixes. I will leave the factors that determine whether a given affix is eventually realized as an affix or as an auxiliary entirely mysterious, directing interested readers to Bjorkman (2011) for proposals. The example in (2) above, for example, will have a tree something like the one in (6):

- (6) a. John has danced.



The Aspect head is introduced into the tree as an affix, here represented as *-HAVE*. The head then participates in the derivation as an affix would; in particular, it is subject to Affix Support. The determination that this particular affix is in fact realized as a free-standing head will be made later in the derivation. Just to be concrete, I will assume that this decision is made once all the requirements of Asp have been satisfied and the next head is about to be Merged.

If we grant that *have* begins its life as an affix, we then want to know what kind of affix it is. I will take advantage, in what follows, of the fact that the verbal inflectional affixes of English are uniformly metrically dependent suffixes, and will assume that *-HAVE* is an affix of the same kind. I will leave open for future research the question of how to represent auxiliaries in languages in which verbal inflectional morphology is less uniform than it is in English.

2. English

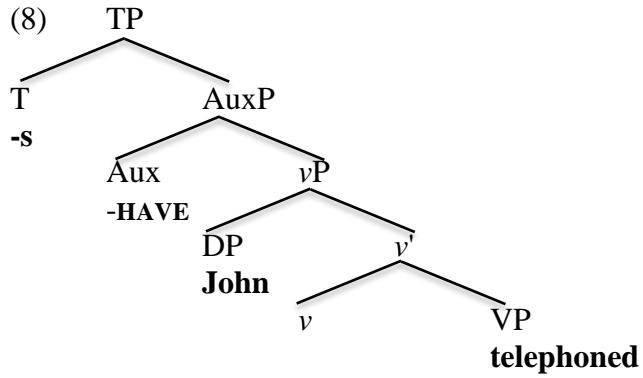
In section 1 of chapter 4, we used Probe-Goal Contiguity to deal with the behavior of main verbs in English. Since English is a language with prosodically active Left edges of ϕ , Probes must be adjacent to Goals that linearly follow them; as a result, the verb must be adjacent to the object, but need not be adjacent to the subject. In what follows we will expand the picture of English to deal with auxiliaries and negation.

The empirical generalization about modern English negation is that it follows the first auxiliary, and does not follow main verbs:

- (7) a. John **may** not **have been** promoted
b. John **has** not **been** promoted
c. John **was** not promoted
d. * Mary promoted not John
e. Mary **did** not promote John

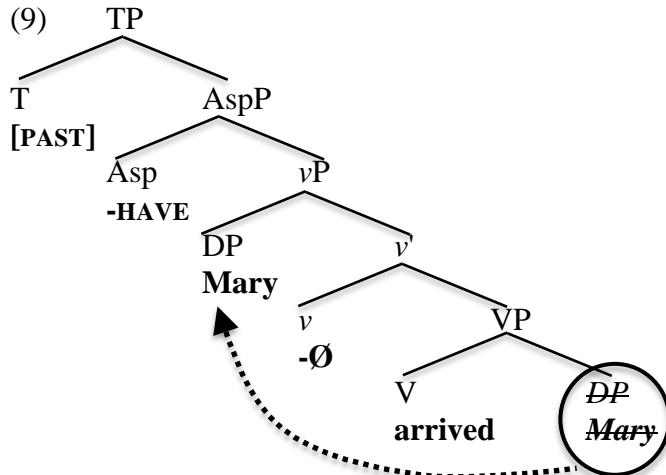
In (7a), the auxiliary *may* is to the left of negation, and the auxiliary *have* is to its right. This is not because forms of *have* cannot precede negation, as we see in (7b); rather, the generalization is that the first auxiliary, whatever it is, precedes negation, and the others follow negation. If there are no auxiliaries at all, as in (7d), main verbs cannot precede negation; rather, as in (7e), the special auxiliary *do* is inserted. These facts are often accounted for in terms of head-movement; all auxiliaries are generated below negation, and the highest one moves past negation to some higher head. On this kind of account, the generalization is that auxiliaries may perform this head-movement in English, but main verbs may not, which is why (7d) is unacceptable. I will adopt this general picture, and offer an account of why auxiliaries and main verbs differ in this way.

Consider the simplified tree in (8), showing the base positions of an auxiliary, the subject, and the main verb:



The result that we want is that T causes the highest auxiliary to head-move to itself (if there is one), and causes the subject to move into its specifier, but then stops; in particular, T does not cause the main verb to head-move to itself, even if there is no auxiliary. We can make sense of this pattern, in terms of the theory developed here, if we associate it with Affix Support, and furthermore assume that T performs the movement operations that are available to it in order of increasing length. Thus, the shortest move to T is of the auxiliary; this move fails to satisfy Affix Support, for reasons discussed in Chapter 2 having to do with how stress is assigned in the English verb. The next shortest possible move is movement of the subject to the specifier of TP, and this move does satisfy Affix Support. The main verb will therefore never move to T, since the subject is always closer, and movement of the subject can always satisfy Affix Support for T. In order to guarantee that the subject is always higher than the main verb when T is Merged, we can say that *v* is also a suffix; the need for Affix Support of *v* will drive movement into its specifier (or insertion of an expletive *there*⁵⁷) in passives and unaccusatives:

⁵⁷ See Deal (2009) for an argument for Merging expletives this low.



On this account, auxiliaries behave differently from main verbs in English because they are generated higher in the tree, and are therefore the first potential candidates for Affix Support of T.

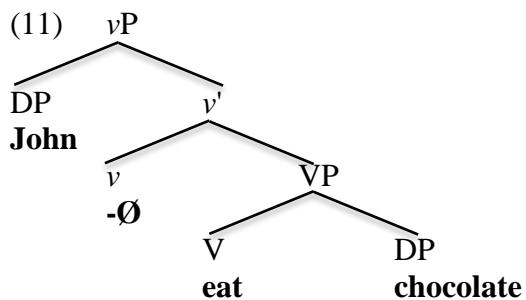
Let us go carefully through derivations of some English sentences, considering how various conditions are satisfied at each step. The following sections will first consider ordinary indicative clauses (with and without auxiliaries), and then quotative inversion examples. We will discuss English questions in section 1.2 of chapter 7.

2.1 Auxiliaries and negation

Let us start with an example containing an auxiliary:

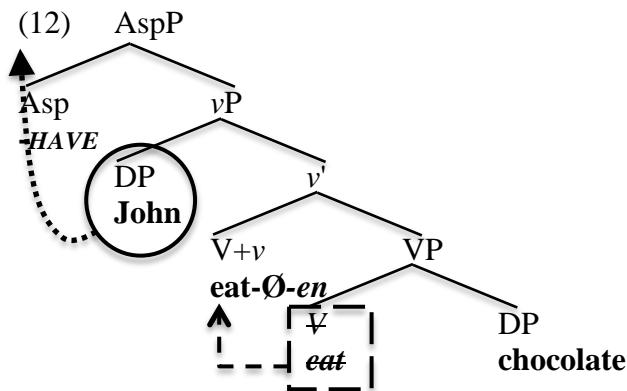
- (10) John has not eaten chocolate.

We can begin with a completed vP:



Here the head v , hypothetically a null affix, satisfies its need for Affix Support with its thematic specifier, *John*, and Agrees with the object DP *chocolate*; this has the consequence that no adverbs can remain between v and the object, since English has prosodically active left edges of ϕ , and thus the only way for the object to become Contiguous with v is for the object and v to be adjacent. In section 2 of chapter 7, we will see some evidence that V raises to v in transitive examples like this one; for the time being, I will simply indicate this movement, without argument.

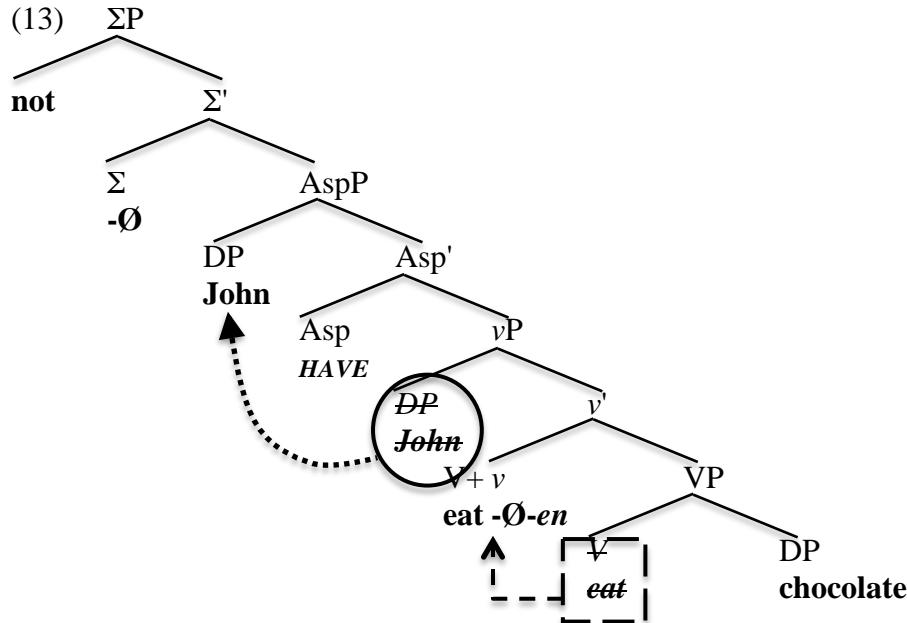
The next head to be Merged is the head which will become the auxiliary *have*. As I explained in section 1, I will be inspired by Bjorkman (2011) in representing this head as an affix:



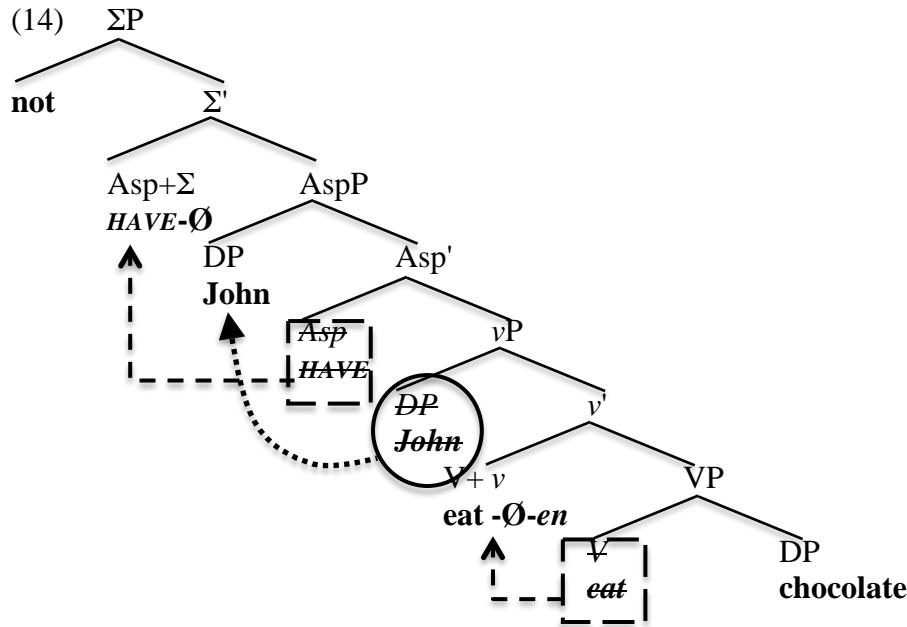
The Asp head, being an affix without metrical structure, requires Affix Support, which is provided by *John*. Movement of *John* also satisfies Selectional Contiguity between Asp and v ⁵⁸. The Agree relation between Asp and v has the morphological effect of realizing the verb in a participial form. Now that the Asp head has satisfied all its requirements, it is converted from an affix to a free-standing auxiliary, a la Bjorkman (2011).

⁵⁸ To guarantee that it is *John* that moves to the specifier of AspP, rather than any randomly chosen phrase, we could declare that Asp is a Probe, and Agrees with *John*. Alternatively, we could grant the grammar enough computational power to realize that although any phrase could satisfy Asp's need for Support, movement of *John* can allow Asp to satisfy its need for Selectional Contiguity as well.

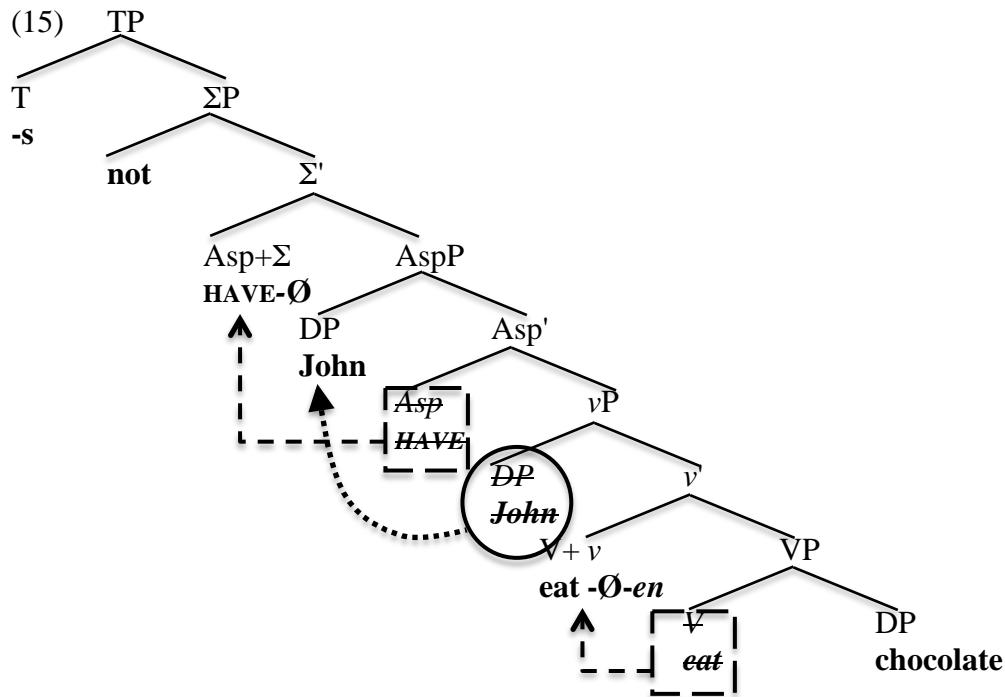
The next thing to Merge to the tree in (12) is negation. I will represent English *not* as a specifier of Laka's (1990) ΣP ; alternatively, we could make *not* the head of ΣP , but this would make it more difficult for auxiliaries to head-move past *not*:



The head Σ is a (null) affix, but its need for Affix Support is satisfied by its specifier *not*. *John* therefore does not move. Σ is not yet Selectionally Contiguous with Asp, since *John* is in the way; *have* therefore undergoes head-movement to create Selectional Contiguity:



Next, we Merge the suffix T:

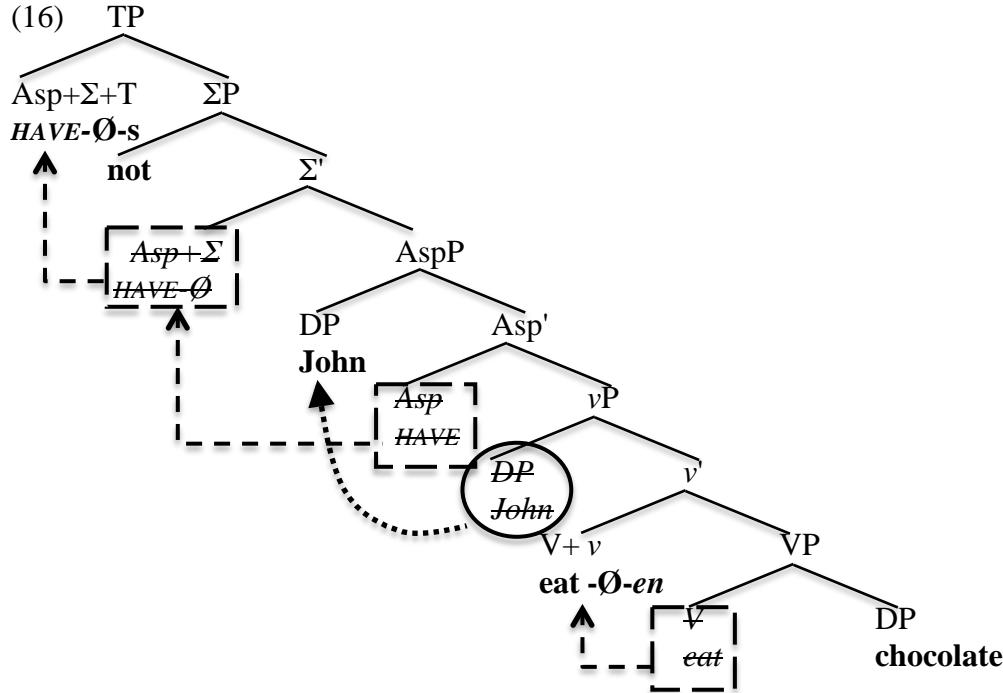


T is both a Probe and an affix, hence subject both to Probe-Goal Contiguity and to Affix Support, as well as to Selectional Contiguity. T is constrained in its choices of candidates for Affix Support by Multitasking. Multitasking will require phrasal movement to be of the DP *John*, since this is the phrase with which T also needs to create a Probe-Goal Contiguity relation.

Similarly, head-movement to T must be of some head containing the head Σ , which needs to be Selectionally Contiguous with T.

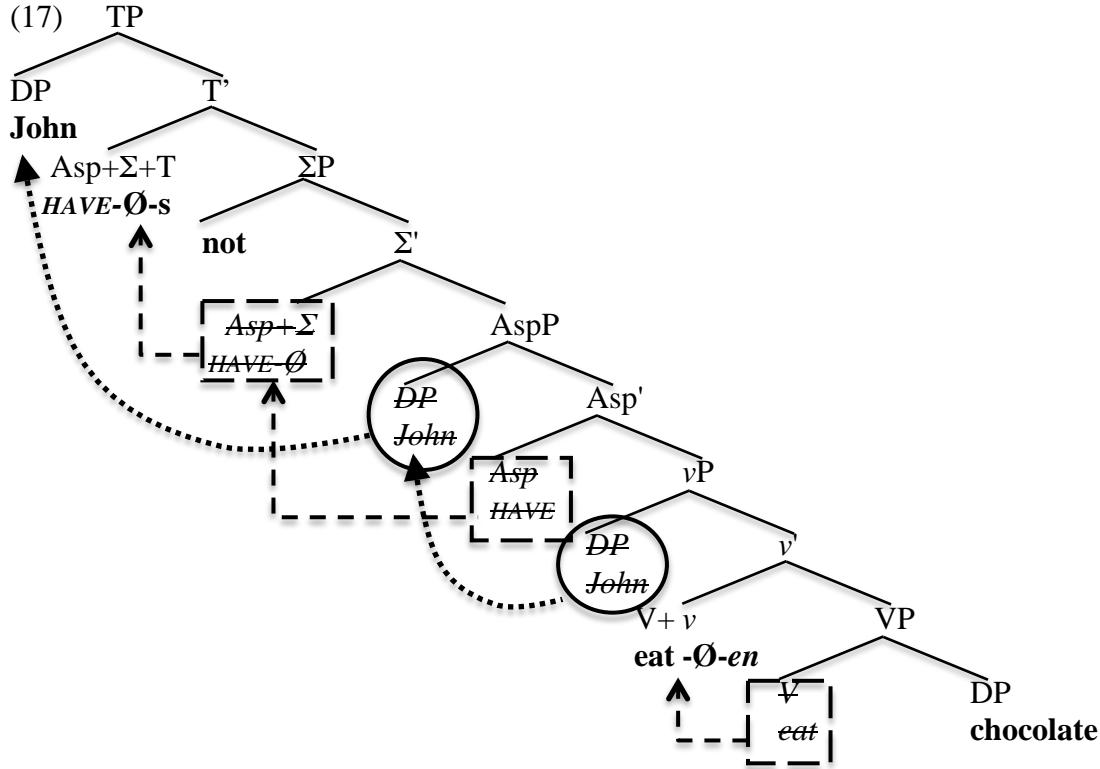
Multitasking regards these two movement operations as tied; neither satisfies a superset of the other's requirements (as both satisfy a species of Contiguity, and both potentially satisfy Affix Support). Given a choice between two Contiguity-creating operations that are equally attractive for Multitasking, the grammar apparently prefers to create the Contiguity relation with the closer element first (see section 4 of the previous chapter for a similar idea). There is clearly no such condition on movements which are driven purely by Affix Support; for example, we saw in section 4.2.2 of chapter 4 that Japanese scrambling, which has nothing to do with Contiguity, may be of any accessible phrase. We will reach the same conclusion for movement to the initial position in V2 clauses, in section 1.2 of chapter 7. We therefore cannot posit a general requirement that the grammar must perform the shortest move available to it. Given the difference between Contiguity and Affix Support, we might conclude that the relevant locality condition is in fact a condition on relations that trigger Contiguity requirements, rather than on movement operations. On this view, a head which must enter into relations of Agree or Selection with other syntactic elements creates these relations in order of increasing length. Because these relations impose Contiguity requirements, the Contiguity relations must be created in order of increasing length as well.

Since the shortest of the Contiguity relations that T must create is with Σ , Σ must move to T first:



Head-movement of *have* in (16) does create Selectional Contiguity between T and Σ. The head-movement fails, however, to satisfy Affix Support, since the resulting complex head contains no metrical boundaries in the syntactic representation.

Since T still needs to satisfy Affix Support, the next candidate for Support is the DP *John*, the Goal that T Agrees with:



Movement of *John* to the specifier of TP satisfies both Affix Support and Probe-Goal Contiguity.

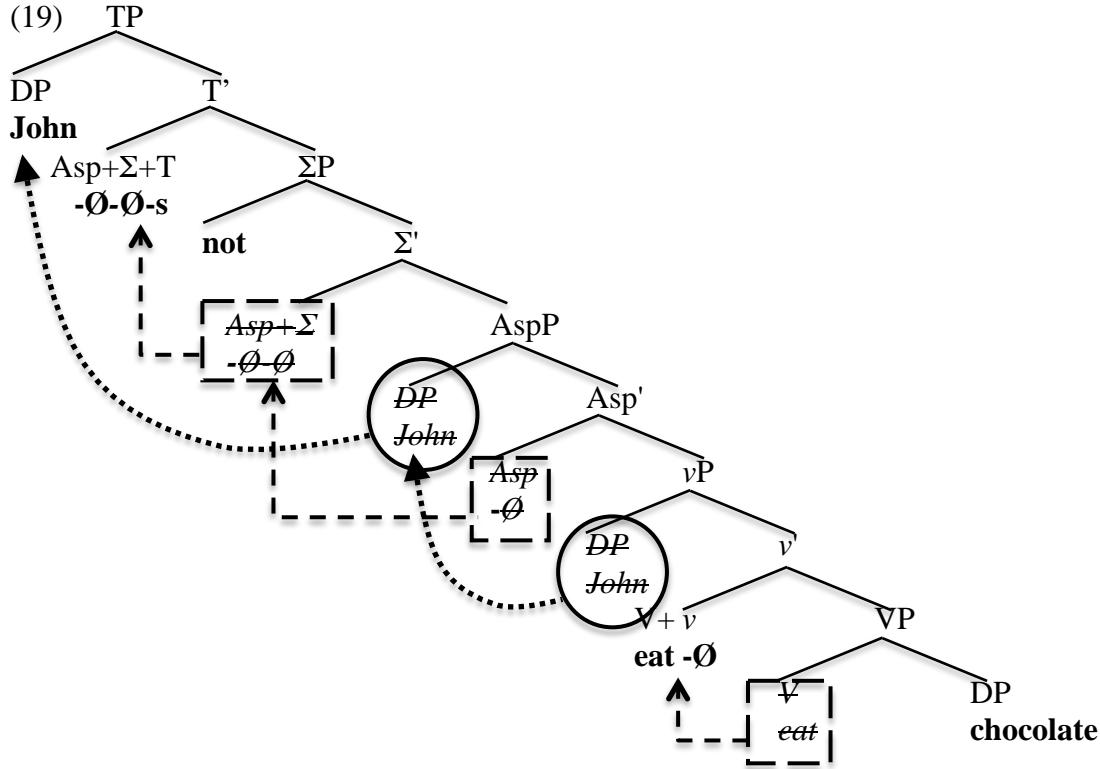
In this particular derivation, there are no stranded affixes to rescue once the various head-movements described above have taken place. Postsyntactic operations convert the string *have-Ø-s* into *has*.

2.2 Do-support

Let us next consider a negative example without an auxiliary:

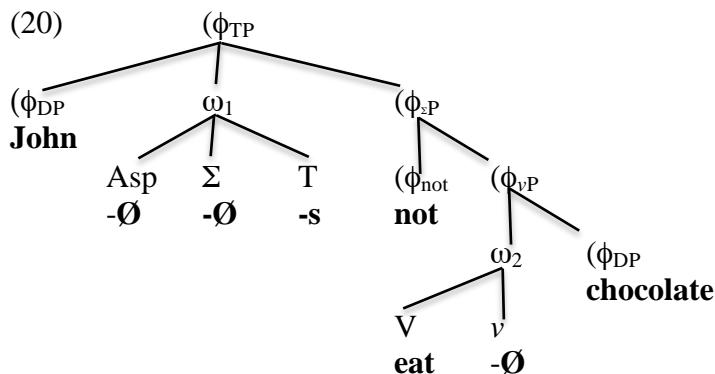
- (18) John does not eat chocolate.

In the theory developed here, the derivation of (18) will be precisely that of (17), with the single difference that the head occupying Asp is phonologically null (though still a suffix):



This derivation differs from the previous one in that it leaves some affixes (currently in T) without hosts. Let us see how a host can be provided for the affixes in T.

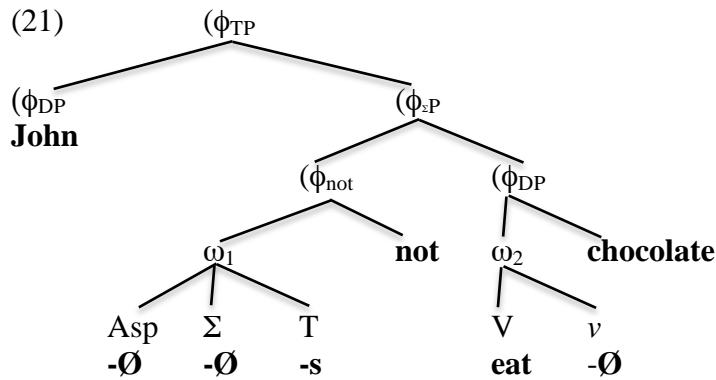
In order to do this, we will need to consider the prosodic tree corresponding to the syntactic tree in (19). Simply applying principles of Match Theory, the tree in (19) would have a representation like that in (20):



The tree in (20) obeys Match Theory, in that every maximal projection is mapped onto a ϕ and every word onto a ω , with pruning of nonbranching nodes and nodes dominating only

phonologically null material. It is entirely possible that some instances of ω , here and in what follows, should actually be represented as having a more complex internal structure, but since this structure will not be relevant in what follows, I will continue to omit it.

Now, what kinds of changes to (20) will Contiguity relations trigger? Probe-Goal Contiguity should hold in (20) between v and the object, and between T and the subject. We might also expect to find Probe-Goal Contiguity between Σ and *not*, since *not* is introduced in the specifier of ΣP . Since v and Σ both precede their Goals, Probe-Goal Contiguity for them would have to involve Contiguity-adjunction to their Goals:



Contiguity-adjunction of ω_2 to the object makes v and the object Contiguous in ϕ_{DP} : the object is Contiguity-prominent within that ϕ , since the object is itself the ϕ within which Contiguity holds, and is therefore not separated from its own prosodically active edge by any material. The same holds for Σ and *not*, thanks to Contiguity-adjunction of ω_1 to *not*. Both heads are unable to be separated from their following Goals by adverbs, as we expect (thanks to David Pesetsky for pointing out the fact in (22b), and see Pesetsky (1989) for discussion)⁵⁹:

⁵⁹ Thanks also to David Pesetsky for pointing out the unsettling fact in (i):

(i) John has **probably** not eaten the chocolate.
I will return to this fact shortly.

- (22) a. *John eats **often** chocolate
 b. * John does **probably** not eat chocolate

Probe-Goal Contiguity between T and the subject is also satisfied in (21): they are Contiguous in ϕ_{TP} , in which the subject is Contiguity-prominent, since it is adjacent to the prosodically active left edge of the ϕ .

Probe-Goal Contiguity, then, is universally satisfied in (21). Selectional Contiguity between Asp and v , though it did hold at one point in the derivation, has been broken by head-movement of Asp past *not*. This is irreparable. The verb is prevented by syntactic conditions on head-movement from moving past *not* (since it would have to move past the traces of Asp and Σ , violating the Head Movement Constraint), and no prosodic manipulation will make Asp and v Contiguous. ϕ_{not} is adjacent to ω_2 , but cannot Contiguity-adjoin to it, since ϕ is higher on the prosodic hierarchy than ω . Nor can they be Grouped, since v would not be Contiguity-prominent in any ϕ that Grouping would create (since English has prosodically active left edges of ϕ).

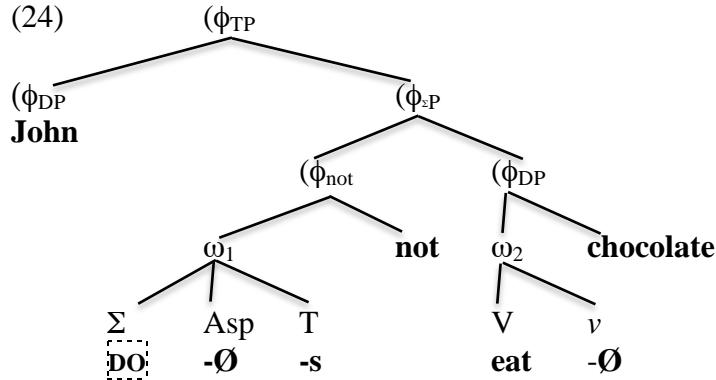
Let us now consider how the affixes under ω_1 can find a host. The default way of doing this is via Prosodic Lowering:

(23) ***Prosodic Lowering***

An affix dominated by ω is realized on the closest host c-commanded by ω in the prosodic tree.

Prosodic Lowering cannot attach the affixes under ω_1 to the verb. The node ω_1 is dominated by ϕ_{not} , which does not dominate the verb, and the relevant c-command relation therefore does not hold.

Languages vary, as we will see, in how they deal with this kind of problem, and perhaps the most widespread response is movement of the verb. English, unusually, instead inserts a dummy host:



The grammar of English must apparently contain a statement to the following effect:

(25) **do-support**

In English, if a null verbal affix is in a position from which it cannot Prosodically Lower to a host, it should be realized on the dummy host *do*.

In (24), movement of Σ has forced Contiguity-adjunction of the head-complex to *not*, and Σ is therefore subject to *do*-support.

The fact that Σ is, exceptionally, overt in examples like (24), while it is typically null, might be part of an account for the contrast in (26) (Pesetsky 1989):

- (26) a. * John does **probably** not eat chocolate
 b. John has **probably** not eaten chocolate

In both of the examples in (26), Σ 's Contiguity relation with *not* is broken by head-movement of the auxiliary to T. Perhaps the fact that Σ has a pronunciation just in (26a) has something to do with the contrast in (26). It cannot generally be the case that phonologically null elements are free from the constraints of Contiguity (English [+wh] C, for example, is phonologically null, but

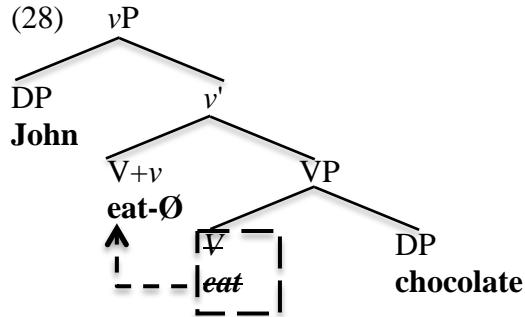
triggers wh-movement to itself to satisfy Contiguity). Rather, we might imagine that the grammar can make use of a last-resort technique for amnestying Contiguity violations in which one of the participants is null. Note that this is a case in which we might expect the fact that Σ is generally null to be part of the syntactic representation; English Σ is typically null, and the exceptions have to do with the operation of *do*-support, which applies, not specifically to Σ , but to any affix which cannot Lower to a host.

2.3 Positive statements

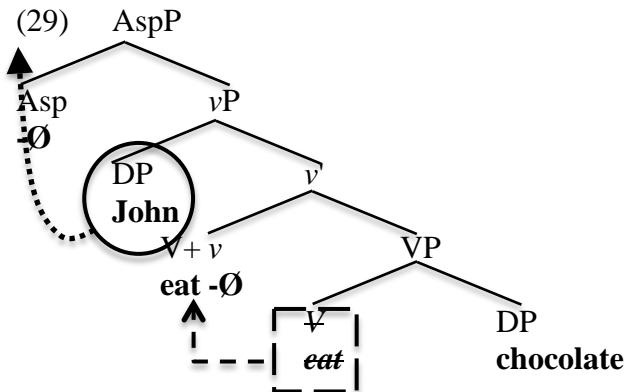
Let us consider a derivation for a sentence without negation:

- (27) John (often) eats chocolate.

We can begin, again, with a *vP*, in which *V* moves to *v* for reasons we will discuss in the next chapter:

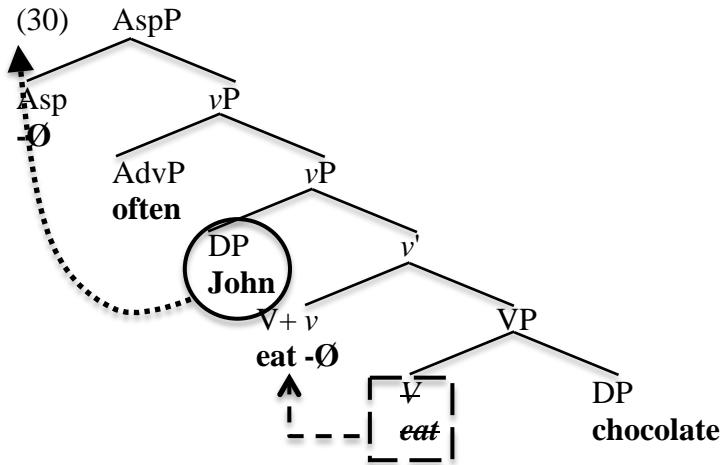


Each new head to be introduced will be an affix, which will trigger movement of the subject to its specifier, thereby making Selectional Contiguity possible between each new head and the head below. For example, Asp will be a null affix:



Movement of *John* makes Asp and *v* linearly adjacent, making Selectional Contiguity between them possible. The verb therefore does not move to Asp.

A note is in order here about the behavior of adverbs. Suppose we had adjoined an adverb to vP before Merging Asp, yielding a tree like the one in (30):



As the tree in (30) stands, the adverb appears to block Selectional Contiguity. In section 8 of the last chapter, I discussed several ways that adverbs can avoid blocking Contiguity, including Untethering and Retethering in final position, and Contiguity-adjunction to the head the adverb modifies.

In the particular tree in (30), however, another way of fixing Selectional Contiguity is logically possible, which would be to move the verb past the adverb. This move would break the Probe-Goal Contiguity relation between *v* and the object, but we have already seen cases of

head-movements which break such relations in languages like Danish and Irish; the grammar should no longer be attempting to preserve the *v*-Object Contiguity relation, since it was created in an earlier phase. We need to find some way of ruling out this option, since it yields the ungrammatical string **John eats often chocolate*.

I hinted in the previous chapter that part of the solution to this problem would be a relaxation of the Ban on Altruism, repeated in (31):

(31) ***Ban on Altruism***

Any operation affecting the position of α must place α in a new relation that satisfies a constraint.

As stated, the Ban on Altruism dictates that adverbs cannot be compelled to Untether or to Contiguity-adjoin in order to create Contiguity relations in which they do not themselves participate. If there are adverbs which lack the properties that drive these operations, then such adverbs ought to be able to remain in situ, forcing the grammar to fix Contiguity via head-movement.

All of the instances of the Ban on Altruism that were given in the previous chapter involved arguments in Contiguity relations, which were unable to jeopardize those Contiguity relations by ‘altruistic’ movement. Adverbs, by hypothesis, are generally not in Contiguity relations, since they are not selected and do not routinely enter into Probe-Goal relations. Let us revise the Ban on Altruism to take advantage of this difference:

(32) ***Hippocratic Altruism***

No operation can affect α if the only effect of the operation on α is to alter α ’s position in a way which might disrupt a Contiguity relation in which α participates.

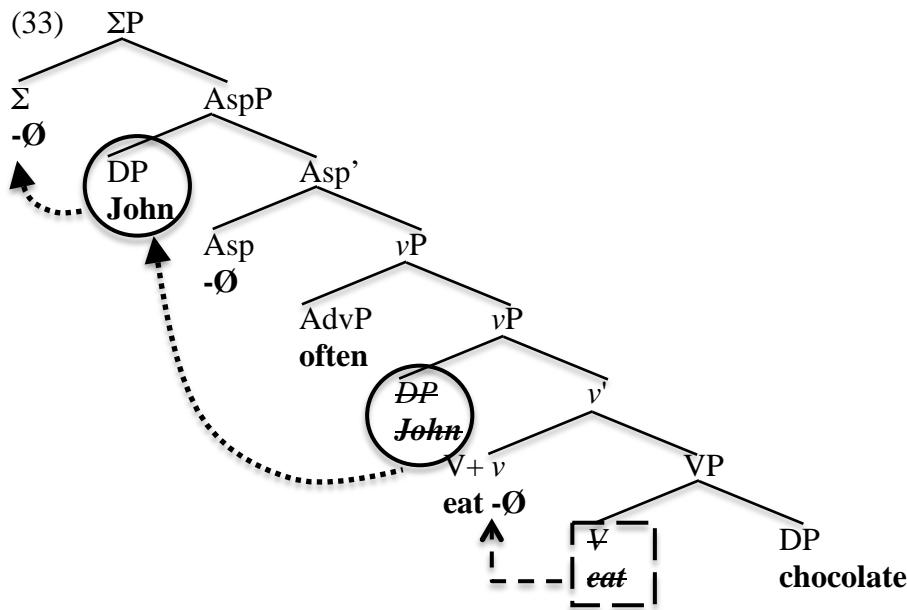
Hippocratic Altruism allows elements to behave altruistically just in case they can do themselves no harm in the process. For arguments in Contiguity relations, Hippocratic Altruism and the Ban on Altruism are equivalent; such arguments cannot move in order to create Contiguity relations in which they do not participate. For adverbs, however, the requirements behave differently; an adverb has no Contiguity relations to jeopardize, and may therefore behave ‘altruistically’.

This move partly solves the problem raised by examples like (30); we can now say that the adverb is in fact motivated to either Contiguity-adjoin or Untether, since its current position blocks a Contiguity relation. Why are such operations on the adverb preferable to verb movement?

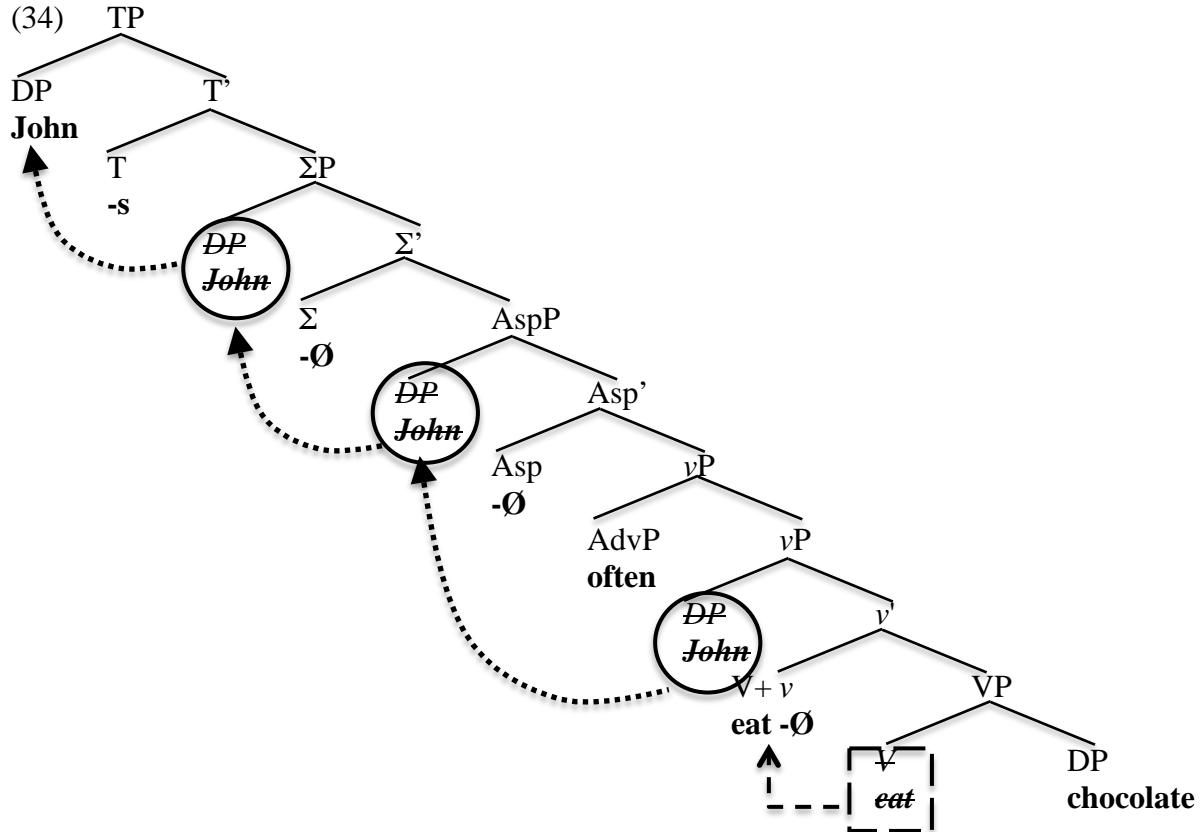
Here I think we can appeal again to a general principle which has surfaced several times in the discussion, for example in section 4 of the last chapter; given a set of requirements that need to be satisfied (and that are unranked by Multitasking), the grammar opts for the requirement that involves the shortest dependency first. For example, a head which needs to create both Selectional Contiguity with the head of its sister, and Probe-Goal Contiguity with some phrase lower in the structure, must opt to create Selectional Contiguity first. This was why Japanese C, for example, Untethers to become Contiguous with the head of its sister before it Probes to find a wh-phrase (if it performed its operations in the reverse order, it would trigger overt wh-movement, since it would Probe the wh-phrase while still initial). In the case at hand, the grammar chooses between Untethering an adverb (affecting the relation between the adverb and its sister) and moving a head. The positions involved in head-movement are, by any measure of distance, further apart than the adverb is from its sister, and Untethering the adverb is therefore preferred.

The principle invoked in the preceding paragraph must be stated fairly carefully, as a condition on which requirements are to be satisfied first. There cannot be a general principle that non-movement is always preferred over movement; we have seen, for example, that there are languages in which wh-movement is optional. The question of which requirement the grammar should satisfy first therefore has to be distinguished from the question of how a given requirement is to be satisfied. A language with optional wh-movement, for example, has multiple ways of satisfying the single requirement of Probe-Goal Contiguity between C and the wh-phrase, and our conditions on locality of movement must be flexible enough to allow this. The principle which ensures, among other things, that adverb Untethering will be chosen over head-movement is a slightly different one; it requires the grammar to satisfy requirements in order of increasing dependency length, and thereby forces the grammar to first satisfy the conditions on ordering of the adverb with its sister before considering the Selectional Contiguity relation that the adverb interrupts.

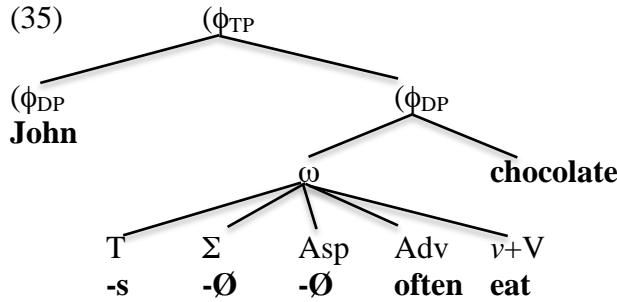
The derivation can continue with the Merge of a phonologically null Σ , this time without a specifier. Affix Support for Σ will trigger movement of the subject:



Movement of the subject to the specifier of ΣP both satisfies Affix Support for Σ and makes Selectional Contiguity possible between Σ and Asp. Finally, T is Merged, and triggers movement of the subject to its specifier:



Finally, we can consider the prosodic tree associated with the syntactic tree in (34). As before, v will be Contiguity-adjoined to the object, creating Probe-Goal Contiguity between them. We have already established that the adverb is Contiguity-adjoined to v , the head that it modifies, so that it does not interfere with Selectional Contiguity relations. Each head introduced has been linearly adjacent to the heads that it selects, and each will be made Contiguous with its selectee via Contiguity-adjunction. We thus arrive at the following tree:



All Contiguity relations are respected in the tree in (35) (including Contiguity between T and the subject; these are Contiguous in ϕ_{TP} , within which the subject is Contiguity-prominent). The affixes in this tree may be Prosodically Lowered to the verb at Spell-out⁶⁰. The derivation thus correctly yields the string *John often eats chocolate*. We arrive at the correct conclusion that *do*-support will not arise here, despite the presence of the adverb⁶¹.

We have now derived the distinction between auxiliaries and main verbs in English from general conditions on locality, together with Affix Support: T seeks the closest possible objects to provide it with Affix Support, and independently understood facts about the structure of the clause tell us that these will generally be the highest auxiliary (if any) and the subject. These are therefore the elements that can move into the projection of T, and the main verb consequently never does.

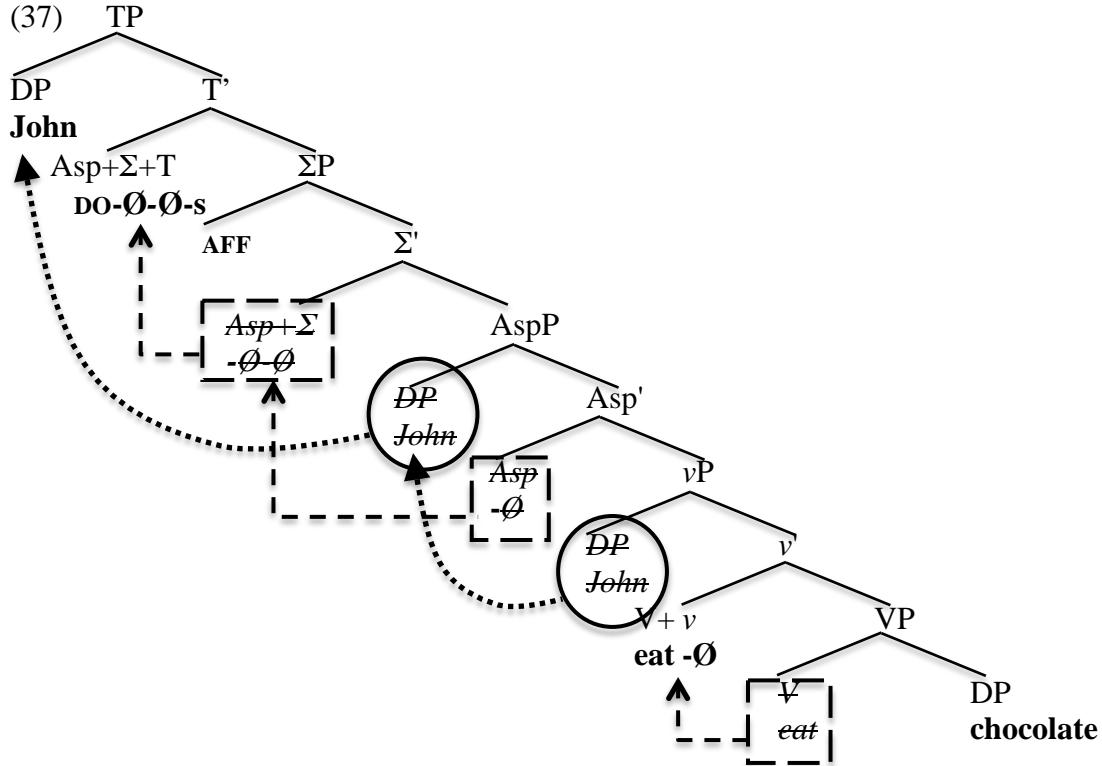
I leave as an exercise for the reader the job of considering the rest of the derivations for positive statements; as far as I can see, the theory developed here has no obviously undesirable

⁶⁰ Careful readers may note that the instance of ω represented in the tree does not actually c-command the verb, contrary to the conditions on Prosodic Lowering, since it dominates the verb. I leave for future research the question of whether this is an argument for a more articulated structure for the various nodes under ω , or for a definition of ‘c-command’, in the sense relevant for Prosodic Lowering, which does not ban c-command by α of nodes dominated by α .

⁶¹ In fact, the failure of the adverb to trigger *do*-support is somewhat overexplained in this account. Adverbs are capable of Contiguity-adjoining altruistically, thanks to Hippocratic Altruism, with the result that they will not prevent higher suffixes from Contiguity-adjoining to their eventual hosts. But relatedly, adverbs are unlike *not* in that they do not enter into Probe-Goal relations with any head. The property of *not* which ultimately triggered *do*-support was the fact that movement of Σ past *not* forced Σ to Contiguity-adjoin to *not* for Probe-Goal Contiguity, and this operation broke the c-command relation which would otherwise have held between Σ (and T) and the verb in the prosodic tree. Since adverbs are not in Probe-Goal relations, they will never trigger such an operation, and hence do not trigger *do*-support.

consequences for such statements. We might need to posit a null operator that can occupy the specifier of Σ in emphatic statements, in order to trigger *do*-support (Chomsky 1957, Laka 1990):

- (36) John *does eat* chocolate!



(37) is syntactically just like the negative *do*-support example in (19), from the standpoint of the theory; in particular, the specifier of Σ is occupied in both examples, and this occupied specifier blocks Selectional Contiguity between T and Σ , triggering head-movement across it and ultimately yielding *do*-support⁶².

2.4 Quotative Inversion

Quotative Inversion, discussed previously in section 2 of the previous chapter, is exemplified in

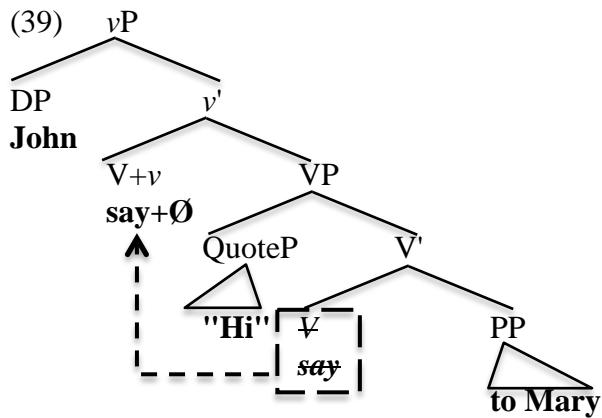
- (38):

⁶² The specifier of Σ in (37) has no segmental content; this must not prevent it from blocking Selectional Contiguity across it, either for the familiar reason that its null status is a lexically idiosyncratic fact not represented in the narrow syntax, or because, though it lacks segmental content, it is realized suprasegmentally as a kind of emphasis on the auxiliary, and hence is not actually ‘phonologically null’ in the strict sense.

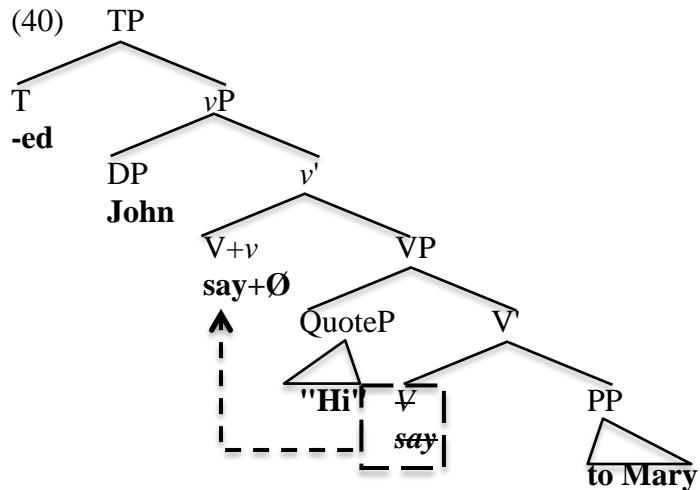
- (38) "Hi," said John to Mary.

In the previous discussion of Quotative Inversion we saw reasons to think that it differs from Locative Inversion in that the subject has not undergone any kind of shift to the right. Let us consider how the theory developed here might derive the word order in (38).

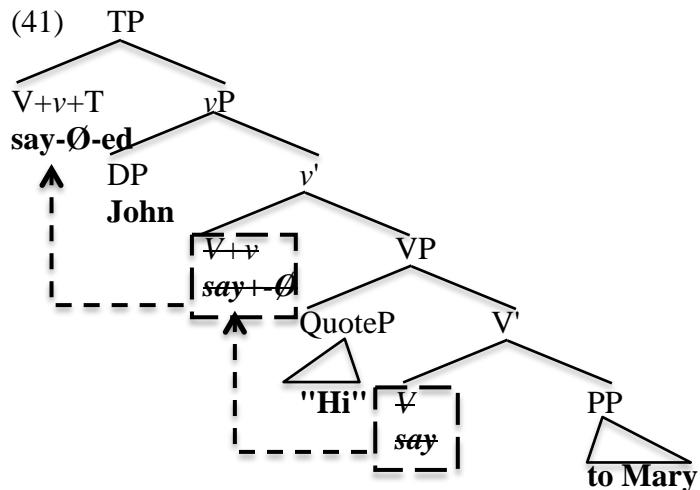
The central stipulation will be that T, in Quotative Inversion, is for some reason unable to trigger movement of the subject, preferring to move the quote instead. I will not speculate about why this might be. A derivation for (38) might begin with the vP in (39):



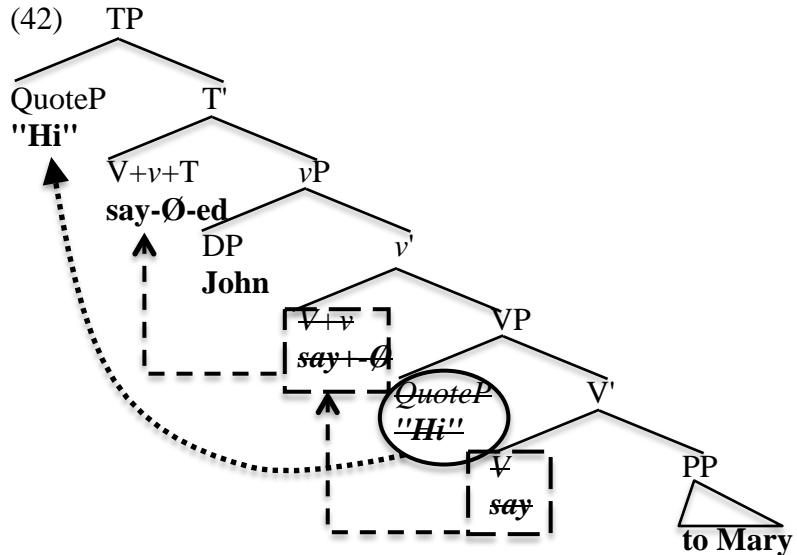
Again, the verb has raised to v , for reasons we will discuss in the next chapter. I have represented the quote as a QuoteP, leaving aside serious investigation of the syntactic nature of quotes. Abbreviating the tree somewhat for expository purposes (leaving out the null Σ and Asp heads, which will have no effect on the word order for this particular derivation), we can next Merge the head T:



By stipulation, the version of T used in Quotative Inversion cannot cause the subject to move into its specifier. It therefore seeks Affix Support from the next highest candidate, which is *say*:



The verb *say* moves to T. It fails to satisfy Affix Support, since it lacks internal metrical structure at this point in the derivation. T therefore seeks Affix Support from QuoteP:



This derivation gets us the right word order. On this account, Quotative Inversion is one of the few places in which the main verb raises to T in English. Ordinarily, the subject prevents this from happening; the subject is closer to T than the main verb, and hence Affix Support will typically choose the subject over the main verb. In Quotative Inversion, for some reason, T is unable to choose the subject for Affix Support, and the main verb therefore becomes available.

T does satisfy Probe-Goal Contiguity with the subject, as neither negation nor adverbs can intervene between them:

- (43) "Hi," said (*not/yesterday/quickly) John to Mary

Moreover, *John* cannot move past negation to become Contiguous with T; T in Quotative Inversion is apparently incapable of triggering any kind of movement of the subject:

- (44) * "Hi," said John not to Mary

As we saw in section 2 of the previous chapter, it is in fact necessary that the main verb move to T in Quotative Inversion; Quotative Inversion is impossible if the clause contains an auxiliary:

- (45) * "Hi," has John said to Mary

The explanation for this is unchanged from chapter 4; *John* prevents the establishment of Selectional Contiguity between the auxiliary and the participle.

3. French

Now we can apply the approach developed so far to French. Consider a French sentence like the one in (46):

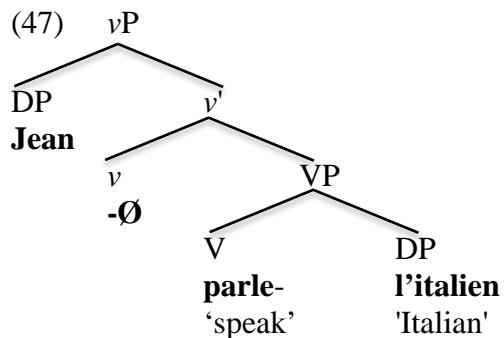
- (46) Jean (ne) parle pas l'italien

Jean *ne* speaks not the Italian

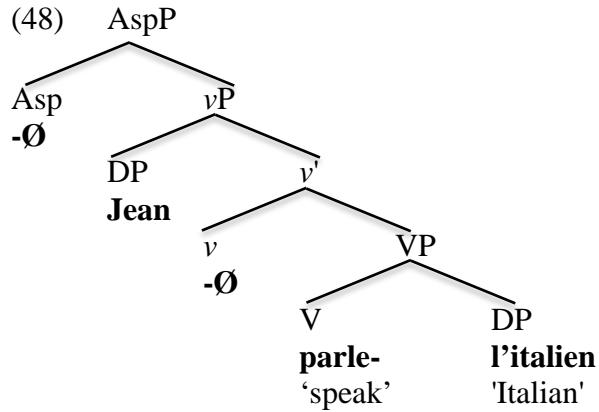
'Jean does not speak Italian'

In what follows I will follow Pollock (1989) and much other work in treating *pas* as the true exponent of negation in French. I will not venture a guess about the syntactic position of the preverbal negative marker *ne*, and will not include it in trees.

We can begin the derivation of (46) with a completed vP:

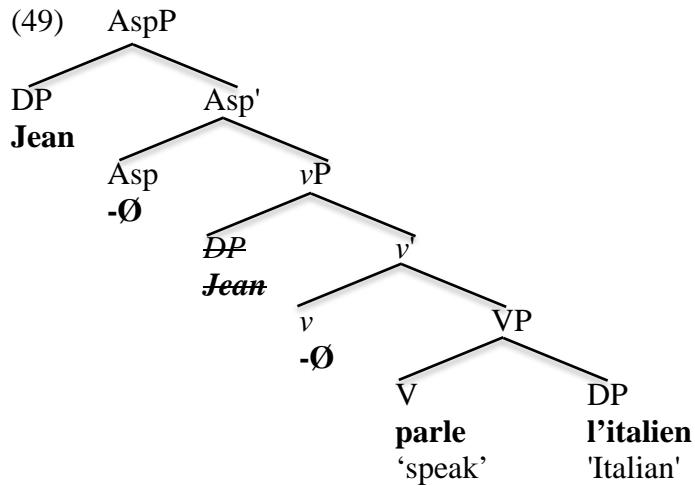


The next head to Merge is Asp:

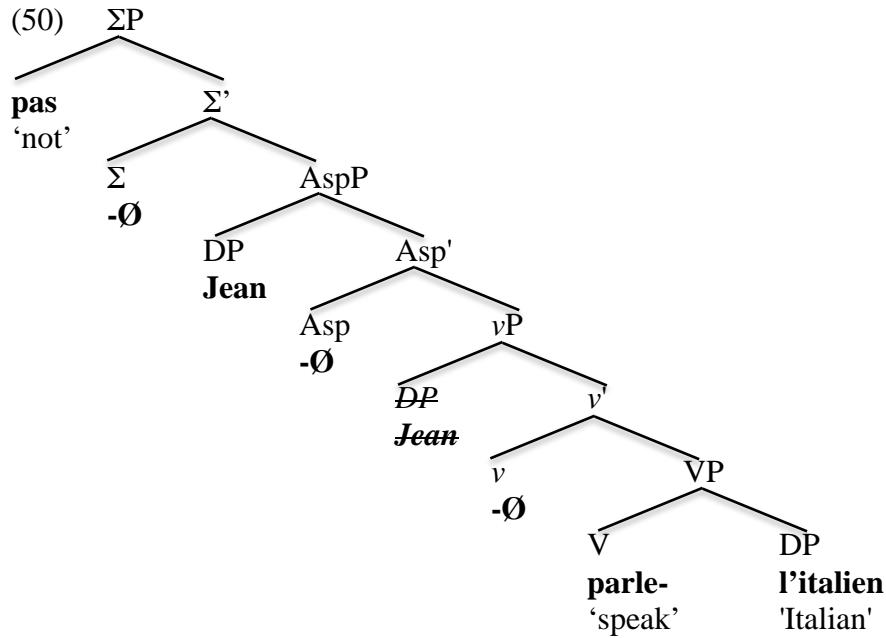


Since the Asp head is an affix, it triggers movement of the subject into its specifier, satisfying

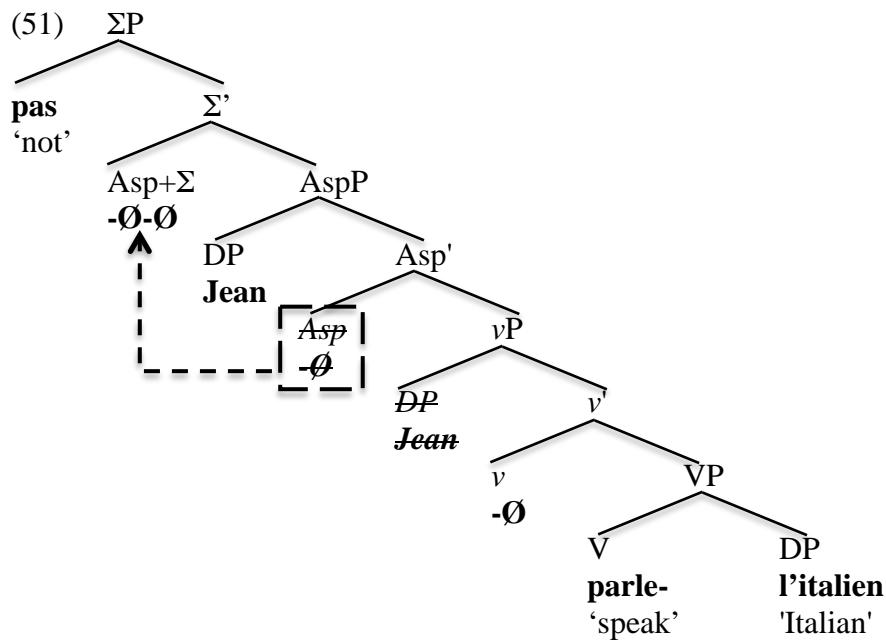
Affix Support for itself and Selectional Contiguity for its relation with *v*:



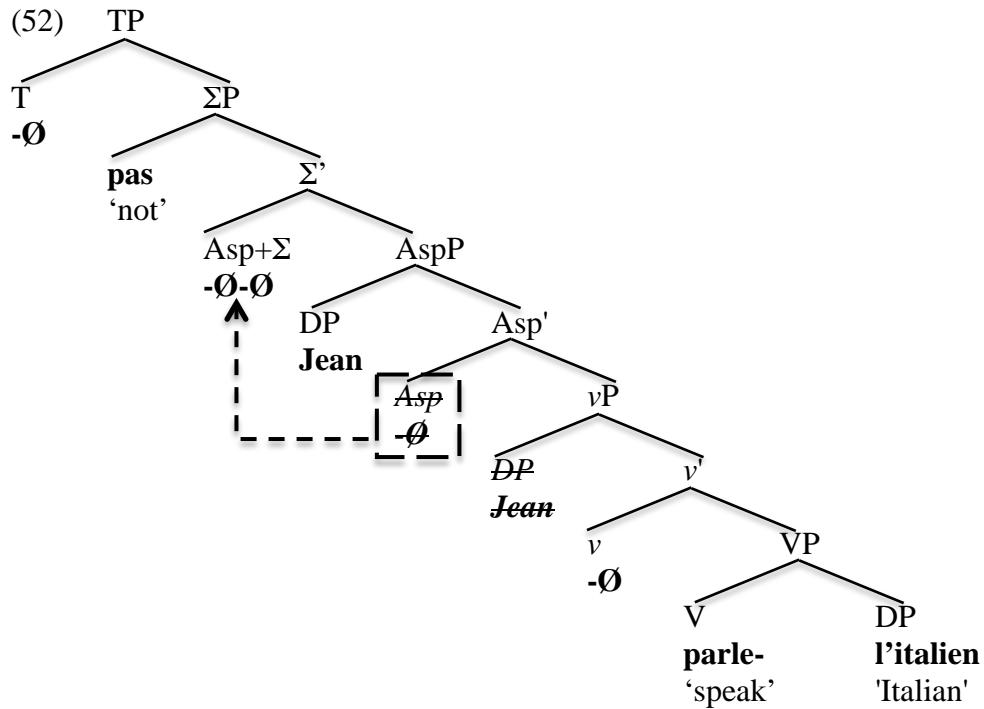
The next head to Merge is Σ , with its specifier *pas*:



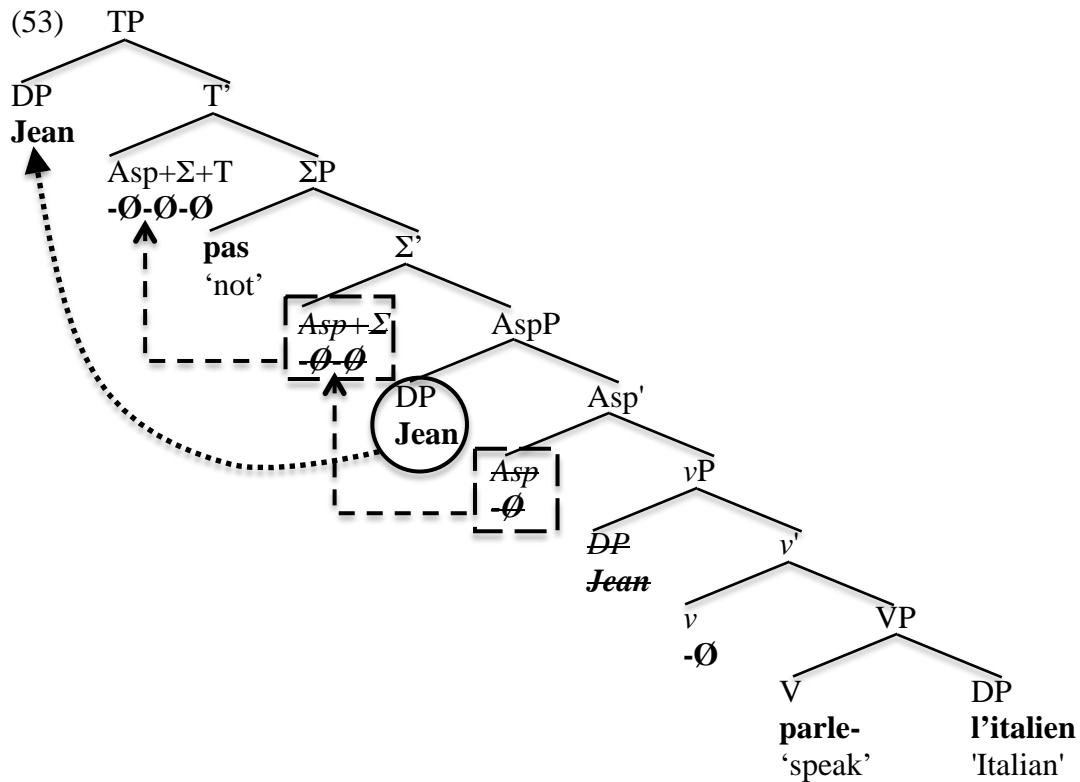
Since Σ and Asp cannot be made Selectionally Contiguous in this tree, Asp will move to Σ :



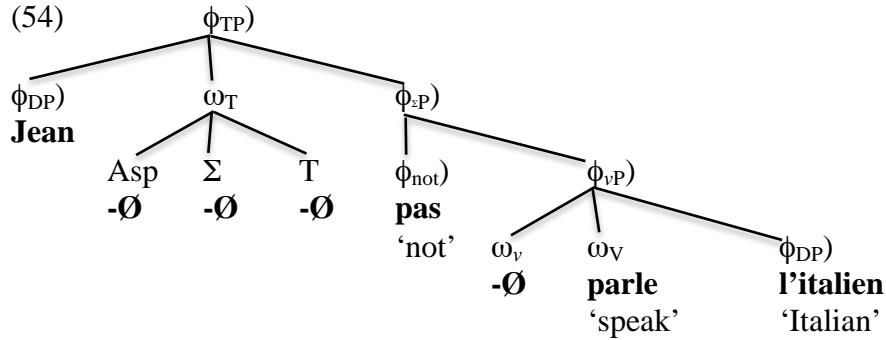
The next head to Merge is T:



T needs Affix Support, which it will seek first from Σ , and then from the subject *Jean*:



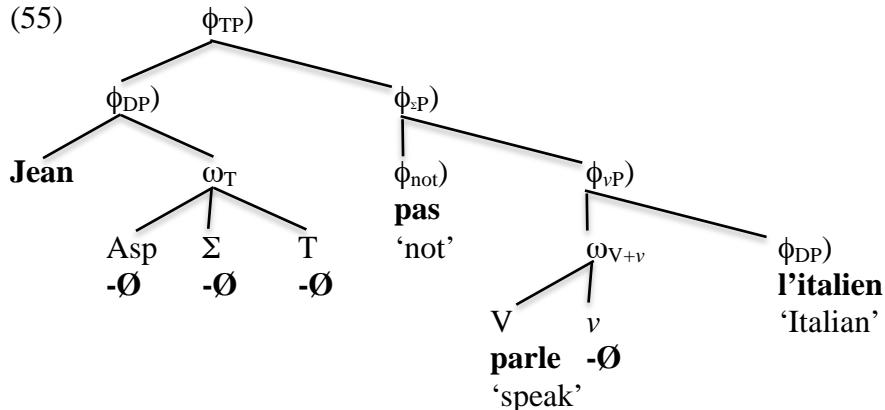
Thus far, the derivation is virtually identical to its English equivalent. Let us now consider the prosodic tree associated with the syntactic tree in (53), again starting with a version of the prosodic tree in which Contiguity is not taken into account:



French has prosodically active right edges of ϕ , and this means that Probe-Goal Contiguity for v and the object is satisfied without further manipulation; they are Contiguous in ϕ_{vP} , which has the object adjacent to its prosodically active right edge⁶³. Asp, Σ , and T are Selectionally Contiguous thanks to head-movement: v and V can be made Selectionally Contiguous through Contiguity-adjunction.

Probe-Goal Contiguity between T and the subject, and between Σ and *pas*, would require some manipulation of the structure; both of these pairs are dominated by ϕ_{TP} , but neither Goal is Contiguity-prominent in that domain, since neither is at its right edge. Since Σ and T are part of a complex head, I will assume that the two must occupy the same prosodic position, and as a result, their needs are incompatible; Σ needs to Contiguity-adjoin to *not*, and T needs to Contiguity-adjoin to the subject. Since T enters the derivation later, the logic of the cycle allows its needs to prevail, and ω_T Contiguity-adoins to the subject:

⁶³ In an example with vP -internal material following the object, it would be necessary (and straightforward) to apply Grouping to connect v with the object.



The Selectional Contiguity relation between Asp and v is unavoidably broken, as is the relation between Σ and *pas*. All other Contiguity relations are respected in (55). v and the object are still Contiguous, in ϕ_{vP} , which has the object adjacent to its right edge. Heads other than Asp and v are all Selectionally Contiguous with each other. Probe-Goal Contiguity between T and the subject holds in ϕ_{DP} .

Thanks to the Contiguity-adjunction that made T and the subject Contiguous, Prosodic Lowering cannot attach the affixes under ω_T to the verb, as ω_T does not c-command the verb in (55). The grammar therefore moves the verb to T, yielding the correct string:

(56) Jean parle pas l'italien

Jean speaks not the Italian

'Jean does not speak Italian'

We thus derive the generalization that in French tensed clauses, the verb (or an auxiliary) must raise to T.

4. Danish

In what follows I will concentrate on non-V2 clauses in Danish; we will turn to an analysis of V2 in section 1.2 of chapter 7. For non-V2 clauses, the result we want is that nothing raises past negation:

- (57) Jeg spurgte [hvorfor Peter **ikke** havde læst den] [Danish]

I asked why Peter not had read it

'I asked why Peter had not read it'

- (58) I asked [why Peter had **not** read it]

In English, only auxiliaries raise past negation, for reasons we now understand; in Danish non-V2 clauses, not even auxiliaries raise past negation.

Danish negation is somewhat different from English *not*, in ways that will be useful to us.

Danish has both NPIs and negative quantifiers, as (59) shows:

- (59) a. Per læste måske ikke nogen bøger [Danish: Engels 2008]

Per read maybe not any books

- b. Per læste måske ingen bøger

Per read maybe no books

The latter, however, are subject to an interesting constraint; they can only appear if they are adjacent to where the sentential negation marker *ikke* would be:

- (60) a. Per har måske ikke læst nogen bøger [Danish: Engels 2008]

Per has maybe not read any books

- b. *Per har måske læst ingen bøger

Per has maybe read no books

In (60b), the negative quantifier is separated from the position of *ikke* by the verb, and therefore cannot appear. Negative quantifiers can sometimes move into the licensed position:

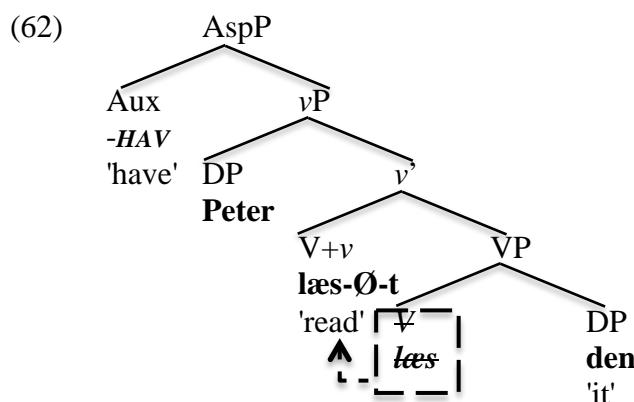
- (61) a. *Jeg har faktisk set ingenting [Danish]

I have actually seen nothing

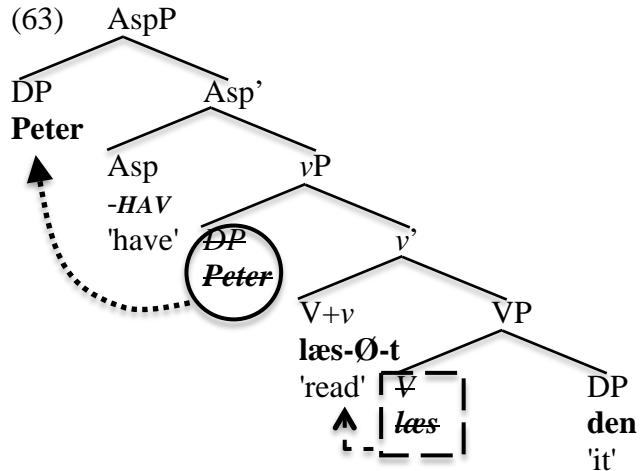
- b. Jeg har faktisk ingenting set
 ↓
 I have actually nothing seen

In the preceding discussion of English, we saw some evidence that English Σ is a Probe which Agrees with *not* in its specifier. We could understand the Danish facts above as telling us that Danish Σ behaves slightly differently; it seeks to Agree with a negative quantifier and move that into its specifier, and only Merges *ikke*, the Danish version of *not*, if it finds nothing to Agree with. It will be important for what follows that Merge of *ikke* is quite late.

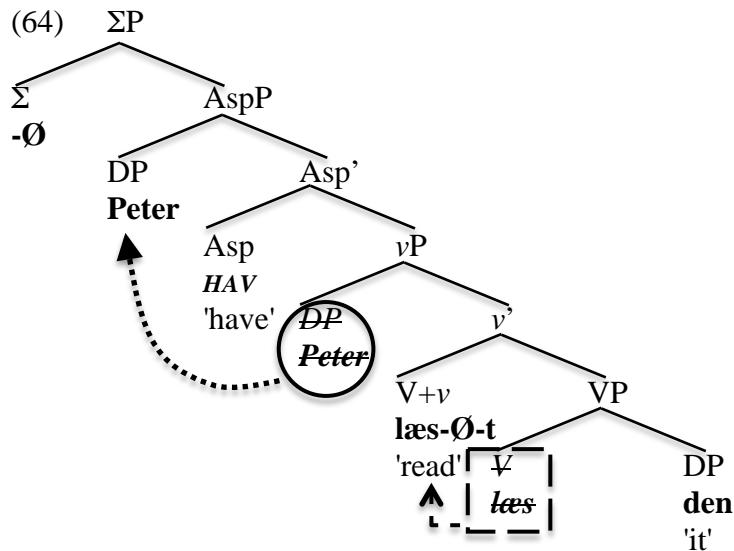
Let us now consider a derivation for the embedded clause of (57) above. I will omit *why*, just for simplicity:



The Danish derivation begins just like its English counterpart. The verb raises to v , for reasons that will be revealed in the next chapter; the auxiliary *-HAV* 'have' is Merged. Since the auxiliary is at this point indistinguishable from an affix (following Bjorkman 2011), its need for Affix Support triggers movement of the subject to its specifier:

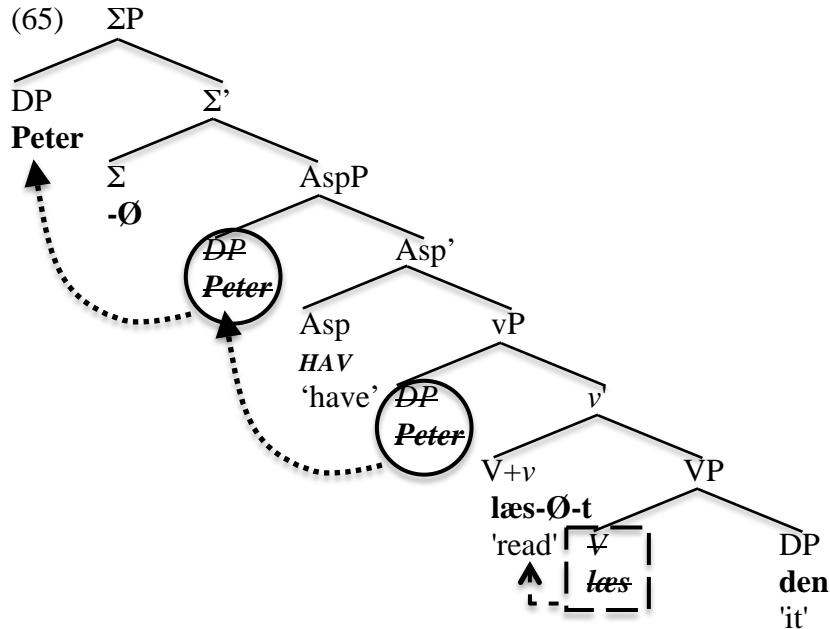


The Asp head has now triggered all the operations of which it is capable, and is realized as a free-standing morpheme. Next we Merge Σ :



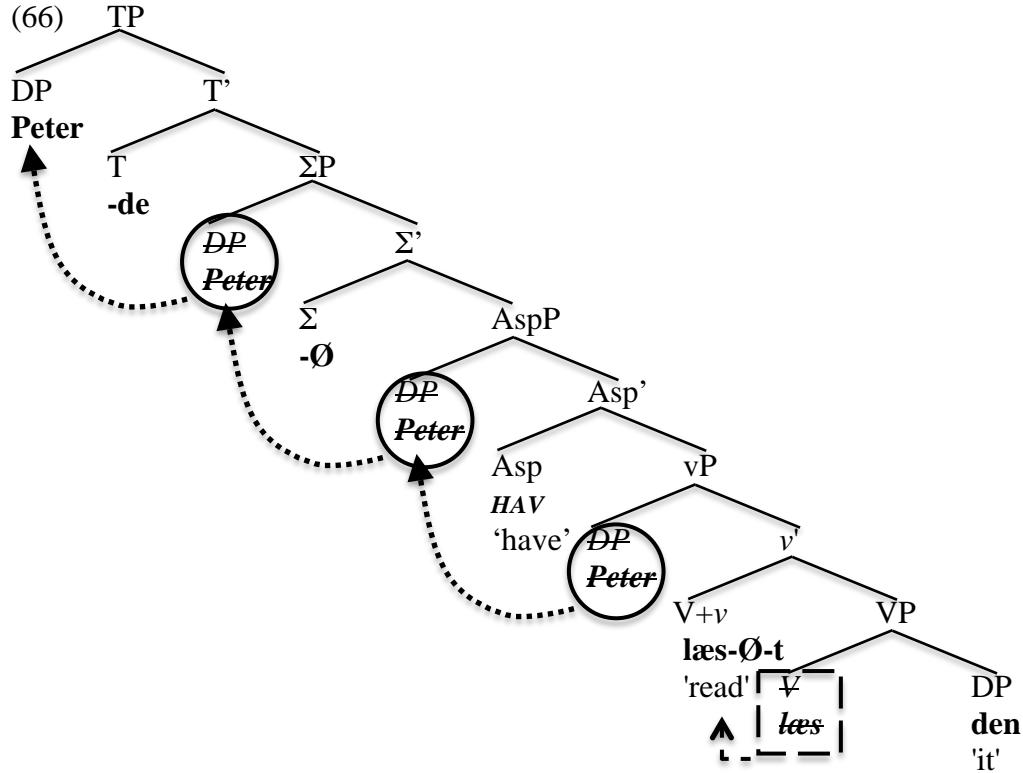
By hypothesis, Danish Σ differs from English Σ in that it does not Merge negation in its specifier until after it has Probed for a negative quantifier (which it will not find, in this particular case). Σ

needs Affix Support, so it begins looking through the structure for possible Supporters, and the closest one it finds is the DP *Peter*:



Σ 's need for Affix Support is now satisfied, and the Selectional Contiguity requirement between Σ and Asp has been satisfied as well.

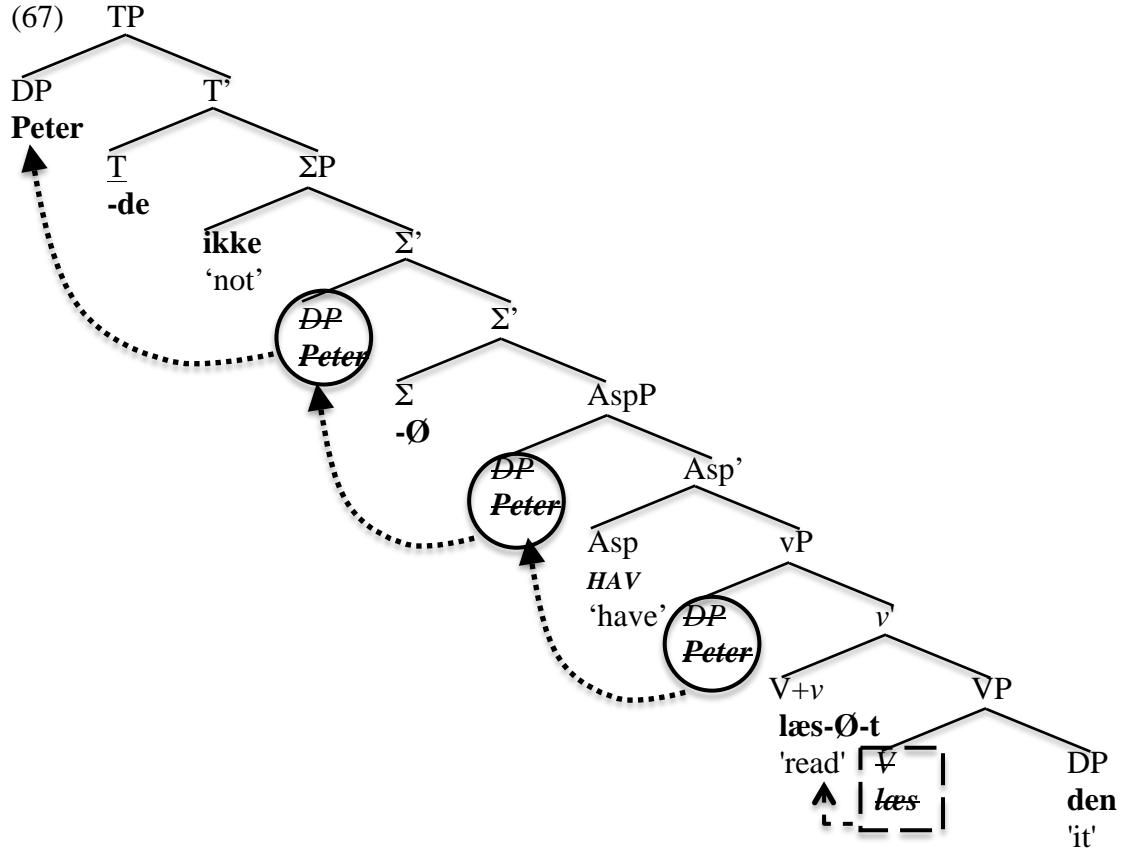
Now T is Merged, and begins trying to satisfy Affix Support. The closest possible Supporter for T is again the DP *Peter*:



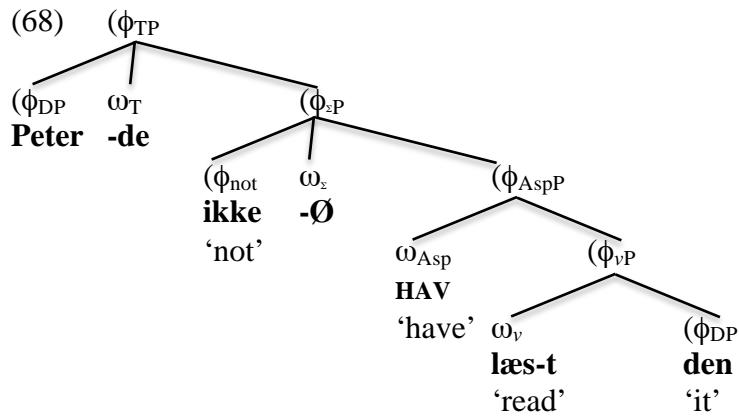
This move provides Affix Support to T, and also creates Selectional Contiguity for T and Σ .

Finally, we can at last Merge the negator *ikke* into the specifier of Σ (thereby unavoidably breaking the Contiguity relation just established between T and Σ)⁶⁴:

⁶⁴ Given what we have previously seen about how the grammar treats broken Contiguity relations, we might wonder why Merge of negation does not trigger head-movement of Σ to T, repairing the broken Selectional Contiguity relation between those two heads. We will see some evidence below (in section 3.5.2 of chapter 7) that repair of broken Selectional Contiguity relations stops occurring at a late point in the derivation of a phrase; perhaps Merge of *ikke* is too late for the Contiguity relation that it breaks to be repaired.

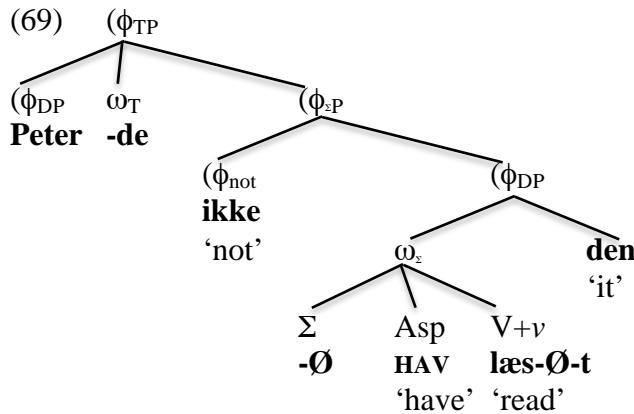


Finally, before Spell-out of TP, we need to make sure that the unattached affixes in T and Σ can find hosts. Ignoring Contiguity relations, the syntactic tree in (67) could be mapped onto the prosodic tree in (68):



Probe-Goal Contiguity between the subject and T is satisfied, just as in English; the two are Contiguous within ϕ_{TP} , where the subject is Contiguity-prominent. Similarly, Σ and *ikke* 'not'

are Contiguous within ϕ_{SP} . Selectional Contiguity between T and Σ is unavoidably broken by *ikke* ‘not’, as mentioned above, but Σ , Asp, and v can be made Contiguous by being Contiguity-joined to each other. Finally, Contiguity-adjunction can make v and the object Contiguous, as in English:



Apart from Selectional Contiguity between T and Σ , all Contiguity relations are respected in (69). ω_T and ω_z both c-command the Asp morpheme in this tree, and T and Σ may therefore be attached to Asp by Prosodic Lowering, yielding the correct word order, repeated in (70):

- (70) Jeg spurgte [hvorfor Peter **ikke** havde læst den] [Danish]

I asked why Peter not had read it

'I asked why Peter had not read it'

What distinguishes Danish from English, on this account, has to do with the timing of Merge of the negative morpheme. Because Danish Σ , unlike English Σ , does not reliably get Affix Support from its version of *not*, its need for Affix Support moves the subject to its specifier. This in turn causes the subject to satisfy Affix Support for T, leaving the auxiliary in a lower position.

5. Icelandic

In section 4 above, we developed a theory accounting for the fact that in non-V2 clauses, Danish verbs fail to raise past negation, and main verbs remain adjacent to the object. The account of the Danish facts should generalize to the similar facts of Norwegian:

- (71) Jeg vet [hvorfor Hedda (*ofte*) **kjøper** (**ofte*) sko] [Norwegian: Wiklund et al 2007, 204]
I know why Hedda often buys often shoes
'I know why Hedda often buys shoes'

As (71) demonstrates, adverbs may intervene between the subject and the tensed verb in a non-V2 clause in Norwegian, but not between the object and the verb.

While this description holds of most Mainland Scandinavian languages, it does not hold for Icelandic:

- (72) Ég veit [af hverju Hedda (**oft*) **kaupir oft** skó] [Icelandic: Wiklund et al 2007, 204]
I know why Hedda often buys often shoes
'I know why Hedda often buys shoes'

In Icelandic non-V2 clauses, the facts are the reverse of the Norwegian/Danish ones; adverbs may intervene between the verb and the object, but not between the subject and the tensed verb.

This contrast between Norwegian and Icelandic is reminiscent of the one between English and French (as has often been pointed out; cf. Vikner 1997, Bentzen 2008, and much other work):

- (73) Hedda (*often*) **buys** (**often*) shoes
- (74) Hedda (**souvent*) **achète** (*souvent*) des chaussures [French]
Hedda often buys often of.the shoes

English is like Norwegian and Danish, in that adverbs can intervene between the subject and T, but not between verbs and their objects. We linked these facts to the fact that all of these languages have obligatory wh-movement; these are languages with prosodically active left edges of ϕ , in which Probes may therefore be arbitrarily distant from Goals that precede them, but must be adjacent to Goals which follow them.

French, by contrast, is like Icelandic, in that it has the reverse of the English/Norwegian/Danish pattern; adverbs may intervene between the object and the verb, but not between the subject and T. This fact is connected, in the theory under development here, to the fact that French has optional wh-in-situ; as Selkirk (1986) has independently argued, French has prosodically active right edges of ϕ , and it therefore allows Probes to be arbitrarily distant from Goals that follow them, but requires Probes to be adjacent to preceding Goals. Can the analysis for French be generalized to Icelandic?

One apparent obstacle to doing so is that Icelandic, unlike French, has obligatory overt wh-movement:

- (75) a. Hvern hefur Pétur talað við? [Icelandic]
 who.ACC has Peter spoken with
 'Who has Peter spoken with?'
 b. *Pétur hefur talað við hvern?
 Peter has spoken with who.ACC

However, in section 4.2.1 of chapter 4, we saw that obligatory wh-movement is a general property of languages with V2. I attributed this property to the principle of Multitasking; if V2, as I will claim in the next chapter, is triggered by an affixal C, then the interrogative version of this affixal C is compelled to satisfy its need for Affix Support with the wh-phrase with which it Agrees. If this is the correct approach, then the fact that Icelandic has overt wh-movement is not an obstacle to giving Icelandic the same analysis as French. In particular, we could assume that Icelandic is like French in having prosodically active right edges of ϕ , so that Probes can be arbitrarily distant from Goals that follow them, but must be adjacent to Goals that precede them. Just as in French, this would have the consequence that T would have to be Contiguity-adjointed to the subject, and therefore that the verb, or the highest auxiliary, would raise to T to provide it with a host. Icelandic would have overt wh-movement, on this account, not just because of Probe-Goal Contiguity, but because of Affix Support together with Multitasking.

Before moving on, I will briefly discuss three potential problems with this approach to Icelandic. First, I have expressed a hope about how Icelandic prosody might work; is there any evidence that it does work this way? Secondly, I have claimed that Icelandic has overt wh-movement because it is a V2 language; what does this predict about clauses which are not V2? And finally, the contrast in verb placement between Icelandic and Mainland Scandinavian is

usually associated, not with differences in prosody, but with differences in richness of agreement. Can or should this account be connected to any facts about agreement?

I do not know of any work on Icelandic prosody that sheds light on which edge of ϕ is prosodically active (see Dehé 2009 for one treatment of Icelandic prosody). The hope expressed in this section about how Icelandic prosody is organized will have to be tested in future work.

The account of Icelandic offered here predicts that Icelandic V2 clauses will have obligatory overt wh-movement. But Icelandic also has obligatory wh-movement in non-V2 clauses:

- (76) Ég veit [**af hverju** Hedda kaupir oft skó] [Icelandic: Wiklund et al 2007, 204]
I know why Hedda buys often shoes
'I know why Hedda often buys shoes'

On the other hand, there are contexts in which French wh-movement is obligatory as well (cf. Chang 1997, Bošković 1998, Mathieu 1999, Cheng and Rooryck 2000, and references cited there). For instance, French does not allow wh-in-situ in embedded questions (Mathieu 1999, 443):

- (77) a. *Je me demande [Jean a vu **qui**]
I myself ask Jean has seen who
b. Je me demande [**qui** Jean a vu]
I myself ask who Jean has seen
'I wonder who Jean saw'

I have no account of this restriction to offer (see the references cited above for some suggestions). But if Icelandic is, for our purposes, a version of French with V2, then we might expect that Icelandic will require overt wh-movement in the places that French does, as well as

in V2 clauses. Thus, embedded questions in Icelandic, even if they are not V2, ought to require overt wh-movement, just as they do in French.

Finally, we should consider a popular alternative to the approach developed here, according to which the crucial difference between Icelandic and Mainland Scandinavian is connected to richness of agreement. Perhaps the most attractive version of this proposal is that of Thráinsson (1996) and Bobaljik and Thráinsson (1998), who claim that languages in which agreement and tense are distinct morphemes must always raise the verb into the inflectional domain, while languages in which agreement and tense are fused may leave the verb in situ. For instance, in Icelandic, in which the verb must raise to be adjacent to the subject, agreement and tense are clearly separate morphemes, as we can see in this paradigm for *heyra* 'to hear':

	PRESENT	PAST	[Icelandic: Bobaljik 2002]
1sg	heyr-i	heyr-ð-i	
2sg	heyr-ir	heyr-ð-ir	
3sg	heyr-ir	heyr-ð-i	
1pl	heyr-um	heyr-ð-um	
2pl	heyr-ið	heyr-ð-uð	
3pl	heyr-a	heyr-ð-u	

By contrast, Danish, which leaves the verb inside the verb phrase, lacks separate morphemes for agreement and tense:

(79)	PRESENT	PAST	[Danish: Bobaljik 2002]
1sg	hør-er	hør-te	
2sg	hør-er	hør-te	
3sg	hør-er	hør-te	
1pl	hør-er	hør-te	
2pl	hør-er	hør-te	
3pl	hør-er	hør-te	

Bobaljik and Thráinsson (1998) are careful to point out that the connection between verb movement and agreement morphology is a one-way implication; in particular, there are dialects of the Mainland Scandinavian languages which have Icelandic-style verb movement even though their agreement morphology is no richer than that of the majority dialects. They suggest that such languages are syntactically like Icelandic in having separate agreement and tense morphemes, but differ from Icelandic in that the agreement morpheme happens to be phonologically null.

Some work on Icelandic (Wiklund et al 2007, Angantýsson 2007, Thráinsson 2010) has uncovered cases in which adverbs may appear between the verb and the subject in non-V2 clauses ((80a-b) from Angantýsson 2007, 243, 245; (80c) from Wiklund et al 2007,)

- (80) a. ?Kennarinn spurði hvers vegna hann **ekki hefði** lesið bókina
 the.teacher asked why he not had read the.book
 'The teacher asked why he had not read the book'
- b. Það er ein bók þarna sem Haraldur **ekki hefur** lesið
 there is one book there REL Harold not has read
 'There is one book that Harold hasn't read'
- c. Ég veit [af hverju Hedda **oft kaupir** skó]
 I know why Hedda often buys shoes
 'I know why Hedda often buys shoes'

Bentzen et al (2007) describe these word orders as being subject to dialectal variation, and all the above works mention that they improve, for some speakers, depending on such factors as stress on the adverb and the heaviness of the subject. Developing an understanding of the various factors that allow this word order is well beyond the scope of this work. If there are indeed Icelandic speakers for whom the word order in (80c) is freely available, then such speakers represent a problem for the one-way correlation between richness of agreement and adverb placement proposed by Bobaljik and Thráinsson (1998); these are speakers for whom the verb can be separated from the subject by adverbs, even though their agreement morphology is 'rich' in the relevant sense.

The correlation between richness of agreement and verb movement, then, appears to be imperfect, possibly in both directions. Still, the correlation is robust enough to have inspired a great deal of work intending to account for it. If we wish to capture this correlation under the theory developed here, we might want to connect it with the different ways in which Contiguity is created between T and the subject. The dialects in which T and the subject must be adjacent

(that is, the majority dialect of Icelandic, and certain dialects of Mainland Scandinavian languages) are, in this theory, languages with prosodically active right edges of ϕ ; such languages create Contiguity between T and the subject by Contiguity-adjoining T with the subject. Languages in which the subject and T may be separated by adverbs, by contrast (majority dialects of the Mainland Scandinavian languages, and possibly minority dialects of Icelandic), are languages with prosodically active left edges of ϕ ; such languages do not need to Contiguity-adjoin T to the subject, but can allow T to be Contiguous with the subject within the ϕ_{TP} constructed by general Match-theoretic principles. Descriptively, the generalization about agreement could be that Contiguity-adjunction of T to the subject tends to be associated with "rich" agreement, and lack of such adjunction with "poor" agreement. See Ackema and Neeleman (2004) for some exploration of a related idea.

In this section I have shown how the basic facts of Icelandic verb movement in tensed, non-V2 clauses might be made to follow from the theory developed here. The proposal makes crucial claims about Icelandic prosody, and I will have to leave the testing of these claims for future work. If the proposal is right, Icelandic is a language which could, prosodically, allow wh-in-situ, and which is forced to perform wh-movement just because it is a V2 language and hence has an affixal version of C; Multitasking forces wh-movement, because movement can satisfy both Probe-Goal Contiguity and Affix Support for C.

6. Spanish, Italian

Our discussion of English and French has made repeated reference to examples like those in (81a-b), which illustrate the sense in which English and French are mirror images of each other, a fact which I linked to differences in placement of prosodically active boundaries. As example (81c) illustrates, not all languages are so neatly classifiable:

- (81) a. John (often) speaks (*often) Italian [English]
 b. Jean (*souvent) parle (souvent) l'italien [French]
 c. Juan (a menudo) habla (a menudo) italiano [Spanish]

English, on the account developed here, is a language with prosodically active left edges of ϕ , while French has prosodically active right edges of ϕ . What should we say about Spanish?

Spanish allows wh-in-situ, if it is followed by a strong phonological phrase break (Uribe-Etxebarria 2002, Reglero 2005):

- (82) Juan compró que?

Juan bought what

'What did Juan buy?'

In this regard, then, Spanish is like French; it is a complementizer-initial language with the option of wh-in-situ, predicted by our theory to have prosodically active right edges of ϕ . Such languages, in general, require adjacency between Probes and preceding Goals, but allow Probes to be arbitrarily distant from following Goals. We can understand why Spanish allows adverbs to intervene between the verb and the object; just as in French, Spanish v can be arbitrarily distant from the following object. The puzzle about Spanish is why adverbs can also intervene between the subject and T.

Spanish wh-movement is also like wh-movement in French, and in Chichewa, in having the option of being overt:

- (83) a. Juan compró que?

Juan bought what

- b. Que compró Juan?

what bought Juan

'What did Juan buy?'

In Richards (2010), I argued that optionality like that in (83) can be understood as long as we do not declare movement to be a last resort. Consider an abstract representation of a sentence like (83a), where I have marked prosodically active boundaries with parentheses:

- (84) C (DP) whP)

There are at least two ways of creating Probe-Goal Contiguity in (84). One would be to leave the wh-phrase in situ, using Grouping to create a ϕ that included both the wh-phrase and C (and, incidentally, the intervening DP).

Alternatively, we could move the wh-phrase to the left, bringing it closer to C and making it unnecessary for the new ϕ to contain the intervening DP as well as C and wh. As long as our theory does not incorporate any statements making movement an option to be avoided, then the optionality of wh-movement in cases like this is to be expected. In some cases, overt wh-movement might have the advantage of minimizing the amount of previously built prosodic material that had to be destroyed by Grouping to make C-wh Contiguity possible.

We saw in chapter 2 that Spanish T is reliably preceded by a metrical boundary; as a result, Spanish T will not trigger any movement operations driven by Affix Support. This was the account of why Spanish lacks conventional EPP effects:

(85) Apareció un hombre.

appeared a man

'A man appeared'

All other things being equal, we might expect that Spanish T would be like Spanish C, in being able to optionally trigger movement to itself.

If the subject did move to become Contiguous with T, where would it land? In section 4.1 of chapter 4, we saw evidence that movement driven just by Contiguity need not land in the specifier of the Probe. The evidence came from Tagalog, in which wh-movement is to a position which is visibly to the right of the complementizer:

(86) Hindi ko alam [**kung** kailan darating ang estudyante] [Tagalog]
not NG.I know C[+wh] when NOM.will.come ANG student

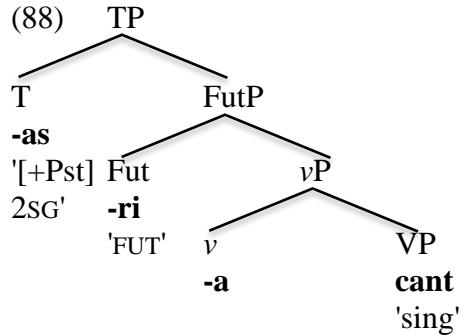
'I don't know when the student will come'

Tagalog is a language with obligatory overt wh-movement; as I argued in Richards (2010), it is a complementizer-initial language with prosodically active left edges of ϕ , and therefore lacks wh-in-situ. However, as we see in (86), wh-movement in Tagalog is not to the specifier of CP. I suggested in chapter 3 that this is because the Tagalog interrogative complementizer is not an affix, but a free-standing morpheme. Consequently, there is no need for the wh-phrase to move all the way to the specifier of C; C is not in need of Affix Support, and wh-movement to a position just under C will be sufficient to create Contiguity between C and the wh-phrase in a way that minimizes destruction of previously built prosodic structure. We might imagine that Spanish preverbal subjects behave in a parallel manner, landing in a specifier of the projection just below the T which Agrees with them. I will suggest that such a movement is usually blocked, because of its effects on Contiguity.

Before we proceed, we need to briefly revisit the theory of Spanish stress offered by Oltra-Massuet and Arregi (2005), and alter it slightly for our purposes⁶⁵. Oltra-Massuet and Arregi claim that the rules of Spanish stress make crucial reference to the T node. Their algorithm for stress runs as follows:

- (87) a. Project a line 0 mark for each syllable nucleus.
 b. Insert a right parenthesis to the left of T on line 0.
 c. Project the rightmost mark of each line 0 foot onto line 1.
 d. Insert a right parenthesis to the right of the rightmost mark on line 1.
 e. Project the rightmost mark of each line 1 foot onto line 2.

Consider how this algorithm derives the correct stress, for example, in the verb *cantarías* 'you would sing'. Oltra-Massuet and Arregi argue that this verb is generated using something like the following tree (omitting all morphemes which are not part of the verb):



In the particular theory of Spanish morphology that they adopt, developing the proposals of Oltra-Massuet (1999, 2000), all the vowels in this tree which are not in the verb root are 'theme vowels', inserted under every syntactic terminal. The stress algorithm in (87) applies to the verb as follows:

⁶⁵ Many thanks to Karlos Arregi (p.c.) for helpful discussion of the theory that follows.

(89)	x	line 2
	x)	line 1
x x x) x		line 0
cant -a -ri -as		
'sing' v FUT T+Agr		

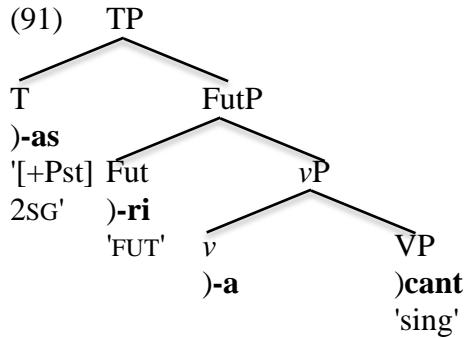
After each syllable nucleus receives a mark on line 0, (87b) places a right parenthesis to the left of the T morpheme, grouping the first three syllables into a foot. (87c) then promotes the rightmost syllable in that foot to line 1. (87d) places a parenthesis after the single mark on line 1, and (87e) projects that mark onto line 2.

It will be helpful for the theory of Spanish word order that follows to alter the second line of Oltra-Massuet and Arregi's stress algorithm:

- (90) a. Project a line 0 mark for each syllable nucleus.
- b. Insert a right parenthesis to the left of **every syntactic terminal node** on line 0.
- c. Project the rightmost mark of each line 0 foot onto line 1.
- d. Insert a right parenthesis to the right of the rightmost mark on line 1.
- e. Project the rightmost mark of each line 1 foot onto line 2.

For purposes of verbal stress⁶⁶, this algorithm will have the same effect as that of Oltra-Massuet and Arregi. Consider again the tree in (91), here annotated with the parentheses inserted by (90b):

⁶⁶ Karlos Arregi (p.c.) notes that it may not be straightforward to apply this algorithm to stress in non-verbs, particularly in plurals. Oltra-Massuet and Arregi claim that stress in non-verbs appears as far to the right as possible without following the *n* or *a* head; in particular, stress never appears on the class marker or on plural morphemes. As Arregi (p.c.) suggests, we might deal with this by claiming that plural morphemes are not in fact present in the syntactic representation.



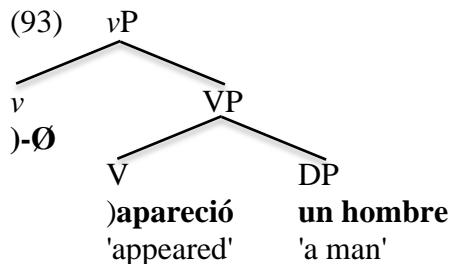
Applying the new version of the stress algorithm to this verb yields the same ultimate result:

(92)

	x		line 2
x	x	x)	line 1
)x)x)x)x
cant	-a	-ri	-as
'sing'	v	FUT	T+Agr

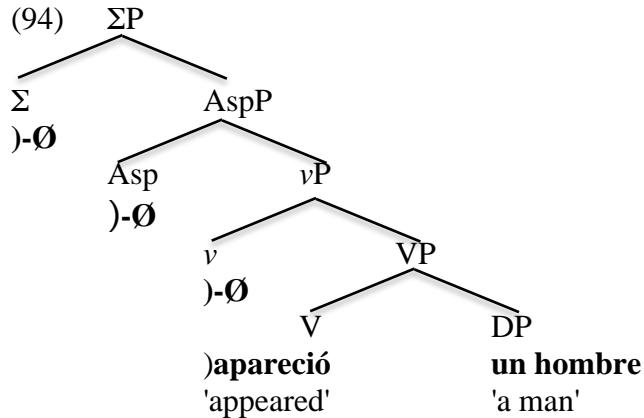
On the new version of the stress algorithm, every syllable in this verb except the last one will have a stress mark placed on line 1. However, lines (90d-e) of the algorithm guarantee that only the rightmost of these syllables will be promoted to line 2. The ultimate result is therefore the same; main stress appears on the syllable before the T morpheme. I will assume the altered version of Oltra-Massuet and Arregi's algorithm in what follows.

Let us consider a derivation in which the subject moves, starting with a completed vP:

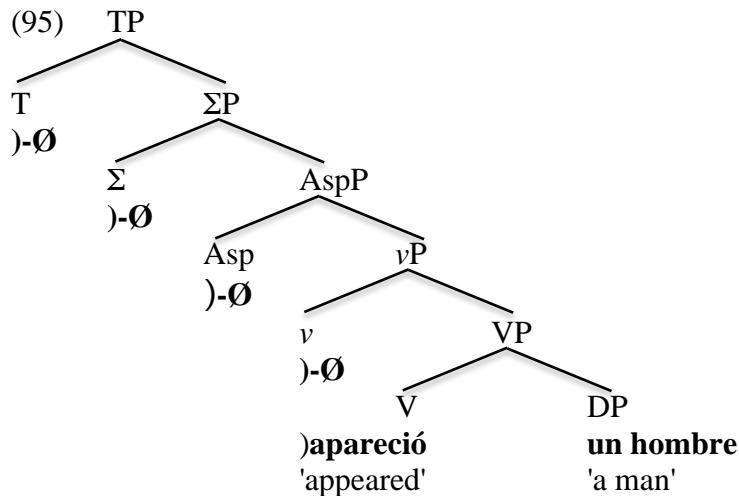


I assume above that *apareció* 'appeared' is unaccusative.

In the tree above, V and v are adjacent, hence easy to make Contiguous, and v , by hypothesis, is metrically independent, and therefore has no need of Affix Support. The derivation continues with the Merge of Asp and Σ ; both of these heads are metrically independent, with the consequence that neither head need trigger any kind of movement:



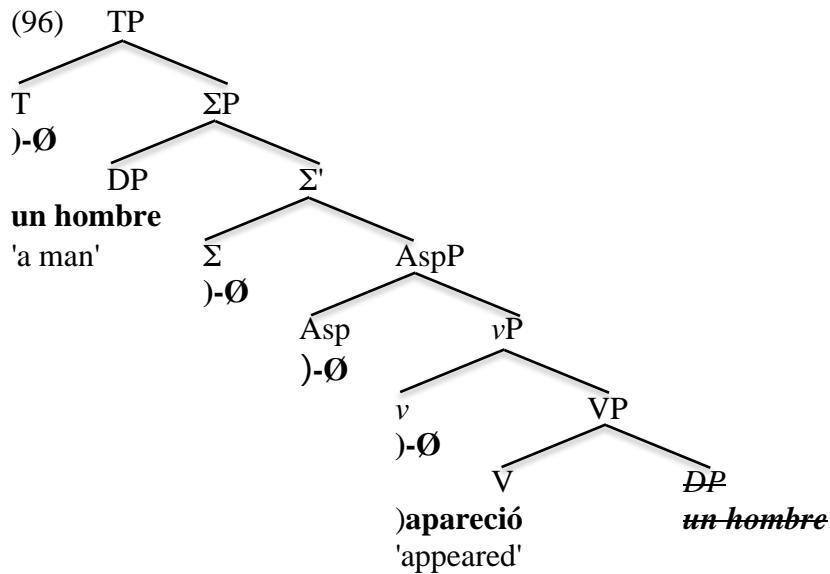
Finally, we can Merge T:



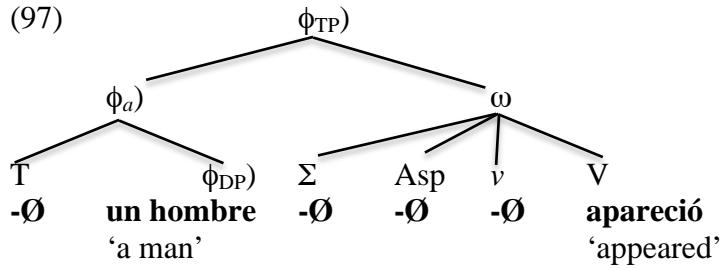
Let us carefully consider the forces acting on T. Affix Support is irrelevant for T, since it is metrically self-sufficient. Selectional Contiguity between T and Σ is satisfied by Contiguity-adjunction.

Finally, we can consider Probe-Goal Contiguity between T and the subject. Since Spanish has prosodically active right edges of ϕ , this Contiguity relation could be created while

leaving the subject in situ. However, Contiguity could also be created with movement; we saw in the discussion of optional wh-movement that movement of Goals should always be an option in creating Contiguity. We have also seen, from our discussion of Tagalog wh-movement, that Contiguity-driven movement need not land in the specifier of the Probe; if Affix Support is not relevant, then the Goal lands in a specifier below the Probe. In the Spanish example under consideration here, Affix Support is not relevant; T is a metrically independent affix. We therefore expect the subject, if it moves, to land in a specifier below T:



Movement of DP to the specifier of ΣP makes it easy to make T and the DP Contiguous, allowing the formation of a Group that consists just of T and DP. The movement also breaks Contiguity between T and Σ. Let us consider the prosodic tree for (96):



In (97), T and the subject have been Grouped to create Contiguity between them; T could also have Contiguity-adjoined to the subject. The other heads in the clause have been Contiguity-adjoined together, making them Contiguous with each other; the Contiguity relation between T and Σ has been irrevocably broken by raising of the subject.

As it happens, this tree will not yield a preverbal subject. T does not c-command the verb in the prosodic tree, and the verb will therefore be compelled to raise to T, yielding a verb-initial structure. We will therefore need to find some other way to generate preverbal subjects.

Is the derivation that yields (96-97) possible, as an alternative way of generating verb-initial word orders? I will assume that it is not. For one thing, assuming that Spanish negation is, like negation in the other languages we have studied, a specifier of ΣP, the derivation in (96-97) leads us to expect it to be possible to leave sentential negation in postverbal position, contrary to fact:

(98) *Apareció un hombre no.

appeared a man not

'A man didn't appear'

The derivation in (96-97) is one that involves breaking of a Contiguity relation (between T and Σ), for the sake of a Probe-Goal relation which could have been created without movement (between T and the subject). As long as we grant the grammar enough computational power to refrain from avoidably breaking Contiguity relations, then we can correctly rule out this

derivation⁶⁷. We have seen other cases of operations that break Contiguity relations, but these cases have all been unavoidable; a Contiguity relation is broken because it is the only way a new Contiguity relation can be created.

Note that the Spanish case is different from the case of Tagalog wh-movement, which also lands in a specifier below the attracting head:

- (99) Hindi ko alam [kung kailan darating ang estudyante] [Tagalog]
not NG.I know C[+wh] when NOM.will.come ANG student
'I don't know when the student will come'

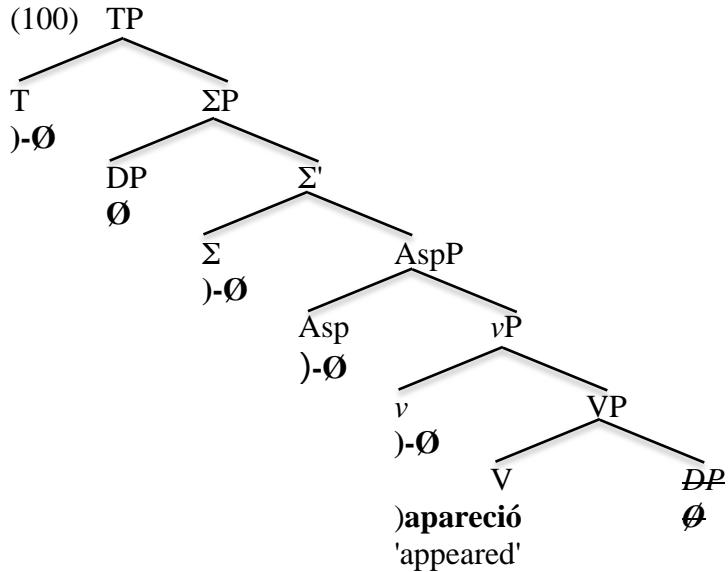
In (99), the wh-phrase moves between C and T, two heads that are separated in any event by the Spell-out operation. The Spanish case is different; the raised subject breaks Contiguity between two heads that would otherwise remain Contiguous⁶⁸. T therefore cannot trigger overt movement to itself.

One could imagine a language that would simply stop here; such a language would be verb-initial. Spanish apparently finds ways of creating preverbal subjects that do not violate Selectional Contiguity.

One way to avoid breaking Selectional Contiguity in (100) would be to have a subject which is phonologically null:

⁶⁷ This idea has many possible ramifications, the full exploration of which I will leave for future work. One potentially interesting case involves languages with optional wh-movement. If the wh-phrase is participating in a Contiguity relation, should overt wh-movement be blocked? The relevant Contiguity relations would have to be ones which are still active at the point in the derivation at which wh-movement takes place; the object, for example, is in a Contiguity relation with *v*, but this relation has presumably been forgotten by the derivation by the time C is introduced to trigger wh-movement. Extraction of external subjects is likely to be a more relevant case; there are well-known issues with extraction of external subjects, but I will leave the topic here.

⁶⁸ Tagalog wh-movement is also obligatory, but this cannot be the relevant difference. If it were, we could expect to find languages like Tagalog both in being verb-initial and in allowing wh-movement to a position below C, but unlike Tagalog in having the option of wh-in-situ; such languages would then be compelled, by the reasoning in the text, to leave the wh-phrases in situ, thereby avoiding an avoidable breakage of Contiguity. Such languages would then in effect have obligatory wh-in-situ, and we have seen that there are no such verb-initial languages (chapter 5, section 3).



This is indeed a well-formed sentence in Spanish:

(101) Apareció.

appeared

'He/she appeared.'

We might imagine several approaches to the well-formedness of (101).

On one of them, the fact that the subject is phonologically null is established early in the derivation. Perhaps there is an actual grammatical operation marking the subject pronoun as null, which applies in examples like (101) to rescue the Selectional Contiguity relation between T and Σ. I will offer a similar claim about the distribution of PRO in section 3.2 of the next chapter, which could certainly be generalized to the pro-drop case.

We will see evidence, in section 3.5.2 of the next chapter, that the type of verb movement triggered by the inability of an affix to undergo Prosodic Lowering takes place quite late, just at Spell-out of the phase containing the affix. This conclusion raises another possibility; perhaps raising of the pronominal subject does indeed break Selectional Contiguity between T and Σ, and

would prevent Prosodic Lowering of T, but the null nature of the subject is established, perhaps via lexical insertion, before the verb can raise.

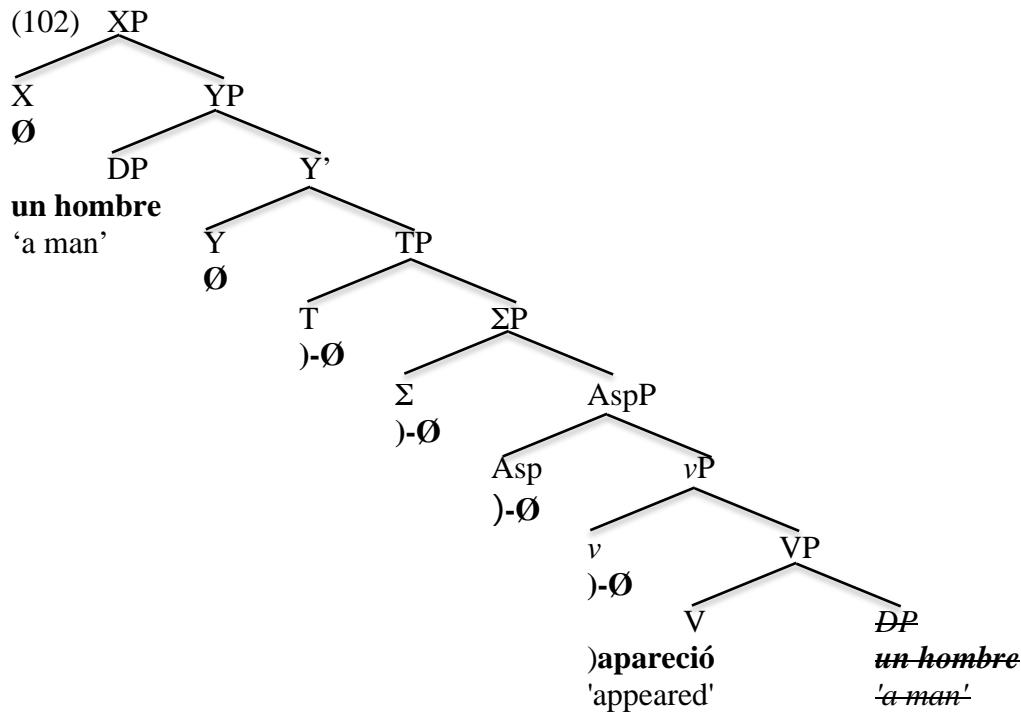
On this second approach, it is a contingent fact about the lexicon of Spanish that it contains phonologically null pronouns, but this theory makes Spanish a language in which such pronouns are particularly useful; Spanish has no Affix Support requirements that might require pronouns to have phonological content, and making subject pronouns null makes them capable of raising towards T without ultimately breaking Selectional Contiguity. This view does not lead us to expect an absolute correlation between lack of EPP effects (of the kind discussed in chapter 2) and pro-drop, but tendencies in the direction of such a correlation would not be surprising. Whether anything more specific can be said about the nature and extent of the correlation is a question I will leave for future work. A natural question that would help to distinguish between the theories sketched above is whether languages in which T is a suffix with no need of Affix Support invariably have the Spanish type of pro-drop (in which case the idea of a grammatical operation of marking the subject null might seem attractive)⁶⁹.

What about overt preverbal subjects? A long literature on preverbal subjects in the Romance pro-drop languages argues that such subjects are, at least sometimes, dislocated to high positions in the clause; topics of debate in this literature include the syntactic nature of the dislocation and the question of whether such dislocation is obligatory or merely optional. See Contreras (1991), Barbosa (1995), Alexiadou and Anagnostopoulou (1998), Goodall (1999), Ordóñez and Treviño (1999), Suñer (2003), Camacho (2006), Sheehan (2007), López (2009), Villa-García (2013), and references cited there for relevant discussion. I will leave for future

⁶⁹ Caribbean dialects of Spanish are sometimes described as making less use of pro-drop than other dialects (see Toribio 2000, Cabrera-Puche 2008, and references cited there, for discussion). It is not clear to me at this point whether any of these dialects have actually *lost* pro-drop, as opposed to simply using it less frequently, but this is precisely the kind of variation that might shed light on the issues in the main text.

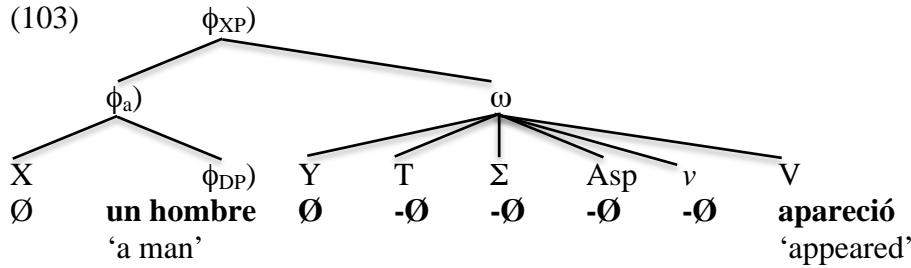
work the question of what exactly these processes are, or where preverbal subjects land (in fact, there may be dislocation processes that result in postverbal subjects, as well⁷⁰); the important thing will be that the relevant processes are triggered by heads above T.

For example, we could posit a pair of nonaffixal heads X and Y, projecting XP and YP above TP; the higher head, X, acts as a Probe, triggering movement of the subject. Since X is not an affix, this particular movement will be to the specifier of YP:



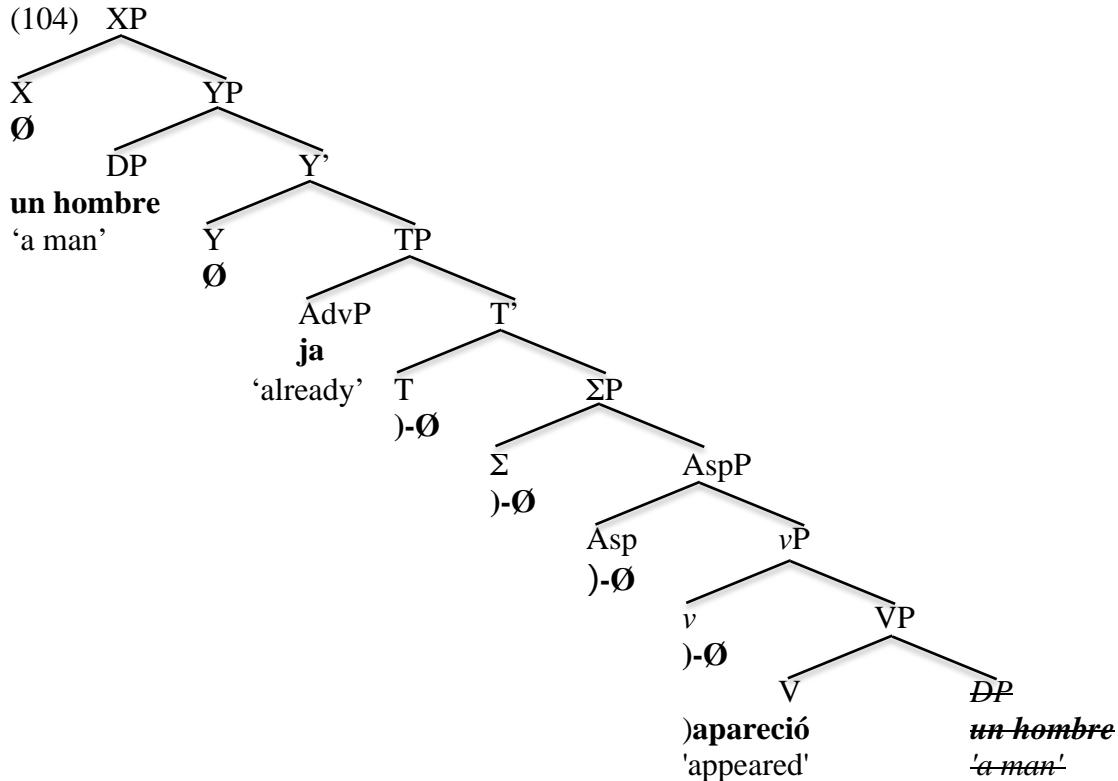
Movement to the specifier of Y irrevocably breaks Contiguity between X and Y; perhaps it will be easiest to imagine that X is C, hence less concerned with this breakage of Contiguity than T would be, since Contiguity will be broken in any event by Spell-out. A prosodic tree for (102) would go as follows:

⁷⁰ Such processes will be important, if we maintain our current assumptions about the architecture of the clause, for dealing with subjects of transitive and unergative verbs. At the moment, we are generating auxiliaries in the head immediately above the base position of such subjects, and these subjects will therefore have to find some way of moving from their base position, in order to make Selectional Contiguity possible for the heads on either side of them. Interestingly, some dialects of Spanish only freely allow postverbal subjects when the verb is intransitive (see Gutiérrez-Bravo 2002, Sheehan 2007 and references cited there for discussion).



In (103), X and the subject have undergone Grouping to become Contiguous within ϕ_a . There is no way for the subject to remain Contiguous with T; since T is to the right of the subject, no Grouping operation will make the subject prominent within the new ϕ created by Grouping, and since T and the subject are not adjacent, they cannot be put together by Contiguity-adjunction.

Any adverbs that have adjoined to TP are therefore able to stay there (and perhaps they will undergo Contiguity-adjunction to T, to make Contiguity with Y possible):



We thus arrive at the desired result: Spanish may put adverbs between the subject and T, as well as between the verb and the object. We also predict, correctly, that adverbs should be able to precede the verb even if the subject does not:

- (105) a. Ya apareció.
already appeared
'He/she already appeared'
- b. Ya apareció un hombre
already appeared a man
'A man already appeared'

In (105a), the subject has been pro-dropped; in (105b), it has been left postverbal. In both examples, the adverb *ya* 'already' is capable of preceding the verb.

The Spanish facts seem to follow, on these assumptions. Moreover, the account developed here for Spanish may be generalized to Italian. Italian is like Spanish, as we saw in chapter 2, in that the subject need not be preverbal:

- (106) a. È arrivato un uomo [Italian]
is arrived a man
- b. Un uomo è arrivato
a man is arrived
'A man has arrived'

Italian is also like Spanish in having prosodically active right edges of ϕ (see Ghini (1993) and Truckenbrodt (1995) for evidence). We therefore expect Italian to allow adverbs to intervene both between the subject and T and between the verb and the object:

- (107) a. Giovanni spesso parla italiano
 Giovanni often speaks Italian
- b. Giovanni parla spesso italiano
 Giovanni speaks often Italian

There are differences between Italian and Spanish that do not follow from this theory, and I will have to leave them for future work. For instance, Cinque (1999) notes that while Spanish and Italian both allow adverbs to either precede or follow verbs, the particular adverbs which can precede tensed verbs vary between the two languages:

- (108) a. El niño casi camina [Spanish: Cinque (1999, 152)]
 the child almost walks
 'The child almost walks'
- b. Juan inmediatamente piensa que nadie lo quiere
 Juan immediately thinks that nobody him loves
 'Juan immediately thinks that no one loves him'
- (109) a. Il bambino cammina quasi [Italian: Maria Giavazzi, p.c.]
 the child walks almost
 'The child almost walks'
- b. Gianni pensa immediatamente che nessuno lo ami
 Gianni thinks immediately that nobody him loves.SUBJ
 'Gianni immediately thinks that no one loves him'

Another difference between Italian and Spanish is that Italian does not allow wh-in-situ:

- (110) a. *Gianni ha comprato che cosa? [Italian]

Gianni has bought what thing

- b. Che cosa ha comprato Gianni?

what thing has bought Gianni

'What did Gianni buy?'

One way of dealing with this special property of Italian arose in the last section; we could say that Italian, like Icelandic, has an affixal interrogative C, and therefore forces wh-movement, not because of Probe-Goal Contiguity, but for Affix Support.

Some evidence for this idea might come from the fact that Italian generally requires the subject to be postverbal in interrogatives (Rizzi 2001)⁷¹:

⁷¹ As Rizzi notes, the one exception to this is interrogatives with *why*:

(i) Perché Gianni è venuto?
why Gianni is come
'Why did Gianni come?'

I have no explanation for this to offer.

- (111) a. *Che cosa Gianni ha fatto? [Italian]

what thing Gianni has done

'What did Gianni do?'

- b. Che cosa ha fatto Gianni?

what thing has done Gianni

'What did Gianni do?'

- c. *Dove Gianni è andato?

where Gianni is gone

'Where did Gianni go?'

- d. Dove è andato Gianni?

where is gone Gianni

'Where did Gianni go?'

- e. *Come Gianni è partito?

how Gianni is left

'How did Gianni leave?'

- f. Come è partito Gianni?

how is left Gianni

'How did Gianni leave?'

Dialects of Spanish differ in their distribution of subject-verb inversion in interrogatives (see

Torrego 1984, Baković 1998 for discussion), but most are more liberal than Italian:

- (112) Cómo Juan ha conseguido meter allí a su hijo?

how Juan has managed get.INF in.there DAT his son

'How has Juan managed to get his son in there?' [Spanish: Torrego 1984, 106]

By saying that Italian interrogative C is an affix while Spanish interrogative C is not, we can hope to capture two differences between them: Italian has obligatory wh-movement while Spanish does not, and Italian has obligatory inversion in its questions while Spanish does not. There are many questions here that I will have to leave for future work. Capturing the facts of Italian inversion in this model would take us too far afield; I will also not try here to account for the distribution of inversion in Spanish questions (see Salanova 2004 for an intriguing account of the facts in one dialect).

This section has shown how we can account for one difference between French, on the one hand, and Spanish and Italian, on the other: namely, the fact that adverbs can intervene between the subject and T in Spanish and Italian but not in French. The difference, in this account, has to do with the fact that Spanish and Italian T is metrically independent, and therefore does not need the subject to move to its specifier for Affix Support, unlike French T. Spanish and Italian verbs and auxiliaries, in this account, are not subject to the forces that require them to move in languages like English and French; in fact, Spanish and Italian should be languages in which verbs and auxiliaries remain more or less in situ, at least in ordinary statements.

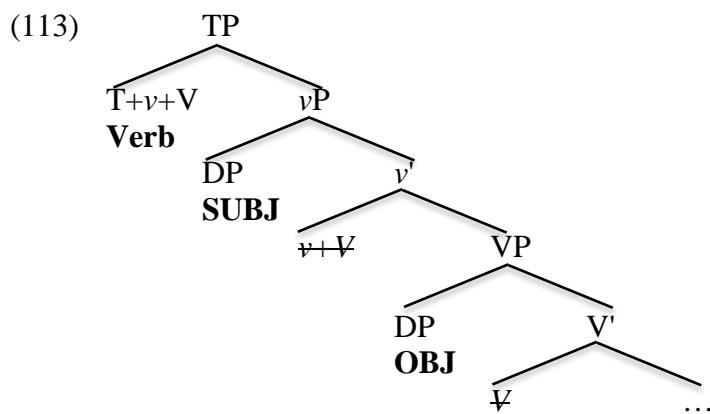
7. Verb-initial languages

This chapter has dealt with verb movement just in languages in which the basic word order is generally SVO. In this section we will see how the model can apply to verb-initial languages. There will be three important kinds of languages to consider. We will deal first with languages in which T and the subject must satisfy Probe-Goal Contiguity: these include languages in which ϕ is prosodically active on its left edge, and languages in which ϕ is prosodically active on its right edge. Finally, we will consider languages in which T does not Probe the subject at all.

7.1 Irish

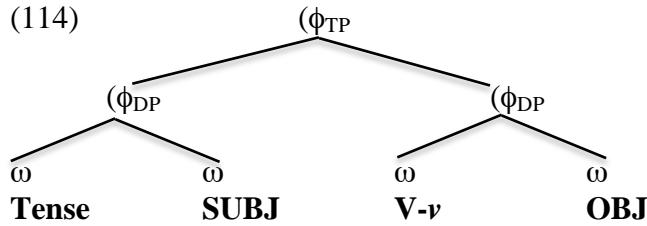
In section 2 of chapter 4, I outlined an approach to Irish word order, concentrating on the distribution of subjects, objects, and adverbs. We saw that because Irish prosody involves prosodically active left edges of ϕ , Irish Probes must be adjacent to Goals which they precede. Moreover, because Irish T is not a suffix, it does not require the subject to move into its specifier; the subject therefore follows T, and must be adjacent to it.

The discussion in chapter 3 made use of simplified trees like the one in (113):

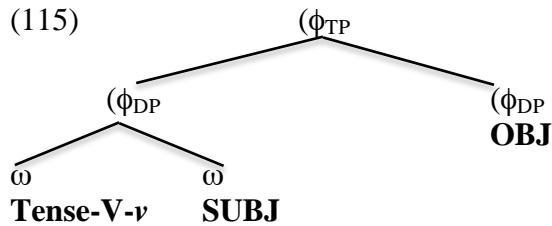


Even if we posit more complex functional structure for the clause, the argument from chapter 3 will not be affected; T and the subject will have to be string-adjacent. This may involve movement of the subject to the specifier of some functional projection below T; as we saw in section 1 of chapter 2, the Irish verb bears several suffixes, and some of these suffixes might trigger EPP effects which would be responsible for movement of the subject.

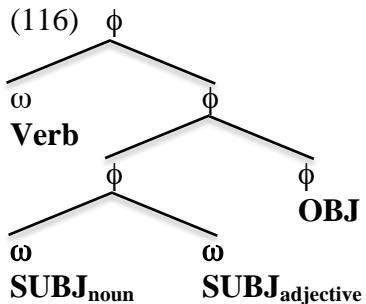
Let us now see why the verb must raise to T. Prior to movement of the verb to T, a tree like (113) would have the prosodic tree in (114), with T-DP Contiguity (and v -object Contiguity) created via Contiguity-adjunction:



In (114), Tense does not c-command the verb; Prosodic Lowering of T to the verb is therefore blocked, and the verb must head-move to Tense, yielding the prosodic tree in (115):



The prosodic structure in (115) is indeed one associated with Irish clauses, according to Elfner (2012), but just when the subject consists of a single word. When the subject consists of two words (e.g., a noun modified by an adjective), Elfner's diagnostics for prosodic structure reveal a structure like the one in (116):



Borrowing an idea from Elfner (2012), we can take the rejection of (116) in favor of (115) as the consequence of a preference for binary-branching prosodic structures. If the structure in (116) had the verb Contiguity-adjoined to the subject, the subject would be ternary-branching. The narrow syntax, on the account developed here, will always construct prosodic structures like the one in (115), and it will be the task of the phonology to convert some of these, postsyntactically, into structures like (116), as a way of avoiding ternary branching. I should emphasize that this is

not Elfner's theory; she takes the structure in (116) as the default prosodic structure of an Irish clause, and uses Selkirk's (2011) STRONG-START to motivate conversation of this structure into (115) (and then limits this conversation to examples with nonbranching subjects, via the preference for binary branching mentioned above). See sections 2.1 and 2.4 of chapter 3 for an overview of Elfner's (2012) theory.

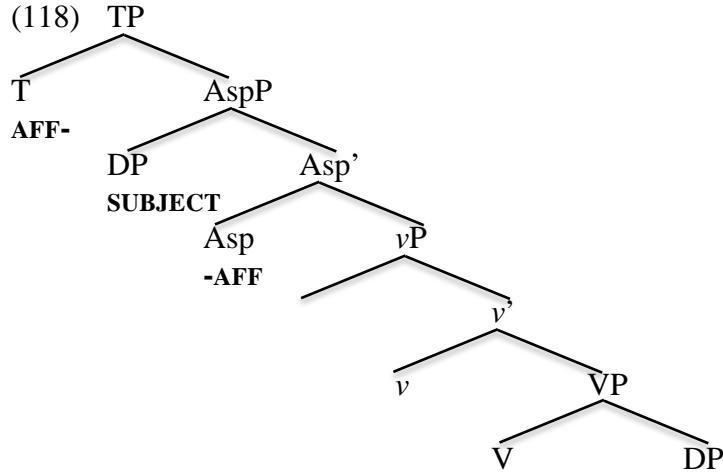
7.2 Malagasy

Let us next consider a verb-initial language in which right edges of ϕ are prosodically active. It was important in section 3 of the previous chapter that there are such languages; these are the verb-initial languages that allow wh-in-situ, counterexemplifying Greenberg's (1963) generalization about verb-initial languages and motivating Potsdam's (2009) corrected version of the generalization. The example of such a language that I offered in that section was Malagasy:

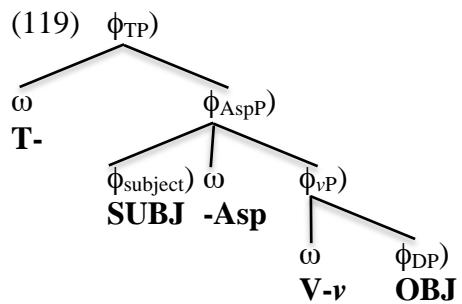
- (17) a. Manasa inona i Be? [Malagasy: Paul 2003]
- wash what Be
- 'What is Be washing?'
- b. Iza no manasa lamba?
- who NO wash clothes
- 'Who is washing clothes?'

Malagasy syntax is complicated in ways that I am not eager to discuss here (see Pearson and Paul 1996, Paul 1998, and references cited there, for discussion). Still, we should ask ourselves how a language with prosodically active right edges of ϕ can be verb-initial, in the system under development here.

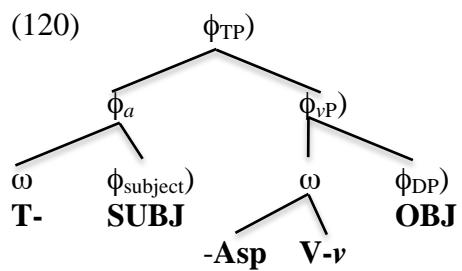
Suppose we imagine the following abstract tree:



Ignoring Contiguity relations for the moment, such a tree could have the prosodic representation in (119):



In (119), v and the object are Contiguous in ϕ_{vP} . T and the subject are not yet Contiguous; they are both dominated by ϕ_{TP} , but the subject is not adjacent to the prosodically active right edge of this ϕ , and is therefore not prominent. T and the subject must therefore Group, or Contiguity-adjoin, to become Contiguous (and Asp will Contiguity-adjoin to the verb, becoming Selectionally Contiguous with v):

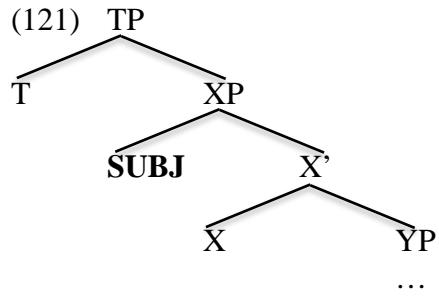


In (120), T is an affix which does not c-command the verb in the prosodic tree. The verb will therefore be motivated to move to T, yielding verb-initial word order, as desired. The theory is therefore capable of representing verb-initial languages with prosodically active right edges of ϕ .

7.3 Ergative verb-initial languages

Finally, we should consider the case of languages in which T does not Agree with the subject at all. Much work on ergativity assumes that T need not agree with the subject in such languages; in particular, a transitive subject receives ergative case, not through any relation with T, but by some other means (see Aldridge 2008, Coon and Adar 2013, Imanishi 2014, Deal to appear for discussion and references). Since there are verb-initial ergative languages, we must have a way of moving the verb past the subject even if T and the subject are in no relation at all.

As long as the subject is Contiguous with the head of which it is the specifier, we will be able to get the desired result. Consider the simplified tree for an ergative language below:



Here we are imagining a language in which T does not require Affix Support, and the subject therefore remains in the specifier of some lower head X. Selectional Contiguity between T and X is disrupted by the subject, and X will therefore head-move into T. As long as X and the subject are in a Contiguity relation, this will be sufficient to trigger movement of the verb to T. Once X is in T, X and the subject must become Contiguous again via Grouping or Contiguity-adjunction, and either will disrupt the c-command relation between X and the contents of YP in the prosodic tree, blocking Prosodic Lowering of X to the verb. The theory is therefore

consistent with the existence of verb-initial languages in which T does not Agree with the subject. In fact, the derivation given above does not depend on the presence of a T node at all; any non-Support-requiring affix higher than a head which is Contiguous with the subject ought to lead the verb to move past the subject.

8. Conclusion

In this chapter we have begun to apply Contiguity Theory to head-movement; we will continue to investigate head-movement in the next chapter. Thus far, head-movement seems to be driven and constrained, for the most part, by the same principles which govern the movement of phrases; we have seen instances of head-movement driven by the need for Affix Support, and also of head-movement driven by Selectional Contiguity.

A difference between head-movement and phrasal movement is that head-movement is responsible for ultimately creating a phonological representation in which affixes are attached to hosts. Once the ordinary syntactic movements are exhausted, if an affix is not yet attached to a host, it appears on the closest host that it c-commands in the prosodic tree (Prosodic Lowering).

We have seen several cases (for example, in French and Irish) of trees in which an affix does not c-command a host in the prosodic tree; such affixes typically trigger head-movement to themselves. The nature and timing of this type of head-movement will be one major topic of the next chapter.

Thus far, we seem to be able to maintain the goal of the general approach. The conditions that drive movement operations are still universal, without regard to specific constructions or languages, and parametric variation is confined to properties which are independently observable (how stress is assigned in the verb, the general organizing principles of prosody, how negation interacts with negative quantifiers, and so forth). We still have not

needed to posit any parameters that simply force one type of movement or another to take place in a particular language; there is no analog of the 'strong' feature or the 'EPP' feature. In the next chapter, we will continue to explore the range of types of head-movement.

Chapter 7

Further topics in head-movement: V2, vP, and Infinitives

In the last chapter, I offered a general description of head-movement which makes lowering the default method of providing potentially stranded affixes with their hosts; in particular, I claimed that an affix will lower (via Prosodic Lowering) to a potential host which it c-commands in the prosodic tree. We have also seen examples in which such lowering is blocked. In section 4 of the last chapter, for instance, we saw that French T triggers movement of the verb to itself; I suggested that this is because T is in a kind of Contiguity relation with the subject which breaks its c-command relation with the verb in the prosodic tree, preventing lowering and forcing the verb to raise.

The discussion in the last chapter centered on tensed statements in a variety of languages; head-movement, when it occurred, typically ended in T. In this chapter, we will consider head-movement to C and to *v*, and also develop an approach to infinitival clauses.

1. Movement to C

This section will concentrate on two types of head-movement to C; wh-questions in languages like English, and V2 phenomena. Both will involve, in this account, instances of C that are affixes that require Support.

1.1 English wh-questions

Let us consider how the theory developed here can account for the distribution of *do*-support in questions:

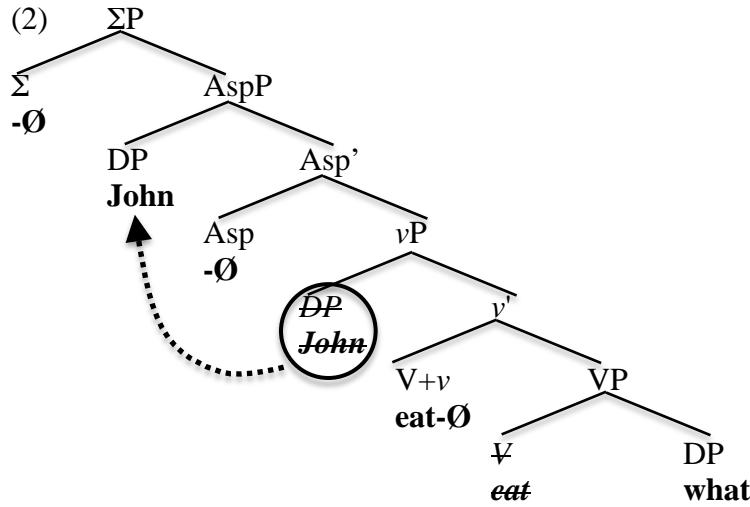
- (1) a. What **did** John eat?
- b. Who (***did**) ate chocolate?
- c. I don't know what (***did**) John ate.

We want the theory to predict *do*-support just in matrix non-subject questions.

It will be important to assume in what follows that wh-movement invariably lands at the edge of ΣP on its way up the tree. We will see instances of wh-phrases in this position behaving like all the other specifiers we have seen; in particular, they will block Selectional Contiguity relations between heads above and below them. The theory will be consistent with the idea that wh-phrases land at the edge of vP as well, as is much more commonly assumed, but such movement will have to fail to interact with Contiguity at all, if indeed it happens.

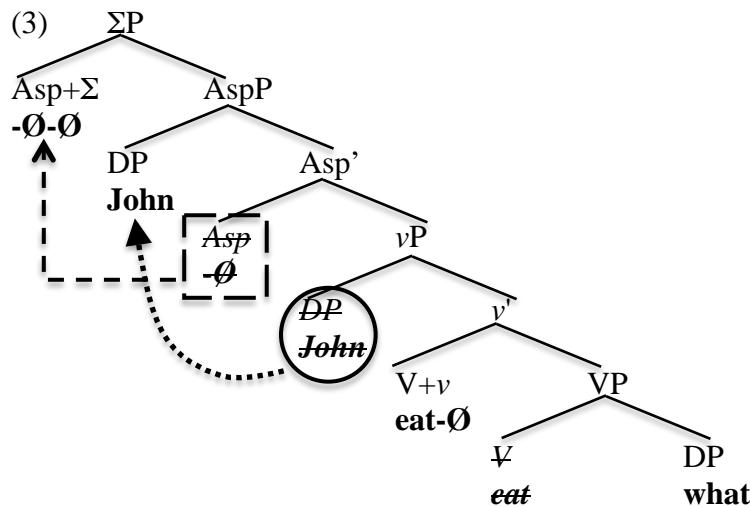
I will not speculate on the force that drives wh-movement to the specifier of ΣP . Pretheoretically, it seems not completely implausible that a projection associated with material that either affirms or denies the truth of the proposition being expressed by the clause could be a landing site for operators, like wh-phrases, which force the creation of a set of propositions and ask the hearer to affirm the truth of a subset of them. On an approach to Phase Impenetrability in which phases are spelled out when the next phase head is introduced (Chomsky 2001), the specifier of ΣP is just as useful a place to land as the edge of vP , for purposes of escaping the vP phase; the only important thing is that the wh-phrase escape Spell-out of vP before C is Merged. I leave for future work the question of whether this idea can be made compatible with the available evidence on the landing sites of successive-cyclic movement.

Let us consider a derivation for (1a). We can begin with the introduction of Σ , which is the point at which the derivation will begin to diverge from that of a corresponding statement:



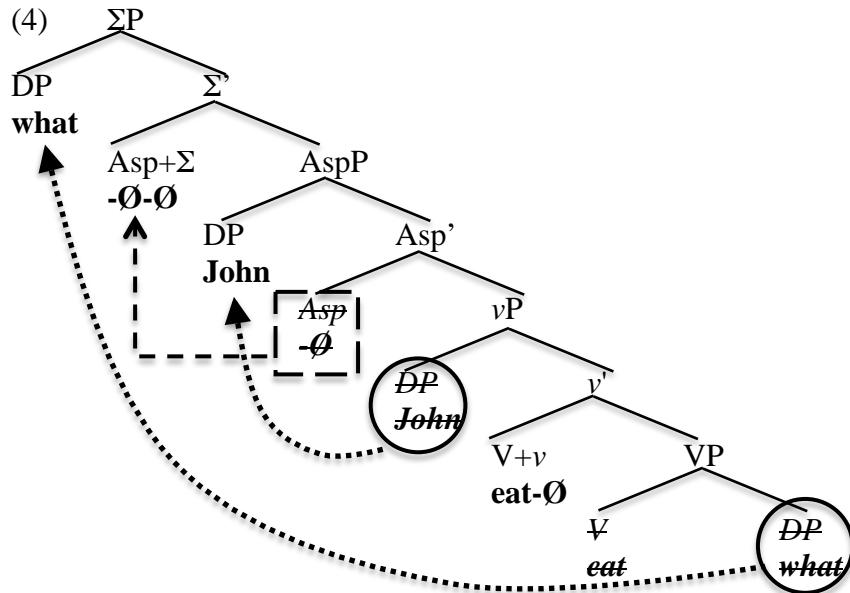
The derivation of (2) has proceeded along familiar lines, with *John* raising to the specifier of Asp to satisfy Affix Support (thereby also creating Selectional Contiguity between Asp and *v*), and the verb raising to *v*, for reasons we will finally get to in section 2 of this chapter. *John* still blocks Selectional Contiguity between Σ and Asp.

Σ seeks Support, which it would ordinarily get from *John*. Since this is a wh-question, however, it will be the wh-phrase that moves to the specifier of Σ . Multitasking therefore compels Σ to seek Support first from the head Asp, which is the closer of the two elements with which it needs to enter a Contiguity relation:

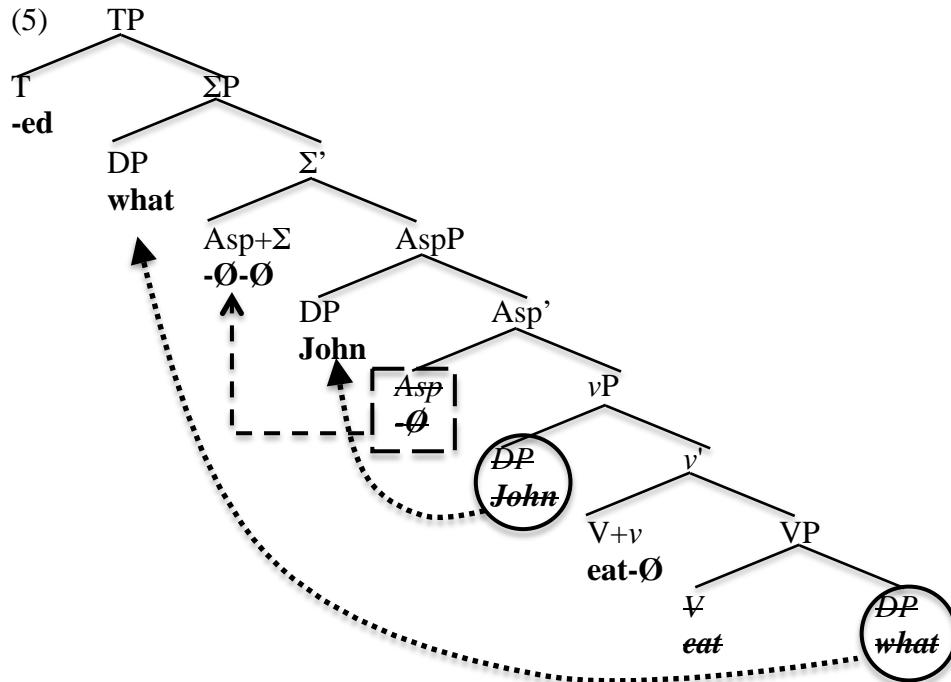


Head-movement, as always in English, creates Selectional Contiguity but not Support, and Σ

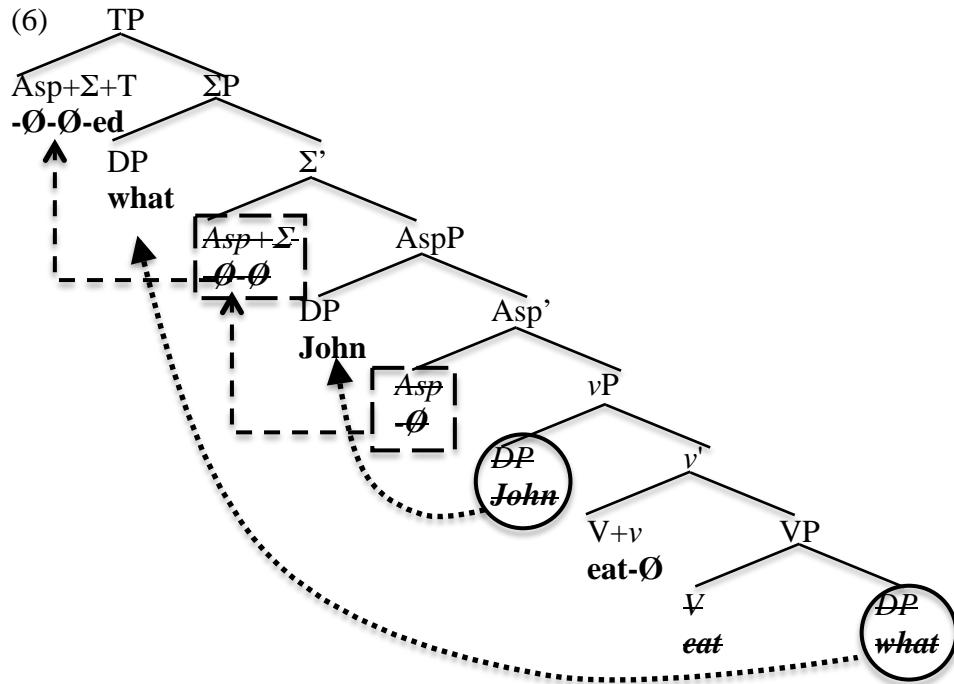
then triggers wh-movement into its specifier:



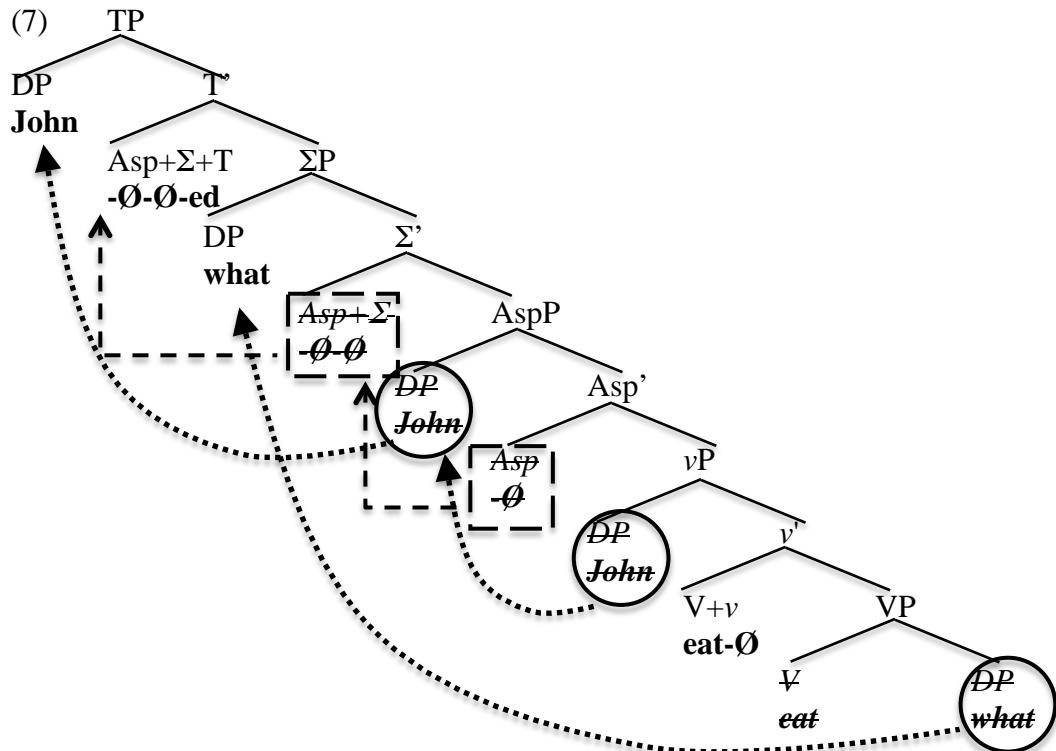
The derivation proceeds with Merge of T:



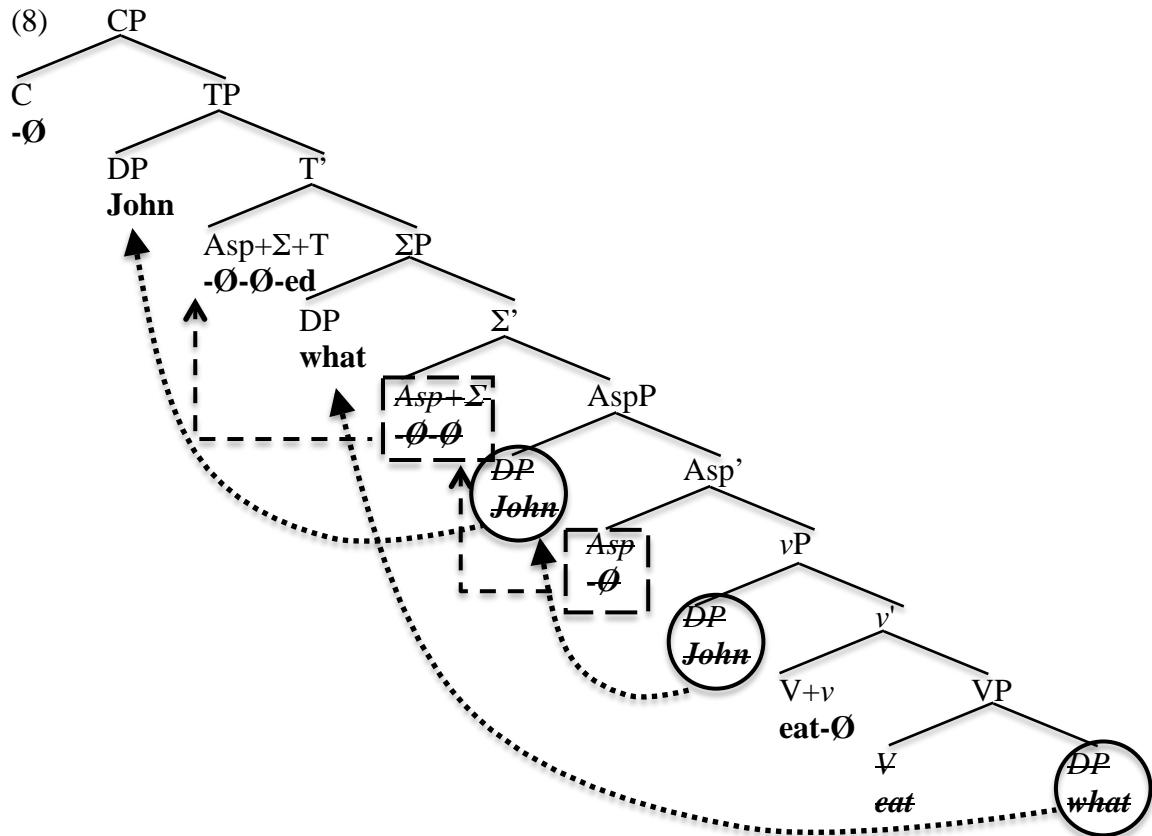
T, like Σ , needs Affix Support, Selectional Contiguity, and Probe-Goal Contiguity, in this case with the subject *John*. Since Σ is the closest element that could in principle satisfy both Contiguity and Support, head-movement will take place first:



Head-movement satisfies Selectional Contiguity, but not Affix Support, and *John* moves next:

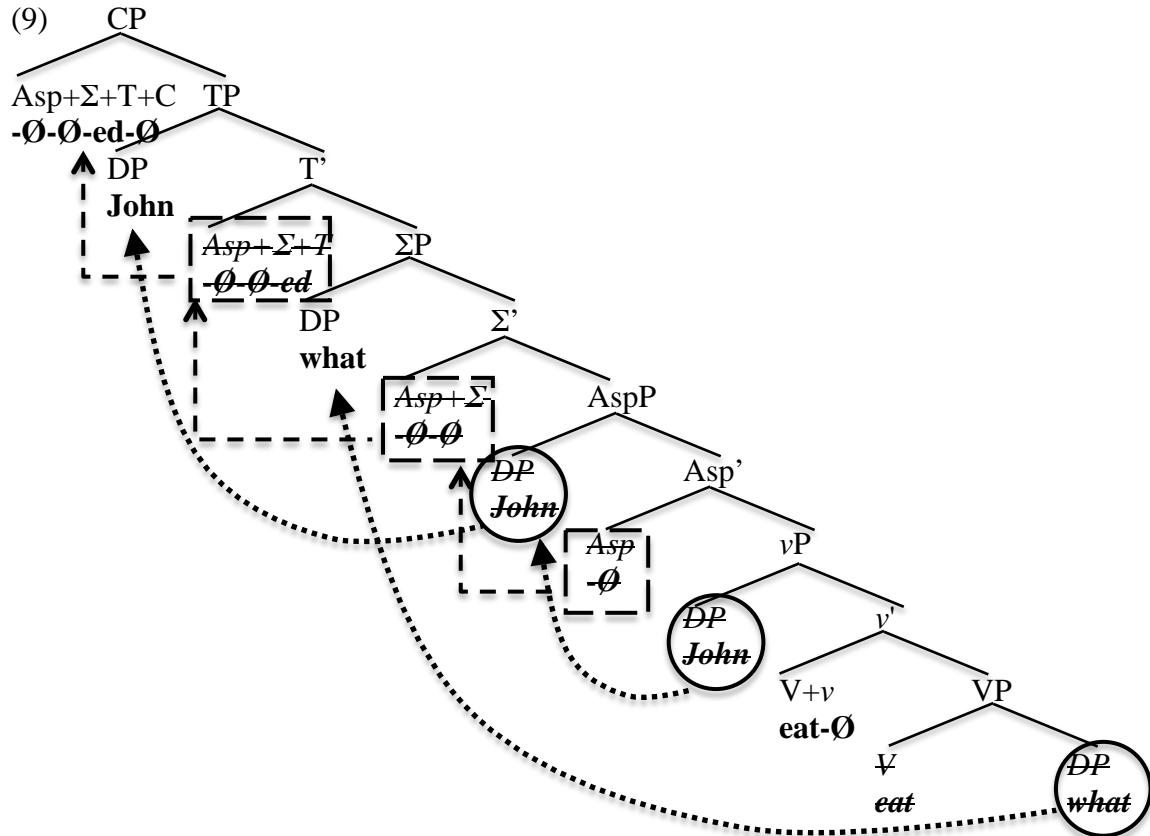


Movement of *John* satisfies T's needs for Support and for Probe-Goal Contiguity. The next head to Merge is interrogative affixal C:

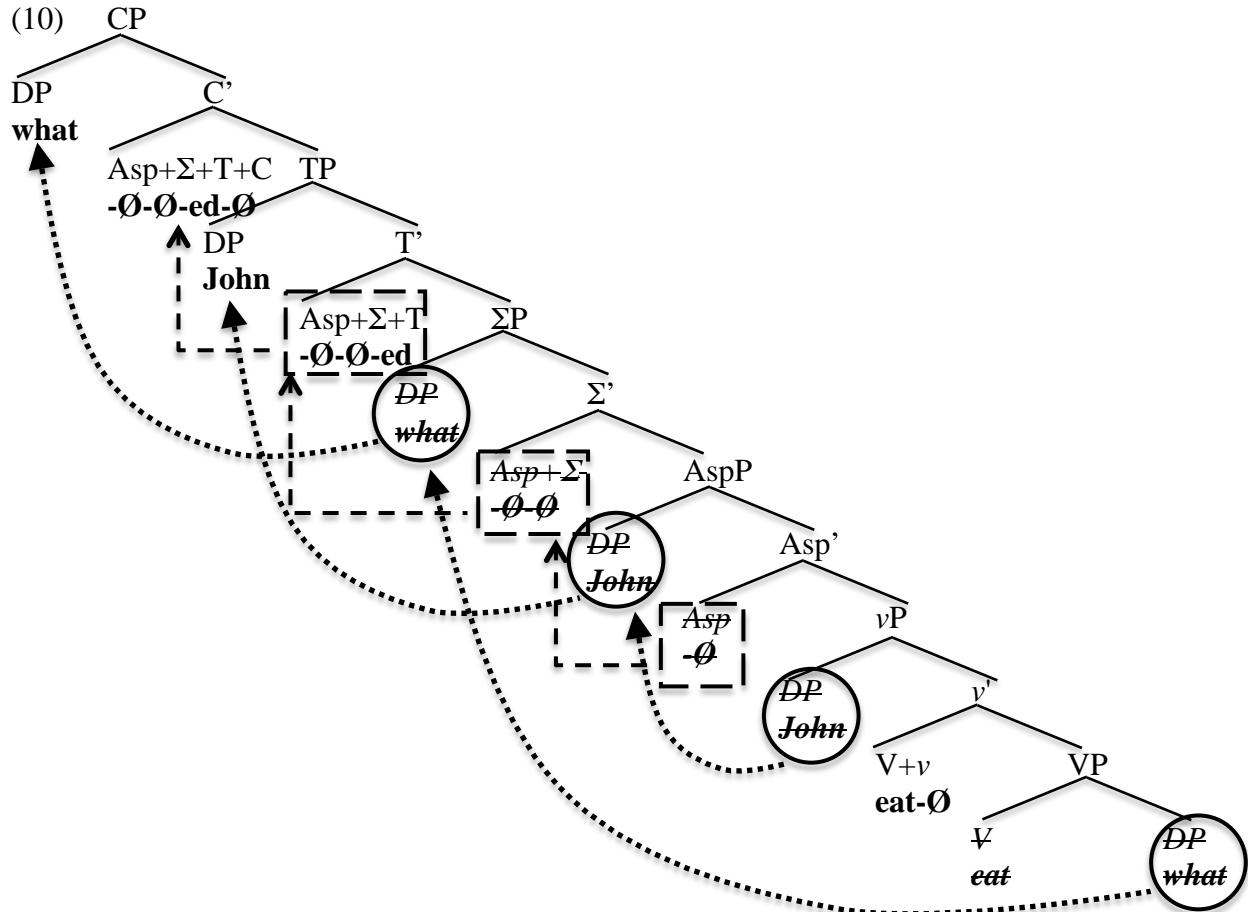


C is another head which seeks Affix Support, Probe-Goal Contiguity, and Selectional Contiguity.

Head-movement of T is the shortest relevant movement available:



Finally, wh-movement supplies Probe-Goal Contiguity, as well as Affix Support:

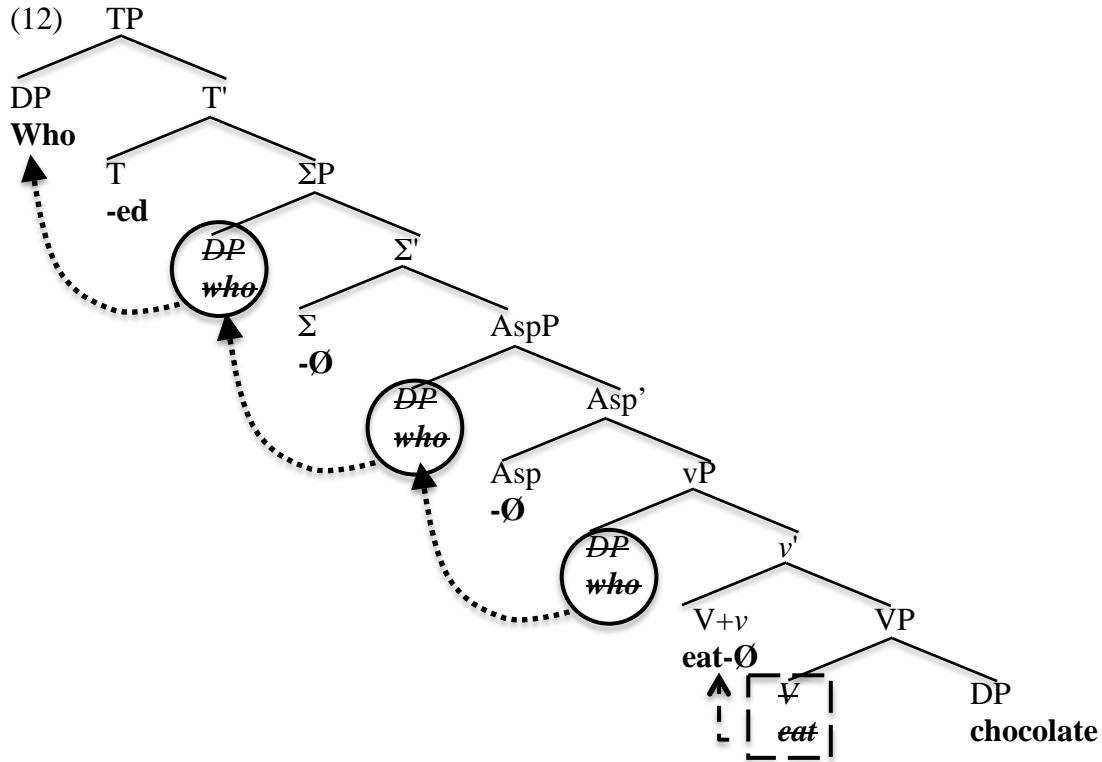


In the prosodic tree for (10), the ω dominating the affixes in C will Contiguity-adjoin to the subject; this is the only way to make T and the subject Contiguous, and will not disrupt Contiguity between C and the wh-phrase (since the wh-phrase will be adjacent to the prosodically active left edge of ϕ_{CP} , and thus Contiguity-prominent in that domain). Contiguity-adjunction will prevent the affixes in C from c-commanding the verb in the prosodic tree, and *do*-support will therefore take place, yielding the desired string *What did John eat?*

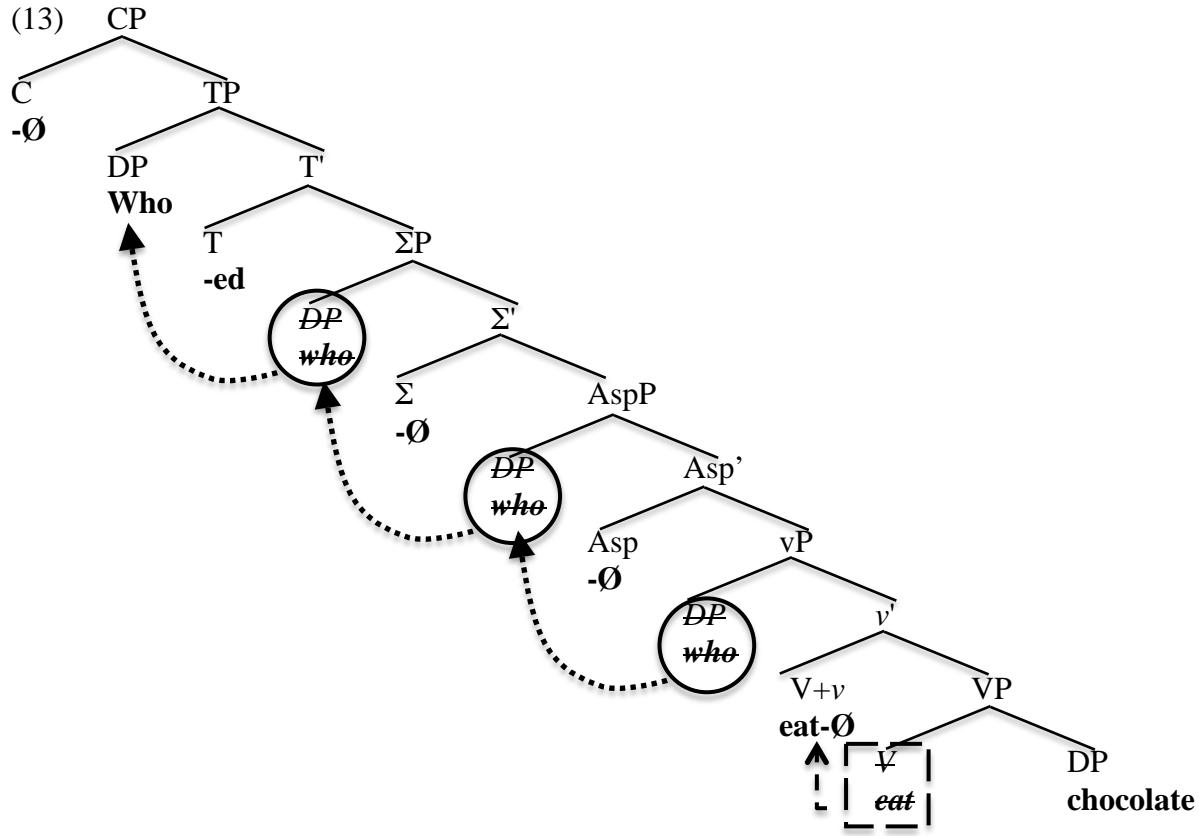
In this derivation, movement of affixes into C is the consequence of a series of Selectional Contiguity failures; the subject and the wh-phrase occupy various specifier positions that prevent Selectional Contiguity across them, forcing head-movement. Using Selectional Contiguity in this way will help us explain why *do*-support does not appear in subject wh-questions:

(11) Who ate chocolate?

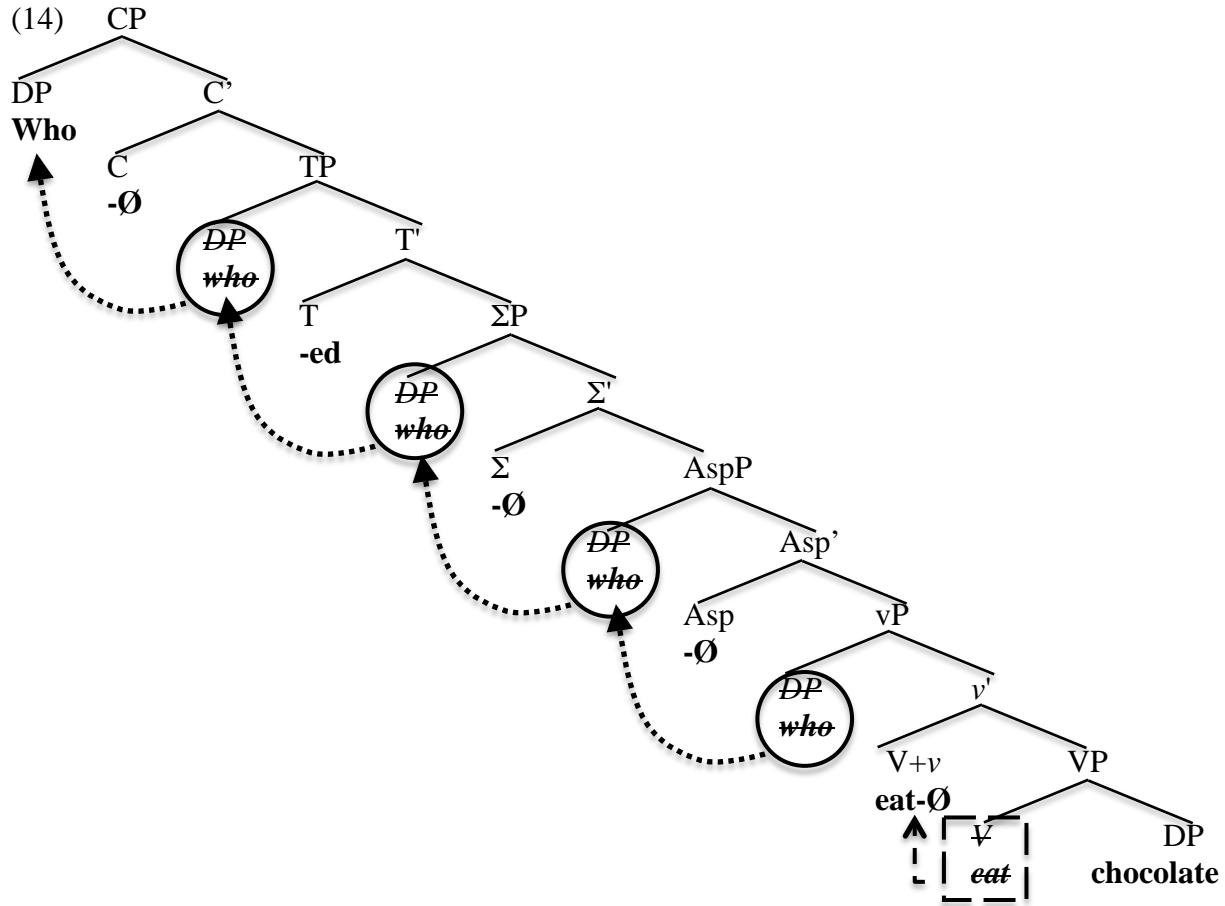
We can begin the derivation with a complete TP:



In the preceding derivation, the wh-phrase and the subject were distinct DPs, which occupied the specifiers of the heads of the spine in ways which blocked Selectional Contiguity across them, triggering head-movement. In (12), the wh-phrase and the subject are one and the same, moving successive-cyclically up through the various specifiers without triggering head-movement. The derivation so far, in other words, is that of an ordinary declarative. Next we can Merge affixal C:



C, as before, seeks Selectional Contiguity, Probe-Goal Contiguity, and Affix Support. The closest possible participant in one of these relations is *who*:

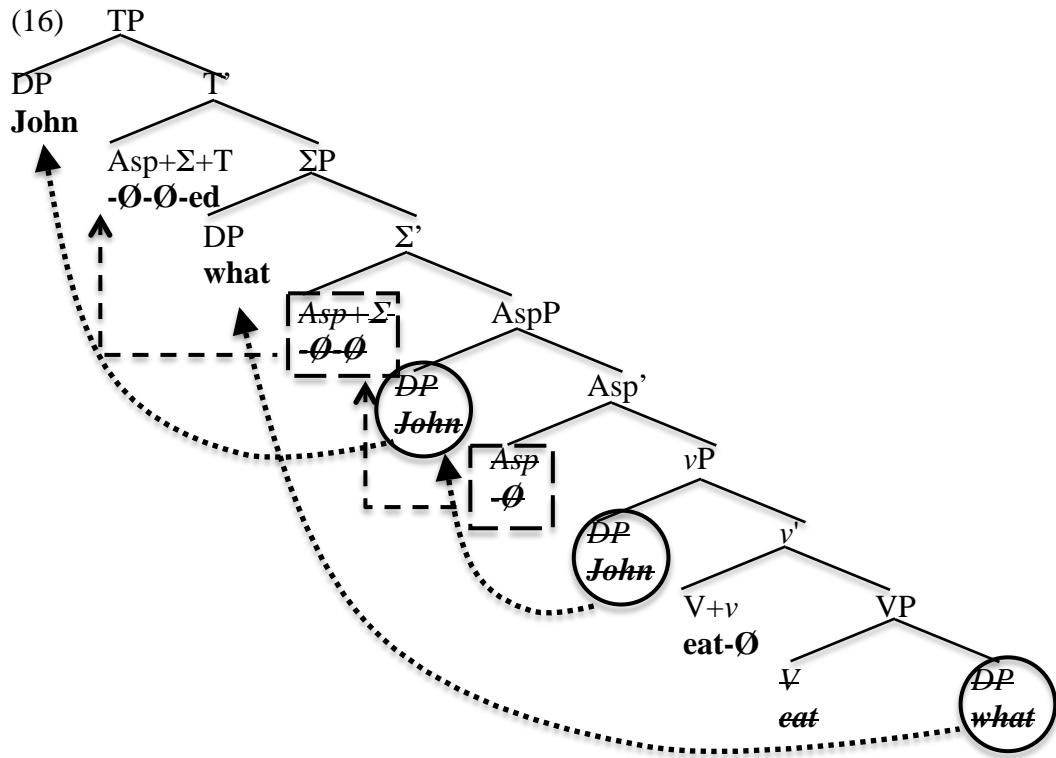


Movement of *who* satisfies Probe-Goal Contiguity and Affix Support, and makes Selectional Contiguity possible by making C and T adjacent. The derivation can therefore stop here. T and the subject are Contiguous without any need for manipulation of the prosody: they are both dominated by ϕ_{CP} , and *who* is Contiguity-prominent within that domain, since it is adjacent to the prosodically active left edge of ϕ . The affixes can therefore Prosodically Lower to the verb, yielding the string *Who ate chocolate?*

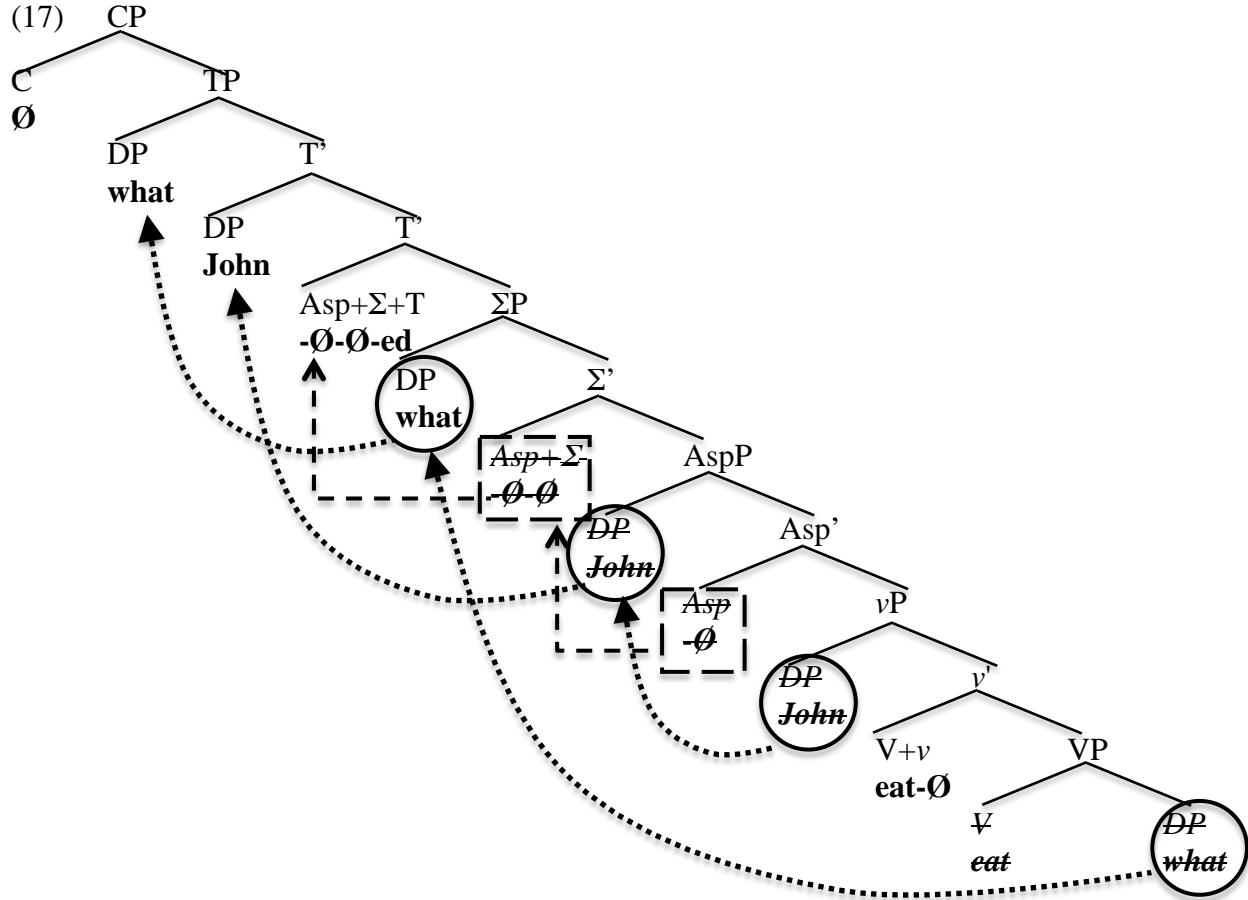
Finally, we can turn to embedded questions. Embedded interrogative C, in the variety of English in which I am writing this book, is not an affix. Let us assume that this is the only difference between matrix and embedded interrogatives in English, and consider a derivation for the embedded clause of an example like (15):

- (15) I don't know [what John ate].

We can start with the TP derived above for the corresponding matrix question:



Non-affixal C is then Merged. Since this C is not an affix, wh-movement will be driven, not by Affix Support together with Probe-Goal Contiguity, but just by Contiguity alone. Wh-movement should therefore land, not in the specifier of CP, but in a specifier of TP which is adjacent to C (see section 4.1 of chapter 4 for discussion):



Since C is not an affix, it will not trigger head-movement to itself. T and the subject can be made Contiguous by Grouping, creating a \emptyset corresponding to the T' immediately dominating the subject, within which the subject will be Contiguity-prominent. The affixes in T are therefore free to Prosodically Lower to the verb, yielding the desired string ...*what John ate*⁷².

In (17), C and T never satisfy Selectional Contiguity. There is in fact no way for them to satisfy it; C is not an affix, so cannot be a landing site for head-movement of T, and T and C cannot be reordered via Untethering in English, perhaps because of the way English sentential stress is assigned (see section 5 of chapter 5 for discussion). The situation is rescued by Spell-out: because C is a phase head, Spell-out eventually separates it from TP, and Contiguity

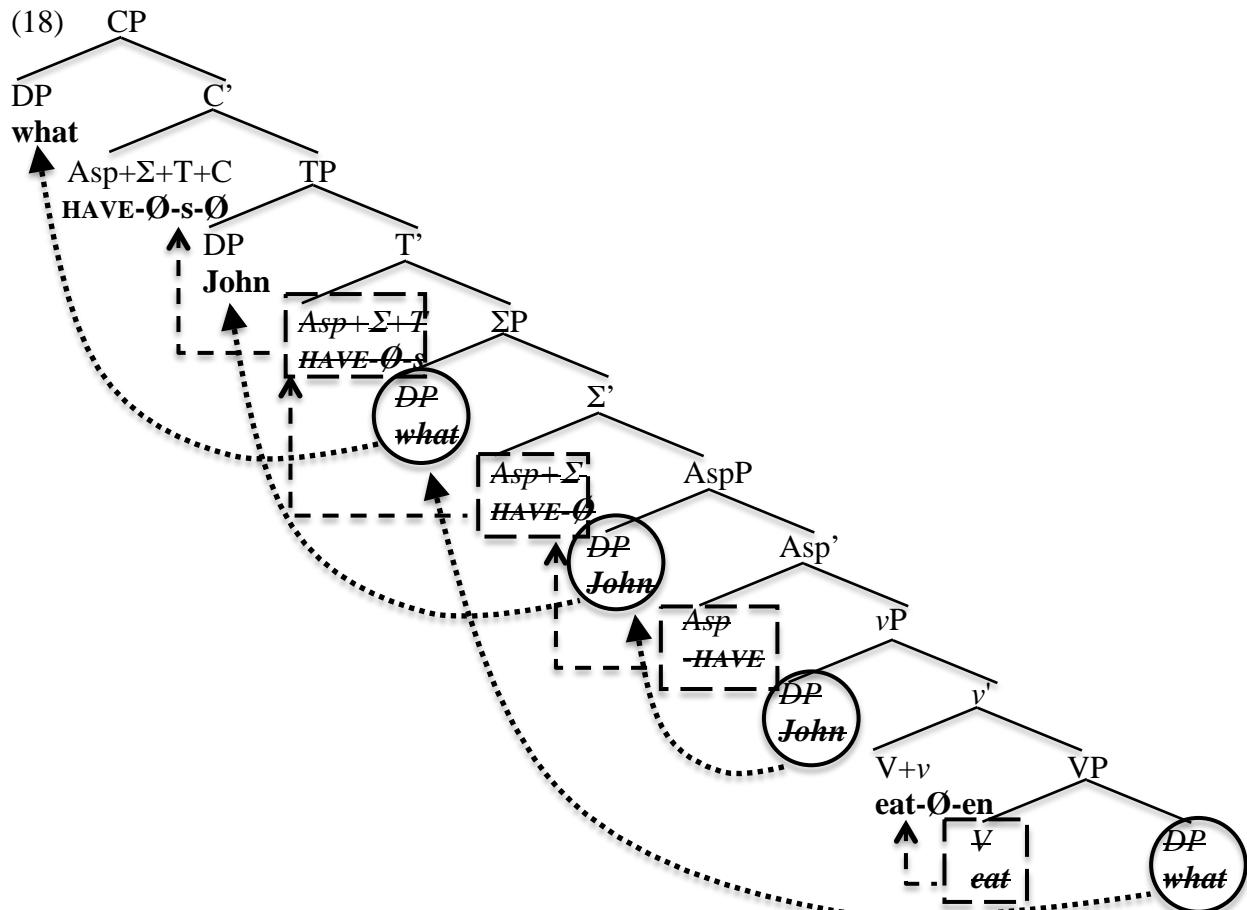
⁷² Note that this approach predicts that embedded questions involving "vacuously moved" subjects do not involve wh-movement at all; the subject is already sufficiently close to C for Probe-Goal Contiguity:

(i) I don't know [who ate the chocolate]

For some arguments that this is a desirable result, see Chung and McCloskey (1983).

relations are only actually evaluated within a phase, although (as we have seen) the grammar seeks to build Contiguity in all cases of Selection and Agree.

I have concentrated here entirely on clauses without auxiliaries, and we have seen that the distribution of *do*-support follows from the theory. Examples with auxiliaries will be syntactically identical, differing only in that Asp, instead of being phonologically null, will be occupied by an auxiliary:

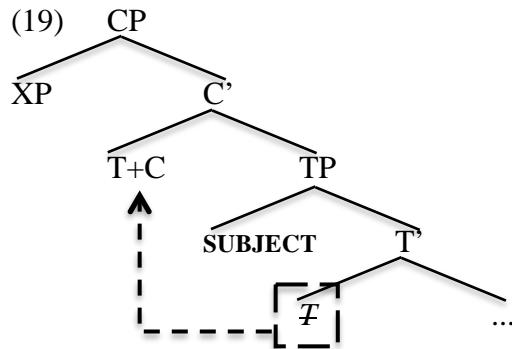


The tree in (18) yields the string *What has John eaten?*.

1.2 V2

Let us now consider how V2 could be modeled in this framework. The starting point of the account will be that V2 clauses, like English matrix interrogatives, have a C which is an affix in need of Support. C in such clauses will therefore always move a phrase into its specifier.

In V2 clauses in which a non-subject occupies the specifier of CP, it will always be the case, in the languages under consideration here, that at least the specifier of TP intervenes between C and T, and T will therefore head-move to C to create Selectional Contiguity between them:



In the prosodic tree corresponding to (19), T and the subject will have to become Contiguous via either Grouping or Contiguity-adjunction; since the subject is not at either edge of ϕ_{CP} , it cannot possibly be Contiguity-prominent within CP without manipulation of the prosodic structure, regardless of which edge of ϕ is active in the language in question. Either Grouping or Contiguity-adjunction of T to the subject will block Prosodic Lowering of T, and the nearest possible host will be forced to head-move to T. V2 clauses in which the subject is not initial will therefore always have the verb or an auxiliary in C, as desired.

For V2 clauses in which the subject is initial, the predictions are more complicated⁷³. In such clauses, T will only be motivated by Selectional Contiguity to move to C in languages in which T is final (e.g., German). In languages with prosodically active right edges of ϕ (languages like Icelandic, by hypothesis), T will be motivated to Contiguity-join to the subject

⁷³ Proposals like those of Travis (1984) and Zwart (1997), which posit a different representation for subject-initial V2 than for non-subject-initial V2, are clearly of interest here; I hope to revisit in future research the question of whether Travis' and Zwart's observations can be captured in Contiguity-theoretic terms.

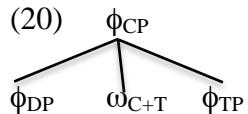
(presumably as part of a complex ω that also contains C) even after the subject has raised to the specifier of CP, again blocking lowering of T to the verb and triggering verb raising.

But there are also V2 languages in which, as the theory stands, we do not predict raising of the verb into C when the subject is initial. In the Mainland Scandinavian languages, for example, movement of the subject into the specifier of CP will leave the subject still Contiguous with T, since these are languages with prosodically active left edges of ϕ . There is therefore no reason for T and C not to Prosodically Lower to the verb. At this point, the theory does not distinguish between a V2 clause in a Mainland Scandinavian language and an English matrix interrogative. We will need to introduce a new parameter to distinguish these cases.

The parameter I will propose is inspired by the work of Tokizaki (2011), Tokizaki and Fukuda (2011), and Tokizaki and Kuwana (2013). Tokizaki, Fukuda, and Kuwana have discovered a statistically significant correlation between the placement of stress in words in a given language and the ordering of various kinds of heads with complements in that language. They take their stress placement data from the StressTyp database (<http://st2.ulter.net>), and their data on head-complement ordering from the WALS database (<http://wals.info>). In these data sets, for example, languages with stress on the first or second syllables of words are significantly more likely to have postpositions than languages with stress whose position is defined by the right edge of the word (e.g., final stress or penultimate stress) ($p < .01$). Tokizaki, Fukuda, and Kuwana propose that languages seek a kind of isomorphism of word-level stress and phrasal stress. Given that, within a PP, stress will typically fall on the DP complement of P rather than on P itself, there is apparently some pressure for languages with initial stress in words to have postpositions—so that they will also have initial phrasal stress in PP. Similarly, final stress is associated with prepositions, which have final-stressed PP. The correlation is clearly not

universal--there are initial-stress languages, like Irish, which have prepositions—but it apparently is statistically significant.

Suppose we approach the V2 phenomenon with this correlation in mind; is there anything about the behavior of word-level stress that correlates with V2? Consider (20), part of the prosodic representation of a clause in which T has moved to C:



If CP's specifier (here, ϕ_{DP}) and head both contain pronounced material, then the specifier ought to typically have more phrasal stress than the head. In other words, if C in (20) does not undergo Prosodic Lowering, then CP will begin with the phrasal-stress equivalent of a trochee, consisting of the stressed ϕ_{DP} and the unstressed ω_{C+T} . The research program sketched in the last paragraph then leads us to ask: is there any correlation between V2 and trochaic word-level stress?

For verbs in the Germanic family, at least, it looks as though there is such a correlation. The Mainland Scandinavian languages, for example, have penultimate stress as a default⁷⁴—that is, words typically end in a trochaic foot (see Rice 2006 on Norwegian, Bruce 1999 on Swedish, and Basbøll 2005 on Danish). The same is true for German (Féry 1998), Yiddish (Jacobs 2005), Afrikaans (Donaldson 1993), and Dutch (van Oostendorp 2012). Stress in Icelandic and Faroese is generally initial—that is, words begin with a trochaic foot (Árnason 2008, 2011). In none of these languages is stress entirely predictable; there is a great deal of apparent lexical idiosyncrasy, some of it possibly involving quantity-sensitivity. Still, the generalizations above hold as the default case. For all of these languages, a bisyllabic verb is typically parsed as a single trochaic foot, with initial stress.

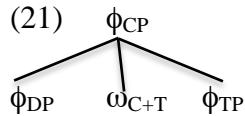
⁷⁴ Many thanks to Ingvar Löfstedt for helpful discussion of the Swedish facts.

In English, by contrast, the majority of bisyllabic verbs (and, for that matter, monomorphemic adjectives) have final stress (e.g., *obéy*, *molést*) (Chomsky and Halle 1968, Hayes 1982, Burzio 1994, Hammond 1999, Albright 2008, Smith 2011, Fullwood 2013)⁷⁵. In fact, the generalization for English appears to be that bisyllabic verbs typically have final stress unless the vowel of the final syllable is short and the coda consists of a single consonant, in which penultimate stress is possible (*édit*, *gállóp*), though not obligatory (*omít*, *attáck*). Experimental work has shown that English speakers expect novel words with final stress to be verbs (Davis and Kelly 1997, Guion et al 2003).

The comparatively straightforward trochaic pattern seen elsewhere in Germanic is well-attested in English nouns, and we find many pairs of verbs and nouns differing only in position of stress, with penultimate stress for nouns and final stress for verbs (e.g., *récord* (n.) vs. *recórd* (v.), *cómpress* (n.) vs. *compréss* (v.)). Various proposals have been offered to distinguish nouns from verbs in English. Hammond (1999), for example, proposes that English verbs end in an invisible catalectic syllable. Hayes (1982) proposes that English trochaic feet can be ‘degenerate’, consisting of a single stressed syllable; he distinguishes between verbs and nouns by allowing the final syllable of nouns, but not the final syllable of verbs, to be extrametrical and hence ignored by stress assignment. What these accounts have in common is the idea that while English stress may be as trochaic as Germanic stress generally is, English trochees in verbs may be (and frequently are) pronounced with only a single stressed syllable, with no following (pronounced) unstressed syllable.

With all this in mind, we can return to (20) above, repeated as (21):

⁷⁵ Many thanks, for much helpful discussion, to Donca Steriade, who should not be held responsible for anything I say above.



(21) is the representation of a CP in which T has moved to C. Assuming that the verb has not moved to C in the syntax, should T undergo Prosodic Lowering to the verb? If Tokizaki, Kuwana, and Fukuda are right, we might expect the answer to this question to be related to the behavior of word-level stress in the language in question. In most of the Germanic languages, which make heavy use of trochees in their verbs, Prosodic Lowering of T will ruin the chance to create a trochaic foot at the beginning of CP, consisting of a pronounced ϕ followed by a pronounced ω . In a language like English, in which verbs typically either are not trochaic at all or are trochaic in a way that is consistent with the second syllable of the trochee being unpronounced, there should be no such pressure to avoid Prosodic Lowering of T. For the Germanic family, at least, the distribution of V2 seems to be accurately describable as follows:

(22) Stress Isomorphy

If the verbs of a language exhibit non-degenerate trochaic feet, Prosodic Lowering from C is blocked.

Again, the idea, following Tokizaki and his colleagues, is that (22) represents an attempt to make phrasal stress pattern with word-level stress, creating a phrasal trochee in CP in languages that make use of word-level trochees in their verbs.

Several aspects of (22) invite comment. Why does (22) make specific reference to verbs? And is C the only head to which (22) should apply?

The specific reference to verbs is empirically necessary; recall that English nouns are as comfortably trochaic as their counterparts in the rest of the Germanic languages. Given that we are considering Prosodic Lowering from a head in the clausal spine, we can think of the principle

as applying to the verb's extended projection; we might hope to find a similar principle operating in the nominal domain.

Similarly, the reference to C is necessary; the Germanic languages cannot simply be blocked from undergoing Prosodic Lowering. Danish T, for example, regularly undergoes Prosodic Lowering to the verb in non-V2 clauses (see section 3 of the previous chapter for discussion). Whether the generalization should be specific to C or about phase heads more generally is a question I will leave for future research. Perhaps it is relevant that C is the last affix which will be attached to the verb, and is the head that is added just before the clause undergoes Spell-out; we might think that this is the point in the derivation at which the grammar may consider the details both of phrase-level and of word-level stress at the same time, as the structure is transferred from syntax to PF.

In the account offered here, V2 is a matter of two intersecting requirements; the newly introduced Stress Isomorphy, and an affixal C that requires Affix Support. The prediction is crucially not that every language with trochaic stress in its verbs will have V2; the properties of C are also relevant. Irish and Icelandic, for example, both have initial stress in most words, but only Icelandic, on the account given here, has affixal C, and hence V2⁷⁶.

2. Movement to *v*

Finally, let us turn to head-movement to *v*. Blight (1997, 2004) offers evidence that transitive and intransitive verbs raise to different heights in English; we will see that his facts follow from the account developed here.

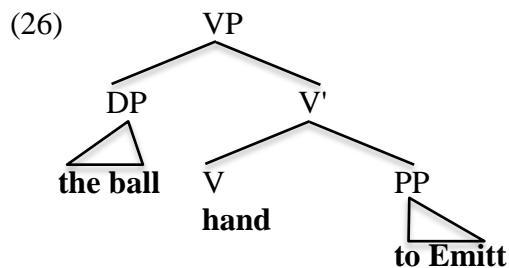
⁷⁶ I will have to leave for later work the testing of Stress Isomorphy in languages outside the Germanic family. Just to briefly consider the V2 languages discussed in section 4.2.1 of chapter 4: Ingush (Nichols 2011) and Kashmiri (Morén 2000), like Icelandic, have generally initial stress. Dinka verbs are, as far as I can tell, uniformly monosyllabic. Karitiana stress is generally final (Storto 1999), and V2 in Karitiana therefore cannot be driven by Stress Isomorphy. As I noted at the beginning of this section, there are kinds of languages in which V2 could arise without Stress Isomorphy playing any role; I leave for future work the question of whether Karitiana could be such a language.

Blight's (1997, 2004) arguments for short verb movement are based on his observations about the distribution of adverbs like *poorly* and *beautifully*:

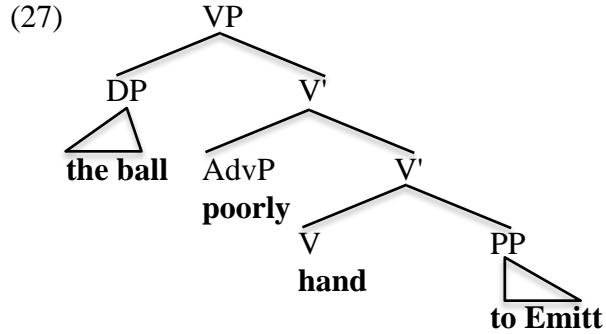
- (23) a. Mary (*beautifully) played the flute (beautifully)
 - b. Troy (*poorly) handed the ball to Emitt (poorly)
- (24) a. Mary has (*beautifully) played the flute (beautifully)
 - b. Troy has (*poorly) handed the ball (poorly) to Emitt (poorly)
- (25) a. The flute was being (beautifully) played (beautifully)
 - b. The ball was being (poorly) handed (poorly) to Emitt (poorly)

Adverbs in this class must follow active verbs (as in (23-24)), but may precede passive verbs (as in (25)). Blight (1997, 2004) and Caponigro and Schütze (2003) conclude from this distribution that active verbs raise higher than passive ones. Blight uses progressive examples, as in (25), to eliminate the possibility that the examples are adjectival passives.

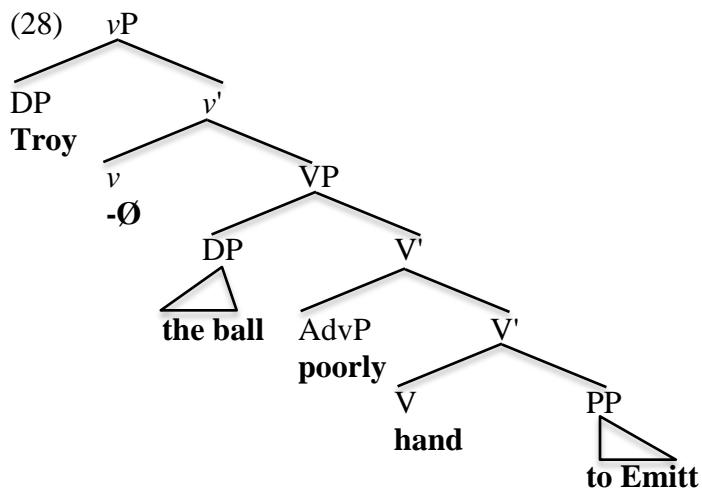
The data in (23-25) follow from Selectional Contiguity. A derivation for an example like (23b) might begin as follows:



At this point, we could adjoin an adverb to VP (I will Merge the adverb in a specifier below the existing one, though nothing will go wrong if we Merge the adverb to the highest specifier instead):



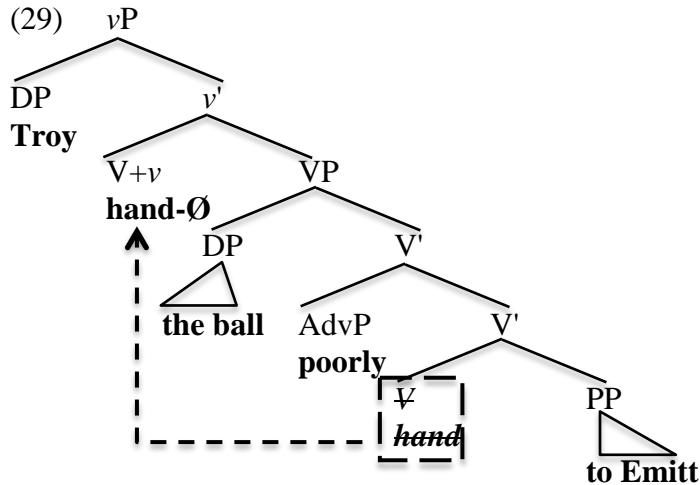
Next we Merge v , along with its specifier:



The newly Merged head v is an affix, but has its need for Affix Support satisfied by a thematic specifier. It Agrees with the object, and must therefore become Contiguous with it, as well as with V. Contiguity with the object can be created immediately through Contiguity-adjunction, since v and the object are string-adjacent. Next let us turn our attention to the Selectional Contiguity relation between v and V.

The first question to ask is whether this Contiguity relation can be created via Untethering. In this case, it cannot be; since the object is already in a Contiguity relation, Hippocratic Altruism prevents it from Untethering, and the lower adverb need not Untether either (in any event, Untethering the adverb alone would not create the desired Contiguity relation).

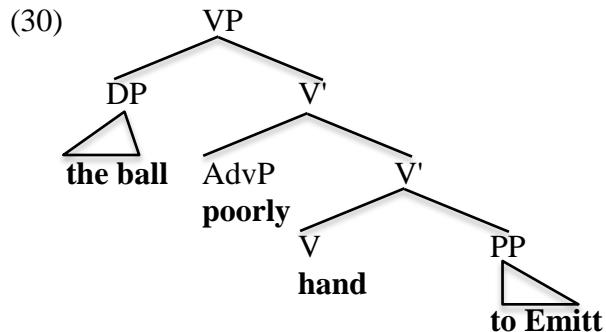
The only way to create Contiguity between V and *v*, therefore, is for the verb to raise to *v*:



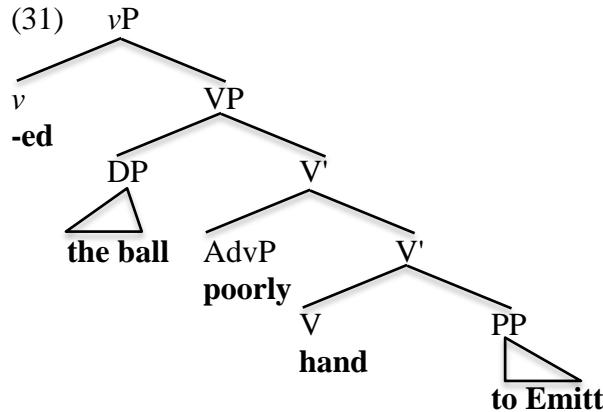
The rest of the derivation will proceed along familiar lines, moving the subject further but leaving the rest of the tree in (29) untouched, ultimately yielding the word order in (30):

- (30) Troy handed the ball poorly to Emitt.

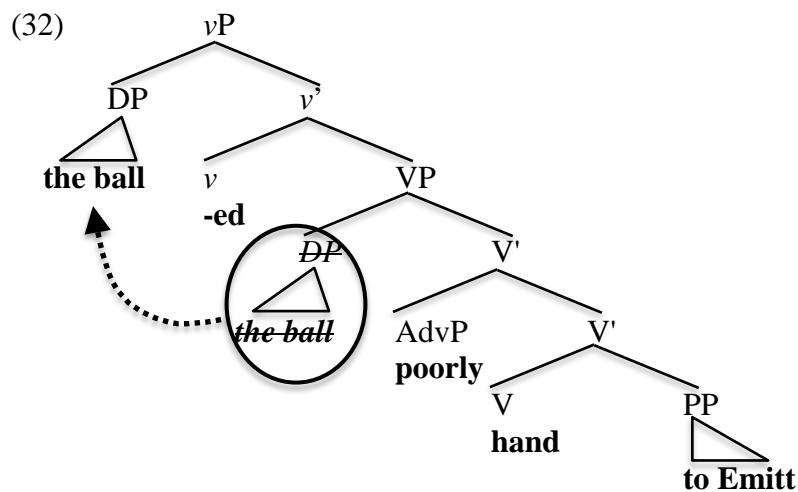
Next we can consider a passive example, starting with the same VP we constructed above:



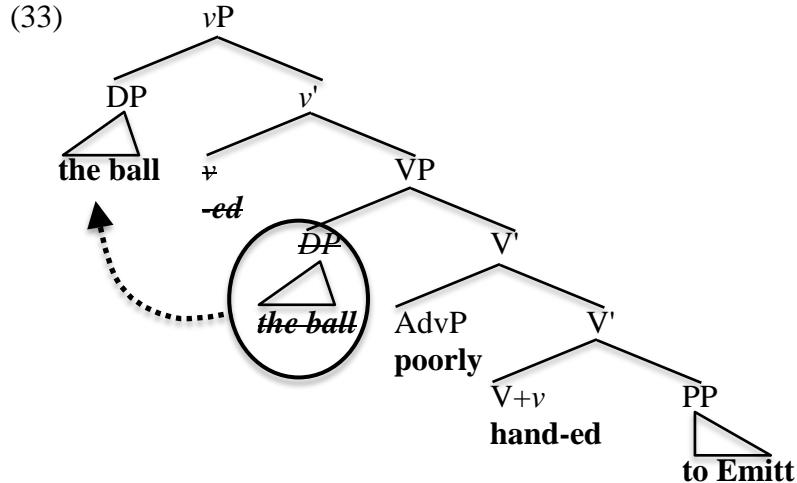
The *v* head Merged in this case will be a passive one, without a specifier of its own:



Since *v* has no specifier, Affix Support will drive movement of the object:



Movement of the object satisfies Affix Support for *v*. The adverb *poorly* can Contiguity-adjoin to the verb, thereby refraining from blocking Selectional Contiguity between *v* and *V*. Since *v* is not Contiguity-adjoined to any phrase, it can Prosodically Lower to the verb, meaning that the verb can be pronounced in its base position, after the adverb.



The passive verb, unlike the active verb, can therefore follow Blight's adverbs.

Blight's facts are unchanged if the object is wh-extracted:

- (34) a. What did Troy (*poorly) hand to Emitt (poorly)?
 b. What was (poorly) handed to Emitt (poorly)?

We must therefore make sure that wh-movement of the object in an example like (34a) does not make Selectional Contiguity between *v* and *V* possible without head-movement. In section 1.2 above, I floated the possibility that wh-movement out of the verb phrase does not land at the edge of *vP* at all, but rather at the edge of ΣP ; if this is correct, then wh-movement of *what* in (34) will not take place until after *vP* is complete, and head-movement will be driven as usual.

Alternatively, if we want to maintain *vP* as a landing site for successive-cyclic wh-movement, we will need to make sure that such movement takes place after *v* seeks Selectional Contiguity with *V*. Here we might take advantage of the fact that it is unclear what kind of Agree relation is responsible for this particular movement; perhaps we should establish a separate category of 'Phase-Impenetrability-driven' movement which happens late, after the other movements discussed here. Either of these options would have the desired result, and I will have to leave further work on the issue for the future.

3. Infinitives

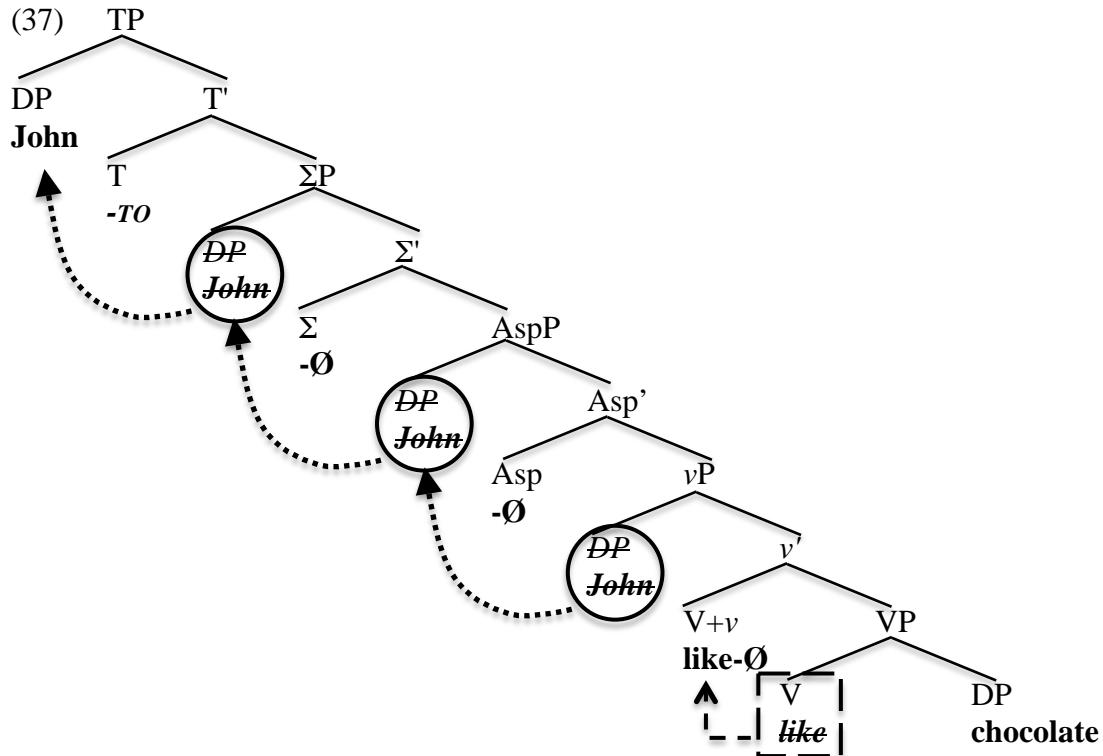
Infinitives, in the theory to be developed here, will be instances of TP selected by a head that is neither an affix nor a phase head. For raising infinitives, this is uncontroversial; a classic analysis of the embedded clause of (35), for example, portrays the infinitive as a TP selected by the verb *seem*:

- (35) John seems [TP __ to like chocolate].

Control infinitives, in this theory, will also have to be TPs selected by non-phase-heads; I will posit a special head INF, responsible for heading control infinitives, which is not a phase head:

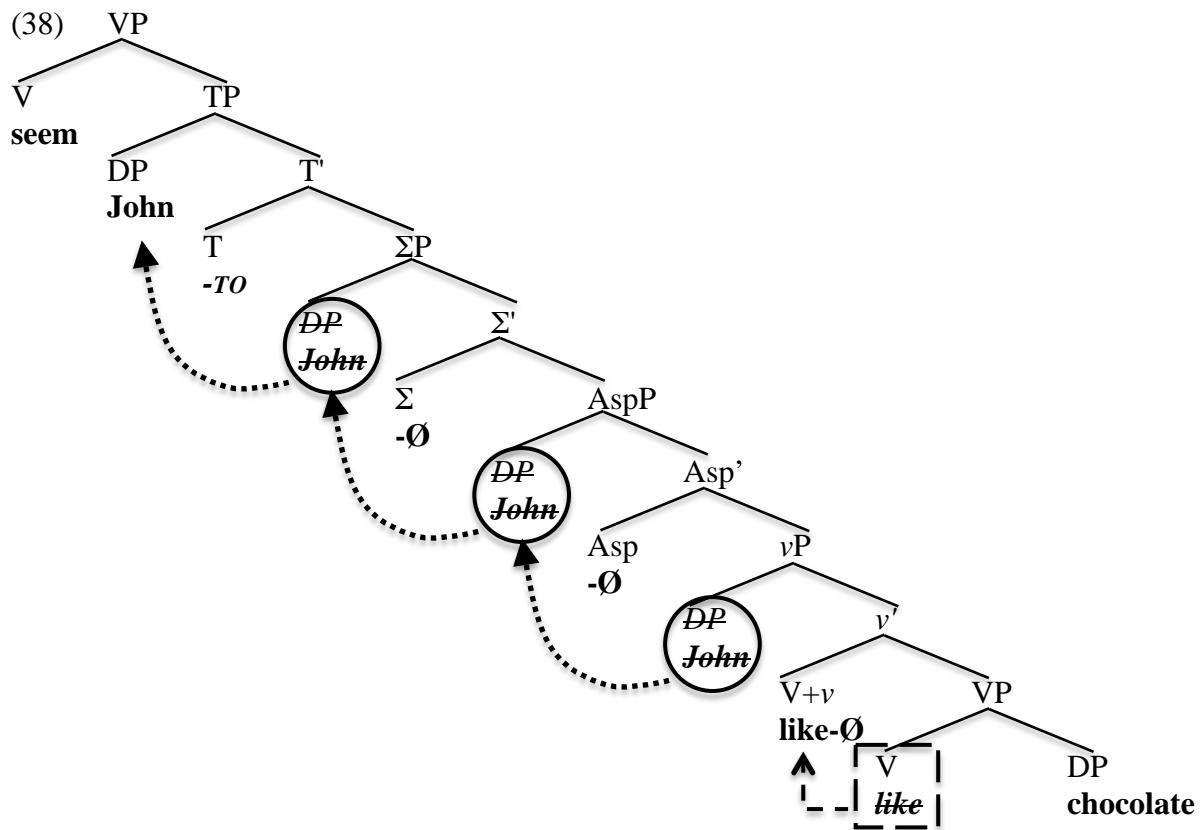
- (36) John promised [INFP __ to avoid chocolate].

Consider what our theory so far predicts about an infinitival clause like the one in (35), given these assumptions. A derivation for an English infinitive could start with the TP in (37):



The derivation of the tree in (37) has proceeded along familiar lines. V moves to v for reasons discussed in the last section, and each affix has triggered movement of *John* to its specifier for

Affix Support. I have represented *to* as a head of T, and have given it the same Bjorkman (2011)-inspired treatment that I gave the auxiliaries in the previous chapter; T begins the derivation as an affix, triggering movement of the subject to its specifier, and is only realized as a free-standing morpheme once its other requirements are satisfied. Selectional Contiguity has been satisfied between each pair of heads, as *John*'s successive-cyclic movement has rendered them all adjacent to each other (and hence capable of Contiguity-adjunction to each other). We next Merge matrix V:



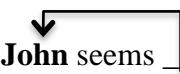
V is subject to Selectional Contiguity with T, which is currently interrupted by *John*. Since V is neither an affix nor a probe, it is incapable of causing *John* to move out of the way. Thus, the tree in (38) is a straightforward failure of Selectional Contiguity. And since V is not a phase head, the Selectional Contiguity failure will not be rescued by Spell-out of TP; the Contiguity

relation must in fact be created. In order to repair the tree, the grammar must make sure that the subject is not pronounced in its current position.

There are, we will see, two ways of achieving this, in principle: one is to move the subject out of the way, and the other is to fail to pronounce the subject. We will then move on to consider a strategy which is not available in English, namely failing to raise the subject to the specifier of TP. Finally, we will discuss what the theory predicts about the structural height of infinitival verbs in various languages.

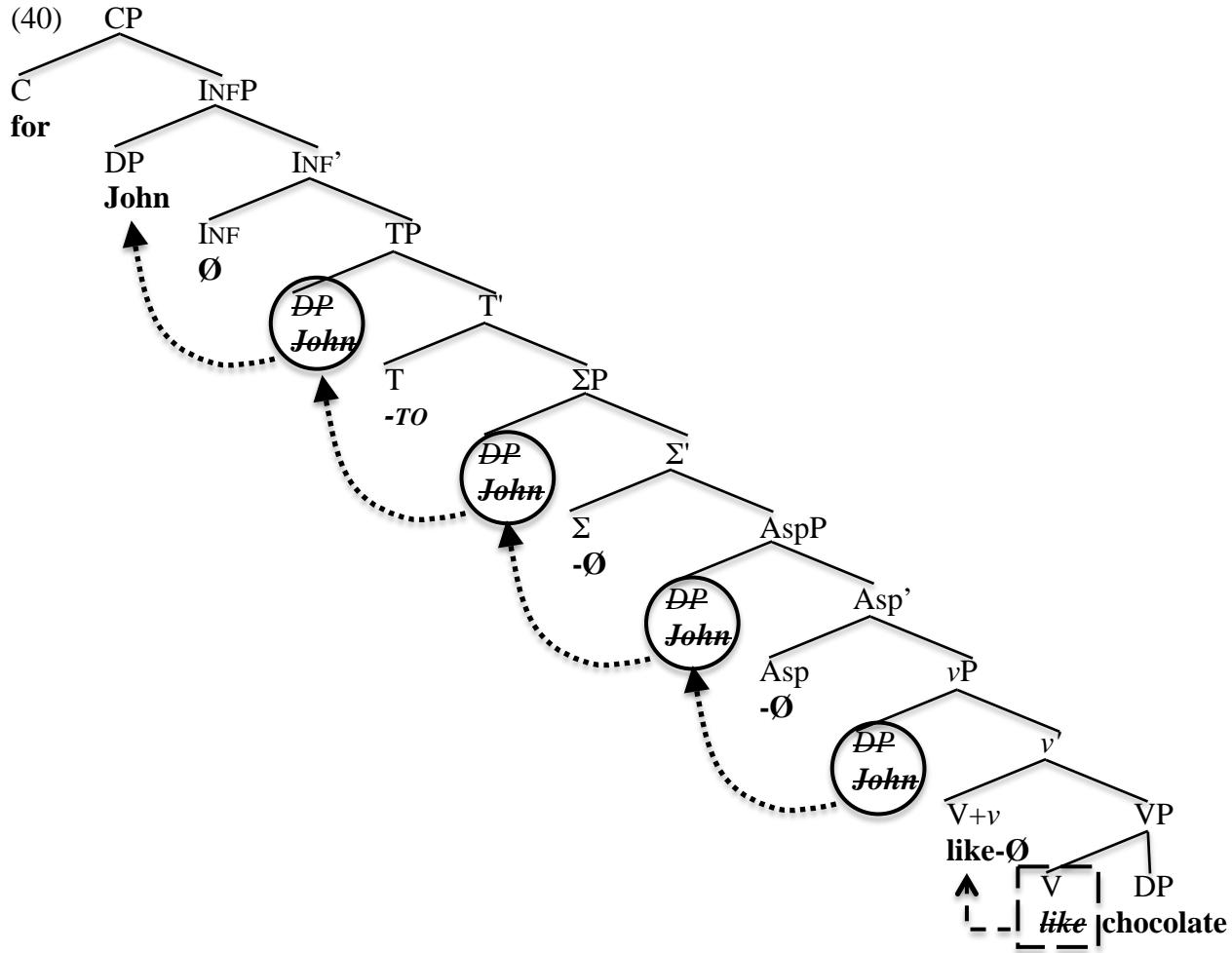
3.1 Moving the subject out of the way

In order to move the subject out of the way, we might, for example, raise it into a higher clause:

- (39) a.  John seems to like chocolate
- b. I believe  John to like chocolate

For evidence that (39b) involves raising into the higher clause, see Postal (1974), Lasnik and Saito (1991).

Alternatively, we could Merge a higher Probe internal to the infinitival clause:



In (40), the Probe *for* is Merged; I have labeled it C here. This Probe Agrees with the subject, but because *for* is not an affix, the subject need only move to become adjacent with the probe, landing in the specifier of a lower projection, for reasons that by now are familiar. As long as C is a phase head, the resulting structure satisfies Contiguity; C and INF are not Contiguous, but Spell-out will separate the two heads in any case. The resulting clause could then be an embedded clause in a sentence like:

- (41) I would prefer [for John to like chocolate]

The movements listed above are arguably A-movements. There is a long tradition of assuming that A-movement is the only kind of movement that can allow subjects of infinitives to

be licensed. If this is true, it does not follow from the theory given here, which should allow subjects of infinitives to evacuate the external subject position by any means, in principle.

In fact, there are cases in which subjects of infinitives appear to be licensable by either A-movement or A-bar movement:

- (42) a.
Mary was wagered [] to have won the race.
- b.
Mary, who John wagered [] to have won the race...
- c. *John wagered Mary to have won the race.

Verbs like *wager* (discussed by Postal (1974) as part of his Derived Object Condition, and referred to by Pesetsky (1992) and Bošković (1997) as *wager*-class verbs) are incapable of ordinary ECM, as (42c) shows, but behave like ECM verbs if the subject of the infinitive is extracted, either via A-movement as in (42a), or via A-bar movement as in (42b). *Wager*-class verbs have traditionally been difficult to deal with in Case-based approaches to the special properties of subjects of infinitives; if the Case Filter demands that every DP get Case exactly once, then the contrast in (42) is difficult to account for.

In the approach developed here, on the other hand, *wager*-class verbs behave more or less the way they are expected to; the subject of their complement infinitive must move out, but any method of moving it out yields a well-formed sentence. Let us therefore take *wager*-class infinitives as the central case, and try to develop explanations for the examples in which certain types of movement fail to rescue subjects of infinitives.

Here there are at least two kinds of cases of immediate interest. The first is that subjects of *wager*-class infinitives, though they can escape the infinitive in a number of ways, cannot

undergo ordinary ECM, as (42c) shows. The second is that subjects of ordinary raising infinitives cannot be rescued by A-bar movement:

- (43) *Who  did it seem [ to like chocolate]?

Let us begin with the second case. Why is (43) rejected, in favor of (44)?

- (44) Who   seemed [ to like chocolate]?

In (44), the subject of the infinitive moves first to the specifier of TP, while in (43), the first move is to the specifier of CP. This suggests an account in terms of the logic of the cycle; the Contiguity problem imposed by the subject intervening between the matrix verb and embedded T must be solved as quickly as possible, and so movement to the specifier of matrix TP is required, since this is the closest landing site that becomes available. We could think of the idea that Contiguity problems must be solved as quickly as possible as the representation in this theory of Chomsky's (1995) proposal that Strong features must be checked as early as possible. A-movement has no special status in and of itself; it simply happens to typically be the shortest possible move that can get the subject out of the infinitive.

On this account, subjects of *wager*-class infinitives can be rescued by A-bar movement in part because these verbs are incapable of ECM; the most local type of movement is unavailable for some reason, and a more long-distance movement is therefore acceptable. Now we can turn to the question of why the more local movement should be ruled out. What distinguishes between an ordinary ECM verb like *believe* and a verb like *wager*?

- (45) a. Bill believed Mary to have won the race.
b. * Bill wagered Mary to have won the race.

Pesetsky (1992) makes a crucial observation which will be helpful for us here: he notes that verbs in the *wager* class invariably require their subjects to be animate agents, while verbs in the *believe* class do not. As he points out, there are some verbs which can be used either agentively or not, and which behave like *wager*-verbs when agentive and like *believe*-verbs when not (Pesetsky 1992, 19):

- (46) a. Sue ultimately understood Bill to have died
only after we had explained it to her many times.

b. ??No, you can't talk to Bill. Try to understand him to have died.

c. No, you can't talk to Bill. Try to understand that he has died.

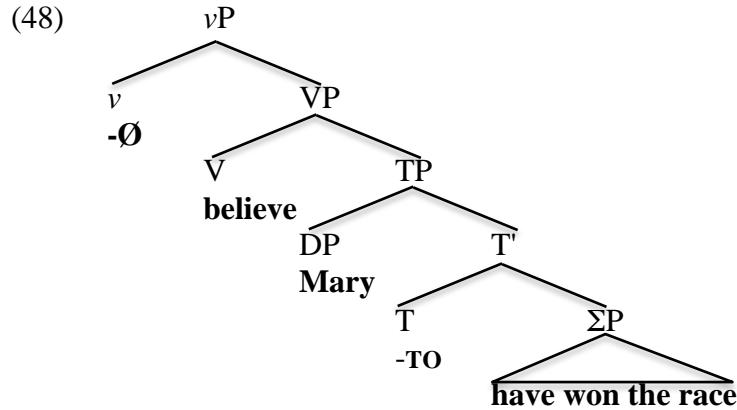
Just in contexts like the one in (46b) that encourage an agentive reading, *understand* acts like a *wager-class* verb, in that it cannot participate in ECM. (46c) shows that *understand* can have the relevant reading, in principle, when ECM is not at issue.

Pesetsky's observation suggests that ECM and agentive subjects may both implicate the same structural position, with the consequence that they are in complementary distribution. For instance, suppose we thought that agentive subjects were always generated in the specifier of vP, while experiencer subjects of verbs like *believe* and *understand* were generated in some other position:

- (47) a.  The tree diagram shows the following structure:
 $v_{\text{EXP}}P$ branches to DP (John) and v_{EXP}' .
 v_{EXP}' branches to v_{EXP} (-Ø) and vP .
 vP branches to v and $\bar{v}P$.
 v branches to V (believe).
 $\bar{v}P$ branches to TP (wager) and \dots .
b.  The tree diagram shows the following structure:
 vP branches to DP (John) and v' .
 v' branches to v and VP .
 v branches to $-Ø$.
 VP branches to V (wager) and TP (wager).
 TP branches to \dots .

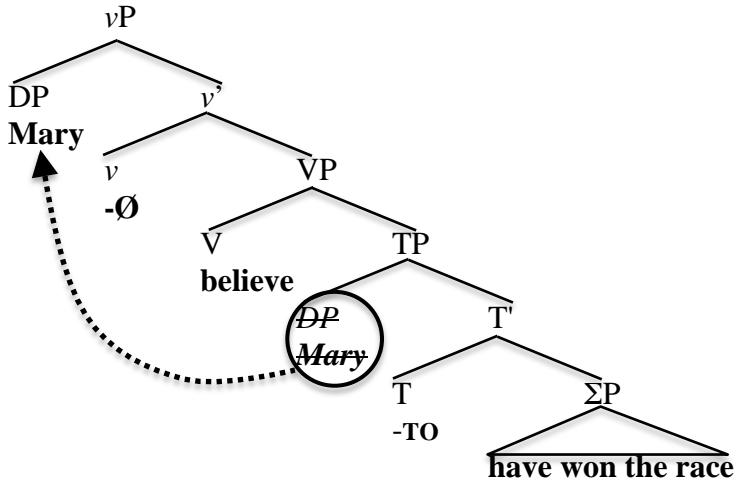
The subject of *wager* in (47b), being an Agent, is introduced in the specifier of vP; the Experiencer subject of (47a), by contrast, is introduced in the specifier of a higher functional head, which I have labelled v_{EXP} . Let us consider what the theory developed here predicts about trees like those in (47).

We can begin the derivation for (47a) at the vP level:



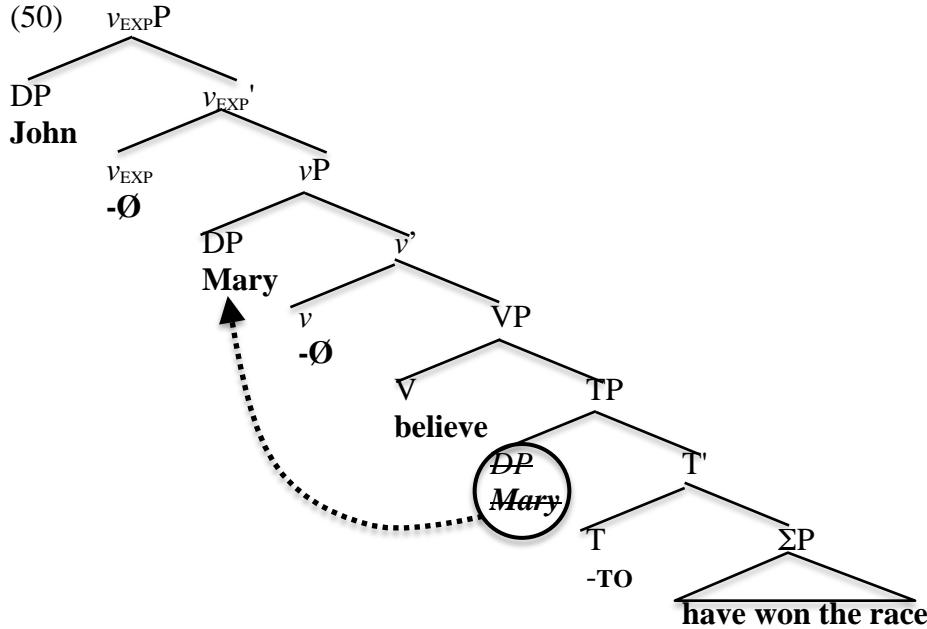
In (48), *Mary* has raised to become the specifier of the embedded TP, for familiar reasons, and has thereby prevented the establishment of Selectional Contiguity between V and T. The null suffix *v* has just been Merged, and if *believe* were an Agentive verb, *v* would be responsible for introducing its Agent. Since *believe* is not Agentive, the specifier of vP is empty, and *v* begins searching for Goals to Agree with. Finding *Mary*, it moves *Mary* into its specifier, thereby satisfying Affix Support for *v* as well as Probe-Goal Contiguity:

(49)

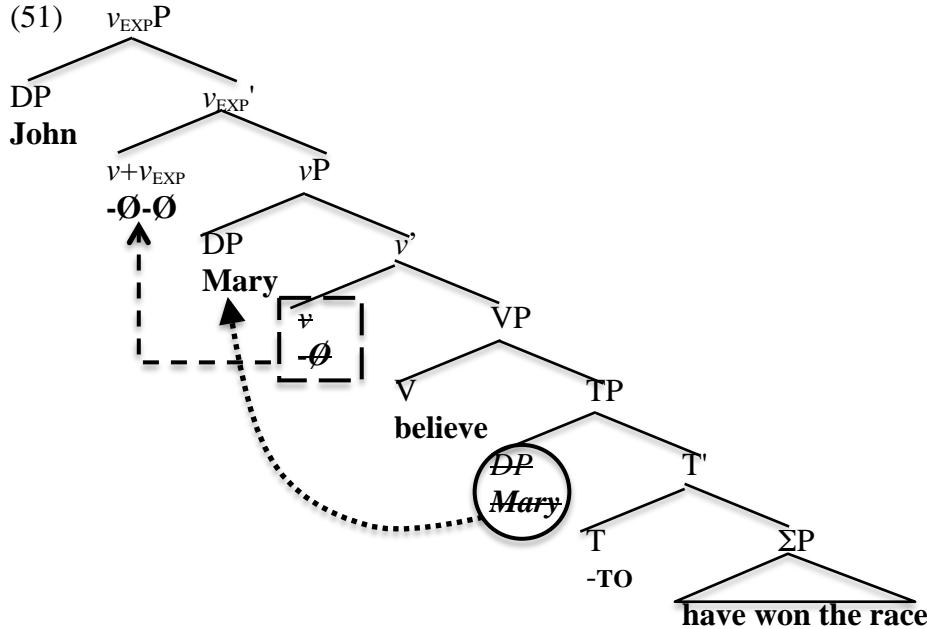


The next head to Merge will be v_{EXP} , which will introduce the experiencer *John* in its specifier:

(50)



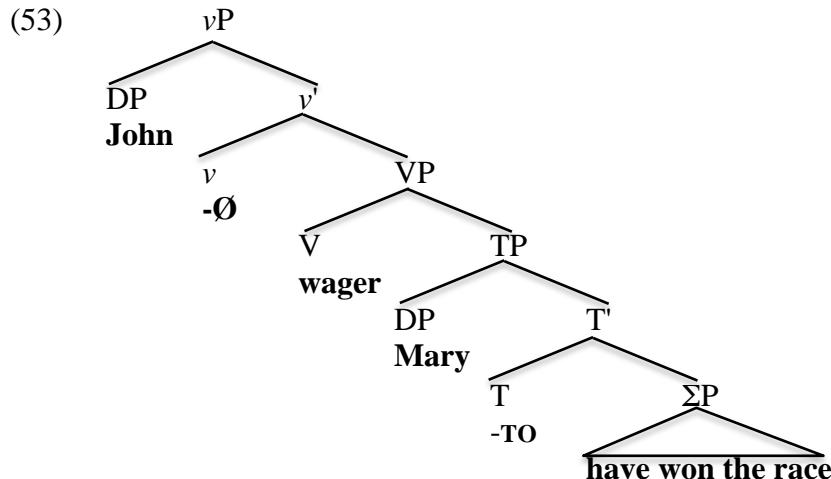
The v head then moves to v_{EXP} for Selectional Contiguity. It must then Contiguity-adjoin to *Mary* to preserve Probe-Goal Contiguity; as a result, v will be unable to later Prosodically Lower to the verb, and the verb will be compelled to raise to v_{EXP} , correctly placing *believe* before *Mary*.



The derivation would proceed from (51) in familiar ways, adding higher functional heads to create example (52):

- (52) John believes Mary to have won the race.

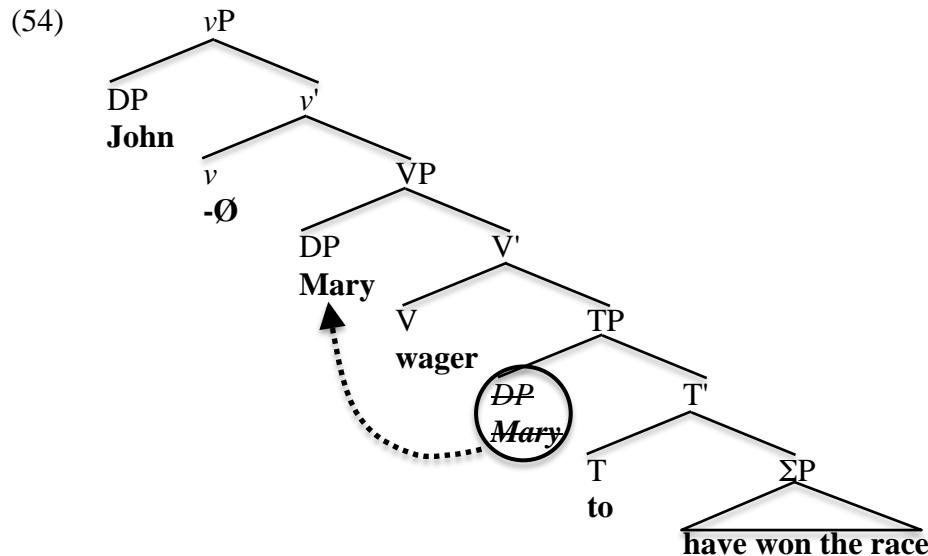
Let us now consider a derivation for a sentence containing *wager*, again starting at *vP*:



It should be clear that this derivation cannot proceed like the one for *believe*; *v*, in this case, has a thematic specifier, and therefore does not need to move *Mary* for Affix Support. We can model Pesetsky's observation about the difference between Agentive and non-Agentive verbs in this

way; non-Agentive verbs have *v* with an empty specifier, to which embedded subjects can in principle move, while Agentive verbs have a thematic specifier of *vP*.

If *v* did Probe the DP *Mary*, what we expect at this point is that *Mary* would raise to a point just under *v*:



The move in (54) is the shortest one necessary to make *v* and *Mary* Contiguous by Contiguity-adjunction; since *vP* has a specifier, there is no need for *Mary* to raise any higher. This move lands *Mary* in what we might expect to be a theta-position; it is the specifier of the verb.

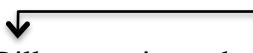
If movement into theta-positions is banned (Chomsky 1981), then the move in (54) might simply be ruled out. But in fact, Pesetsky (1992) argues that *wager*-class verbs are actually capable of ECM, just in case the verb theta-marks the ECM subject. He credits Postal (1974) with observing the following contrast:

- (55) a. Sue estimated Bill's weight to be 150 lbs
 b. * Sue estimated Bill to weigh 150 lbs

As Pesetsky notes, the contrast in (55) is parallel to that in (56):

- (56) a. Sue estimated Bill's weight
 b. * Sue estimated Bill

In other respects, *estimate* acts like an ordinary *wager*-class verb:

- (57) a. Bill was estimated  to weigh 250 pounds
 b. Bill, who Sue estimated  to weigh 250 pounds...

For a verb like *estimate*, then, Pesetsky suggests that straightforward ECM is possible just if the verb theta-marks the object; *estimate* can only act like an ECM verb if the embedded subject is the kind of nominal that could be its object. This suggests that we might be wrong to ban the movement in (54); this movement is indeed possible and resolves the Contiguity problem created by the subject of the infinitive, but has interpretive consequences, requiring the raised subject to receive a theta-role from the verb. In some cases (like that in (54)), this theta-assignment will be semantically anomalous, making the sentence unacceptable⁷⁷. This explanation commits us to the belief that movement into theta-positions is possible; see Hornstein 1999, and much subsequent work, for discussion and arguments.

This account raises a question about the requirement that Contiguity relations be created as quickly as possible. If it is the case that verbs in the *wager*-class have the option of moving the subject of the infinitive into their VP, thereby assigning it a theta-role, we might wonder why

⁷⁷ In this connection, we might worry about the ill-formedness of (i):

(i) * John wagered this dollar to be shiny.

In (i), *this dollar* is the kind of nominal that can receive a theta-role from *wager*, as we can see in (ii):

(ii) John wagered this dollar [that he could eat fifty eggs]

Perhaps this theta-role is assigned in the wrong structural position for a nominal to receive it by moving to the specifier just below *v*.

this option is not obligatory for such verbs. Why can *wager*-class infinitives be redeemed by, for instance, A-bar movement?

- (58) Mary, who John wagered to have won the race...

Given that movement into the theta-position in the specifier of VP is a shorter move than the A-bar movement in (58), why is the relative operator *who* in (58) not required to land in the specifier of VP on its way up the tree, creating the semantic incongruity that makes (54) unacceptable? Movement into VP is the shortest move that will create the desired Contiguity relation, and if the general principle is that Contiguity relations must be created as quickly as possible, it is unclear how this short move is to be avoided.

I think the answer to this question might come from a sufficiently careful definition of “as quickly as possible”. This is a familiar problem in other areas where economy principles are invoked. For instance, we might invoke a general economy principle preferring short moves over long ones, which could rule out (59a) in favor of (59b). It is important, however, that (59c) not be ruled out by (59d):

- (59) a. *What did who buy?
b. Who bought what?
c. What did John eat?
d. What ate John?

(59a-b) must be regarded as comparable in some sense in which (59c-d) are not. One way in which (59c-d) differ from each other is in theta-role assignment. In the case of a principle saying “make the shortest move possible”, we are apparently entitled to define the range of possible options, at least in part, in terms of options involving the same theta-roles being assigned to the

same elements (see Fox 2000 and much subsequent work). For the economy principle requiring that Contiguity relations be created "as quickly as possible", then, we could invoke the same idea. On that view, a derivation in which *wager* assigns a theta-role to the subject of the embedded clause is not comparable with a derivation in which it does not. Consequently, an example like (58) above ought to have the option of avoiding theta-role-assignment by *wager* to *who*.

Obligatory movement of subjects of infinitives has traditionally been taken to be driven by some kind of licensing requirement on the moving nominals, perhaps related to Case. The explanation offered here does not have this property; subjects of infinitives must move because they are in a position which interrupts Contiguity between two functional heads. Hippocratic Altruism guarantees that movement of the subject cannot actually be driven by the need to create Contiguity relations in which the subject itself does not participate; rather, it is driven by familiar forces involving Probe-Goal Contiguity, resulting either in A-movement or in A-bar movement. The account is consistent with infinitives being like any other clause with respect to Case assignment.

3.2 Failing to pronounce the subject

Another option for dealing with subjects of infinitives is to fail to pronounce them:

- (60) a. John tried [PRO to eat chocolate]
b. [PRO to like chocolate] is not a crime

Hornstein's (1999) proposed derivation of control from movement offered an account of a puzzling universal, namely the fact that PRO is always phonologically null. Given the range of cross-linguistic variation in which elements are null, the fact that PRO is universally null

certainly calls for explanation. Hornstein's idea was to connect the fact that PRO is null with the fact that traces of movement are null, by reducing control to movement.

Whether Hornstein succeeded in this has been the topic of a lively debate; see Landau (2003), Boeckx and Hornstein (2006), Bobaljik and Landau (2009), and Boeckx et al (2010), among much other work, for some discussion. Regardless of what we think about this debate, even in Hornstein's original proposal, it was still necessary to stipulate that PRO is null in examples of Non-Obligatory Control like (60b), since there is no plausible movement operation that could leave a trace in PRO's position.

Assuming that Hornstein's approach cannot work for all cases of PRO, then, we need to find some other way of forcing PRO to be null, and of constraining the distribution of PRO so that it cannot simply be used in any argument position. In the account developed here, we can view conversion into PRO as a method for dealing with violations of Contiguity. It is by making PRO null that Contiguity violations are repaired, and the fact that PRO is universally null is thereby explained. The account to be developed here of the distribution of PRO will thus resemble one of the accounts of Spanish pro-drop sketched in section 6 of the last chapter.

It will be crucial for us to posit an operation that explicitly marks PRO in the syntax as lacking phonological content⁷⁸. Prior to this operation, PRO is treated like any other nominal; it moves to the specifier of TP in English to supply Affix Support there, for example.

It will also be crucial that conversion to PRO must be motivated. This is part of the explanation for restrictions on the distribution of PRO; an example like (61) is ill-formed because the direct object does not obstruct any Contiguity relations:

- (61) John_i likes PRO_i

⁷⁸ We might consider the possibility that the syntax fails to send PRO to the interfaces at all. See Chierchia (1987), Heim and Kratzer (1998) for the idea that PRO might be semantically as well as phonologically contentless.

As it stands, this theory leads us to expect that subjects of control infinitives could very generally be licensed by A-bar extraction, as well as by conversion to PRO. There are instances of infinitival relatives that might fit this pattern:

- (62) a man [to fix the sink]

Here the subject of the relative clause has been A-bar extracted, and this is apparently sufficient to avoid the Contiguity violation in the infinitive (here I ignore a great deal of interesting work on the structure of these relatives; see Bhatt (1999), in particular). Wh-movement, by contrast, does not seem to have this effect:

- (63) a. I don't know [what PRO to buy ]
- b. * I don't know [who  to buy that]

These infinitival questions are selected, while the infinitival relatives are not; perhaps this is the relevant difference between them⁷⁹. On this view, certain selected infinitives could be required to have subjects that are referentially dependent on higher arguments; this is a requirement over and above the syntactic requirements I have discussed. I will not have any further light to shed on the nature of this requirement, but we will see some further evidence for this way of understanding the problem in the following section.

Finally, this approach to the distribution of PRO forces us to a particular interpretation of Hippocratic Altruism, the principle introduced in the previous chapter:

⁷⁹ Another potentially relevant difference, depending on our theory of how relative clauses are formed, might be that the relative operator is phonologically null. If null operators can be created in the syntax, like PRO, then the contrast between relatives and questions might follow from this.

(64) **Hippocratic Altruism**

No operation can affect α if the only effect of the operation on α is to alter α 's position in a way which might disrupt a Contiguity relation in which α participates.

Conversion to PRO is, by hypothesis, motivated by the need to create a Contiguity relation which would be blocked by PRO if it were overt. Since PRO does not itself participate in the Contiguity relation that is thus rescued, we must be sure to avoid allowing Hippocratic Altruism to prevent the grammar from converting nominals to PRO. One way to do this would be take seriously the reference, in the statement of Hippocratic Altruism, to altering *positions*: conversion to PRO does not alter the position of the converted nominal (unlike movement or Untethering), and therefore is not subject to Hippocratic Altruism. Another way to think about the same point: moving some element α to a different position has the potential to create a structure containing two elements, α and β , which had previously been in a Contiguity relation and no longer are. By contrast, deleting the phonological content of α creates a structure in which there is no longer an α , as far as Contiguity is concerned, and thus perhaps removes any Contiguity relations α had participated in from consideration by the grammar.

3.3 Postverbal subjects

All of the discussion of subjects of infinitives has concerned subjects in external positions. As we saw in chapter 2, there are languages in which subjects need not raise out of their theta-positions. We predict that such subjects would not need to be converted into PRO, since they are not interrupting any Contiguity relations.

Szabolcsi (2009) offers evidence that this is correct. In Italian, for example, subjects may in principle be either preverbal or postverbal, for reasons that are familiar from chapter 2 and from section 6 of the previous chapter:

- (65) a. Gianni è arrivato

Gianni is arrived

'Gianni has arrived'

- b. È arrivato Gianni

is arrived Gianni

Control verbs, unsurprisingly, may also have preverbal subjects:

- (66) Solo lui non vuole andare a Milano

[Italian: Szabolcsi 2009, 25]

only he not wants go.INF to Milan

'Only he doesn't want to go to Milan'

In (66), the subject outscopes both negation and the modal; the sentence means that everyone else that is contextually relevant does want to go to Milan, and that he is the only one who does not. Szabolcsi points out that an overt subject may also appear postverbally inside the control clause, with a corresponding difference in interpretation:

- (67) Non vuole andare solo lui a Milano

[Italian: Szabolcsi 2009, 26]

not wants go.INF only he to Milan

'He doesn't want it to be the case that only he goes to Milan'

In (67), the overt subject scopes below both negation and the modal, and the matrix subject has undergone pro-drop. Szabolcsi argues that the overt subject is indeed in the embedded clause, ruling out several possible alternative analyses; I refer interested readers to her work for full discussion.

What makes the Italian facts particularly interesting for us is that the overt subject may not be preverbal in the embedded clause:

- (68) *Non vuole solo lui andare a Milano

not wants only he go.INF to Milan

Italian, then, offers another piece of evidence that the difficulty with subjects of infinitives has to do only with pronunciation of the external subject position--in terms of the theory developed here, preverbal subjects of infinitives create Contiguity violations between functional heads. The discussion up to this point has centered on English, in which the subject must be preverbal, and in which subjects of infinitives must therefore either be unpronounced (i.e., PRO) or be moved out via A- or A-bar movement. Italian exemplifies a third option, independently available in that language; the subject can remain postverbal.

We have seen evidence that in Italian, infinitival subjects can be overt if they are postverbal, just as the theory developed here predicts. However, it turns out that this privilege is reserved for subjects, like those discussed in this section, which refer back to an argument of the higher clause (Maria Giavazzi, p.c.)

- (69) a. Gianni non vuole andare solo lui a Milano

Gianni not wants go.INF only he to Milan

'Gianni doesn't want it to be the case that only he goes to Milan'

- b. * Gianni non vuole andare solo io a Milano

Gianni not wants go.INF only I to Milan

'Gianni doesn't want it to be the case that only I go to Milan'

The contrast in (69) offers another argument for a conclusion that we reached at the end of the last section, and that to my knowledge was first defended by Borer (1989): control infinitives must have subjects which are referentially dependent on higher arguments, and this requirement is independent from the conditions on the form of these subjects. In a language like English,

subjects of control infinitives are both null and referentially dependent, leading us to assume that these properties are linked to each other; in Italian, we can see that the requirement of referential dependence is in fact independent of the condition requiring preverbal subjects of infinitives to be null. I have offered an account of why preverbal subjects of control infinitives must be null, based on Contiguity. The requirement that subjects of control infinitives (regardless of where they are or whether they are pronounced) be referentially dependent will have to follow from something else, and I will not attempt to explain it.

3.4 Control and head-finality

All of the preceding discussion has concentrated on head-initial languages. I have claimed that the special properties of infinitives have largely to do with a Contiguity problem; infinitival TP is selected by a head which is neither a phase head nor an affix (the matrix verb, for raising infinitives, and a functional head I have called INF, for control infinitives). Subjects in the specifier of TP interrupt Contiguity between T and the head which selects it.

This theory would appear to predict that head-final languages ought to lack obligatory PRO; if T and INF are both final, then the subject cannot block Selectional Contiguity between them⁸⁰. For some languages, this may be the correct result: there is a group of head-final languages that play an important role in the literature on 'backward control', allowing controlees to be overt (and, in all of the cases below, allowing the controllers in the matrix clause to be null):

⁸⁰ We make a similar prediction for verb-initial languages. In some cases, this may be correct. Irish nonfinite clauses, for example, are not verb-initial (Carnie 1995), and Tagalog nonfinite clauses may have overt subjects (Schachter and Otanes 1972, 270):

(i) Gusto-*ng* [pumunta sa tindahan ang Nanay]
want-LI NOM.INF-go DAT store ANG mother
‘Mother wants to go to the store’

A full-scale investigation of the properties of nonfinite clauses in verb-initial languages is something I will have to leave for future work.

- (70) Isya-ga [kanzya-ga aruk-u-no]-o tetudatta
 doctor-NOM patient-NOM walk-PRS-C-ACC helped
 'The doctor helped the patient to walk' [Japanese: Fujii 2006]
- (71) Chelswu-ka [Yenghi-ka kakey-ey ka-tolok] seltukha-ess-ta
 Chelswu-NOM Yenghi-NOM store-LOC go-C persuade-PAST-DECL
 'Chelswu persuaded Yenghi to go to the store' [Korean: Monahan 2003, 356]
- (72) [Kid-bā čorpa b-od-a] y-oqsi
 girl-ERG soup.III.ABS III-make-INF II-began
 'The girl began to make soup' [Tsez: Polinsky and Potsdam 2006, 177]
- This is not to say that these languages will lack control infinitives; we saw in the previous section that it is useful to posit a condition on control infinitives, unrelated to the Contiguity problems which are the main driving force of the account here, which requires control infinitives to have subjects which are referentially dependent on higher arguments. Similarly, we might find head-final languages with infinitives out of which raising is possible; A-movement into a higher clause is presumably possible whenever locality permits, and a head-final language could certainly have an embedded clause with a sparse enough functional structure to permit A-movement to escape. But these languages conform, in general, to our expectations about head-final languages; the subject of an infinitive is not forced to be phonologically null.

On the other hand, there are also languages that are head-final in the relevant portion of the clause and appear to have an entirely conventional distribution of PRO:

- (73) Jan probeert (om) Marie te kuss-en [Dutch: Zwart 1997, 114]
 Jan tries OM Marie INF kiss-INF
 'Jan tries to kiss Mary'

- (74) Der Johann hat versucht, den Traktor zu reparier-en [German]

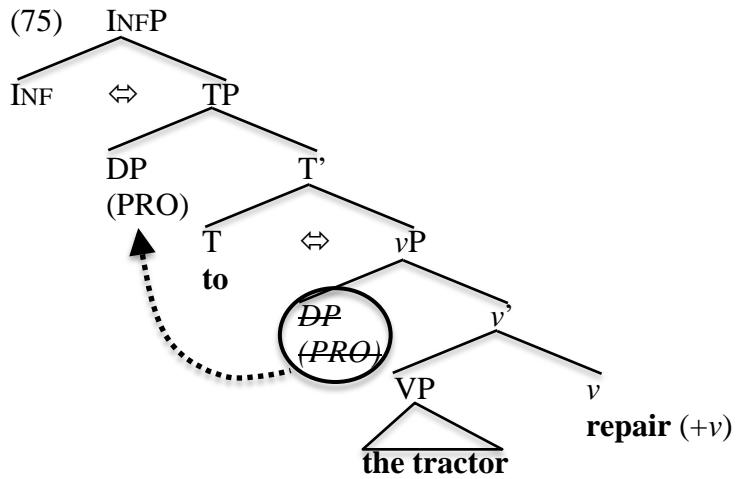
the Johann has tried the.ACC tractor INF repair-INF

'Johann tried to repair the tractor'

In what follows I will sketch an account of this distinction which is consistent with Contiguity theory.

One apparent difference between the languages in (73-74) and the languages in (70-72) is that the former languages have morphemes, which are at least orthographically free-standing, that appear before infinitival verbs (Dutch *te*, German *zu*), while the latter class of languages appear to lack such morphemes. The proposal developed below will hinge on this difference. I will also make a claim about the timing of Retethering, the operation that applies to Untethered heads and imposes an order on them. I have not yet had to be very specific about the timing of Retethering; it has been important that it take place fairly late (so that, for example, Japanese T is free to move any phrase to its specifier, rather than being constrained by Multitasking to triggering movement only of the subject with which it Agrees), but the evidence so far has been consistent with a number of assumptions about when exactly heads Retether. In what follows, I will rely on the idea that Retethering happens at Spell-out, once a phase is complete.

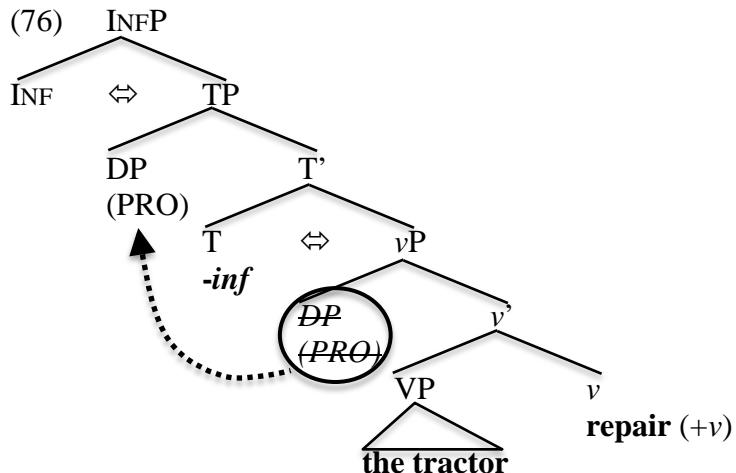
Consider, on that assumption, an infinitival clause in a head-final language (glossed here with English words):



In (75), Spell-out of the vP phase has Tethered *v* and the verb in final position, and the higher heads are still Untethered. T is a free-standing morpheme, as in Dutch and German. I have deliberately simplified the tree, just to make the example easier to discuss. I have pictured the verb as raising to *v*, not especially crucially.

INF and T are both Untethered, meaning that their order with respect to their sisters has not yet been determined. In the end, INF and T will both be linearized in final position, making Selectional Contiguity possible, but at this point, it is still possible that PRO intervenes between them. If we allow the grammar to respond seriously to such a possibility, then we could have an account of why PRO should appear even in a head-final language.

Now, consider a tree very similar to the one in (75), except that T is an affix:



In the imagined language in (76), T and INF are still Untethered, but T is an affix, meaning that it will be attached to the verb, which is currently final, via Prosodic Lowering⁸¹. If the grammar presumes that an affix attached to a final verb must itself be final, then a tree like (76) is one in the grammar has no reason to be concerned about the subject blocking Contiguity between T and INF. If T is final, then either INF is also final (in which case the subject will not intervene between them) or INF is initial (in which case the entire clause will intervene between them, and converting the subject to PRO will not help). This might be the kind of head-final language, like Japanese, Korean, and Tsez, in which nonfinite clauses can simply have overt subjects.

I have left much argumentation for future work, which will have to involve a serious investigation of the distribution of different types of infinitives in head-final languages. All I have done here, I hope, is to show that the theory is logically compatible with the existence of both of these kinds of head-final languages. In particular, the existence of head-final languages in which the subject of infinitives experiences no particular pressure to be null is very much in line with the approach developed here to the distribution of PRO.

⁸¹ As things currently stand, there is no question that this is how T will be attached to the verb. Stress Isomorphy is specifically defined so that it does not apply to T, and since T is Untethered, it cannot currently be in a Contiguity relation which prevents it from c-commanding the verb in the prosodic tree.

3.5 Infinitival verb height

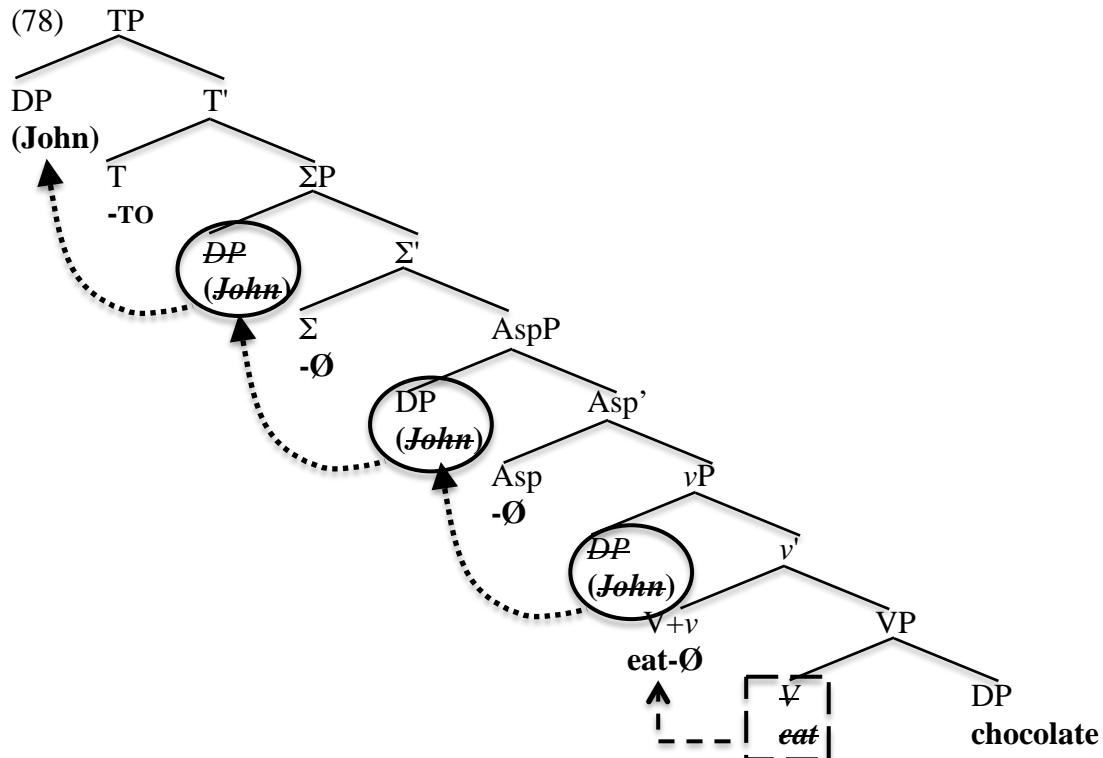
The preceding sections have centered entirely on the behavior of subjects of infinitives. In the following sections, we will turn our attention to the behavior of infinitival verbs themselves, deriving the facts about the height of infinitival verbs in English, French, and Italian.

3.5.1 English

Let us consider a control infinitive in English, like the embedded clause of (77):

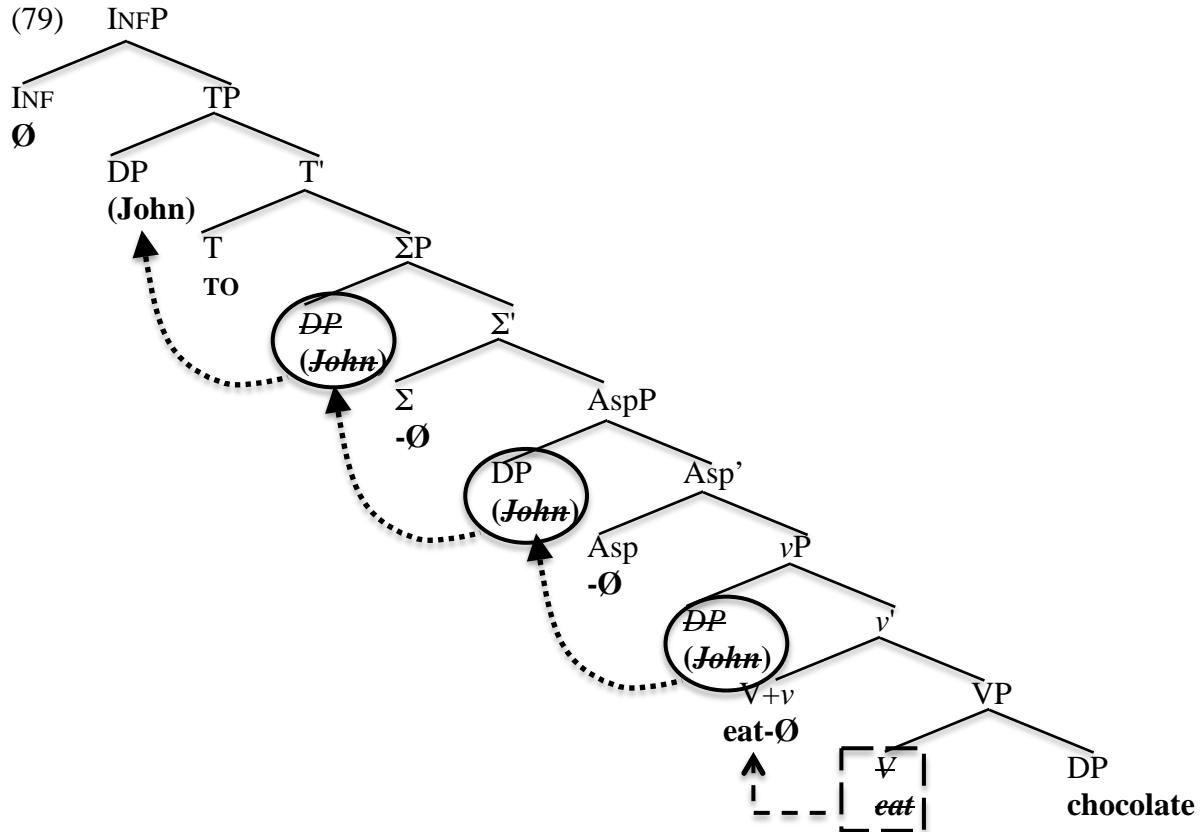
- (77) John decided [PRO to eat chocolate]

We can begin the derivation for this clause with the TP in (78):

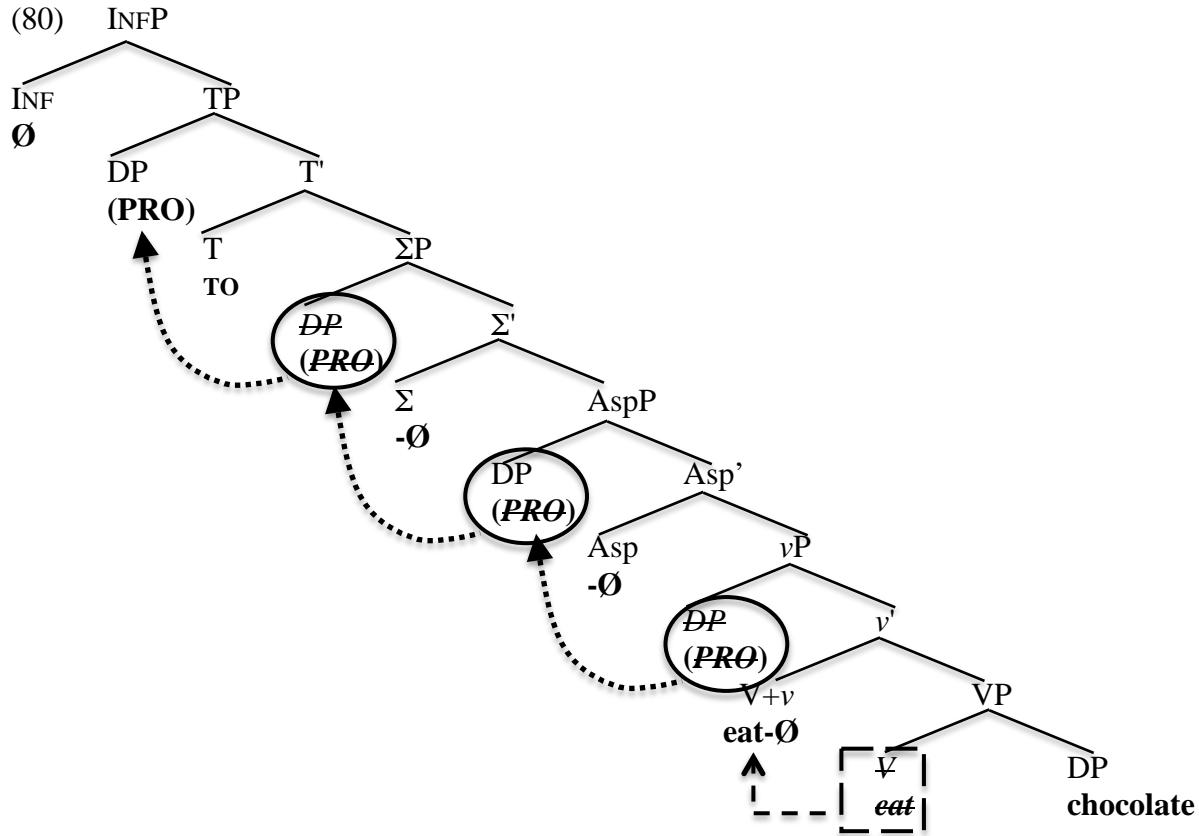


The subject of (78) is a DP which has not yet been converted to PRO; I have written it as *(John)* here, not because I think it is necessarily a version of its eventual controller, but just to remind us that it is not yet null. The subject has moved three times to satisfy Affix Support on higher heads (including the ‘affix’ *to*, which is realized as a free-standing head once all its requirements are satisfied), and the verb has moved to *v*; the other affixes will Prosodically Lower to the verb.

The next head to Merge is INF:



At this point, Selectional Contiguity does not hold between INF and T, since it is interrupted by the subject DP. The grammar has several options at this point, including waiting for some higher head to move (John) out of the way, and stripping (John) of its phonology by converting it to PRO. Let us consider the latter option:

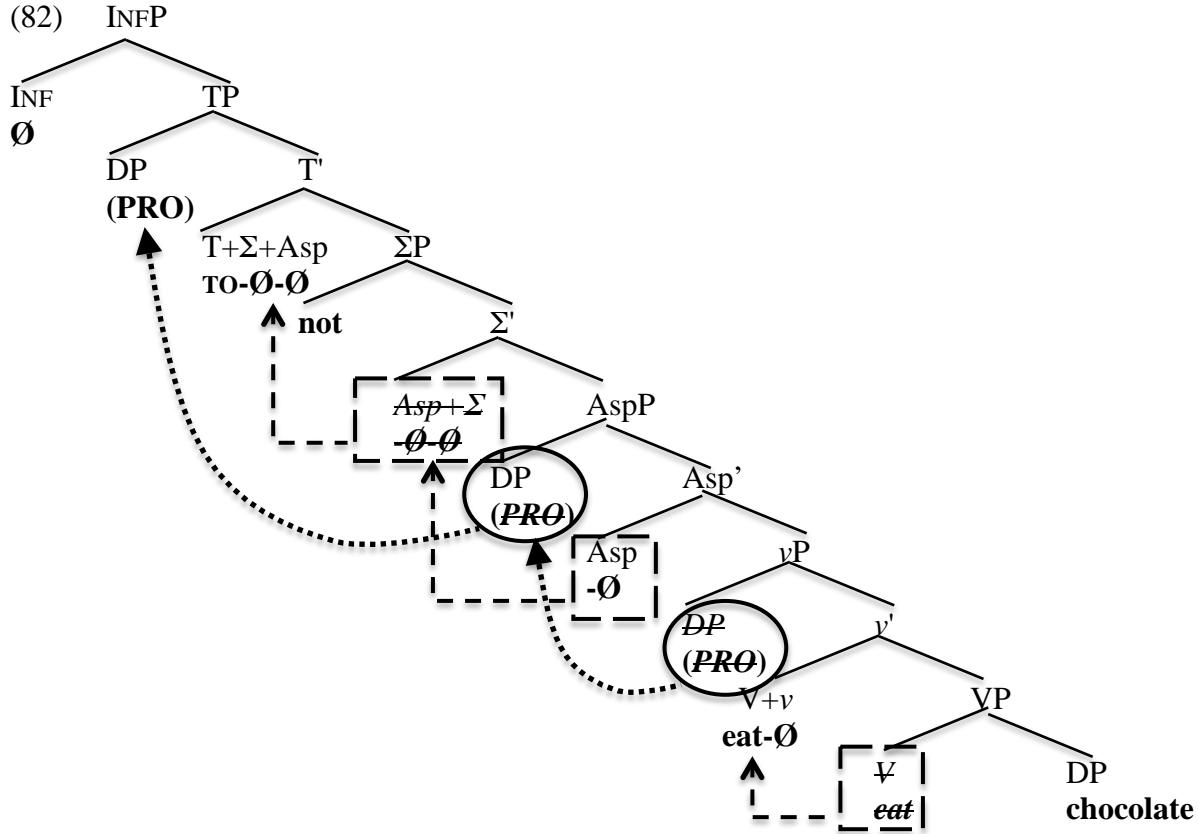


Converting the subject to PRO removes the barrier to Contiguity between INF and T. We get the correct word order, with the verb remaining in its usual place.

The infinitives discussed so far have not contained negation. As things stand, we are in a position to derive the word order in (81a), but not the word order in (81b):

- (81) a. John decided [PRO to eat chocolate]
 b. John decided [PRO not to eat chocolate]

The word order in (81a) would involve a tree like the one in (82) for the embedded clause:

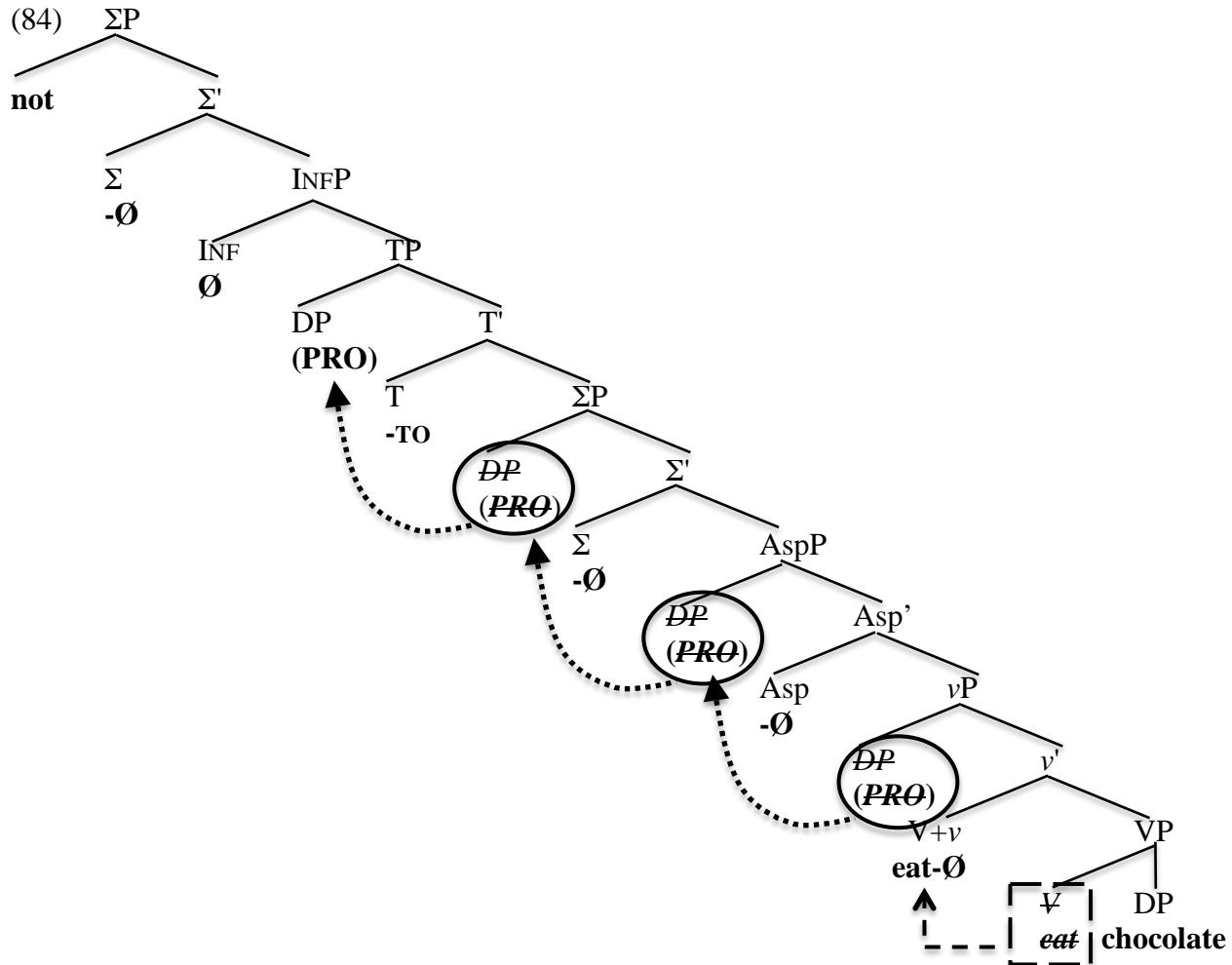


In (82), the specifier of ΣP is occupied by *not*, and the subject moves directly from the specifier of $AspP$ to the specifier of TP , where it is converted to PRO to create Contiguity between INF and T . Asp has moved to Σ , and Σ to T , for Selectional Contiguity, but this does not yield *do-support*, since T is a free-standing morpheme.

One way to get the word order in (81b) would be to allow negation to be generated in several different positions. This is presumably necessary anyway to get an account of constituent negation:

- (83) a. I have **not** given chocolate to the dog
 b. I have given chocolate **not** to the dog (but to the cat)

(81b) might then involve a structure in which a ΣP dominates $INFP$:



The tree in (84) contains two instances of ΣP, allowing for examples like (94):

- (85) John decided **not** to **not** eat chocolate⁸²

3.5.2 French

French infinitival verbs do not raise as high as their tensed counterparts:

⁸² We may have to posit more possible sites for ΣP in order to yield the full set of possible placements of negation in infinitives:

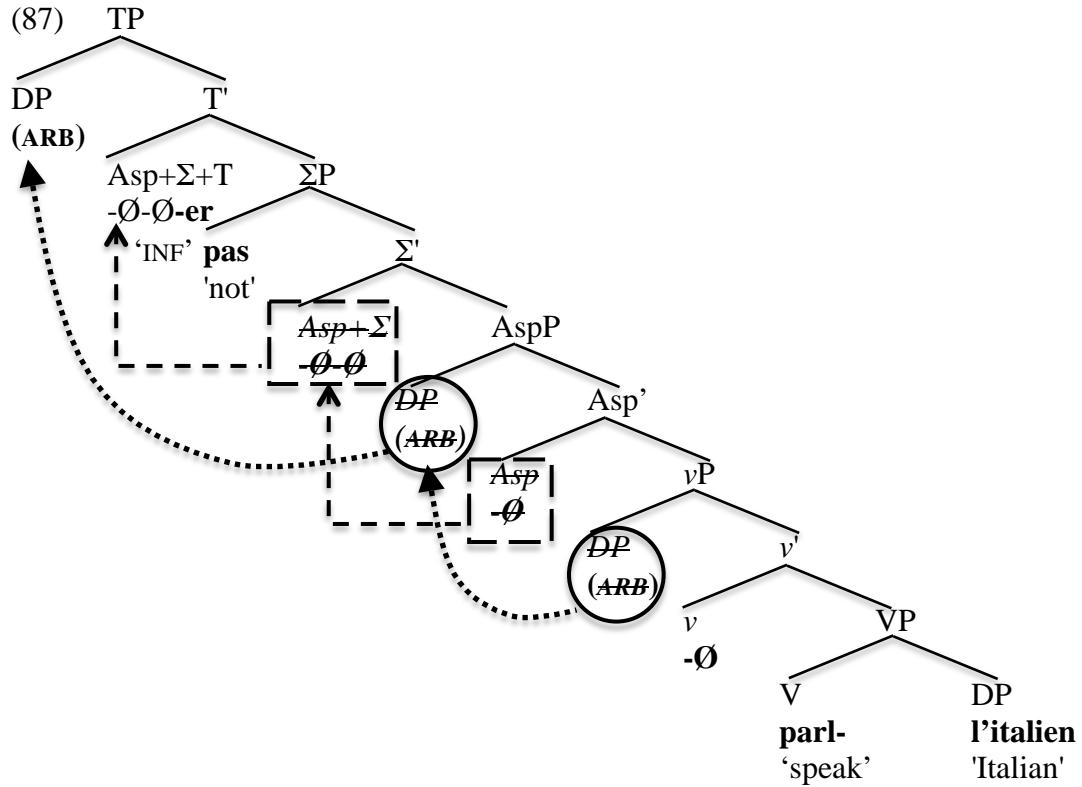
- (i)
 - a. John claims [not to have eaten chocolate since he was 10]
 - b. John claims [to not have eaten chocolate since he was 10]
 - c. John claims [to have not eaten chocolate since he was 10]

Perhaps this relative freedom of placement for ΣP in infinitival clauses could be related to a lack of semantic content for heads like INF and infinitival T; if these heads are comparatively meaningless, then their hierarchical relations with negation may not be tightly constrained.

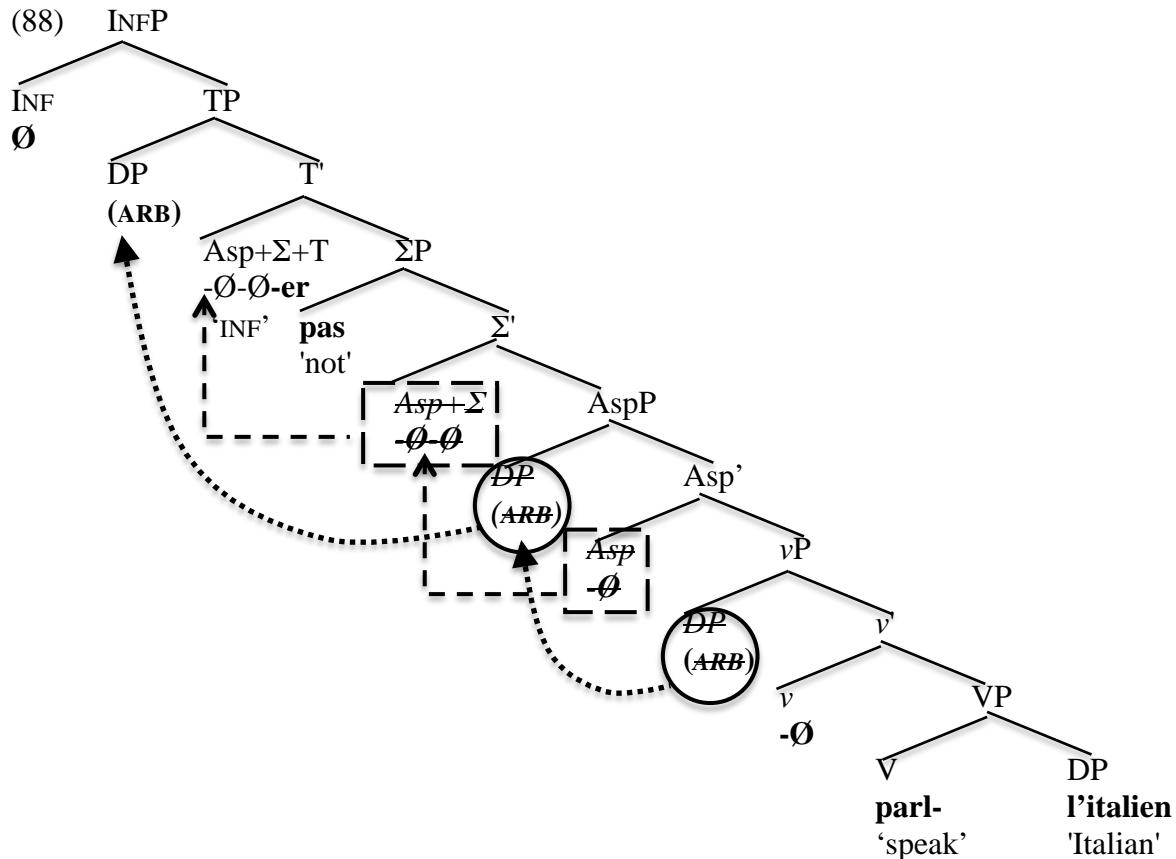
- (86) a. Jean **parle pas** l'italien
 Jean speaks not the-Italian
 'Jean doesn't speak Italian'
 b. * Jean **pas parle** l'italien
 Jean not speaks the-Italian
 c. **Pas parler** l'italien ...
 not to.speak the-Italian
 'To not speak Italian...'
 d. * **Parler pas** l'italien ...

The raising of the verb past negation to T in (86a) is triggered by the Contiguity relation between T and the subject. In French, T must Contiguity-adjoin to the subject, and as a result, no longer c-commands the verb in the prosodic tree. This prevents T from undergoing Prosodic Lowering to the verb, and in French, the repair for this problem is to raise the verb to T. As I remarked in section 1 of chapter 4, the theory that French verb movement is driven by the presence of the subject is supported by the lack of verb movement in the infinitive; if the subject is not overt, verb movement fails to occur.

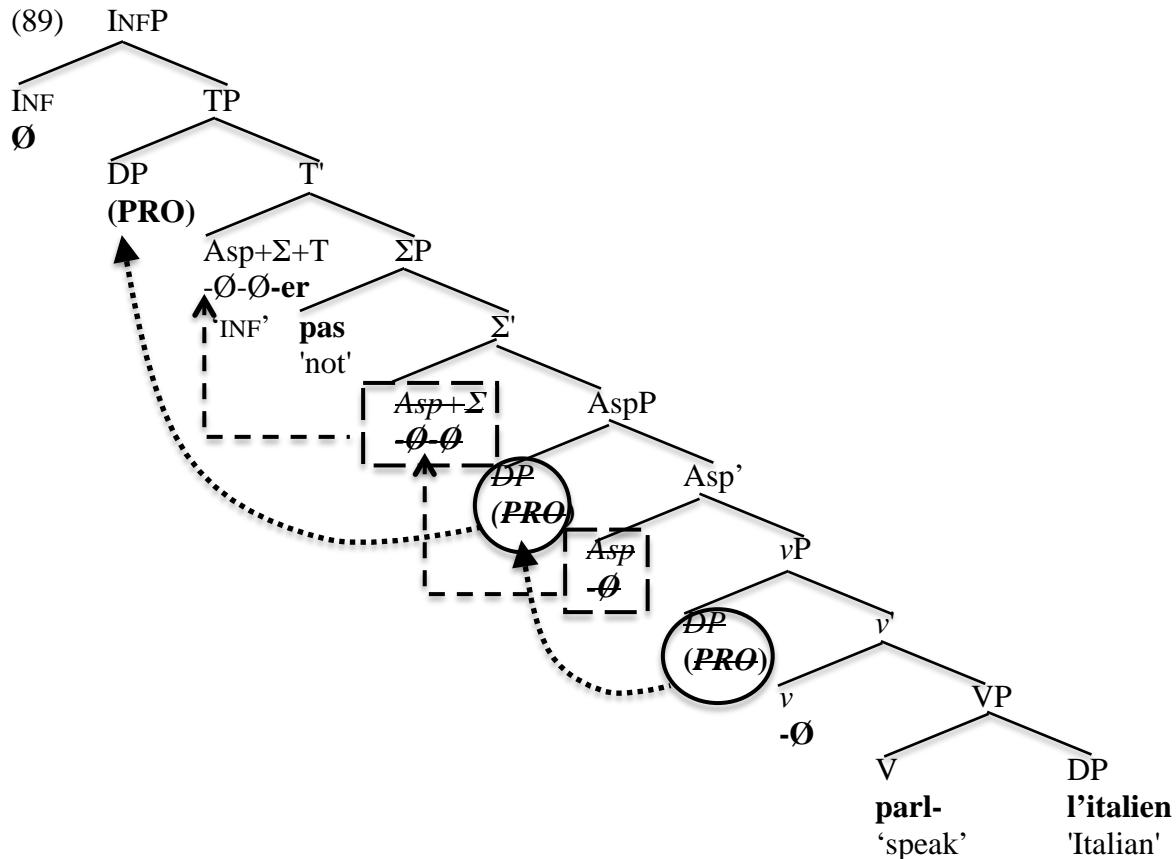
Consider a derivation for (86c), starting at TP:



I have written the subject, which will later become PRO, as (ARB). It has moved into the specifier of TP for Affix Support--which it is capable of providing, since at this point in the derivation it is still overt, or at least the fact that it is null has not yet been established in a way that is relevant for the syntax. The next head to Merge is INF:

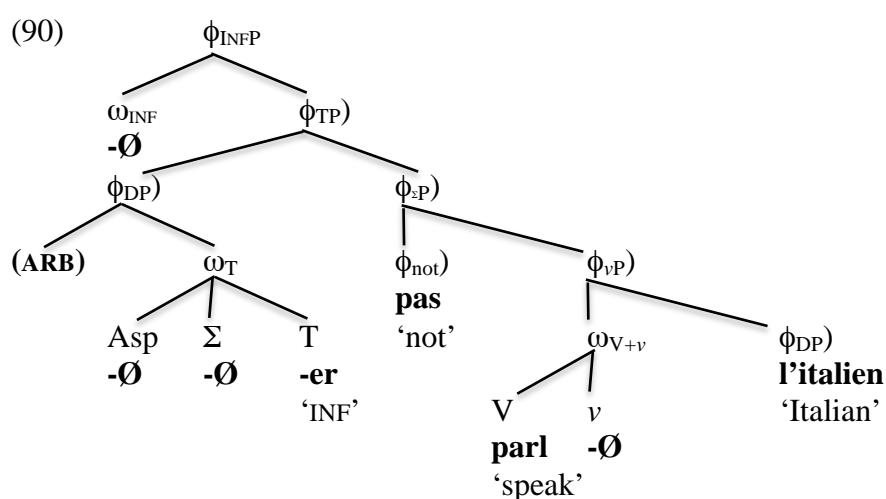


Now that INF has been Merged, the grammar must create a Contiguity relation between INF and T. In this case, it does so by making the subject null:



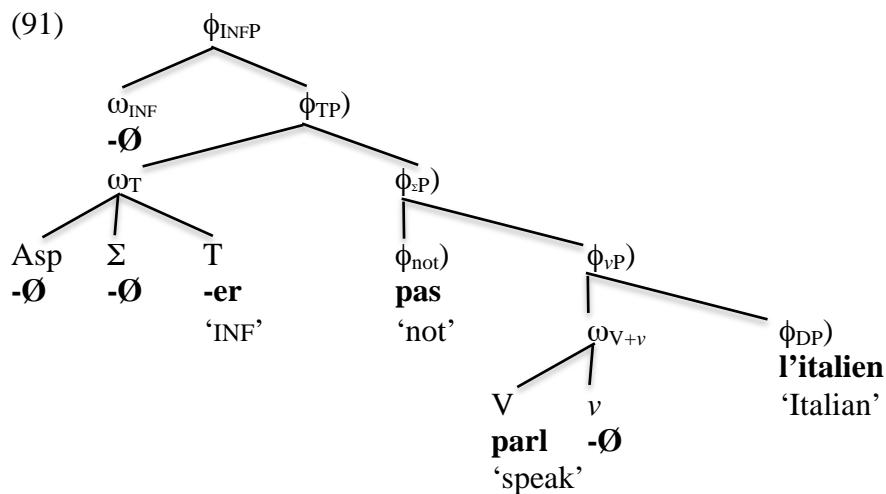
The verb remains low, following negation, and the remaining affixes Prosodically Lower to it.

Prior to making the subject null, examples like (88) ought to have prosodic trees like the one in (90):



Recall from section 4 of the previous chapter that a prosodic tree like (90) is the product of a conflict between the Contiguity needs of T and Σ . Both of these heads need to Contiguity-adjoin to their Goals in order to be Contiguous with them; both are contained in ϕ_{TP} together with their Goals, but neither Goal is Contiguity-prominent in this domain, since neither is adjacent to the prosodically active right edge of ϕ_{TP} . Since T and Σ are part of a complex head, their Contiguity-adjunction needs cannot both be met, and the complex head of which they are a part Contiguity-adjoins to the subject; I claimed in the previous chapter that this resolution to the competing needs of T and Σ is determined by cyclicity, since T is the head introduced last.

Once the subject has become phonologically null, we expect its representation to be pruned from the tree in (90). If the Contiguity needs of Σ were still under consideration by the grammar, we might expect ω_T to now Contiguity-adjoin to *pas* ‘not’. This would lead us to the false prediction that the affixes in ω_T cannot Prosodically Lower to the verb. It will therefore be important that, just as when Grouping prunes prosodic structure, the material stranded by pruning is reintroduced into the prosodic tree simply through the default Match requirements which dictate that T be part of the ϕ onto which TP is mapped:



ω_{INF} can now Contiguity-adjoin to ω_T , creating Selectional Contiguity between INF and T. In the resulting structure, ω_T c-commands the verb, and the affixes can Prosodically Lower to the verb, as desired.

Throughout, I have described Prosodic Lowering as occurring late, just before Spell-out. This derivation offers a piece of evidence for this conclusion⁸³. Prior to Merge of INF, the subject of the infinitive is overt, providing Affix Support for the morphology in T, and T must Contiguity-adjoin to the subject in order to create Contiguity between them, as is usual in French. The conversion of the subject into something phonologically null releases T from the need to remain Contiguous with it, thereby making it possible for T to Prosodically Lower to the verb. Since the decision to make the subject null cannot be made until INF is Merged, Prosodic Lowering also cannot take place until well after TP has been completely constructed. By the same reasoning, we must conclude that the kind of head-movement that is triggered by the impossibility of Prosodic Lowering cannot take place until just before Spell-out. The discussion around the tree in (91) arrived at the conclusion that after the subject has become phonologically null, the grammar fails to repair a previously broken Contiguity relation by Contiguity-adjoining Σ to *pas*; we might take this as evidence that at this late point in the derivation, the grammar has stopped trying to repair broken Contiguity relations⁸⁴.

Note that the decision about whether to Prosodically Lower an affix cannot occur at or after the end of the syntactic derivation. If it did, then wh-extraction of French subjects would cause the verb to remain low, which is not the case:

⁸³ Thanks to Bronwyn Bjorkman for very helpful discussion.

⁸⁴ See footnote 64, in section 4 of the previous chapter, for discussion of a similar failure to repair broken Contiguity in Danish.

- (92) a. Qui est-ce que tu penses ___ n' achètera pas ce livre? [French:
who is.it that you think NE will.buy not this book Lionel
'Who do you think [__ will not buy this book]? Mathieu, p.c.]

b. *Qui est-ce que tu penses ___ ne pas achètera ce livre?
who is.it that you think NE not will.buy this book

The verb *achètera* 'will buy' must precede *pas* 'not' in these examples, just as it would in any other tensed clause. The distribution of lowering and raising of T follows from the decision to posit Prosodic Lowering as an operation occurring just before Spell-out. At the embedded CP phase in (92a), for example, the wh-extracted subject is still within the phase, albeit at its edge, and Contiguity still holds between it and T; T therefore cannot lower, and the verb must raise to it. In the infinitive in (89), by contrast, there is no overt subject in the specifier of TP by the time the phase is finished, and consequently there is no reason not to lower T to the verb. We therefore derive the fact that French infinitival verbs are structurally lower than their tensed counterparts; infinitival T, by the relevant point in the derivation, has lost its Contiguity relation with the subject.

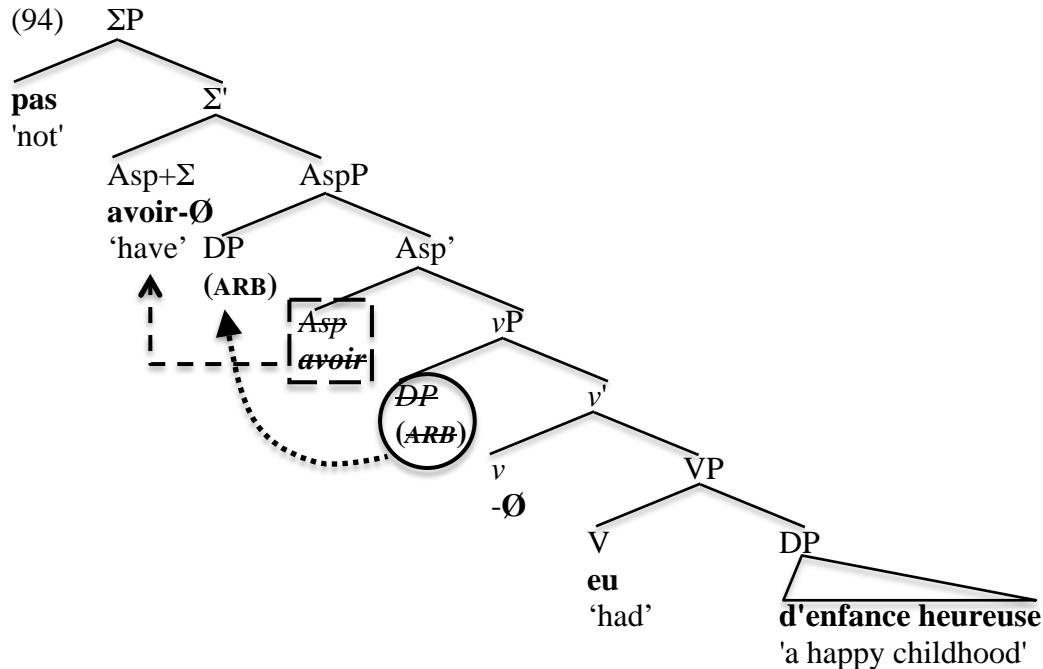
Finally, we should consider what this theory predicts about infinitival auxiliaries in French. Pollock (1989) mentions that French auxiliaries may either precede or follow negation in infinitives:

- (93) a. N' avoir pas eu d'enfance heureuse...
ne to.have NEG had of.childhood happy

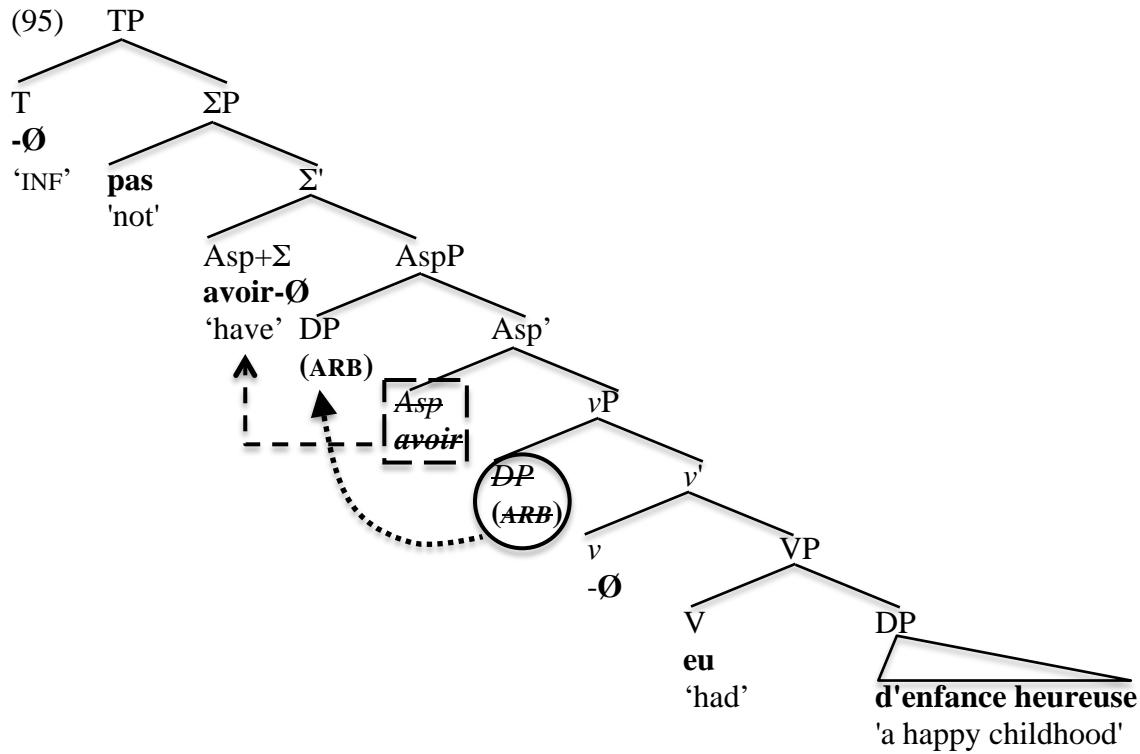
b. Ne pas avoir eu d'enfance heureuse...
ne NEG to.have had of.childhood happy
 'Not to have had a happy childhood...'

The two options apparently differ in style, with (93a) being more "literary" than (93b), but both are acceptable (and (93a) clearly contrasts, even for speakers who find it excessively literary, with examples in which infinitival main verbs precede negation).

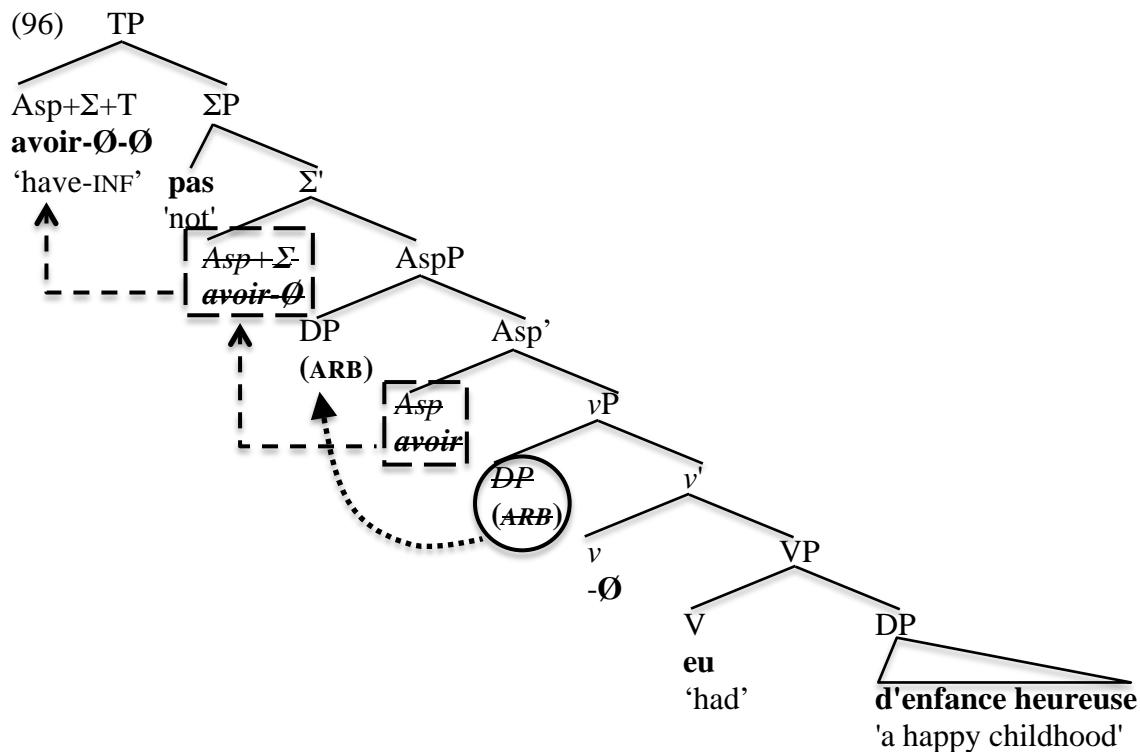
The order in (93a) is the one that falls naturally out of the theory presented here. Let us consider a derivation for (93a), starting at ΣP :



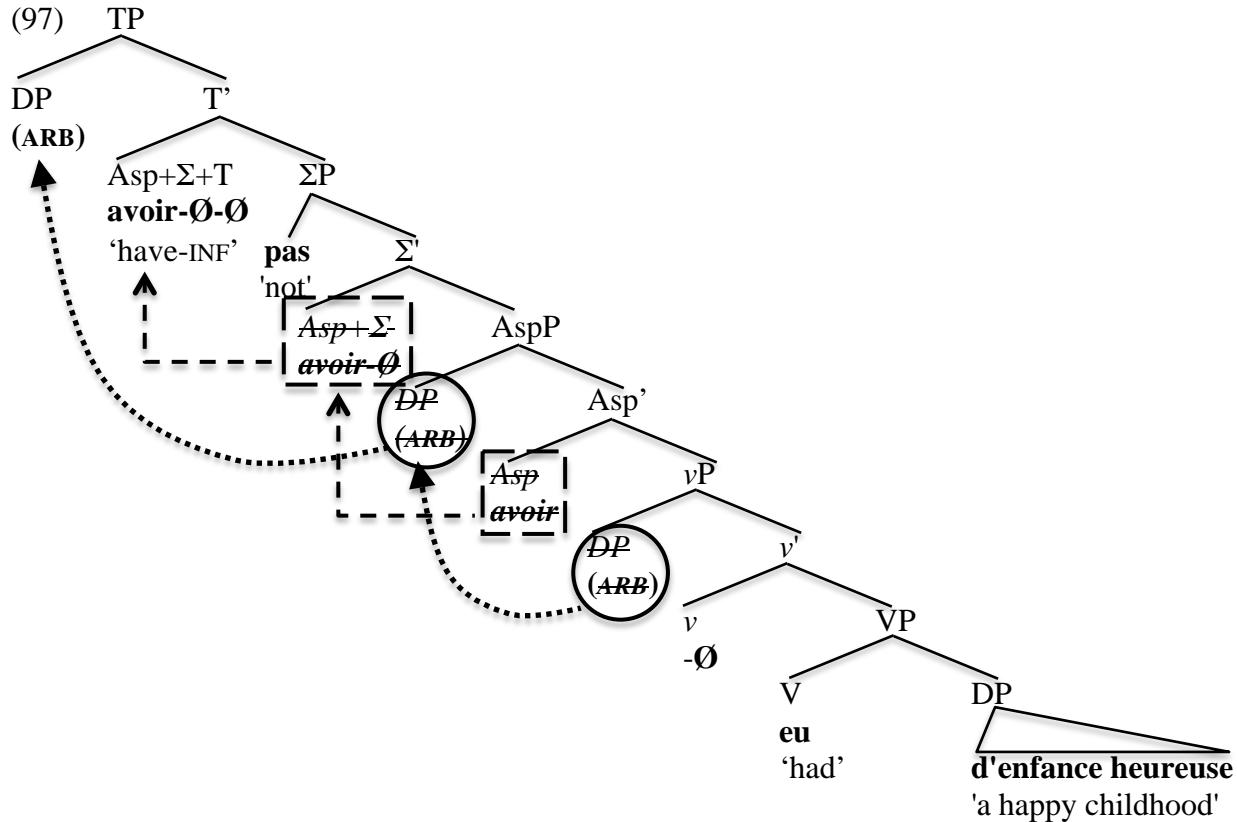
The derivation to this point has proceeded along familiar lines. The Asp head has pulled the subject into its specifier for Affix Support, and then moved into Σ to create Selectional Contiguity between them; the null Σ head has *pas* 'not' as its specifier (and we continue our tradition of ignoring French *ne* in our trees). The next head to Merge is T:



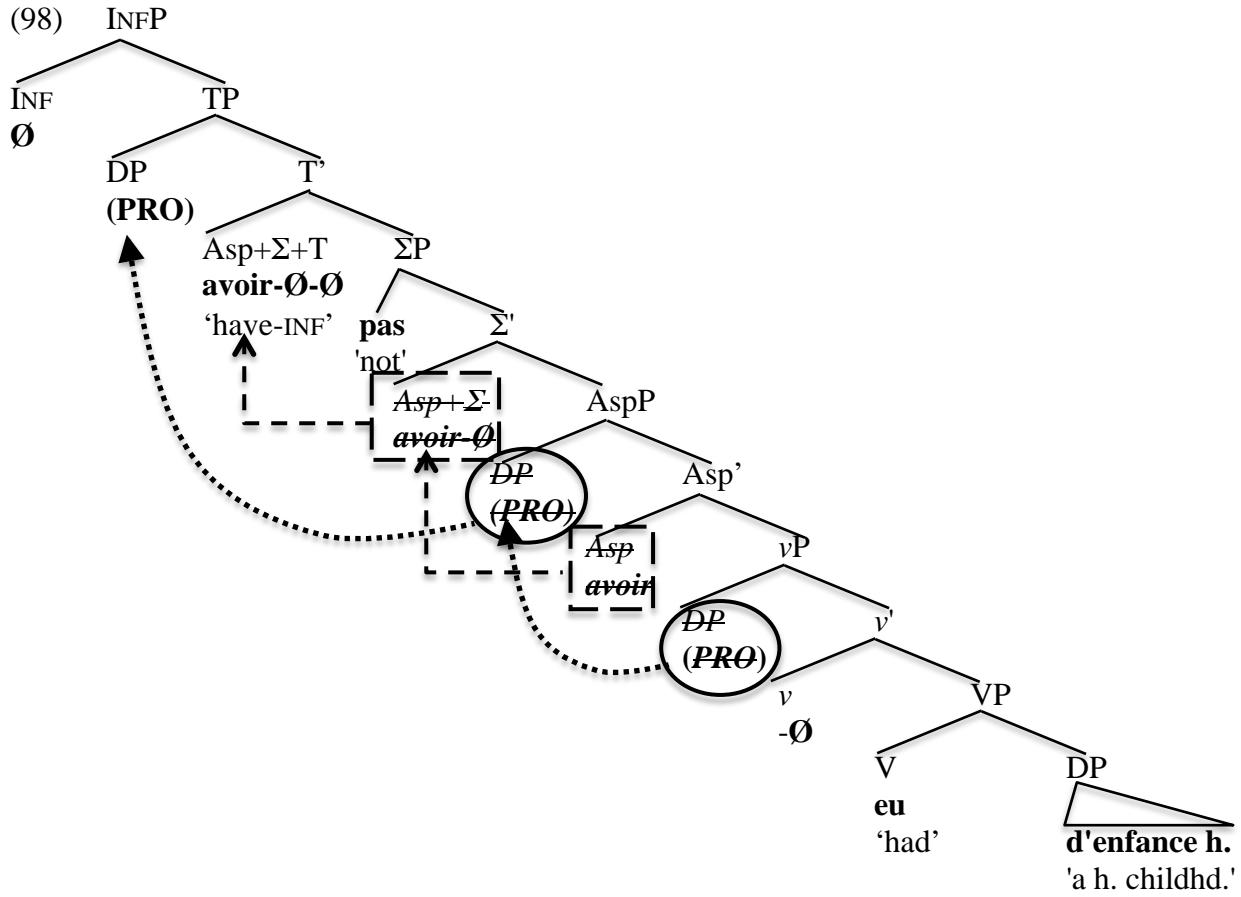
French T is like its English counterpart in needing Affix Support, and the auxiliary will therefore move to T, just as it would in an English tensed clause:



Also as in English, movement of the auxiliary to T will not satisfy Affix Support, since the auxiliary contains no internal metrical structure at this point. The subject will therefore have to move to T's specifier:



The derivation would then continue, as before, with the Merging of the INF head and the subsequent conversion of the subject to PRO:



The account developed here shares with Pollock's the consequence that French infinitives should resemble English main clauses. Once French T is relieved of the need to be adjacent to the subject, the motivation for raising to T that distinguishes French from English is gone, and the two languages begin to behave in the same way, reflecting the fact that both of them are Tense-suffixing languages in which verbs lack internal metrical boundaries⁸⁵.

This accounts for the well-formedness of (99a):

⁸⁵ Our theory does not predict that French infinitives will be identical to English tensed clauses. In particular, adverbs should still be able to intervene between the verb and an object in a French infinitive (Pollock 1989, 377-378):

(i) (à peine) parler (à peine) l'italien...
hardly to.speak hardly Italian
'To hardly speak Italian...'

French v, like all French Probes, can precede its Goal at an arbitrary distance, becoming connected to it prosodically via Grouping. The verb and the object therefore need not be adjacent, regardless of finiteness.

- (99) a. N' avoir pas eu d'enfance heureuse...
ne to.have NEG had of.childhood happy
- b. Ne pas avoir eu d'enfance heureuse...
ne NEG to.have had of.childhood happy
'Not to have had a happy childhood.'

To deal with (99b), we might make use of the conclusion drawn for English at the end of section 3.5.1, namely that ΣP can be generated dominating INFP. This will always have the consequence that negative morphology precedes the infinitive, regardless of whether the infinitive is an auxiliary or a main verb.

3.5.3 Italian

French and English differ, in the account developed here, in that French T Contiguity-adjoins to the subject for Contiguity, while English T does not. One consequence of this difference is that finiteness affects verb height in French, but not in English; French tensed verbs are high because French T cannot Prosodically Lower, and must be given a host by verb-raising, and once the subject is no longer overt, this motivation for verb raising disappears.

In languages of the Italian type, T is metrically independent, and the subject is therefore under no compulsion to appear in its specifier. Consequently, according to the theory developed in the previous chapter, Italian T does not Contiguity-adjoin to the subject: the subject is either below T, in which case Grouping can connect the two, or some kind of dislocation has moved the subject too far away from T for Contiguity between them to be maintained at all. Italian verbs, then, are like English verbs in not being constrained by any inability of T to Prosodically Lower, and we therefore expect Italian infinitives, like English infinitives, to have more or less the behavior of their tensed counterparts.

Much work on Italian verb movement concludes that this is essentially correct; see Belletti (1990) and Cinque (1999), for example, for arguments to this effect. Belletti (1990, 76), for example, points out that infinitival verbs in relative clauses obligatorily precede lower adverbs like *spesso* ‘often’, and obligatorily follow higher adverbs like *probabilmente* ‘probably’:

- (100) a. Ho trovato qualcuno a cui affidare **spesso** questo tipo di incarico
 I.have found someone to whom to.assign often this kind of duty
 ‘I found somebody to whom to assign this kind of duty often’

- b. *Ho trovato qualcuno a cui **spesso** affidare questo tipo di incarico
 I.have found someone to whom often to.assign this kind of duty
 ‘I found somebody to whom to assign this kind of duty often’

- (101) a. *Ho trovato qualcuno a cui affidare **probabilmente**
 I.have found someone to whom to.assign probably
 questo tipo di incarico
 this kind of duty

- ‘I found somebody to whom to probably assign this kind of duty’
 b. Ho trovato qualcuno a cui **probabilmente** affidare
 I.have found someone to whom probably to.assign
 questo tipo di incarico
 this kind of duty

‘I found somebody to whom to assign this kind of duty often’

Belletti concludes that Italian finite and infinitival verbs are in the same syntactic position.

As Pollock (1992) remarks, the Italian facts are problematic for Pollock's (1989) suggestion that the difference in verb height between English and French has to do with richness of morphological agreement. Italian infinitives are no morphologically richer than their French counterparts, but infinitives in the two languages behave quite differently. The difference is not surprising on the theory developed here; it is related to the fact that Italian, but not French, is a language without classic EPP effects, hence without the need (driven by Affix Support, on our theory) to move the subject into the specifier of TP. A consequence of Affix Support in French is that subjects are left in a position in which T must Contiguity-adjoin to them to make Probe-Goal Contiguity for T and the subject possible, thereby breaking the c-command relation between T and the verb in the prosodic tree and forcing the verb to raise to T. Since Italian T need not Contiguity-adjoin to the subject, the verb is free to remain in a lower position, regardless of the properties of the subject.

Cinque (1999) notes the existence of a class of Italian infinitives which are unusual in that adverbs cannot precede the verb. He contrasts examples like those in (102) with examples like those in (103) (Cinque 1999, 144-146):

- (102) a. Non lo entusiasmava, (***forse**) ottenere (**forse**) la loro fiducia.
not him made.enthusiastic perhaps to.obtain perhaps the their trust
'It did not arouse his enthusiasm to perhaps obtain their trust'

- b. (***Forse**) ottenere (**forse**) un risultato migliore, avrei preferito!
perhaps to.obtain perhaps a result better I.would.have preferred
'To perhaps obtain a better result, I would have preferred!'

- c. Sono riuscito a (***forse**) convincerlo
I.am succeeded P perhaps to.convince-him
'I succeeded in perhaps convincing him'

- (103) a. Cerco un uomo al quale **forse** presentare Maria
I.seek a man to.the which perhaps to.present Maria
'I'm looking for a man to whom perhaps to introduce Maria'

- b. Mi chiedo perché (**forse**) non dimostrargli (**forse**) più fiducia.
me I.ask why perhaps not to.show.him perhaps more trust
'I wonder why not to perhaps show him more trust'

- c. Gli hanno parlato più volte senza **forse** riuscire
to.him they.have talked few times without perhaps to.succeed
a convincerlo
P to.convince.him
'They talked to him a few times without perhaps managing to convince him'

Cinque notes that while infinitival relatives, infinitival wh-questions, and infinitival complements of certain prepositions (like *senza* 'without' in (103c)) allow the verb to be preceded by high adverbs, infinitives in sentential subjects and sentential objects, and infinitival

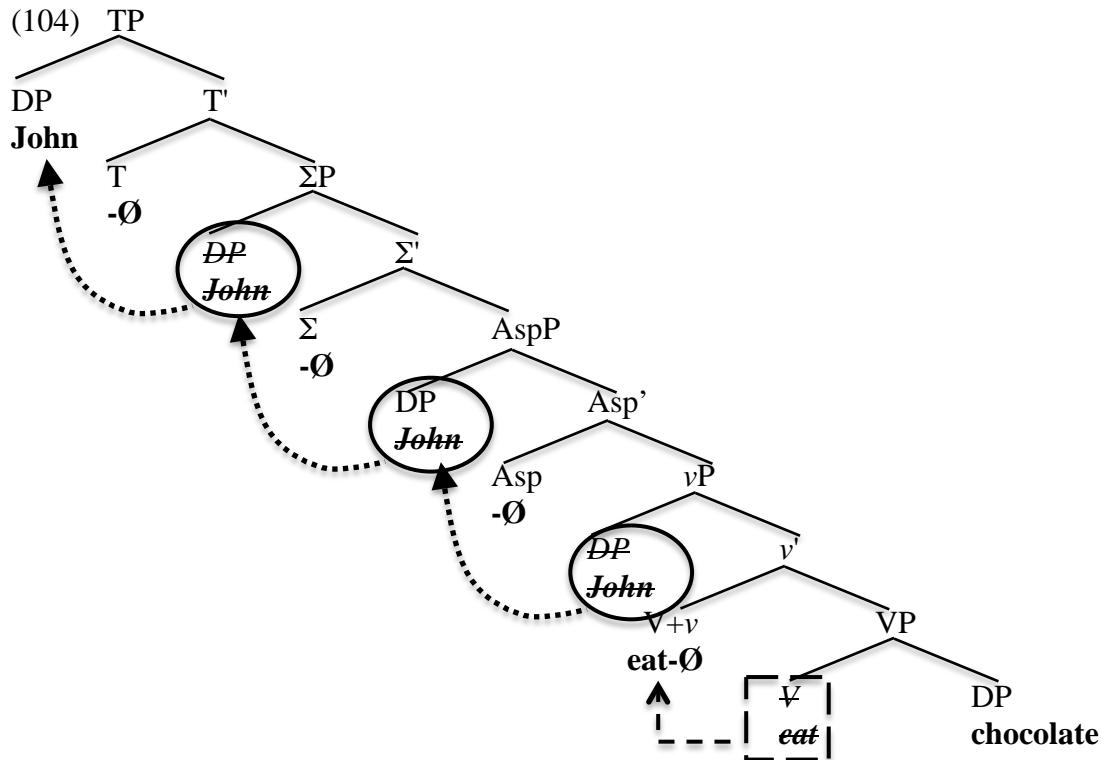
complements of certain other prepositions (like *a* in (102c)) require the verb to be initial in the infinitive.

In the theory developed here, it is natural to try to attribute the behavior of the infinitives in (102) to Selectional Contiguity. Italian is unlike English and French in that the subject itself need not disrupt Selectional Contiguity at any point, and we might imagine that the adverbs in (102), which are the only potential obstacles to full Selectional Contiguity along the clausal spine, are compelled to Untether and Retether out of the way; this would constitute a discovery about a preference, at least in Italian, for using Untethering to deal with adverbs that are the sole obstacles to Selectional Contiguity. Infinitival relatives and infinitival wh-questions are unlike the ordinary sentential subject and sentential object cases, in that the moving operator might itself constitute a temporary obstacle to Selectional Contiguity in one of its intermediate landing sites (and thereby remove the motivation for Untethering and Retethering the adverbs, since doing so will not solve the Selectional Contiguity problem). I will have to leave the matter here, pending a better understanding of the prosody of modification in Italian.

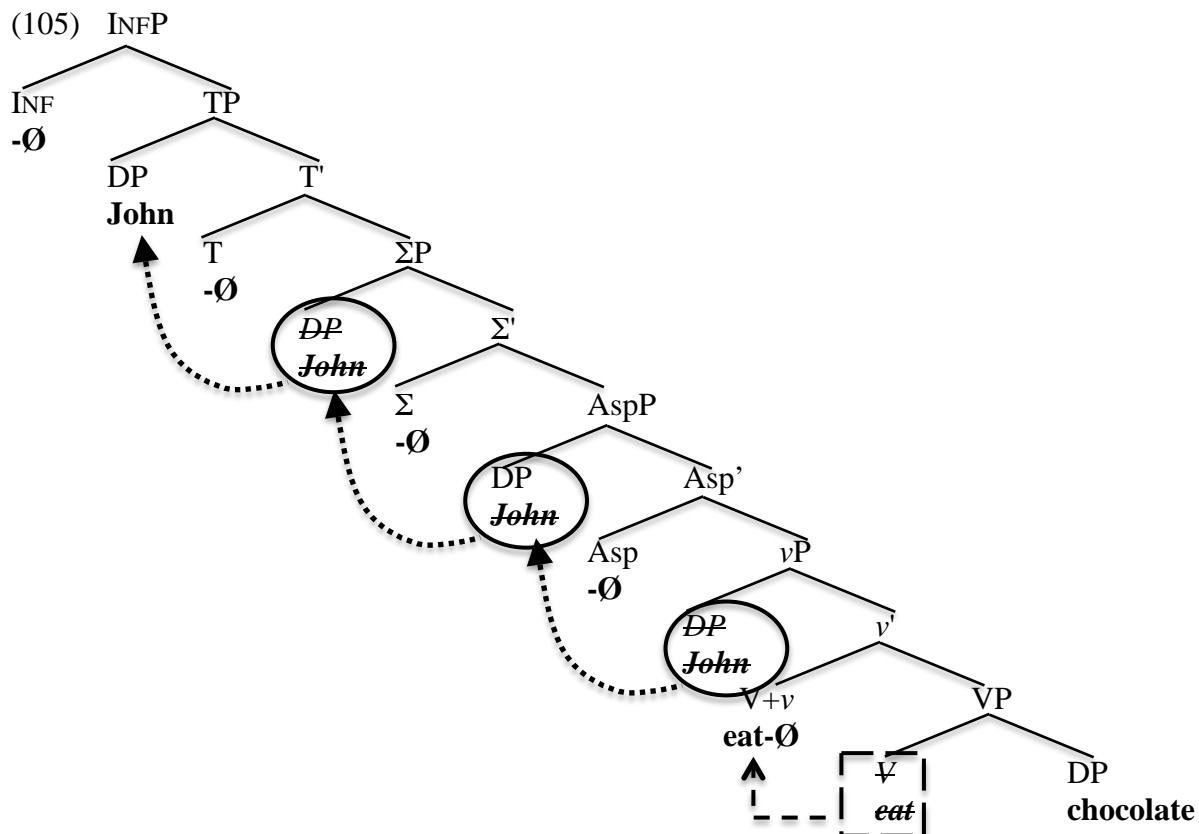
3.5.4 Affixal INF?

All of the preceding discussion of infinitives has involved positing a head INF which is neither a phase head nor an affix. Positing this head allows us to capture a number of facts about the distribution of PRO and the special behavior of subjects of infinitives. Still, we might wonder whether INF's non-affixal status is universal, and if so, why.

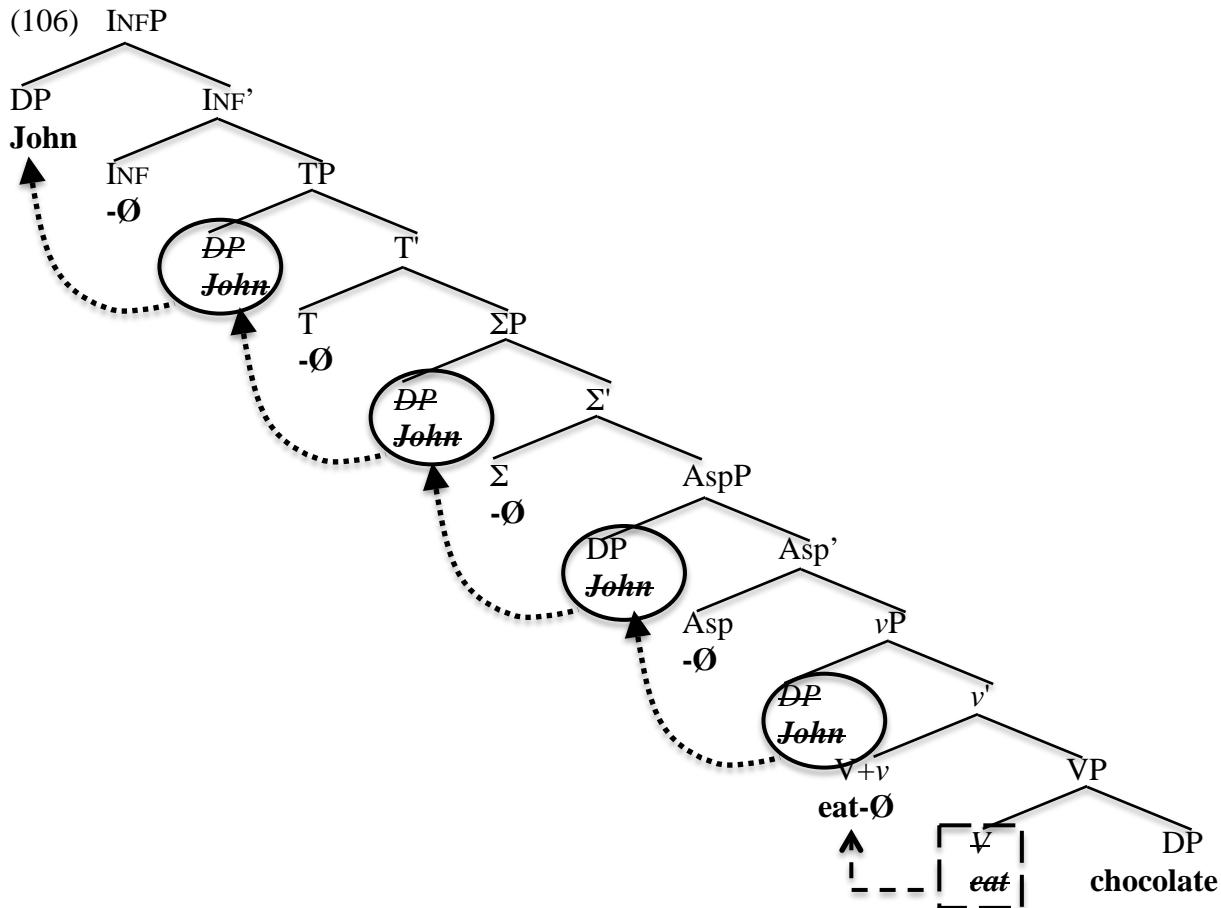
Consider what would happen if, for instance, English INF were a suffix. We can consider a derivation beginning with TP:



The next head to Merge is the hypothetical affixal version of INF:



As an affix, INF will trigger movement of *John* into its specifier⁸⁶:



Movement of *John* allows INF to satisfy Selectional Contiguity with T. Finally, all the affixes will Prosodically Lower to the verb.

The derivation that ends with (106) is very difficult to distinguish from an ordinary tensed clause⁸⁷. One possibility is that this is indeed the correct structure for tensed clauses, and that INFP should really be thought of as Rizzi's (1997) FinP, with both infinitival (non-affixal) and finite (affixal) forms. This still leaves us with the question, however, of why it should be

⁸⁶ To guarantee that it is *John* which moves, we would presumably need to regard INF as a Probe; if it were not, any phrase would be able to move to the specifier of INF. Perhaps the latter possibility would be useful as part of an account of embedded V2.

⁸⁷ The account of T-to-C in English wh-questions, offered in section 1.2 of this chapter, would have to be changed to become compatible with this proposal.

infinitives in which Fin is not an affix, and finite clauses in which it is, rather than (for example) the other way around. I leave this question for future research.

4. Conclusion

This chapter has been an exploration of head movement to positions and in constructions other than the ordinary declaratives that were the focus of chapter 6. We have considered head-movement to C in English wh-questions and in V2 clauses, and short verb movement to transitive *v* in English. The bulk of the chapter has been dedicated to a discussion of infinitives, including the special properties of their subjects and the positions of infinitival verbs in English, French, and Italian.

For the most part, the facts have been made to follow from previously proposed requirements. The discussion of V2 introduced a condition of Stress Isomorphy, which blocks Prosodic Lowering of C in languages in which verbs are standardly stressed with full trochaic feet. The discussion of infinitives relied on the existence of a head INF, responsible for introducing infinitives larger than TP, which is neither an affix nor a phase head.

One of the contributions of this chapter has been establishing the existence of a class of ‘late’ operations, which take place just at Spell-out. The account of French infinitival verb height in section 3.5.2 of this chapter depends on conversion to PRO and Prosodic Lowering both being operations of this kind; in particular, if Prosodic Lowering of T took place once TP was complete, we would incorrectly predict that French infinitival verbs would have to raise to T, since conversion of the subject to PRO is not motivated until after the higher head INF has been Merged. And if Prosodic Lowering is late, then Stress Isomorphy, introduced in section 1.2 as a way of blocking certain instances of Prosodic Lowering, cannot apply until Spell-out, either (which may partly explain why Stress Isomorphy apparently applies only to phase heads).

Finally, the discussion of infinitives in head-final languages, in section 3.4, depended on Retethering being a late operation. The familiar operations of Move and Merge, along with the less traditional one of Untethering, apparently apply during the syntactic cycle, at least partly in response to the requirements of Contiguity and Affix Support introduced and defended in this book; Prosodic Lowering, conversion to PRO, and Retethering, however, occur at the last possible moment, just before the contents of the phase are sent to PF.

Chapter 8

Conclusion

This book has been an attempt to develop a predictive theory of the forces that drive syntactic movement. The existing machinery for driving movement in Minimalist approaches to syntax consists of a type of diacritic; in some languages but not others, features on certain heads drive overt movement of various kinds to themselves, essentially because we say so. The goal of this book has been to replace this system with a set of principles, grounded in independent and observable properties of languages, which make testable predictions.

In particular, I have pursued a classic Minimalist idea, attempting to explain the properties of syntax by connecting them to the grammar's need to create objects that are acceptable to the interfaces. I have argued that the grammar begins the building of PF representations earlier than previously thought, and that many movement operations are triggered by conditions on these representations. It has been important that these PF representations are not identical to the eventual PF outputs; in particular, I have argued (starting in chapter 2) that lexically idiosyncratic information is not available to the syntax, perhaps for reasons having to do with the timing of lexical insertion.

The partial character of the grammar's access to phonological information represents one argument against one kind of imaginable alternative to the theory developed here, in which we would use the phonology as a filter for the syntax. Such an account would have difficulty explaining why only some aspects of phonology, and not others, may act as filters. Another such argument has rested on various instances of derivationally induced opacity; we have seen many cases of movement operations, driven by phonological considerations, which create representations that do not survive to the final phonological output.

1. Review

The bulk of the book has been concerned with the syntactic derivation; I have proposed several conditions that the derivation seeks to meet, and operations that it uses to meet them. In chapters 6 and 7, as the focus shifted to head-movement, we began to see evidence for another set of requirements and operations that come into play just at Spell-out. The following two sections consider these parts of the derivation in turn.

1.1 Narrow Syntax

The two principles that drive movement of phrases in this theory are:

(1) **Affix Support**

If a head is an affix, there must be a metrical boundary in the direction in which it attaches.

(2) **Generalized Contiguity**

If α either Agrees with or selects β , α and β must be dominated by a single prosodic node, within which β is Contiguity-prominent.

And the definition of *Contiguity-prominence* is as follows:

(3) **Contiguity-prominence**

For a particular node F, an element X dominated by F

has *Contiguity-prominence within F* just in case:

(i) X has no sister which is higher on the prosodic hierarchy ($\omega < \phi < \iota$) than X,

and

(ii) X is not linearly separated from a prosodically active edge of F.

Affix Support is responsible for movement of phrases to specifiers of heads which are subject to it. It first appeared in Chapter 2 as a way of deriving classic EPP effects, but has also

made an appearance in the accounts of wh-movement to the specifier of CP (for instance, in English main-clause questions) and in the account of V2 word order, among other places.

Generalized Contiguity is an updated and generalized version of the condition on the prosody of wh-questions that I offered in Richards (2010). I have sometimes spoken informally of *Selectional Contiguity* and *Probe-Goal Contiguity*, the subtypes of the general condition of *Generalized Contiguity*. Contiguity relations are sometimes created via movement, sometimes via manipulation of the prosodic structure, and sometimes by a combination of the two. Probe-Goal Contiguity has often driven phrasal movement; Selectional Contiguity has driven head-movement, and has also been important in accounts of various typological generalizations (for instance, Trask's (1979) generalization that ergative languages are invariably verb-peripheral, Potsdam's (2009) generalization that verb-initial language never have obligatory wh-in-situ, Haider's (2004) observations about extraposition in English and German, and the Final-over-Final Constraint of Biberauer, Holmberg, and Roberts (to appear)).

I have assumed a modified version of Selkirk's (2009, 2011) Match theory of prosodic structure. Match theory proposes that prosodic structure is more or less isomorphic to syntactic structure; that is, it reflects fairly closely the effects of Merge operations. I have proposed that prosodic structure reflects, not only the effects of Merge, but also the effects of Agree; the need to create Contiguity relations is one of the factors, I have claimed, leading to departures from isomorphy between the prosodic tree and the syntactic one.

I have proposed two types of operations affecting prosodic structure, neither of which affects linear order of terminals:

(4) **Grouping**

Take a pair of prosodic nodes α , β , and create a ϕ which dominates them both.

(5) **Contiguity-adjunction**

Take a pair of adjacent prosodic nodes, and make one of them a daughter of the other.

Grouping can apply over an arbitrary distance, while Contiguity-adjunction requires adjacency; consequently, if Grouping is prevented from creating Contiguity relations (typically, by the position of prosodically active boundaries in the language in question) then Contiguity will require adjacency (to make Contiguity-adjunction possible). We arrive at the result that, at least in languages in which only one edge of a prosodic phrase is prosodically active, Probes will generally have to be adjacent to Goals on one side of them, and can be arbitrarily distant from Goals on the other.

A third condition first appeared in section 5 of chapter 5; I proposed (inspired by the line of research developed in Christophe et al (1997), Christophe et al (2003), and Nespor et al (2008)) that languages can vary in the position of phrasal stress, and that this variation has consequences for head direction. If a language prefers for phrasal stress to be final in a given phrase, the idea was, then the head of that phrase should be initial, since heads generally shun phrasal stress. This condition was one of the necessary conditions licensing Prosodic Untethering:

(6) **Prosodic Untethering**

Given two sisters in the prosodic tree, X and Y,

delete all existing ordering statements which make reference to either X or Y.

Prosodic Untethering has to be motivated, both by the conditions on phrasal stress and by the need to create Contiguity relations; the latter requirement was central to the derivation, in section

5 of chapter 5, of Holmberg, Biberauer, and Roberts' (to appear) Final-over-Final Constraint, along with some of its apparent exceptions (including the existence of final interrogative complementizers in generally head-initial languages). The decision to apply Prosodic Untethering to the prosodic tree rather than the syntactic one was important in the account of Potsdam's (2009) generalization in section 3 of chapter 5; verb-initial languages must also be complementizer-initial, because as soon as C is Merged in such a language it can Contiguity-adjoin to T, creating Contiguity between them and changing the prosodic tree in ways which make it impossible for Prosodic Untethering to alter the order of C and TP.

1.2 At Spell-out

We have seen evidence for a number of last-minute operations that the grammar may apply at Spell-out, to improve the status of the structure before handing it off to the PF interface. In particular, we saw that the grammar works to find hosts for affixes, to create Contiguity relations which have not yet been correctly constructed, and to fix word order which has been disrupted by Untethering.

The movement of heads is regulated and motivated by the principles reviewed above for phrases. Making head-movement one way of satisfying Affix Support was part of the account of the distinction between auxiliaries and main verbs in a language like English; making head-movement one way of satisfying Selectional Contiguity was important for, for instance, the account of verb-initial word order.

Heads were also subject to one condition which does not hold for phrases; if a head is an affix, it must have a host. Several of the principles that apply at Spell-out are concerned with supplying hosts to potentially stranded affixes.

The default way for an affix to attach itself to a host is via Prosodic Lowering:

(7) **Prosodic Lowering**

An affix dominated by ω is realized on the closest host c-commanded by ω in the prosodic tree.

We considered two kinds of cases in which Prosodic Lowering fails. One is when an affixal head has Contiguity-adjoined to some phrase to create Contiguity; this was the account, for example, of why verbs generally raise to T in French, and why they need not do so in infinitives, in which the subject is not pronounced in the specifier of TP.

The second failure of Prosodic Lowering was due to a principle that appeared in the account of V2, in section 1.2 of chapter 7:

(8) **Stress Isomorphy**

If the verbs of a language exhibit non-degenerate trochaic feet, Prosodic Lowering from C is blocked.

Stress Isomorphy represents an attempt by the grammar to arrange sentence-level stress along the same lines as word-level stress (a desideratum argued for by Tokizaki (2011), Tokizaki and Fukuda (2011), and Tokizaki and Kuwana (2014)). It had the effect of preventing affixal C from lowering in most Germanic languages (but not English).

The typical reaction to failure of Prosodic Lowering, we have seen, is movement of a host to the stranded head. We have also seen that English, unusually, instead inserts an appropriate host:

(9) ***do*-support**

In English, if a null verbal affix is in a position from which it cannot Prosodically Lower to a host, it should be realized on the dummy host *do*.

English *do*-support is triggered when heads in the verbal spine must Contiguity-adjoin to Goals, which happens in English when the heads precede their Goals; thus, Σ can trigger *do*-support if it moves to the left of negation, and T can trigger *do*-support if it moves to the left of the subject.

I argued, in section 3 of chapter 7, that the special properties of subjects of infinitives represent another attempt by the grammar to create Contiguity relations, sometimes just at Spell-out. Because subjects of infinitives, if they are pronounced in the specifier of TP, typically interfere with a Selectional Contiguity relation between the heads on either side of them, the grammar finds various means of not pronouncing them there, including moving them out of position (Raising), failing to raise them to the external subject position (e.g., in languages like Italian) and failing to pronounce them at all (Control). Marking subjects as unpronounced (perhaps even suppressing their Spell-out altogether), I argued, is a last-ditch attempt by the grammar to create Contiguity, employed just at Spell-out; see the discussion in section 3.5.2 of chapter 7. In section 6 of chapter 6 I floated the possibility, to be tested in further research, that pro-drop, at least of the Spanish type, may be given an account along the same lines.

Finally, I argued in section 3.4 of chapter 7 that it is at Spell-out that the grammar employs the operation of Retethering, thereby reestablishing linear order of elements which had been left unordered by Untethering. The lateness of Retethering was useful for the account of control in head-final languages.

1.3 Constraints on operations

The operations discussed in the last two sections are subject to a number of conditions constraining how they could be used.

Two of these have to do with the order in which operations should be performed. The first appeared for the first time in section 3.2 of chapter 4:

(10) **Multitasking**

At every step in a derivation, if two operations A and B are possible, and the conditions satisfied by A are a superset of those satisfied by B, the grammar prefers A.

The main effect of Multitasking, in Contiguity Theory, has been to guarantee that a head in need of Affix Support must typically use a Goal that it Agrees with for Support, if there is such a Goal. Multitasking was part of the account for the fact that V2 languages (almost) universally exhibit overt wh-movement; such languages, I argued, have affixal C, and this affix must trigger movement of a wh-phrase with which it Agrees, if there is such a phrase. Multitasking also helped us deal with the difference between EPP effects in head-initial languages like English (which are generally satisfied by the subject) and their counterpart in head-final languages like Japanese (which can be satisfied by any phrase).

The second principle guiding order of operations was an unnamed condition requiring the grammar, given a choice of pairs of nodes that should be affected by an operation, to choose the structurally closest such pair. The principle surfaced in section 4 of chapter 5 (where it was part of the account of why Untethering affected head direction in languages like Japanese before Probe-Goal Contiguity relations could be established), section 2.1 of chapter 6 (where it required head-movement of auxiliaries to precede phrasal movement of the subject in a language like

English), and section 2.3 of chapter 6 (where it was part of an account of why adverbs do not trigger head-movement across them for Selectional Contiguity)

A third condition on the grammar limits the search space of elements that may be affected by operations driven by the need to create a particular relation:

(11) **Hippocratic Altruism**

No operation can affect α if the only effect of the operation on α is to alter α 's position in a way which might disrupt a Contiguity relation in which α participates.

Hippocratic Altruism guarantees that no element in a Contiguity relation will move in order to create a relation in which it does not itself participate. The “Hippocratic” part of the principle is designed to exclude adverbs from its effect, allowing them to Untether or Contiguity-adjoin purely in order to facilitate the creation of Contiguity relations across them. Phrases like subjects and objects, by contrast, are prevented from being so accommodating. Hippocratic Altruism has played a role, for example, in accounts of conditions on Quotative and Locative Inversion in English, and on participle agreement in Romance languages (in section 2 of chapter 5).

Finally, a perennial theme has been the treatment by the grammar of Contiguity relations. We have seen that Contiguity relations must be created as quickly as possible; this was important, for example, in the treatment of ECM and *wager*-class verbs in section 3.1 of chapter 7, as well as in the account of Potsdam's generalization in section 3 of chapter 5. Contiguity relations are forgotten once a phase is complete; this is why the adjacency requirements imposed by Probe-Goal Contiguity between v and the object in languages like Danish and Irish are broken by head-movement triggered by heads in higher phases (section 2.2-2.3 of chapter 4). Within a phase, Contiguity relations are to be maintained and repaired as much as possible; this is why,

for example, English T-to-C may not leave T separated from the subject by an adverb (section 2.1 of chapter 4).

2. Conclusion

I have tried to show how Contiguity Theory can account for variation in the distribution of several kinds of overt movement, including the classic triumvirate of wh-movement, head-movement, and A-movement to the specifier of TP. On the approach developed here, this variation can be traced to a variety of previously recognized and directly observable differences between languages: languages differ in the distribution and type of their affixes, the rules for insertion of word-internal metrical structure, and the nature of prosodic phrasing. If the account offered here is correct, these differences have syntactic as well as phonological consequences, and the child's task in acquisition is made easier; once a Spanish child has learned where stress appears in the verb, for example, she has also learned that her language lacks EPP effects.

Much work remains to be done, of course. There are many kinds of movement that I have not tried to develop accounts of, including movement apparently driven by information-structural notions like topic and focus, object shift of the Scandinavian type⁸⁸, multiple wh-movement, and many instances of scrambling. I have concentrated entirely on the syntax of the clause, neglecting the internal syntax of DPs⁸⁹. I have demonstrated the consequences of this theory for several languages, but I am sure that the theory will need to change as it encounters data from a wider range of languages.

I hope to have demonstrated, however, that there are interactions between phonology and syntax that we may make fruitful use of in our explanations of syntactic phenomena. The

⁸⁸ For proposals relating object shift to prosody, see Erteschik-Shir and Josefsson 2013, Hosono 2013.

⁸⁹ As Steven Franks (p.c.) points out to me, the generalization of the theory to DP structure will not be straightforward. For instance, we saw in chapter 2 that verbs with suffixes often exhibit EPP effects; by contrast, nouns with suffixes never seem to do this. Work on phonological differences between nouns and verbs (see Smith to appear and work cited there) seems like a natural place to begin to seek a solution to this problem.

working hypothesis of Contiguity Theory, hopefully to be tested in much future research, is that a complete description of the phonology of a language is also a complete description of its syntax.

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