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Phases

An essay on cyclicity in syntax

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List of glosses used

1, 2, 3, ...	noun class one, two, three, ...	GEN	genitive case
1 st , 2 nd , 3 rd	first, second, third person	GO	Irish neutral complementizer
		ICP	incompletive aspect
A	Tzotzil set A affix	INDEF	indefinite
A	Lakhota agent agreement	INF	infinitive
ABL	ablative case	INST	instrumental case
ABS	absolutive case	IV	instrumental voice
ACC	accusative case	LNK	linker
AGR	agreement	LOC	locative
AL	Irish leniting complementizer	M	masculine
AN	Irish nasalizing complementizer	NE	French initial part of bipartite negation
AM	Malagasy agent marker	N	neuter
APPL	applicative	NMLZ	nominalizer
ART	article	NOM	nominative case
ASP	aspectual auxiliary	OBJ	object case
aux	auxiliary	OV	objective voice
AV	agentive voice	P	pre- or postposition
B	Tzotzil set B affix	PASS	passive voice
BV	benefactive voice	PERF	perfect
CAUS	causative	PL	plural
COMP	complementizer	POSS	possessive
COND	conditional	PRS	present tense
CP	completive aspect	PROG	progressive aspect
DAT	dative case	PST	past tense
DEF	definite	PRT	particle
DEM	demonstrative	PV	Hungarian preverb
DIR	directional	Q	interrogative marker
DR	German filler morpheme used with prepositions	REFL	reflexive
DV	dative voice	REL	relative marker
ENC	enclitic	SG	singular
ERG	ergative case	SM	subject marker
F	feminine	SUBJ	subjunctive
FOC	focus marker	T	French marker of subject auxiliary inversion
FUT	future tense	TM	Malagasy theme marker
FV	final vowel	U	Lakhota theme agreement

1 Introduction

This essay investigates the concept of the phase in minimalist syntax. If the concept of the phase is fundamental to the theory and if it is to be productive theoretically, it should provide the grounds for a unifying formulation of different aspects of syntactic theory. I try to make some progress on this project, restricting myself to the theory of movement. The investigation focuses on cyclic movement and certain questions connected to it. I ask to what extent a unifying treatment of successive-cyclic movement, partial movement, pied-piping, secondary movement under pied-piping, and Abels's (2003c) stranding generalization is possible and what role the notion of a phase might play in this.

Movement is a characteristic property of human languages. In many languages particular structural positions are associated with particular properties. In English (English being a SVO language) the position immediately after the verb is canonically associated with accusative case on pronouns and, semantically, with the thematic interpretation of patient, (1a). The clause-initial position on the other hand is associated with topics and with question words in constituent questions. When a constituent realizes the thematic role of patient and is the focus of a question or the topic, it is displaced to the front of the clause (1b–c).

- (1) English
- a. John kicked him.
 - b. Him, John kicked.
 - c. Who did John kick?

There is substantial evidence that such movement is mediated locally. Take for example the description of Belfast English in Henry, 1995. According to Henry, Belfast English exhibits subject-auxiliary inversion of the standard English type in direct questions, (2a). However, unlike standard English, Belfast English also allows inversion in indirect questions, (2b), and, crucially, along the path of Wh-movement, (2c).

- (2) Standard English (SE) and Belfast English (BE)
- a. ✓SE | ✓BE What have you done?
 - b. *SE | ✓BE She asked who had I seen. Henry, 1995, p. 106
 - c. *SE | ✓BE Who did John hope would he see? Henry, 1995, p. 108

Effects like these can be given a simple account if the Wh-word *who* in (2c) moves from the canonical object position in the embedded clause to the position

where it is pronounced not in one step but in two steps, passing through the initial position of the embedded clause and triggering subject-auxiliary inversion there. Effects like subject-auxiliary inversion in (2c) are usually taken to provide evidence for successive-cyclic movement: long movement proceeding in a series of short steps.

I hasten to add that this interpretation of the evidence is not uncontroversial. Some of the controversy is the topic of chapter 2. For the moment it is sufficient to note that there is evidence suggesting that apparently unbounded movement proceeds in a sequence of short steps. This is the successive-cyclic property of movement.

This property is related to phases here via the assumption that all and only the phase edges along the path of successive-cyclic movement provide intermediate landing sites for movement. This is implemented using features that have an interpretation but—and this is a special property of phase heads—that need not be interpreted on phase heads.

In some languages Wh-phrases are pronounced in positions which, in other languages, are hypothesized to provide intermediate landing sites for movement. For example, Malagasy, an Austronesian VOS language, has two strategies for forming local constituent questions (Sabel, 2006). An *in situ* strategy, where the questioned constituent remains in its canonical position, and a movement strategy, where the questioned constituent moves to the clause-initial position. If the canonical position of a Wh-phrase is separated from the clause with interrogative scope by a clause boundary, a third strategy becomes possible: The Wh-word may remain in situ in the embedded clause, it may move to a left-peripheral position in the embedded clause, or it may move to a left-peripheral position in the interrogative clause itself, (3a–c), respectively. Malagasy allows the same three strategies also in forming indirect questions. I refer to the type of pattern in (3b) as *partial Wh-movement*: the Wh-phrase appears to undergo Wh-movement to a position between its canonical position and its scope position and surfaces where theories of successive-cyclicity would locate an intermediate landing site.

- (3) Malagasy Sabel, 2006, 157 ex. 18
- a. Heverin' i Piera fa nividy inona Rakoto?
 PRS.TM.believe ART Piera that PST.AM.buy what Rakoto
 - b. Heverin' i Piera fa inona no novidin-
 PRS.TM.believe ART Piera that what FOC PST.TM.buy
 dRakoto ____?
 GEN.Rakoto
 - c. Inona no heverin' i Piera fa novidin
 what FOC PRS.TM.believe ART Piera that PST.TM.buy

dRakoto ____?

GEN.Rakoto

What does Piera believe that Rakoto bought?

Talk of *partial Wh-movement* is intended merely as a convenient descriptive label in line with the usage in the literature. The analysis of these patterns in later chapters will not literally involve partial Wh-movement, that is, Wh-movement that does not terminate in the scopal position. Analytically, I follow Sabel, 2006, who suggests that partial Wh-movement instantiates focus movement rather than Wh-movement proper.

A complete theory of Wh-movement must be able to account for such patterns. The theory of phases and features in this book provides just such an analysis. The implementation again rests on features that need not be interpreted on the phase head targeted by partial movement. This ties together the theories of successive-cyclicity with that of partial movement via the unifying concept of the phase.

Movement also has the property of pied-piping. The specific syntax of constituent questions in English generally requires one Wh-word to front. If a word is fronted that does not belong to the narrowly circumscribed class of question words, the particular interrogative syntax of subject-auxiliary inversion is not triggered and no question interpretation is possible, (4). We can informally call this the *Wh-requirement* imposed on the clause-initial position in Wh-questions.

(4) English

- a. Who did John kick?
- b. *Fred did John kick?
- c. I wonder who John kicked.
- d. *I wonder Fred John kicked.

Phrases that merely *contain* a Wh-word may frequently satisfy the Wh-requirement. The initial preposition in (5a–b) is not a Wh-word and neither is its noun phrase complement. The Wh-word is relatively deeply buried inside of the prepositional phrase. Yet the entire prepositional phrase satisfies the Wh-requirement. Similarly, the head noun of the initial phrase in (5c–d) is not morphologically a Wh-word. The Wh-word is deeply buried in the possessor. Nevertheless, the entire phrase satisfies the Wh-requirement. Following Ross, 1967, this phenomenon is called *pied-piping* (for a concise overview see Horvath, 2006).

(5) English

- a. In what way did he solve the problem?
- b. I wonder in what way he solved the problem.
- c. Whose mother's demands could he satisfy?
- d. I wonder whose mother's demands he could satisfy.

Recent work on pied-piping (Cable, 2007, 2010a,b; Heck, 2004, 2008, 2009) has revealed a number of cross-linguistically valid generalizations. First, to enable pied-piping, the pied-piper must be situated in one of a few canonical pied-piping positions. Second, the definition of such positions is recursive. Third, words and phrases often move to their pied-piping position. Finally, and more controversially, pied-piping is optional.

Regarding the first two points I will claim that the canonical pied-piping positions are the complement and the movement-derived specifier positions of phase heads. Pied-piping is recursive because of iterated agreement from phase head to phase head. Such agreement is mediated by the same features that drive successive-cyclic movement. The analysis rests on the concept of the phase with its specific property that phase heads may bear features not interpreted on them.

The third generalization about pied-piping above requires elaboration. Following Heck, 2004, I refer to movement as *secondary movement*, if it involves placement of a constituent in a particular position to enable pied-piping. A good example of this type comes from Tzotzil, a Mayan VOS language (see Aissen, 1996). Within the noun phrase, the possessor follows the possessed, (6).

- (6) Tzotzil Aissen, 1996, 454 ex. 22, 455 ex. 25
- a. s-p'in li Maruch-e
A3rd-pot the Maruch-ENC
Maruch's pot
 - b. *Maruch s-p'in
Maruch A3rd-pot
 - c. *li Maruch s-p'in ...-e
the Maruch A3rd-pot -ENC

Wh-words are fronted in Tzotzil:

- (7) Tzotzil Aissen, 1996, 453 ex. 16
- a. K'usi a-man?
what A.2nd-buy?
What did you buy?
 - b. *A-man k'usi?

In *Wh*-questions with pied-piping, a *Wh*-possessor obligatorily fronts across the possessed:

- (8) Tzotzil Aissen, 1996, 457 ex. 32, 35
- a. Buch'u x-ch'amal i-cham?
who A3rd-child CP-died
Whose child died?

- b. *X-ch'amal buchu i-cham?
 A3rd-child who CP-died

This cannot be treated as a simple, local flipping-around of the branches of the tree, leaving the hierarchical structure of the phrase intact. Clear evidence for a movement derivation comes from recursive possessor constructions. The declarative (9a) allows the three interrogative versions in (9b–d). (9c) clearly shows that the Wh-possessor has moved within the pied-piped noun phrase. If the possessor fails to front, pied-piping is impossible.

- (9) Tzotzil Aissen, 1996, 481 ex. 97a, 485 ex. 103
- a. I-'ixtalaj s-kayijonal y-osil li j-tot-e.
 CP-ruin A3rd-firelane A3rd-land the A.1st-father-ENC
 The firelane around my father's land was ruined.
 - b. Buch'u i-'ixtalaj s-kayijonal y-osil?
 who CP-ruin A3rd-firelane A3rd-land
 - c. Buch'u s-kayijonal y-osil i-'ixtalaj?
 who A3rd-firelane A3rd-land CP-ruin
 - d. Buch'u y-osil i-'ixtalaj s-kayijonal?
 who A3rd-land CP-ruin A3rd-firelane
 The firelane around whose land was ruined?

Regarding secondary movement, I will claim that it is independently motivated movement to a phase edge. It enables pied-piping as a side effect, relying yet again on the privilege of phase heads to bear features not interpreted there.

Pied-piping is often optional, as in (9b–d) above. There are important exceptions to this optionality. Thus, pied-piping may become obligatory if extraction would lead to an island violation.

A particular case of obligatory pied-piping is formulated as the stranding generalization in Abels, 2003c. The stranding generalization says that the complement of a phase head may never move without pied-piping of the immediately containing phase. Thus, a TP embedded under C, for example, cannot move alone but must pied-pipe the entire CP. I argue that this follows as a direct consequence of the theory of successive-cyclicity and the last-resort nature of movement.

To achieve all of this I will assume that phase heads are special in that they and only they are able to bear movement-inducing features that need not be interpreted on them. Universal grammar imposes no further restrictions on the feature content of phase heads, but it does impose such restrictions on interpretation. Particular languages also impose restrictions on the feature content of phase heads.¹

¹ The idea pursued here has a certain similarity to Chomsky's suggestion (Chomsky,

The remainder of this chapter gives an overview of the contents of the book by chapter and provides a thumbnail sketch of the theory.

1.1 Overview

Syntacticians working within the Extended Standard Theory, Government and Binding theory, and Minimalism have usually assumed that long distance displacement is mediated by a series of relatively local steps. This assumption has been challenged from various sides. Chapter 2 defends the traditional position in generative grammar. Section 2.2 clarifies the logic of the situation and to make explicit what shape arguments for successive-cyclic movement in the traditional sense would need to take. It is also an attempt to provide such arguments. (This section is a development of Abels, 2003c, chapter 2.1 and of Abels and Bentzen, 2009, 2010. Kristine Bentzen's contributions are hereby gratefully acknowledged.) The evidence reviewed in section 2.2 suggests that there is a landing site for successive-cyclic movement at the edge of vP. Traditionally, the edge of CP is taken to provide another intermediate landing site. However, in a number of papers den Dikken (2006; 2009) has challenged this idea. Section 2.3 discusses this challenge. I suggest that neither den Dikken's arguments nor his counter-proposal actually threaten the traditional view. Section 2.4 provides a brief discussion of the tools that will be used to implement successive-cyclicity. Among these are a last-resort condition on movement and movement-type-specific features on select heads, the phase heads. These features drive movement. The section is also a first answer to the charge that these features might be purely theory internal devices to implement movement. It should become clear in later chapters that this is not the case: the features on phase heads that implement successive-cyclic movement have empirical and not just theory internal content. A lot of evidence for this claim is given in later chapters, but the issue is raised in section 2.4 and the lines of later argumentation are foreshadowed.

Chapter 3 is a brief overview of the most salient properties of pied-piping, secondary movement, and partial movement. The chapter summarizes findings already in the literature. The discussion of partial Wh-movement and basic properties of pied-piping illustrates known facts. The examples of partial movement come mostly from Kĩtharaka, and some of them cannot be found in the literature. Regarding secondary movement, I introduce a distinction between *secondary movement proper* and *apparent secondary movement*, which I haven't

2008, p. 143) that "I[nternal] M[erge] should only be driven by phase heads." The difference is that in the present system not all movement-inducing features reside on phase heads but only those that are not interpreted.

found in the prior literature. *Apparent secondary movement* is movement of an element to a particular position, where pied-piping is impossible without that movement but where the relevant movement can be shown to exist in the language independently of pied-piping. *Secondary movement proper* is movement of an element to a particular position, where pied-piping is impossible without that movement and the movement does not exist in the language independently of pied-piping. Judging by the examples of secondary movement given in Heck, 2008, secondary movement proper is rare. The theory in this book (chapter 5) derives the prediction, idealized from the facts, that secondary movement proper is altogether impossible.

Chapter 4 is the theoretical companion to chapter 2. The chapter implements and formulates more precisely the ideas sketched in section 2.4. The main idea is that a given feature may be deficient and that this deficiency can be overcome if the feature enters into an agreement relation. I understand agreement as structure-sharing much like Pesetsky and Torrego, 2007. In order to enter into such sharing relations, the heads and phrases bearing the features need to be brought into certain syntactic configurations (section 4.1). Items can be brought into the relevant configurations through application of the operation merge. Merge is subject to a last resort condition (section 4.2): If no feature enters into a structure-sharing relation as a result, merge cannot take place.

To implement successive-cyclicity, I adopt the phase impenetrability condition from Chomsky, 2000. Section 4.3 explains why I do not adopt some of the other phase-related assumptions from Chomsky, 2000. I also point out the lack of a logical relation between phase theory and the theory of islands given current approaches to islands: The existence of islands does not follow from existing conceptions of phases and phase theory is not entailed by the existence of islands. Finally, I show how the stranding generalization follows directly from the joint action of the last resort and the phase impenetrability conditions.

Some of this discussion is very abstract and formal. The final section of chapter 4 therefore explains how the assumptions made in earlier parts of the chapter derive successive-cyclicity. I illustrate how assuming specific features for different movement types accounts for various morphological and syntactic effects of cyclicity. I use Kîtharaka to illustrate the morphological point, drawing heavily on Abels and Muriungi, 2008. The syntactic point is made through an analysis of the pivot-only restriction of Tagalog. Tagalog, like other Austronesian languages, only allows extraction of a dedicated constituent within each clause, the pivot. Furthermore, extraction is only possible from the pivot itself. I show that the existence of a system like the one found in Tagalog is expected if we assume movement-type-specific features on phase heads and parameterization for the availability of such features. The pivot-only restriction is difficult to capture otherwise and has been a persistent puzzle within Austronesian syntax.

Chapter 5 is the theoretical companion to chapter 3. It develops notions of

feature valuation and feature interpretation to accompany the theory from chapter 4. The main superficial aim of sections 5.1 and 5.2 is to account for the fact that the features postulated on intermediate phase heads only have morphological and syntactic effects but seem to be semantically empty. I adopt, adapt and sharpen Adger and Ramchand's (2005, p. 174) condition *Interpret Once under Agreement* as *Interpret Once under Sharing*. The resulting suggestion about feature interpretation also captures those aspects of Rizzi's (2006) *Criterial Freezing* that seem defensible to me. The suggestions boils down to saying that any given feature is interpreted once under sharing and that an element undergoing movement of type μ determines interpretation exactly at the highest landing site of its μ -movement. To illustrate and possibly clarify the intent of the definitions, section 5.3 illustrates the workings of the system in the abstract using only a single feature. From the discussion it can be seen very clearly that, when only a single feature is considered, the descriptive apparatus made available by the theory is quite limited. This allows a number of generalizations about the system to emerge. Section 5.4 returns to the generalizations from chapter 3 and shows how they are derived or, in the case of partial movement, described. Section 5.5 finally, discusses various strategies of forming Wh-questions found in the languages of the world and shows how they fit into the descriptive apparatus. The descriptions are mere sketches of single-, multiple-, and non-Wh-movement strategies. They are intended mainly as a demonstration of the reasonable fit between the theory and the cross-linguistic record.

The remaining two chapters deal with the stranding generalization. They are revised versions of chapters 3 and 4 of Abels, 2003c. Chapter 6 discusses the observation that light verbs, complementizers, and adpositions are not stranding by their complements. This is expected under the current theory on the assumption that v, C, and P are phase heads. In chapter 7, I discuss the question whether the generalization regarding P carries over to languages that allow adposition stranding.

1.2 Theoretical sketch

I assume a theory of syntax here in which structures are built bottom up by a structure building operation merge. Merge combines two syntactic objects (where both lexical items and the results of merger count as syntactic objects) to create a new one, projecting the label of one of the two objects as the label of the resulting structure. Lexical items are their own label.

Merger can either combine syntactic objects that are not in a part-of relation (external merge) or objects that are in such a relation (internal merge). The

operation merge is constrained by a condition, Last Resort, which states that merge is only possible when this lead to at least one feature being shared.

Features may be valued ([F]) or unvalued ([uF]). Unvalued features need to acquire a value in the course of the derivation, otherwise they are illicit interface objects (*[uF] at the interface). When two features are shared, this leads to valuation as long as one of the two features is also valued, but it need not, if both of the shared features are unvalued (see discussion in Pesetsky and Torrego, 2007). Last Resort is formulated in terms of feature-sharing rather than in terms of feature-valuation.

There are certain configurations in which features may be shared. These configurations are defined in terms of the more primitive *c-command* relation, which underpins syntactic relations in general (Koster, 1987; Neeleman and van de Koot, 2002, 2010). More concretely, a feature borne by a syntactic head *H* can be shared with the feature borne by a different syntactic object *O* if either *H* *c-commands* *O*, *O* *c-commands* *H*, *H* and *O* *c-command* each other. Unvalued features are cross-classified by the conditions under which they can be shared. For a feature that can be shared under *c-command* from *H* to *O*, I will write [uF_↓]. For a feature that can be shared under *c-command* from *O* to *H*, I will write [uF_↑]. Finally, for a feature that requires mutual *c-command* between *H* and *O*, I will write [uF_{↓↑}].² These three types of unvalued features will be called probes. I make a distinction between unvalued features and probes, because I allow the possibility of unvalued features that do not probe ([uF]).

As mentioned above, Last Resort dictates that an application of merge is never licensed unless a probe enters into a feature-sharing relation that it couldn't have entered into without this application of merge. I will also, albeit more tentatively, assume that internal merge can only be licensed by [uF_{↓↑}].

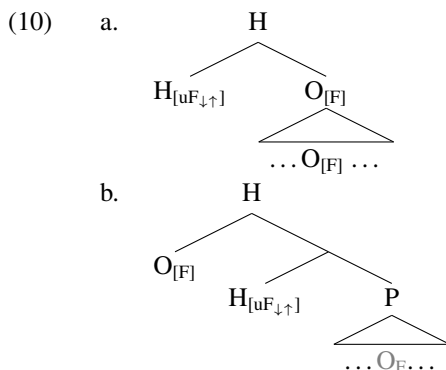
A number of further restrictions apply. Thus, I will adopt the phase impenetrability condition, according to which the complement domain of a phase head is inaccessible for further operations once the phase, that is, the maximal projection of the phase head is complete. I assume that *v*, *C*, *P*, and *D* are phase heads. Borrowing a term first suggested for a similar concept by Juan Uriagereka, I will also adopt a virus theory of feature-sharing, according to which an unshared probe may never be syntactically embedded without projecting.

These notions are mostly directly adopted or slightly adapted from fairly standard minimalist notions. What is absent here is a notion of edge features, of a specifier-head relation, and of feature strength. What replaces such notions, for the most part, is [uF_{↓↑}]. Recall that [uF_{↓↑}] is a kind of probe that requires the head that bears it and another syntactic object bearing [F] to *c-command* each other. Mutual *c-command* of this type can be achieved in exactly two ways. Ei-

² My use of the upward and downward arrows has nothing to do with the use that these arrows have in functional equations in Lexical Functional Grammar.

ther H and O are sisters, (10a), or they come to c-command each other by virtue of internal merge, (10b). Recognizing the connection, Epstein et al., 1998 called the latter relation ‘derivational sisterhood’.

The trees below also introduce a bit of notation that I will use throughout the book. The official definition of internal merge gives rise to multidominance structures (see chapter 4). Informal representations are usually sufficient and in those, I represent unpronounced occurrences (traces, lower copies) by grey print: *this is an unpronounced occurrence*.



Not represented in the tree above is the notation for feature-sharing: That [F] on O and [uF_{↓↑}] on H come to be shared is merely implicit in (10). When it is relevant to represent sharing explicitly, I will make use of a co-superscripting notation. This notation indicates structure sharing and is borrowed from Pesetsky and Torrego, 2007, who borrow it from Head-driven Phrase Structure Grammar. Co-superscripted features share a value ([F^[1]] ... [F^[1]]), while counter-superscripted features do not share their value ([F^[1]] ... [F^[2]]), though they may have type-identical values, of course. When no superscripting is present, the reader has to infer the relevant interpretation from context. In cases where superscripting is systematically indicated, lack of co-superscripting indicates lack of sharing. Otherwise it may or may not indicate sharing. In (10), sharing is intended.

Of course, the mutual c-command relation between a head and an element moved from its complement domain holds whether the moved element is internally merged locally or at an arbitrarily great distance. The idea of the specifier-head relation makes the additional claim that a specifier is local to its head—contained within the head’s projection. In the present theory, this local aspect of feature-sharing results from the virus theory.

The assumptions above entail a particular implementation of successive-cyclicity. Merge, and in particular internal merge, is subject to the last-resort condition. In addition, the phase impenetrability condition limits the structural distance between a moving element and the target of movement. It follows that

long distance movement must be driven by $[uF_{\downarrow\uparrow}]$ on intervening phase heads.

The feature-sharing relation that results between the moving element and the phase head, I will claim, enables pied-piping. We therefore have an account for why pied-piping is possible, in traditional terms, from complement position and from specifier position (assuming the specifier is movement derived): These are the two configurations in which a $[uF_{\downarrow\uparrow}]$ can be satisfied. We also predict that CP, vP, PP, and DP may be pied-piped, since they are phase heads. Finally, the system directly derives Abels's (2003c) stranding generalization. This is the generalization that phase heads may never be stranded by their complements. The predictions follow from the joint action of the last resort and the phase impenetrability conditions.

Chapter 4 develops the ideas just sketched. I argue that the system describes movement as we find it in natural languages to a certain extent, but brief reflection reveals that it considerably overgenerates. A lot of the excess power is taken back in chapter 5, which discusses the question of feature-interpretation.

I assume that shared features must be interpreted. However, I borrow Adger and Ramchand's (2005, p. 174) *Interpret Once under Agree*, which I call *Interpret Once under Sharing*. It says that a shared feature is interpreted in exactly one position. *Interpret Once under Sharing* encodes certain aspects of Rizzi's (2006) *Criterial Freezing*. While Rizzi claims, in essence, that every syntactic object is associated with at most one scope position (a.k.a. criterial position), I suggest that this condition needs to be relativized to features: relative to a given feature, every syntactic object has only one scope position.

I then define the positions where a shared feature is interpreted. For $[uF_{\downarrow}]$ and $[uF_{\uparrow}]$ this is the unique position where the feature is shared and that c-commands all other positions where that feature is shared. For $[uF_{\downarrow\uparrow}]$, it is the highest position where $[uF_{\downarrow\uparrow}]$ triggered merger. Not every position where $[uF_{\downarrow\uparrow}]$ is shared is also one where it triggers merger. The distinction between a feature that triggers merger and one that doesn't (that is, one that gets shared as a free-rider) is drawn in terms of an independently justified restriction on the order in which features must be used. Abels, 2007, 2009; Williams, 2002, 2011 assume that there is a, presumably universal, constraint on the ordering of operations in language. In Abels, 2007, 2009 I call this *Universal Constraint on the Ordering of Operations in Language*, Williams, 2011 refers to a similar idea as the *F-clock*. A feature counts as the trigger of merger only if it is the lowest feature on this universal hierarchy that is being shared as the result of an application of merge.

With the help of the ancillary definitions and assumptions just mentioned, *Interpret Once under Sharing* can be used to derive the empirically correct restrictions on partial and secondary movement.³

³ Further restrictions directly relevant to the question of criterial freezing follow from

the generalized bans on improper movement formulated in Abels, 2007, 2009; Williams, 2002.

2 On successive-cyclic movement

2.1 Introduction

This chapter investigates the question of how movement dependencies should be modeled. It provides arguments that long-distance dependencies are represented in the grammar as a series of relatively short steps that affect some phrases along the path of movement and leave others unaffected.

I take the question of whether movement dependencies are mediated in a very local, medium-range local, or long-distance manner to be empirical. Investigating this question requires considering effects movement has on the material crossed by that movement. Whether such effects exist at all and where and how they are expressed are all empirical questions.

It is clear, empirically, that the material along the path of movement has an effect on the movement dependency. The most obvious case are island effects: While (1a) is ambiguous between the readings in (1a.i) and (1a.ii), the ambiguity disappears once we replace *that* by *how* along the path of movement, as in (1b). Such effects necessitate some notion of *path of movement*.

(1) English

- a. When did the boy say that he hurt himself?
 - (i) When did the boy say [*that* he hurt himself *when*]?
 - (ii) When did the boy say [*that* he hurt himself] *when*?
- b. When did the boy say how he hurt himself?
 - (i) *When did the boy say [*how* he hurt himself *when*]?
 - (ii) When did the boy say [*how* he hurt himself] *when*?

Example (2) shows that changing *that* to *how* along the linear path between filler and gap does not necessarily give rise to the effect seen in (1). This is why paths must be construed in hierarchical terms. All modern theories of grammar make available the relevant notion of path.

(2) English

- a. When did [the boy who told his mother [*that* he hurt himself]] go to bed *when*?
- b. When did [the boy who told his mother [*how* he hurt himself]] go to bed *when*?

Given this much, we might expect to find an influence not only of the path on

the dependency but also of the dependency on the path. Whether movement in any given structure, say (3), has an effect on the material between the filler and the gap is again an entirely empirical question.

- (3) Which book
- ↑
- does John think that Mary said that
Frank believes that he should tell the po-
lice that it is unlikely that Edward has
read
- which book
-

As a matter of empirical fact, we find that movement along a path does exert an influence on the material crossed. This is shown by familiar effects from word order—for example, the famous inversion under question formation in Spanish (Torrego, 1983, 1984; Uribe-Echevarria, 1992)—and from morphology—for example, the alternation in the shape of the complementizer in Irish (McCloskey, 1979, 1990a, 2002; Noonan, 1997), illustrated in (4). Reconstruction effects to places along the path—like the reconstruction effects for binding theory to intermediate landing sites, sometimes called *pit-stop reflexives* (as discussed in Barss, 1986)—show yet another type of interaction between path and moving item.

- (4) Irish McCloskey, 1990b, p. 205
- a. Dúirt sé gu-r bhuail tú é
said he GO-PST struck you him
He said that you struck him
- b. an rud a shíl mé a dúirt tú a dhéanfa
the thing AL thought I AL said you AL do-COND-2ndSG
the thing that I thought you said you would do

I introduce a distinction between two types of theories, which was pointed out in this form first in Abels, 2003c. There, I distinguished between *punctuated* and *uniform* paths. A path will be called punctuated if some but not all nodes along a filler-gap dependency are affected. A path will be called uniform if all nodes along it are affected in the same way. HPSG, Categorical Grammar, and the theory of the Configurational Matrix are examples of theories where paths are treated uniformly: All nodes along the path are affected, and all are affected in the same way. Tree-Adjoining Grammars offer a theory that is uniform in a very different way: the nodes along the movement path remain uniformly unaffected.

On the other hand, theories in the narrower Chomskyan tradition postulate punctuated paths. This is true of the Extended Standard Theory of the seventies, where only selected nodes, namely the COMP nodes, along the path were affected. This is true of the Barriers theory, where intermediate landing sites

are available at some nodes along the path while they are unavailable at others. The same is true, of course, also of the more recent idea of vP and CP as phases. Even in theories where landing sites are quite close together, as for example in Chomsky and Lasnik, 1993, Takahashi, 1994a, Stroik, 1999, Boeckx, 2001, 2008, and Bošković, 2007, it still remains true that only the maximal projections along the path are affected, but not intermediate projections.¹

Most so-called cyclicity effects of the types alluded to above have no direct bearing on the question of punctuated versus uniform paths. The Irish data, for example, are compatible with various uniform and punctuated analyses.

Bouma, Molouf, and Sag (2001), who treat the alternating element, irrelevantly, as a preverbal particle rather than a complementizer, use a theory where paths are uniform. They model the alternation in HPSG using the assumption that the morphological shape of the alternating element depends on whether its sister has an empty or a non-empty SLASH value.²

By contrast, the analyses of the same alternation that McCloskey has given over the years (with the exception of McCloskey, 1979) treat the alternation in terms of a punctuational model, in which the shape of the complementizer depends on a local relation with the moving element at various stages of the derivation. The moving element itself ‘leapfrogs’, leaving many nodes along the path completely untouched.

Finally, we can give a uniform non-local account of the alternation. We could assume the following realization rule for the complementizer in Irish.³

- (5) a. Realize an instance of the complementizer C^0 as *aL* (leniting) if there is a movement chain in which the head c-commands C^0 and C^0 c-commands the foot. Otherwise
- b. realize an instance of the complementizer C^0 as *aN* (nasalizing) if it is locally c-commanded (Spec-Head) by an operator. Otherwise

¹ Abels, 2003c calls theories where the nodes affected by movement are very close together *quasi uniform*. The reason for this terminological move was the assumption that it would be empirically very difficult to distinguish quasi uniform theories from uniform theories, while it seemed at the time easier to distinguish punctuated theories with wide gaps between the affected nodes from the other two types. This assumption was probably wrong.

We might still end up with a category of quasi-uniform theories. For example Lechner, to appear proposes that every instance of external merge and most (see Lechner’s paper for details) instances of internal merge trigger displacement, leading to a theory where there can be several intermediate landing sites within one and the same maximal projection. Still, not every node is affected identically.

² See also Adger and Ramchand, 2005 for an approach without intermediate traces.

³ There might be an indirect argument here against a non-local treatment. The rules (5a) and (5b) are not ordered by the elsewhere principle unless “c-commands” is replaced by “locally c-commands” in the formulation of the first condition.

- c. realize an instance of the complementizer C^0 as *go*.

The Irish data therefore do not provide conclusive evidence one way or another.

The existence of reconstruction to positions along the path of movement is often taken as strong evidence for punctuational theories of movement. However, considerations similar to those just rehearsed for the Irish complementizer alternation make even fairly complex arguments demonstrating the existence of reconstruction sites silent on the issue of punctuated versus uniform movement paths; thus, while (6) argues for the existence of a reconstruction site for the topicalized noun phrase in between the position of the subject and the object of *ask*, it does not bear on the question whether all nodes between the subject and object of *ask* can serve as reconstruction sites or just some.

- (6) English Lebeaux, 1991, see also Fox, 2000, pp. 10–11
- a. [The papers that he₁ wrote for Ms. Brown₂] every student₁ [_{VP} t' asked her₂ to grade t]
 - b. *[The papers that he₁ wrote for Ms. Brown₂] she₂ [t' asked every student₁ to revise t]

The aim of this chapter is to improve on this unsatisfactory state of affairs.

The chapter has three further sections. In section 2.2 I argue that movement paths are punctuated. In subsection 2.2.1, I discuss the shape that a true argument for the punctuated path hypothesis would have to take. In section 2.2.2, I investigate whether the argument in Abels, 2003c for the punctuated path hypothesis is compelling, reaching a negative conclusion. In section 2.2.3, I offer a set of data from Norwegian as empirical support in favor of punctuated movement paths. Section 2.2.4 discusses the syntax of the ellipsis of modal complements in Dutch, based on Aelbrecht, 2008, as further evidence. Section 2.2.5 discusses evidence from parasitic gaps and finally 2.2.6 provides a short survey of other configurations that would be involved in constructing *prima facie* arguments for the punctuated path hypothesis, but for which relevant data has not been investigated yet. The tentative conclusion is that movement paths are indeed punctuated. We can then ask where the intermediate landing sites of movement are. In the clausal domain there is good evidence that there is an intermediate landing site at the periphery of the traditional VP and in the periphery of the clause itself. This state of affairs is as predicted by the models of Chomsky, 1986 and Chomsky, 2000. Evidence will be reviewed in section 2.3. Section 2.4 reflects on the shape of an explanatory analysis of the facts.

2.2 Are movement paths punctuated or uniform?

2.2.1 What constitutes a valid argument for punctuated paths?

The putative arguments for the punctuated nature of movement paths from the previous section can all be construed as arguments from reconstruction: reconstruction for (local) agreement in the case of the Irish complementizer alternation and reconstruction for binding and scope in the case of topicalization. What these arguments seem to show is that some nodes along the path of movement are affected because they act as reconstruction sites. Such arguments do not bear on the question of the punctuated nature of paths, since they are fully compatible with a theory where all nodes along the path serve as reconstruction sites and, hence, are all affected.

To give a true argument for the punctuated nature of paths, we therefore need to show that some nodes along the path are *unaffected* by movement while others are affected. As noted for example in Abels, 2003c and Boeckx, 2008, the literature contains little if any convincing empirical evidence for the absence of reconstruction to a particular position. The situation is complicated by the fact that even the lack of reconstruction (construed in the broadest sense) to a particular position is not direct evidence for the punctuated nature of paths; a node might have been affected by movement, yet, for independent reasons, we might be unable to show this. Boeckx (2008, p. 58) expresses this clearly at the end of the following quotation (see also Boeckx and Grohmann (2007, fn. 5)):

“Whereas the copy theory of movement readily accounts for reconstruction by involving the interpretation of unpronounced copies, we cannot conclude from this that if no reconstruction effect is found, no copy is available at the relevant site. All we can conclude from the absence of reconstruction is either that there is no copy present, or that a copy was created, but for some (perhaps interpretive) reason cannot be interpreted in the relevant position.”

A well-known case where reconstruction is blocked is provided by the readings that quantified arguments get when they are extracted from a weak island (for related discussion see also Bianchi and Zamparelli, 2004; Rizzi, 2001b and the references cited there). Consider example (7). There is no reconstruction of the restriction of the Wh-phrase into the weak island in (7b) (Cinque, 1990a; Cresti, 1995; Frampton, 1999; Longobardi, 1991), hence, only a *de re* reading of the Wh-moved NP is available. This could be taken to indicate that there is no copy of the Wh-phrase inside of the weak island. This conclusion would be rash, however—and a different explanation for the lack of reconstruction has to be sought—since there is reconstruction into the island for other properties such as binding (Cinque, 1990a; Starke, 2001).

(7) English

- a. How many people do you think that John invited?
- b. How many people do you wonder whether to invite?

What is striking about this case and others like it is that while reconstructive behavior is not uniform along the entire length of the path, it is monotonic: for some reconstructive property, the path is cut into two contiguous bits one of which allows and the other one of which disallows reconstruction.

Let us make a terminological distinction between uniform, (non-uniform) monotonic, and punctuated reconstruction patterns.

Uniform reconstruction patterns are those where no two points along a path can be distinguished by their reconstructive behavior, that is, either reconstruction is possible to every point along the path or to none. In figure 2.1, a uniform reconstruction pattern would correspond to a situation where either reconstruction is possible at all points along the path between XP and its trace, that is, a situation in which reconstruction to all of α , β , γ , and γ is possible, or else where no reconstruction is possible at all, that is, none of α – γ are available for reconstruction.

On the other hand, non-uniform monotonic patterns are those where the path can be divided into two contiguous bits one of which allows and the other one of which disallows reconstruction. In figure 2.1, this would be the case if reconstruction was available to α and β but not to γ and γ . The weak-island extraction facts are a case of the monotonic sort, where reconstruction of the nominal restriction is possible above the island-inducing element but not below it.⁴

A punctuated reconstruction pattern is one where there are sites for reconstruction both above and below sites that do not allow reconstruction. In figure 2.1, we would speak of a punctuated reconstructive pattern if α and γ were possible reconstruction sites while β and γ were not, if reconstruction sites alternated with non-reconstruction sites, etc.

Different theories of movement give rise to different expectations regarding reconstructive patterns. Uniform theories of movement predict uniform reconstructive patterns and need to invoke additional assumptions to handle non-uniform monotonic and punctuated reconstructive patterns. Theories of movement that predict punctuated movement paths on the other hand give rise to the expectation that we should find punctuated reconstructive patterns. They need additional assumptions to deal with non-uniform monotonic and uniform patterns.

Therefore, if a punctuated reconstructive pattern can be found, this provides a *prima facie* argument for a punctuated theory of movement paths. Such an argument will fall if an independent reason can be found why reconstruction

⁴ Notice that uniform reconstructive patterns are also monotonic, hence the modifier ‘non-uniform.’

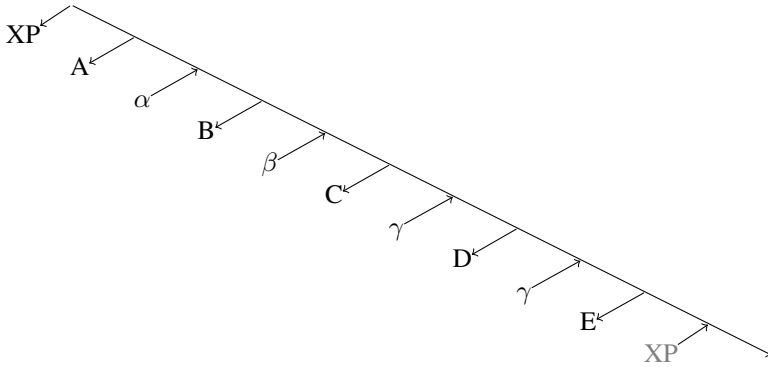


Figure 2.1: Path between XP and XP with four distinct points along the path, $\alpha-\gamma$

to particular points along the path is blocked (the second disjunct in the quote from Boeckx above) or if reconstructive behavior for different properties does not align, that is, if a position is not a scope reconstruction site but it is a binding reconstruction site, etc.

These matters have not been investigated in sufficient detail. Below I discuss and reject an argument given in Abels, 2003c to support the assumption that movement paths are punctuated. I then discuss different data from Norwegian, English, and Dutch that suggest that movement paths are punctuated in those languages. Together, these data present a *prima facie* argument for the punctuated nature of movement paths.

2.2.2 Proposed evidence for punctuated paths (Abels 2003c)

Let us start by looking at a case involving binding condition A. The locality inherent in Principle A of the binding theory allows us to probe for lack of intermediate landing sites. Given that, in a language like English, binding condition A roughly requires the antecedent and the anaphor to be clausemates, binding condition A is a relatively coarse measure of the absence/presence of intermediate landing sites.

The relevant structure is schematized below in figure 2.2. In the structure there is an anaphor contained in a moving phrase, XP. Under the punctuated path hypothesis, there would be various copies of XP, concretely in figure 2.2 there are three. For each of the copies there is a certain local domain within which the anaphor has to be bound if that copy is the one relevant to binding.

This is schematized in figure 2.2 by the nodes labeled ‘DomainP’ which are co-superscripted with the copy for which they constitute the binding domain. Finally, there are various potential antecedents for the anaphor.

For any given copy, the closest dominating DomainP indicates the maximal possible binding domain of the anaphor contained in the moving constituent. Given this structure, what we should test is whether there are DPs that cannot antecede the anaphor despite the fact that they c-command one or more copies of it, simply because these DPs are not sufficiently local to any of the intermediate copies. This is again illustrated in figure 2.2. Pit-stop binding by Antecedent₃ and Antecedent₁ ought to be possible, while the same should not be true for Antecedent₂.

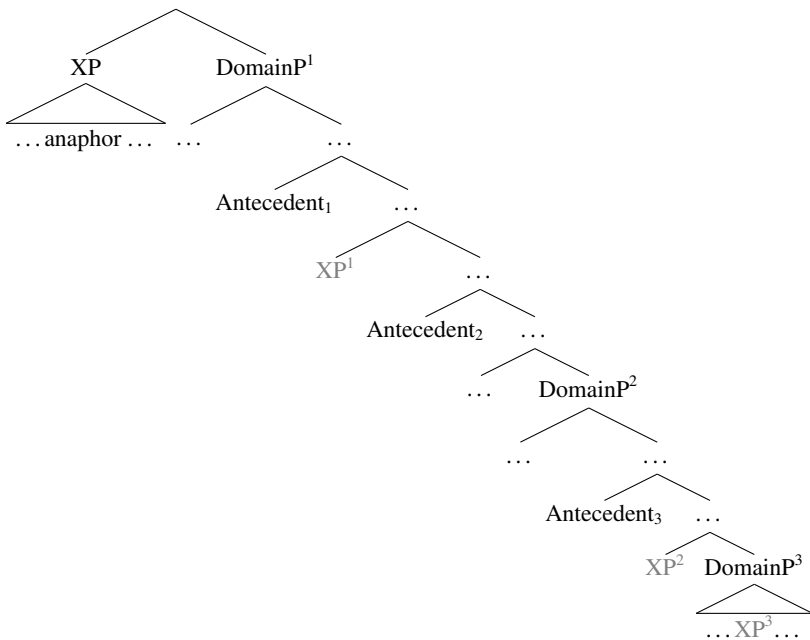


Figure 2.2: Schematic representation of the argument in Abels, 2003c

Abels, 2003c attempts an argument of this shape.

Anaphors may be bound at various points along the movement path (see Barss 1986), as shown in (8). In (8a), the anaphor *himself* within the Wh-phrase is bound by *John* in its surface position. In (8b), *herself* is bound in the base position of the Wh-phrase. In (8c), *himself* is bound by *John* in some intermediate position of the Wh-phrase.

(8) English

- a. John_i wonders which pictures of himself_i Mary likes.
- b. John wonders which pictures of herself_i Mary_i likes.
- c. Which pictures of himself_i does Jane believe (that) John_i thinks (that) she likes?

As explained in the previous subsection, such examples do not tell us anything about whether paths are uniform or punctuated. A sentence like (8c) can be analyzed in conformity with both hypotheses.

(9) a. **Uniform path:**

[which picture of himself]_i [... John ... [_{VP} t_i v^o [_{VP} t_i thinks [_{CP} t_i that [_{TP} t_i Mary [...]]]]]]]

b. **Punctuated path:**

[which picture of himself]_i [... John ... [_{VP} t_i v^o [_{VP} thinks [_{CP} t_i that [_{TP} Mary [...]]]]]]]

Crucially, though, Abels, 2003c provides a context in which intermediate binding of a moved anaphor is not possible. Consider the pair in (10). In (10a), the experiencer of *seem* can bind the anaphor in the moved Wh-phrase. In (10b), when *seem* is used as a raising verb, on the other hand, this is not possible.⁵

(10) English

- a. Which picture of himself_i did it seem to John_i that Mary liked?
- b. *Which picture of himself_i did Mary seem to John_i to like?

In Abels (2003c) I claimed that in (10a) there is a copy of the Wh-phrase in the embedded Spec,CP and this copy is local enough for *John* to bind the anaphor. This is shown in (11).

- (11) [Which picture of himself]_i it [_{VP}¹ seem [_{VP}² to John t_{seem} [_{CP} t_i that [_{TP} Mary [_{VP}³ t_i liked t_i]]]]]]

In (10b) on the other hand, no such copy is available, as seen in (12). The raising infinitive is taken to be a TP rather than a CP, and, following Chomsky, 1986, adjunction to TP is not allowed. Furthermore, the Wh-phrase could not have moved through Spec,TP, as a copy of *Mary* occupies this position.

- (12) [Which picture of himself]_i Mary [_{VP}¹ seem [_{VP}² to John t_{seem} [_{TP} t_{Mary} to [_{VP}³ t_i like t_i]]]]

⁵ Since I ultimately reject the argument based on anaphors in *picture*-NP contexts, I will simply assume here that they are subject to Principle A of the binding theory rather than being logophoric (Pollard and Sag, 1994; Reinhart and Reuland, 1993; Runner, Sussman, and Tanenhaus, 2002).

As we just saw, Abels takes the contrast in (10) as evidence for punctuated paths and constructs his analysis accordingly: the moving element makes intermediate stops only in certain positions, namely in the embedded CP but not in the TP.

I am aware of two potential challenges to this argument. Gereon Müller makes the following observation concerning the two crucial examples: While in (10a) only a single phrase, the Wh-phrase, is moving, there are two moving phrases in (10b). In (10b), the Wh-phrase and the raising subject move along overlapping paths. This raises the possibility that there *is* an intermediate landing site both for the Wh-phrase and the subject above the embedded Spec,TP position but below the experiencer, as schematized in (13).

- (13) [Which picture of himself]_i Mary [_{VP}¹ seem [_{VP}² to John [t_{Mary} [t_i [t_{seem} [TP t_{Mary} to [_{VP}³ t_i like t_i]]]]]]

Notice that all traces of the Wh-phrase below the experiencer in (13) are c-commanded by a trace of the subject below the experiencer. Therefore, if the trace of the subject can be construed as an intervener for the purposes of anaphoric binding, the pattern in (10b) receives a different explanation. Under Müller's assumption, the raised subject would always be the relevant binder for the anaphor in (10b)/(13). In (10a) by contrast, there is an intermediate position where the experiencer is the closest potential binder for the anaphor, since the embedded subject does not raise. Hence, Müller argues, the contrast between (10a) and (10b) does not provide evidence for the punctuated nature of movement paths.

This objection, of course, is only as strong as the binding theoretic assumption that it crucially rests upon, namely, that anaphors in English can only be bound by the closest c-commanding antecedent. This assumption is problematic, as (14) illustrates.

- (14) English
 a. Mary explained the man to himself.
 b. Mary explained the man to herself.

As is well-known, the DP object in such examples c-commands into the PP, (14a). However, and this undermines the strength of the objection, in example (14b) the subject can antecede the anaphor despite the fact that it is not the closest potential c-commanding antecedent, which, just as in (14a), is the object.⁶

⁶ There might be ways of rescuing the closest c-command theory of anaphor binding; thus, Lechner, to appear, for unrelated reasons, posits an intermediate structure where the subject locally c-commands the second object in a double-object structure. If Lechner's theory is correct and if binding could be read off this structure, then the closest c-command approach to anaphor binding might be workable for English after all.

A second, more damaging problem for the argument is pointed out by Boeckx 2008; Boeckx and Grohmann 2007. If the contrast between (10a) and (10b) were due only to the presence versus absence of a CP below *John*, then we would expect reconstruction for anaphor binding to be possible past the experiencer and into a more deeply embedded intermediate position. This would be the hallmark of a truly punctuated pattern of binding reconstruction. The expectation then is that all examples in (15) should be fine. However, (15c) is ungrammatical. It seems that reconstruction of the moved Wh-phrase to an intermediate landing site below the experiencer in a raising construction is blocked in general.

(15) English

- a. Which picture of himself_i did Mary tell John_i that she liked?
- b. Which picture of himself_i does it seem to Jane that Mary told John_i that she liked?
- c. *Which picture of himself_i does Mary seem to Jane to have told John_i that she liked?

In the terminology of the previous section, we are dealing with a monotonic reconstruction pattern. We argued that non-uniform monotonic patterns like this one (or the reconstruction of the nominal restriction into a weak island discussed above) require additional assumptions no matter what we assume about the punctuated or uniform movement paths and do not, therefore, provide a direct argument for or against punctuation.⁷

Thus, I agree with Boeckx that when the data in (15) are taken into account, the contrast between (10a) and (10b) does not constitute an argument for punctuated paths. In the next subsections, some facts are presented that do argue for punctuated paths. The first set are reconstruction data from Norwegian (see also Bentzen 2007).

2.2.3 Reconstruction in Norwegian

This section looks at the interaction of scope and variable binding as a source of information about the absence of sites for intermediate reconstruction. The idea

On the other hand one might accept as fact that the closest c-command theory of anaphor binding is wrong but assume that binding domains are upward bounded by subjects and that intermediate traces of subjects count as subjects. Under this latter approach (suggested by Winnie Lechner, pers. comm.) Müller's objection would again stand.

I will not pursue these issues here, simply because there is a second, stronger objection to Abels's argument, to which I now turn.

⁷ I leave an investigation of what exactly is going on in these examples for future research.

is the following: Suppose a moved quantifier can take either wide or narrow scope with respect to another scope-bearing element. If the quantifier needs to take scope below the other scope-bearing element and simultaneously bind into an even lower XP, this will only be possible if there is a reconstruction site in between the two but not if there is no such reconstruction site between them. The situation is illustrated in Figures 2.3 and 2.4, where the trace (QP) between the scope-bearing element and XP in figure 2.3 marks the availability of a reconstruction site while its absence in Figure 2.4 indicates the absence of such a site. Both figures are concrete instantiations of the abstract schema in the earlier figure 2.1. In figure 2.3 there are reconstruction sites everywhere, while in figure 2.4, a reconstruction site is missing between the scope-bearing element and XP.

The expectations created by the two structures are quite different: given that scope reconstruction of QP is possible below the scope-bearing element by assumption, the structure in Figure 2.3 gives rise to the expectation that narrow scope of QP should be able to go hand in hand with binding into XP; the structure in Figure 2.4 gives rise to the expectation that low scope of QP and binding into XP cannot happen simultaneously.

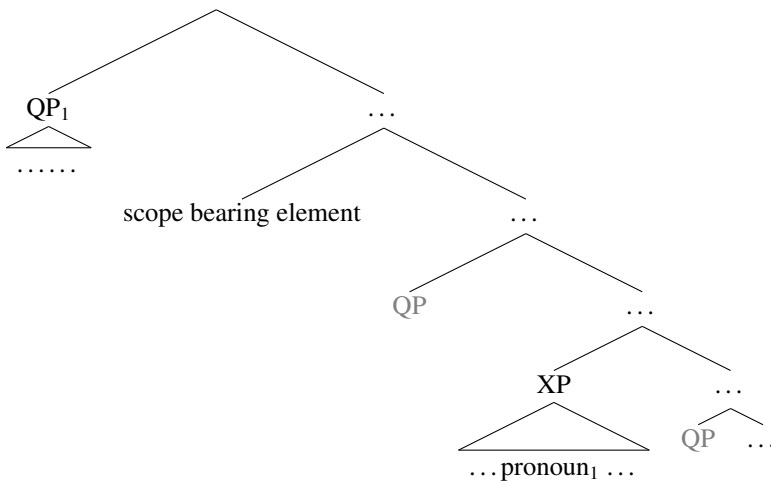


Figure 2.3: Low scope and simultaneous high binding possible with intermediate trace

This logic will now be applied to data from Norwegian, and, as we will see, the observations provide support for the punctuated nature of movement paths.

First consider example (16). There are two readings for this example, one in which the quantified DP *some girls* has surface wide-scope over the adverb