Are movement paths punctuated or uniform?*

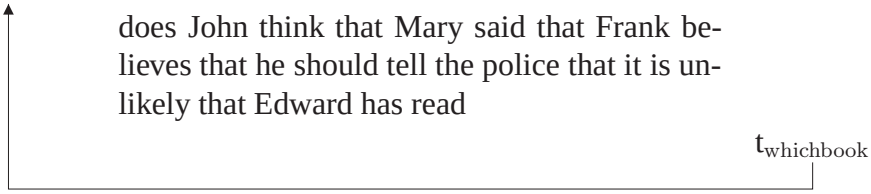
Klaus Abels, UCL
k.abels@ucl.ac.uk
&
Kristine Bentzen, University of Tromsø
kristine.bentzen@uit.no

February 20, 2009
Draft version 2.0

1 Introduction

In this paper we investigate how movement dependencies should be modeled. Movement is certainly the most-studied example of a long-distance dependency in language and it is therefore the focus of our investigation.

We take the issue of whether movement dependencies are mediated in a very local, medium range local, or long-distance manner to be an empirical question. There are several different modes of investigation that one could use to pursue this issue. They will rely on effects that movement has on the material that has been crossed by the movement. Whether such effects exist, where and how they are expressed are all empirical questions. There is no a priori answer to the question of whether the fact that movement occurred in (1) has an effect on the material that has been crossed.

(1) Which book


*We would like to thank the audience at the 2008 DGfS workshop on Local Modelling of Non-Local Dependencies in Syntax, Winnie Lechner for a constructive review, and the editors of this volume for their patience with us.

What *is* clear, is that the material that falls between a filler and the corresponding gap in a movement dependency has an effect on that dependency. The most obvious case are island effects. While (2a) is ambiguous between the readings in (2ai) and (2aii), the ambiguity disappears under a minor change of an element along the path of movement, that is, the replacement of *that* by *how* in (2b). Such effects of the material crossed on the dependency necessitate some notion of *path of movement*.

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

(3) 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, it is unsurprising that the influence between paths and filler-gap dependencies also goes the other way. What lies along the path of movement influences whether and what type of movement is possible. Conversely: Movement along a path seems to exert an influence on what lies along the path. This is shown by familiar effects from word order (e.g., the famous inversion under question formation in Spanish (Torrego (1983; 1984), Uribe-Echevarria (1992)) and morphology (e.g. the alternation in the shape of the complementizer in Irish (McCloskey (1979; 1990a; 2002), Noonan (1997)), shown 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 examples from (McCloskey 1990b:p. 205)
   a. Dúirt sé gur bhuail tú é
   said he COMP struck you him
   He said that you struck him
   b. an rud a shíl mé a dúirt tú a dhéanfá
   the thing COMP_t thought I COMP_t said you COMP_t do-COND-2SNG

the thing that I though you said you would do.

We introduce here a distinction between two types of theories which comes from Abels (2003). Abels distinguishes between *punctuated* and *uniform* paths. A path will be called punctuated if some nodes along it are affected by having been moved through while others are not. A path will be called uniform, if all nodes along it are affected in the same way. HPSG, Categorial 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 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 little vP and CP as phases. Even theories where landing sites are quite close together, as for example in Chomsky and Lasnik (1993), Takahashi (1994), 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 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 et al. (2001) treat the alternating element as a preverbal particle rather than a complementizer, but this has no bearing on the logic of the situation. They use a theory where paths are uniform, HPSG, and make the shape of the alternating element depend on whether its sister has an empty or a non-empty SLASH value.

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 where 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" as it were, leaving many nodes along the path completely untouched.

Finally, we can give a uniform non-local account of the alternation. We could as-

[1] Abels (2003) 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. We believe that this assumption was 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.

sume the following realization rule for the complementizer in Irish.[2]

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

Similar considerations make even fairly complex arguments that demonstrate the existence of a particular reconstruction site 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) a. [The papers that he_1 wrote for Ms. $Brown_2$] every $student_1$ [$_{VP}$ t' asked her_2 to grade t]
b. *[The papers that he_1 wrote for Ms. $Brown_2$] she_2 [t' asked every $student_1$ to revise t] (Lebeaux 1990, see also Fox 2000:10-11)

In this paper we argue that movement paths are punctuated. In section 2 we discuss the shape that a true argument for he punctuated path hypothesis would have to take. In section 3 we investigate whether the argument in Abels (2003) for the punctuated path hypothesis is compelling, reaching a negative conclusion. In sections 4, we offer a set of data from Norwegian as empirical support in favor of punctuated movement paths. Section 5 is a short survey of other configurations that would be involved in constructing prima facie arguments for the punctuated path hypothesis. The relevant cases have not been investigated yet. Section 6 contains a brief speculation on the location of intermediate reconstruction sites. Section 7 concludes the paper.

2 What constitutes a valid argument for punctuated paths?

The putative arguments for the punctuated nature of movement paths mentioned in the previous section can all be construed as arguments from reconstruction: reconstruction for (local) agreement in the case of Irish complementizer agreement 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 are

[2]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.

reconstruction sites. These 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 are affected.

To give a true argument for the punctuated nature of paths, we therefore need to show that some nodes along the path are *un*affected by movement while others are affected. As noted for example in Abels (2003) and Boeckx (2008), there is little if any convincing empirical evidence to argue 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:

> "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. Consider example (7). There is no reconstruction of the restriction of the *wh*-phrase into the weak island (Longobardi 1991, Cinque 1990, Cresti 1995, Frampton 1999), 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 (1990), Starke (2001)).

(7) 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 P, 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, i.e., either reconstruction is possible to

every point along the path or to none. In Figure 1 this would correspond to a situation where either reconstruction is possible at all points along the path in between any two elements, i.e., where reconstruction to all of α, β, γ, and δ is possible, or else where no reconstruction is possible at all, i.e., none of α-δ 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 1 this would be the case if reconstruction was available to α and β but not to γ and δ. The weak island extraction facts are a case of this sort, where reconstruction of the nominal restriction is possible above the island inducing element but not below it.[3]

A punctuated reconstruction pattern is one where there are sites for reconstruction both above and below sites that do not allow reconstruction. In Figure 1, we would speak of a punctuated reconstructive pattern if α and δ were possible reconstruction sites while β and γ were not, if reconstruction sites alternated with non-reconstruction sites, etc.

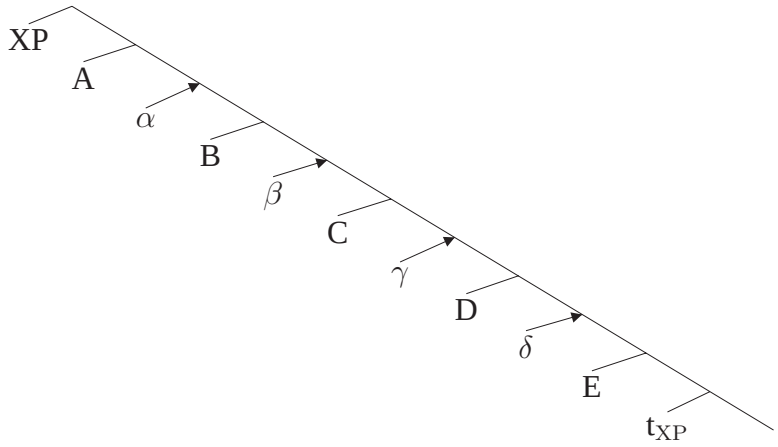


Figure 1: Path between t_{XP} and XP with four distinct points along the path, α-δ

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, need additional assumptions to deal with non-uniform monotonic and uniform patterns.

[3]Notice that uniform reconstructive patterns are also monotonic, hence the modifier 'non-uniform.'

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 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, i.e., if a position is not a scope reconstruction site but it is a binding reconstruction site, etc.

Since these matters have not been investigated in detail before, we will present here two case studies of reconstructive patterns, the second of which will turn out to provide a prima facie argument for punctuated paths. We also sketch the logic of other potential cases which should be but have not been investigated. We are not able at this moment to tell whether our prima facie argument will eventually fall for one of the two reasons mentioned above.

3 Proposed evidence for punctuated paths (Abels 2003)

Let us start by looking at a case involving binding condition A. The locality inherent in Principle A of 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 given below in Figure 2. In the structure there is an anaphor contained in a moving phrase, XP. Under the punctuated path hypothesis, there would be various traces/copies of XP, concretely in Figure 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 to be involved. This is schematized in Figure 2 by the nodes labeled DomainP which are cosuperscripted with the trace/copy for which they constitute the binding domain. Finally, there are various potential antecedents for the anaphor.

DomainP indicates the maximal possible binding domain of the anaphor within the moving constituent from the closest trace position.What we would test is whether there are DPs than 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 illustrated in Figure 2, where pit-stop binding by Antecedent_3 and Antecedent_1 ought to be possible, while the same should not hold be true for Antecedent_2.

Abels (2003) attempts an argument of this shape. It is of course well-known that anaphors may be bound at various points along the movement path (cf. Barss 1986). This is illustrated in (8). In (8a), the anaphor *himself* within the *wh*-phrase is bound by *John* in its surface position, whereas in (8b), *herself* is bound in a position below *Mary*, presumably its base position. In (8c) *himself* is bound by *John* in some intermediate position.

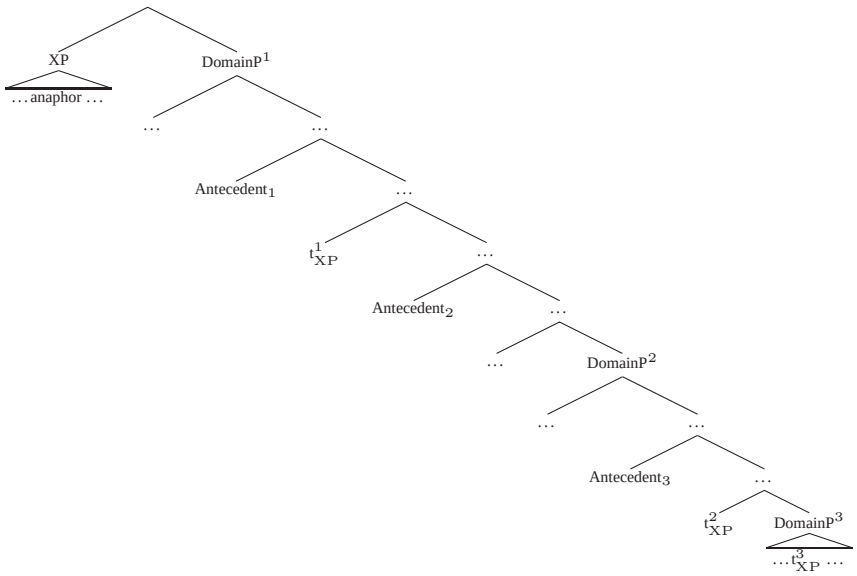


Figure 2: Schematic representation of the argument in Abels (2003)

(8) 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?

However, these examples do not tell us anything about whether paths are uniform or punctuated. A clause like (8c) can be construed with either a uniform or a punctuated path, as shown in (9)-(10).

(9) **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 [...]]]]]]

(10) **Punctuated path:**
[which picture of himself]$_i$ [... John ... [$_{vP}$ t$_i$ v^o [$_{VP}$ thinks [$_{CP}$ t$_i$ that [$_{TP}$ Mary [...]]]]]]

Crucially, though, Abels (2003) provides a context in which binding of a moved anaphor is not possible. Consider the pair in (11). In (11a), the experiencer of *seem* can bind the anaphor in the moved *wh*-phrase. In (11b), when *seem* is used as a raising verb, however, this is not possible.

(11) 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?

Abels (2003) claims that this is because in (11a) there is an available SpecCP position below *John*, which the *wh*-phrase moves through or adjoins to, and this position is local enough for *John* to bind the anaphor, as shown in (12).

(12) [Which picture of himself]$_i$ it [$_{VP1}$ seem [$_{VP2}$ to John t$_{seem}$ [$_{CP}$ t$_i$ that [$_{TP}$ Mary [$_{VP3}$ t$_i$ liked t$_i$]]]]]

In (11b) on the other hand there is no such position available, as illustrated in (13). 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 SpecTP, as the trace of *Mary* occupies this position.

(13) [Which picture of himself]$_i$ Mary [$_{VP1}$ seem [$_{VP2}$ to John t$_{seem}$ [$_{TP}$ t$_{Mary}$ to [$_{VP3}$ t$_i$ like t$_i$]]]]

Abels takes this as evidence for punctuated paths; that is, the moving element only has intermediate stops in certain positions, in CP but not in TP.

We are aware of two potential challenges to this argument. Gereon Müller makes the following observation concerning the two crucial examples: While in (11a) only a single phrase, the *wh*-phrase, is moving, there are two moving phrases in (11b). In the latter, 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 (14).

(14) [Which picture of himself]$_i$ Mary [$_{VP1}$ seem [$_{VP2}$ to John [t$_{Mary}$ [t$_i$ [t$_{seem}$ [$_{TP}$ t$_{Mary}$ to [$_{VP3}$ t$_i$ like t$_i$]]]]

Notice that all traces of the *wh*-phrase in (14) that are c-commanded by the experiencer are also c-commanded by the subject and various traces thereof. Notice further that in every single case the subject or its trace are closer to (the trace of) the *wh*-phrase than the experiencer. Assuming a binding theory strictly in terms of closest c-command, the subject would always be the relevant binder of the anaphor in (14). Given that the subject does not raise in (11a), there is an intermediate position where the experiencer is the closest potential binder for the anaphor. Hence, Müller argues, the contrast between (11a) and (11b) does not provide evidence for the punctuated nature of movement paths.

This objection, of course, is only as strong as the binding theoretic assumptions that it rests upon, namely, that anaphors in English can only be bound the closest c-commanding antecedent. This assumption is problematic, as the examples in (15) illustrate. As is well known, the DP object in such examples c-commands into the PP, (15a). However, and this undermines the strength of Müller's objection, in example (15b) the subject can antecede the anaphor despite the fact that it is not the closest potential c-

commanding antecedent, which is the DP object as in (15a).[4]

(15) a. Mary explained the man to himself.
b. Mary explained the man to herself.

A second more damaging problem for the argument is pointed out by Boeckx (2008). If the contrast between (11a) and (11b) was only due to the presence versus absence of a CP below *John*, then we would expect anaphor binding to be possible also into a more deeply embedded CP, i.e., we would expect a punctuated pattern of binding reconstruction. The expectation then is that all examples in (16) should be fine. However, (16c) 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. 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 movement paths in general and cannot, therefore, provide prima facie evidence one way or another.

(16) 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?

Thus, we agree with Boeckx that when the data in (16) are taken into account, the contrast between (11a) and (11b) does not constitute an argument for punctuated paths. In the next section, however, we present some new facts that we believe count as evidence for punctuated paths, namely reconstruction data from Norwegian (cf. Bentzen 2007).

[4]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.
On the other hand we 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 to us by Winnie Lechner) Müller's objection would again stand.
We will not pursue these issues here simply because we believe that there is a second, stronger objection to Abels' argument, to which we now turn.

4 New empirical evidence: Reconstruction in Norwegian

In this section we investigate the interaction of scope and variable binding to give us information about the absence of sites for intermediate reconstruction. The idea 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 possible site for reconstruction in between the two but not if there is no such reconstruction site between them. The situation is illustrated in Figures 3 and 4, where the trace between the scope-bearing element and XP in Figure 3 marks the availability of a reconstruction site while its absence in Figure 4 indicates the absence of such a site. Both figures are concrete instantiations of the abstract schema in the earlier Figure 1, where in Figure 3 there are intermediate copies/reconstruction sites everywhere while in Figure 4 such an intermediate copy 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 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 4 gives rise to the expectation that low scope of QP and binding into XP cannot happen simultaneously.

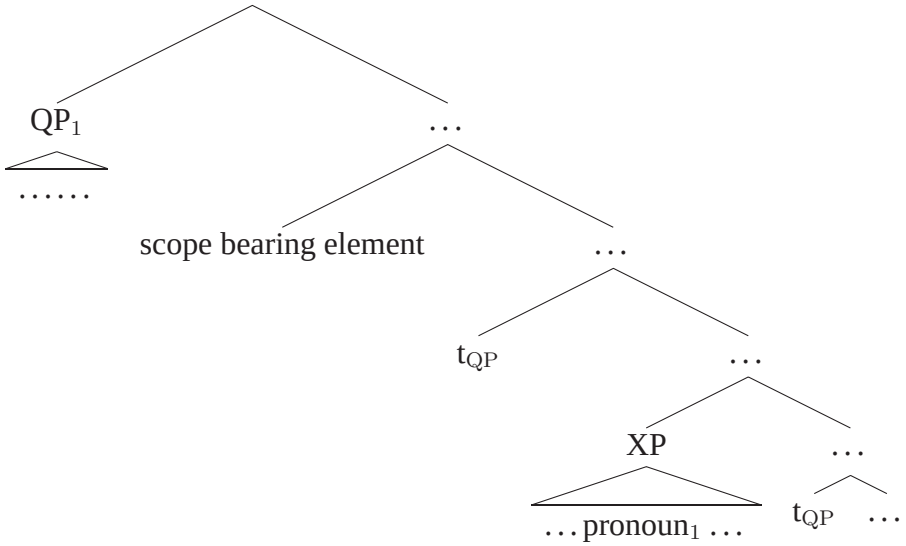


Figure 3: Low scope and high binding possible with intermediate trace

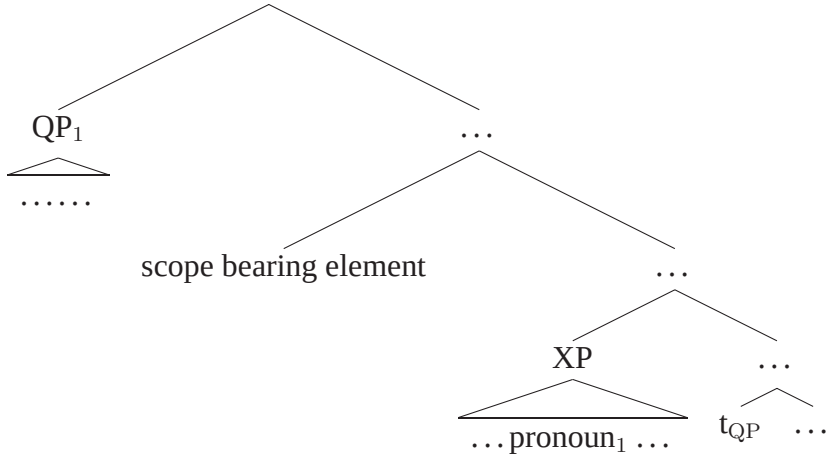


Figure 4: Low scope and high binding impossible without intermediate trace

We now apply this logic to data from Norwegian, and as we will see, the observations we present provide support for the punctuated nature of movement paths.

First consider example (17). There are two readings for this example, one in which the quantified DP *some girls* has surface wide-scope over the adverb *probably*, yielding the reading that *some girls are probably such that they will come to the party*. Alternatively, the quantified DP may be reconstructed into a position between *probably* and *come* (indicated by **t** in the gloss), yielding the reading that *it is probable that some girls are such that they will come to the party*.

(17) Noen jenter vil sannsynligvis komme på festen. (Norw.)
some girls will probably **t** come on party.the
'Some girls will probably come to the party.'

In (17) it is not clear exactly where reconstruction position **t** is located; it could either be the DP's base position (presumably in SpecvP), or some intermediate position. Thus, to probe whether or not an intermediate reconstruction site is indeed available, we need to construct a context in which reconstruction into the base position can be excluded semantically. (18) provides exactly such a context.

(18) ... at noen gutter sannsynligvis må ha dratt til Roma. (Norw.)
that some boys probably **t**′ must have **t** gone to Rome
'... that some boys probably must have gone to Rome.'

(18) is three-ways ambiguous. The quantified DP *some boys* may get a surface wide-scope reading: *Some boys are such that they probably must have gone to Rome*. A second reading is possible if the DP reconstructs into a position between the adverb

probably and the modal *must*. This yields the reading that *it is probable that some boys are such that they must have gone to Rome*. In the third reading, then, the DP reconstructs below *must*, yielding the reading that *it is probable that it must be the case that some boys have gone to Rome*.

Of course what we are interested in is the availability of the intermediate reading in (18), **t**′.[5] The availability of the intermediate reading, or its absence, provides information about the availability (or lack thereof) of an intermediate site for scope-reconstruction of the moved subject. This is the first ingredient in the crucial example we are about to present.

The second ingredient involves variable binding. Since binding requires scope, we can force the subject to take scope at least as high as some other phrase, by forcing the subject to bind into that other phrase. The relevant phrase is the PP 'på eget initiativ' – *on their own initiative* in (19).

(19) Noen jenter vil sannsynligvis på eget initiativ komme på festen.
some girls will probably ***t**′ on own initiative ***t** come on party.the
'Some girls will probably on their own initiative come to the party.'

In (19) reconstruction into the DP's base position is blocked for reasons of binding, indicated by the starred **t**, as the DP needs to bind the reflexive *own* inside the adverb *on their own initiative*. If paths were uniform, it should still be possible to reconstruct the subject in a position in between 'sannsynligvis' and 'på eget initiativ.' However, it turns out that only a wide-scope reading of the DP is available in (19), suggesting that there is no reconstruction site for the subject in between 'sannsynligvis' and 'på eget initiativ.' The observation thus argues that there is no intermediate reconstruction site for the subject in the position of the starred **t**′, and, in conjunction with the observation that intermediate reconstruction is available in (18), this constitutes support for the assumption that paths are punctuated. Note that the observation in these two clauses cannot be accounted for by simply assuming monotonic (non-uniform) paths.

The starred trace **t** is there, but cannot be used for reasons of binding, while the starred trace **t**′ must be assumed to be absent.

A possibly even more telling contrast is that between (18) and (20). The examples form a minimal pair; the only difference is the addition of 'mot sin vilje' – *against his own will* to the right of 'sannsynligvis' in (20).

(20) ... at noen gutter sannsynligvis ***t**″ mot sin vilje ***t**′ må ha ***t** dratt
that some boys probably against REFL will must have gone

[5] A potential challenge to the argument we are developing here might come from the treatment of scope phenomena in the absence of syntactic scope by way of quantification over semantic objects of higher types (see Engdahl (1980; 1986), Chierchia (1993), Kratzer (1998), Sauerland (1998; 2004) and in particular the application of these ideas to scopal interactions between quantifiers and modals in Abels and Martí (2008)).

til Roma.
to Rome
'... that some boys probably must have gone to Rome against their will.'

Reconstruction of the subject to a position below the added PP is impossible, since this would leave the possessive anaphor unbound. This explains why reconstruction to **t** is impossible. Structurally, it seems that both trace **t**′ and **t**″ in (20) could be in a position corresponding to **t**′ in (18). However, we know that reconstruction to **t**′ is impossible in (20) for binding reasons, a restriction not found in (18).

If there were an intermediate landing site in the position of **t**″, (20) should still be ambiguous, though, between a reading where the subject takes scope over 'sannsynligvis' and a reading where 'sannsynligivs' takes scope over the subject. However, the example is unambiguous: only the wide scope reading for the subject is available. This suggests, again, that there is no trace in the position of **t**″, which in turn suggests - together with the three way ambiguity of (18) - that paths are punctuated. There is no reconstruction site at **t**″; there are reconstruction sites at **t**′ and **t**, but they are unavailable in (20) because of binding. Although reconstruction below the PP containing the possessive anaphor is unavailable, the fact that there is no reconstruction site in between 'sannsynligvis' and the PP makes the pattern overall punctuated. In our view, these Norwegian constructions therefore constitute the appropriate kind of test cases for the availability of intermediate reconstruction sites, and we therefore believe that the data illustrated in this section provide real support for the claim that movement paths are punctuated rather than uniform.

5 Other cases

5.1 Scope: the best tool we have

Scope, as in the Norwegian facts just discussed, is the best tool we have for probing the punctuated versus uniform nature of movement paths. When two scope-bearing elements, whose relative scope we can independently determine, lie along a movement path, it is in principle a simple task to find out whether the moving element can scope below, above, and/or in between them. Arbitrarily fine spatial distinctions can in principle be made this way.

Nissenbaum (2001) discusses a case of roughly this shape in his thesis, though it may be debateable whether 'scope' is exactly the right notion. He observes, following an observation originally due to Larson that in a situation with several VP adjuncts, if one of them contains a parasitic gap, then all the ones closer to the VP must obligatorily also contain a parasitic gap.[6] This is schematized in (21).

[6]The observation as relating to Heavy NP Shift is apparently due to Larson (1988).

(21) Nissenbaum (2001):
V ([. . . PG]) ([. . . PG]) [. . . no PG] (*[. . . PG]) ([. . . no PG])

The examples in (22) illustrate this generalization. If both adjuncts contain a parasitic gap, as in (22a), no problem arises. If neither of them does, as in (22b), still no problem arises. However, when only one of the adjuncts contains a parasitic gap it must be the one closer to the verb, as the contrast between (22c) and (22d) illustrates.

(22) Examples from (Nissenbaum 2001:p. 82-83)

a. Who did you [$_{\text{VP}}$ [$_{\text{VP}}$ [$_{\text{VP}}$ [$_{\text{VP}}$ praise ~~who~~ to the sky $_{\text{VP}}$] [after criticizing *PG*] $_{\text{VP}}$]] [in order to surprise *PG*] $_{\text{VP}}$] ~~who~~ $_{\text{VP}}$] ?

b. Who did you [$_{\text{VP}}$ [$_{\text{VP}}$ [$_{\text{VP}}$ [$_{\text{VP}}$ praise ~~who~~ to the sky $_{\text{VP}}$] ~~who~~ $_{\text{VP}}$] [after criticizing *him*] $_{\text{VP}}$] [in order to surprise *the poor man*] $_{\text{VP}}$]?

c. Who did you [$_{\text{VP}}$ [$_{\text{VP}}$ [$_{\text{VP}}$ [$_{\text{VP}}$ praise ~~who~~ to the sky $_{\text{VP}}$] [after criticizing *PG*] $_{\text{VP}}$] ~~who~~ $_{\text{VP}}$] [in order to surprise *him*] $_{\text{VP}}$]?

d. *Who did you [$_{\text{VP}}$ [$_{\text{VP}}$ [$_{\text{VP}}$ praise ~~who~~ to the sky $_{\text{VP}}$] [after criticizing *him*] $_{\text{VP}}$] [in order to surprise *PG*] $_{\text{VP}}$]?

Nissenbaum accounts for these facts by assuming that in successive cyclic movement an intermediate copy, interpreted as a variable of type <e> and a λ-binder, which gives rise to an abstract of type <e, t>, are created. Clauses without parasitic gaps are of type <t>, while those containing a parasitic gap are of type <e, t>. This allows a straightforward explanation of Larson's generalization in terms of a type mismatch, as shown in Figure 5. If a clause with a parasitic gap adjoins too high, a type-mismatch occurs leading to a failure of interpretation higher up in the tree. The same is true if a clause without a parasitic gap adjoins too low. Adjunction sites that are even lower than the λ-binder will have to be ruled out, presumably by syntactic stipulation.[7]

To the extent that it is empirically and theoretically sound, Nissenbaum's analysis provides an argument for the punctuated nature of paths. His account of Larson's generalization relies crucially on a distinction being made between nodes between the intermediate copy/trace of movement and the λ-binder and those above the intermediate copy/trace of movement. A uniform theory of paths, where all nodes are treated the same way – Nissenbaum himself mentions the slashed categories of HPSG – has no way of making such a distinction. Hence, not every node along the path can be treated as identically affected by the movement, hence, we have a prima facie argument for punctuated paths.

[7] To complete the argument, multiclausal structures have to be considered. To the extent that Nissenbaum discusses them, they indicate that the Larson's generalization is neither linear nor monotonic but holds separately of each VP along the path of movement, i.e., the pattern is punctuated.

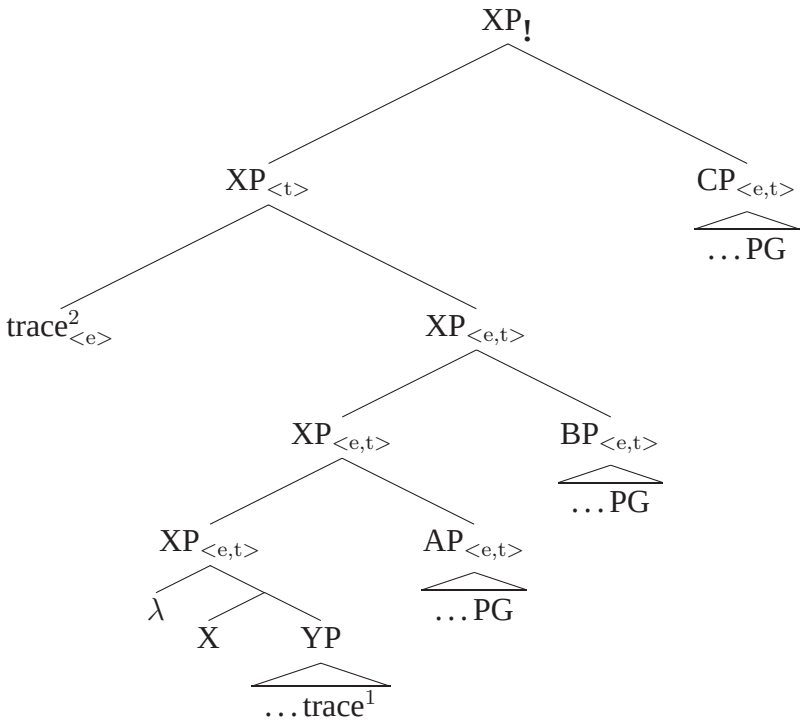


Figure 5: Type-annotated tree illustrating Nissenbaum's account of (21)

5.2 Condition C and Scope for Binding

Certain interactions between scope for binding and condition C of the binding theory are potentially informative regarding the punctuated nature of paths. Recall examples (6), repeated as (23). In the good example, (23a), the quantifier that binds into the moved phrase c-commands that pronoun, which potentially interacts with the R-expression in the moved phrase via condition C. In the bad example, (23b), the c-command relations are reversed. The pronoun c-commands the quantifier: hence, if the quantifier is to bind into the moved phrase so will the pronoun.

(23) a. [The papers that he_1 wrote for Ms. $Brown_2$] every $student_1$ [$_{VP}$ t' asked her_2 to grade t]

b. *[The papers that he_1 wrote for Ms. $Brown_2$] she_2 [t' asked every $student_1$ to revise t] (Lebeaux 1990, see also Fox 2000:10-11)

Now, if an example just like the acceptable example, (23a), could be found that was unacceptable so long as the quantifier and the pronoun were structurally very close, but which improved once the structural distance between them was increased, this would be an argument for the punctuated nature of paths.

In the hypothetical case, represented in Figure 6, there is no possible intermediate node from which the moving element could take scope below the quantifier – which it needs to to allow binding into XP – and above "her_2" – which it needs to to avoid a violation of Binding Condition C. This situation would then be remedied if the quantifer and the pronoun are structurally separated, as in Figure 7. This would make available an intermediate reconstruction site.

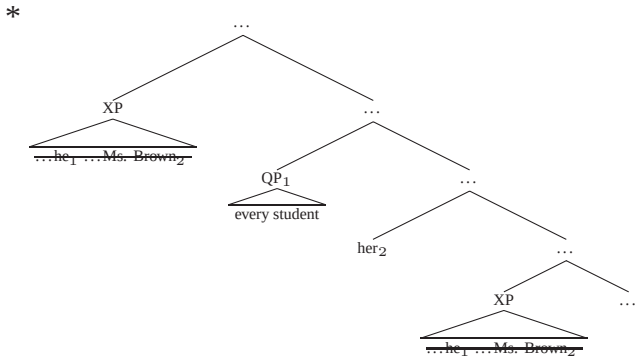


Figure 6: A hypothetical unacceptable variant of (23a)

Whether such cases exist, needs to be investigated.

6 Speculations on the location of reconstruction sites

The section on Norwegian demonstrated what we consider evidence for the punctuated nature of movement paths. In this section we will briefly speculate on the question of *why* certain intermediate positions are potential reconstructions sites, while others are not.

Consider again (18) and (19). The intermediate position $\mathbf{t}'$ appears to be the same in the two examples. Still, as pointed out, reconstruction to this position is only possible in (18), and not in (19). Why would this be? Within a phase-based framework, one suggestion is that reconstruction sites are related to phase edges. According to Chomsky (2000), vP and CP are phases, and their edges have been argued to display various special properties. One such edge property is the function of being an escape hatch for moving elements from one phase into another. Movement is consequently perceived as proceeding cyclically through phase edges. Furthermore, it has also been demonstrated that reconstruction appears to be possible at precisely these escape hatch positions. Thus, the vP edge and the CP edge have been claimed to be the sites available for reconstruction.

An argument for reconstruction at the vP edge is provided in Fox (2000). As mentioned in section 1, Fox has shown that there must be a reconstruction site to the left of VP. The relevant context, example (6a) in section 1, is repeated here as (24) for convenience. As discussed above, the topicalized noun phrase needs to reconstruct below the subject 'every student' in order for the pronoun 'he' to be bound by the subject. Fox locates the particular reconstruction site in a position adjoined to VP, but this can be reinterpreted as the edge of vP.

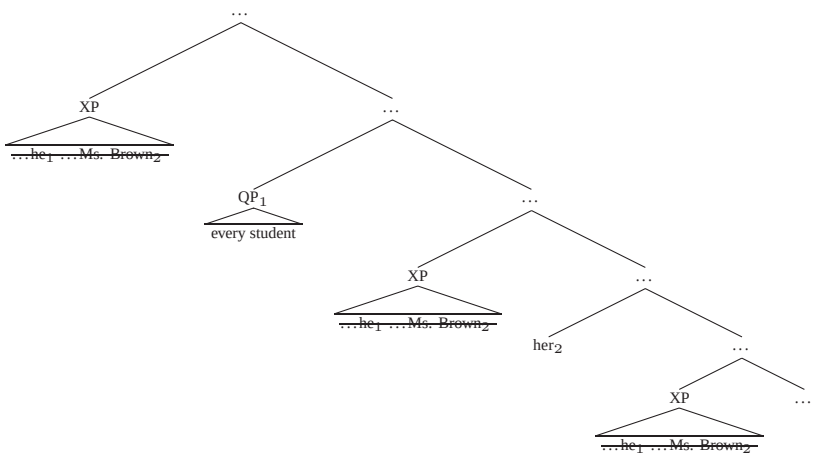


Figure 7: Hypothetical repair of the example in Figure 6

(24) [The papers that he$_1$ wrote for Ms. Brown$_2$] every student$_1$ [$_{\mathrm{VP}}$ t' asked her$_2$ to grade t]

Furthermore, Abels (2003) and Svenonius (2004) demonstrate that reconstruction is also available at the edge of CP. We saw an example of this in (12), here repeated as (25). Here, the *wh*-phrase is assumed to reconstruct at the edge of the lower CP, allowing 'John' to bind the anaphor 'himself'.

(25) [Which picture of himself]$_i$ it [$_{VP1}$ seem [$_{VP2}$ to John t$_{seem}$ [$_{CP}$ t$_i$ that [$_{TP}$ Mary [$_{VP3}$ t$_i$ liked t$_i$]]]]]

Now let us consider the Norwegian examples again, in light of pinpointing the location of reconstruction sites to phase edges. We will focus on examples (18) and (19). On the assumption that reconstruction (only) is available at the edge of a phase, we expect the possibility of a surface wide scope reading in both these examples. In (18) we also expect the narrow scope reading as a result of reconstruction to the vP phase edge. Furthermore, it is predicted that the narrow scope reading in (19) is unavailable because the vP-external phrase *on their own initiative* needs to be bound by *some girls*, thus blocking reconstruction to the vP phase edge. However, for (18), we pointed out that an intermediate reading is in fact also available, while in (19) it is not. Within the "reconstruction at phase edges" approach, the lack of intermediate reconstruction is expected in (19). The intermediate position **t**′ does not correspond to a phase edge in neither (18) nor (19), according to the definition of a phase in Chomsky (2000). The question then is what makes reconstruction to **t**′ available in (18)?

Based on verb movement facts in non-V2 contexts in Northern Norwegian, Bentzen (2007) suggests that not just vP and CP constitute phases, but that in fact all finite verbs induce a new phase in their surface position. If this suggestion is on the right track, we might have an explanation for the difference in intermediate reconstruction between (18) and (19). Assuming that reconstruction only occurs at phase edges and that finite verbs induce phases, we expect reconstruction to be available at the vP (and CP) edge, and also at the left edge of the finite verb. And in (18) this is exactly what we see; the intermediate reconstruction site can be associated with the specifier of the finite modal 'måtte'. However, in (19), there is no finite verb at the position of **t**′. The finite verb 'vil' surfaces in the V2 position, so there is no phase edge in the intermediate position.

Thus, this phase-based approach correctly predicts which intermediate positions are possible reconstructions sites in Norwegian. One might of course question whether *phases* is the correct concept here. However, we note that the available reconstruction sites we have identified in Norwegian correspond to the structural positions that people independently have argued to constitute phase edges.

7 Concluding remarks

In this paper we have sketched the logic that arguments should take which purport to argue for punctuated and against uniform movement paths. In particular, punctuated reconstruction patterns can lend support to the position that movement paths are punctuated, a position that has long formed part of the orthodoxy of Chomskyan syntactic theory without being backed by truly decisive arguments.

We concede that the evidence for punctuated paths originally proposed in Abels (2003) turns out not to stand up to scrutiny, but the case for punctuated paths can still be made. We illustrated this using the interaction of scope reconstruction and binding in Norwegian. The Norwegian examples suggest that a moving element only makes pit-stops in selected positions along the movement path, positions we might want to call phase edges. To complete the argument, one would have to show that different properties cluster in their reconstructive behavior: If the positions involved in morphosyntactic changes under movement were limited in a cross-linguistic perspective, if they coincided with the positions crucially involved in locality theory, and if those same nodes were the only possible reconstruction sites, then this would constitute very strong evidence for the punctuated nature of paths. For the moment our knowledge, especially that of lacking reconstruction sites, is too limited to warrant such conclusions.

Since the Norwegian facts discussed here are fairly subtle and subject to a certain amount of variation, we conclude noting that the true issues involved by the punctuated paths hypothesis have barely been probed and that the paucity of compelling evidence in favor of the punctuated paths position remains as a challenge to those who wish to uphold it.

References

Abels, Klaus. 2003. *Successive Cyclicity, Anti-locality, and Adposition Stranding*. Doctoral dissertation, University of Connecticut.

Abels, Klaus and Luisa Martí. 2008. All split scope is not alike. Talk presented at Sinn und Bedeutung 13, Stuttgart.

Barss, Andrew. 1986. *Chains and anaphoric dependence: On reconstruction and its implications*. Doctoral dissertation, MIT.

Bentzen, Kristine. 2007. *Order and Structure in Embedded Clauses in Northern Norwegian*. Ph.D. thesis, University of Tromsø, Norway.

Boeckx, Cedric. 2001. *Mechanisms of Chain Formation*. Doctoral dissertation, University of Connecticut.

Boeckx, Cedric. 2008. *Understanding Minimalist Syntax: Lessons from Locality in Long-Distance Dependencies*, vol. 9 of *Generative Syntax*. Blackwell Publishing.

Bošković, Željko. 2007. On the locality and motivation of move and agree: An even more minimal theory. *Linguistic Inquiry* 38: 589–644.

Bouma, Gosse, Robert Molouf, and Ivan A. Sag. 2001. Satisfying constraints on extraction and adjunction. *Natural Language and Linguistic Theory* 19 1: 1–65.

Chierchia, Gennaro. 1993. Questions with quantifiers. *Natural Language Semantics* 1 3: 181–234.

Chomsky, Noam. 1986. *Barriers*. MIT Press, Cambridge, Ma.

Chomsky, Noam. 2000. Minimalist inquiries: The framework. In *Step by Step: Minimalist Essays in Honor of Howard Lasnik*, edited by Roger Martin, David Michaels, and Juan Uriagereka, pp. 89–155. MIT Press, Cambridge, Ma.

Chomsky, Noam and Howard Lasnik. 1993. The theory of principles and parameters. In *Syntax: An international handbook of contemporary research*, edited by Joachim Jacobs, Arnim von Stechow, Wolfgang Sternefeld, and Theo Vennemann, vol. 1, pp. 506–569. Walter de Gruyter, Berlin.

Cinque, Guglielmo. 1990. *Types of A'-dependencies*. MIT Press, Cambridge, MA.

Cresti, Diana. 1995. Extraction and reconstruction. *Natural Language Semantics* 3 1: 79–122.

Engdahl, Elisabet. 1980. *The Syntax and Semantics of Questions in Swedish*. Ph.D. thesis, University of Massachusetts, Amherst, Mass.

Engdahl, Elisabet. 1986. *Constituent Questions -The Syntax and Semantics of Questions with Special Reference to Swedish*. Reidel, Dordrecht, Boston, Lancaster, Tokyo.

Fox, Danny. 2000. *Economy and Semantic Representation*. MIT Press and MITWPL, Cambridge, Mass.

Frampton, John. 1999. The fine structure of wh-movement and the propert formulation of the ecp. *The Linguistic Review* 16 1: 43–61w.

Giorgi, A and Giuseppe Longobardi. 1991. *The Syntax of Noun Phrases*. Cambridge University Press, Cambridge.

Kratzer, Angelika. 1998. Scope or pseudoscope? In *Events in Grammar*, edited by Susan D. Rothstein, pp. 163–197. Kluwer Academic Publishers.

Larson, Richard K. 1988. Light predicate raising. Tech. rep., Center for Cognitive Science, MIT, Cambridge, Mass.

Lebeaux, David. 1990. Relative clauses, licensing, and the nature of the derivation. In *Proceedings of NELS 20*, edited by Rose-Marie Déchaine, Bill Philip, and Tim Sherer, pp. 318–332. GLSA, University of Massachusetts, Amherst.

Lechner, Winfried. to appear. Evidence for survive from covert movement. In *The Survive Principle in a Crash Proof Syntax*, edited by Michael T Putnam. John Benjamins, Amsterdam.

Longobardi, Giuseppe. 1991. Extraction from NP and the proper notion of head government. In Giorgi and Longobardi (1991), chap. 2, pp. 57–112.

McCloskey, James. 1979. *Transformational Syntax and Model Theoretic Semantics:*

A Case Study in Modern Irish. Synthese Language Library. D. Reidel Publishing Company, Dordrecht, Boston, and London.

McCloskey, James. 1990a. *Clause structure, ellipsis and proper government in Irish*. Syntax research center, Cowell College, University of California at Santa Cruz., Santa Cruz, Cali.

McCloskey, James. 1990b. Resumptive pronouns, a'-binding, and levels of representation in irish. In *The Syntax of the Modern Celtic Languages. Syntax and Semantics 23*, edited by Randall Hendrick, pp. 199–248. Academic Press, San Diego.

McCloskey, James. 2002. Resumption, successive cyclicity, and the locality of operations. In *Derivation and Explanation in the Minimalist Program*, edited by Samuel David Epstein and T David Seely, pp. 184–226. Blackwell, Malden, MA and Oxford, UK.

Nissenbaum, John. 2001. *Investigations of Covert Phrasal Movement*. Ph. d. dissertation, MIT.

Noonan, M. 1997. Functional architecture and wh-movement: Irish as a case in point. *Canadian Journal of Linguistics* 42: 111–139.

Sauerland, Uli. 1998. *The Meaning of Chains*. Ph.D. thesis, MIT, Cambridge, Mass.

Sauerland, Uli. 2004. The interpretation of traces. *Natural Language Semantics* 12: 63–127.

Starke, Michal. 2001. *Move Dissolves into Merge: a Theory of Locality*. Doctoral dissertation, University of Geneva.

Stroik, Thomas. 1999. The survive principle. *Linguistic Analysis* 29 3-4: 282–309.

Svenonius, Peter. 2004. On the edge. In *Peripheries: Syntactic Edges and their Effects*, edited by David Adger, Cécile de Cat, and George Tsoulas, pp. 261–287. Kluwer, Dordrecht.

Takahashi, Daiko. 1994. *Minimality of movement*. Doctoral dissertation, University of Connecticut.

Torrego, Ester. 1984. On inversion in spanish and some of its effects. *Linguistic Inquiry* 15: 103–129.

Torrego, Esther. 1983. More effects of successive cyclic movement. *Linguistic Inquiry* 14: 561–565.

Uribe-Echevarria, María. 1992. On the structural positions of subjects in spanish, and their consequences for quantification. In *Syntactic theory and Basque syntax*, edited by Joseba A. Lakarra and Jon Ortiz de Urbina, pp. 447–493. ASJU, San Sebastian.