Anti-*That*-Trace Effects In Norwegian

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## 0.	Introduction

In this paper I will analyze the anti-*that*-trace effect in Norwegian, as described in Taraldsen (1986). When a subject is extracted locally within an embedded clause by wh-movement (Chomsky (1977)), the complementizer *som* is obligatory.

1.	*Embedded Questions* (Taraldsen (1986))
  a. Jeg   vet   hvem   som   vant.
     I   know   who   Comp   won
  b. *Jeg vet   hvem   vant.
     I   know   who   won

  'I know who won.'

  Free Relatives
  c. hvem   som   vant
     whoever   Comp   won
  d. *hvem   vant
     whoever   won

  'Whoever won'

The examples in (1) show the anti-*that*-trace effect. The anti-*that*-trace effect contrasts with the *that*-trace effect which requires the absence of a complementizer when a subject is wh-moved long distance from an embedded clause. The analysis of the anti-*that*-trace effect I will give is couched in Optimality Theory (OT) Syntax (Prince and Smolensky (1993), Grimshaw (to appear) Grimshaw and Samek-Lodovici (1995), Grimshaw and Samek-Lodovici (1996), Legendre, Wilson, Smolensky, et al. (1995), Legendre, Smolensky and Wilson (1995), Samek-Lodovici (1996), Bakovic (1995)). I will show that the same constraints used by Grimshaw (to appear) to account for English wh-movement can account for the Anti-*that*-trace effects in Norwegian given the hypothesis that subject wh-phrases must move in that language. Independent evidence from matrix wh-questions supports this hypothesis. Not only these effects but the distribution of complementizers in general in the two languages can also be accounted for.

I will assume the following constraints all of which are from Grimshaw (to appear).

2.	*Economy Constraints*
  ECONOMY OF MOVEMENT (STAY)
       Trace is not allowed
  NO MOVEMENT OF A LEXICAL HEAD (NO-LEX-MVMNT)
       A lexical head cannot move
  OPERATOR IN SPECIFIER (OP-SPEC)
       A syntactic operator must be in a specifier position which c-commands the extended projection where it takes scope

OBLIGATORY HEADS (OB-HD)
> Phrases have lexical heads

HEAD LEFT (HD-LFT)
> Overt perfect heads are leftmost in their projections; where perfect heads are those heads that match the projection in all respects (the constraint holds of unmoved heads)

PURITY OF EXTENDED PROJECTION (PURE-EP)
> No movement into the head of a subordinate clause

TRACE IS GOVERNED (T-GOV)
> A trace is properly governed

TRACE IS LEXICALLY GOVERNED (T-LEX-GOV)
> a trace is properly governed by a lexical head

FULL INTERPRETATION (FULL-INT)
> Lexical conceptual structure is parsed

I will discuss these constraints and their formulation at the relevant place in the text.

Another aspect of the analysis I will adopt directly from Grimshaw (to appear) is the typology of empty elements. In this system there are only two types of phonetically empty elements, traces and radically empty structure. Traces can be thought of as phonetically unrealized copies of displaced material which still have structural realization. All other phonetically empty material is radically empty, that is not present in the structure. This assumption is consistent with Samek-Lodovici's (1996) characterization of unrealized subjects. The status of the two types of phonetically empty structure with respect to the constraints is as given in table one.

Table 1

	Satisfies OB-HD?	Violates HD-LFT?	Able to head govern?	Violates STAY?
trace	yes	no	?	yes
radically empty	no	no	no	no

There are four constraints where the difference between phonetically empty and phonetically filled structure can make a difference. In terms of OB-HD, the structurally present trace satisfies the constraint, while structurally absent heads fail the constraint (c.f. Bakovic (1995) where OB-HD is an inviolable principle of UG and Samek-Lodovici (1996) where the effects of OB-HD are subsumed to the inviolable Obligatory Content principle). Both the structurally present trace and the radically empty structure fail to cause HD-LFT violations. That traces are exempt from HD-LFT violations is argued for with respect to English matrix wh-questions in Grimshaw (to appear; 38). With respect to the government constraints, radiclly empty structure is clearly not capable of government. On the other hand traces may or may not be able to govern. In the analysis I present here it is possible to assume that traces are not proper governors, as long as they do not block government from their raised counterpart. See the discussion of *that*-trace effects in Norwegian below for

more on this. Finally, traces violate the constraint STAY, while radically empty structure does not.

The outline of the rest of the paper is as follows. In section one I will defend the hypothesis that subject wh-phrases in Norwegian must move. This contrasts with subject wh-phrases in English which must remain in situ. In section two I will show how this hypothesis accounts for the anti-*that-trace effects given in (1). The crucial aspect of this account is that the configuration *som - t* is the best possible configuration given the constraints and their relative ranking in Norwegian. In section three I will argue against a proposal for why the wh-phrase must move in Norwegian which relies on constraint reranking. In this section I will also argue for the relative ranking of HD-LFT in both English and Norwegian. In section four I will show in detail how other potential candidates in the anti-*that-trace configuration are ruled out. In section five I will argue for further rankings between HD-LFT and OB-HD based on configurations where the complementizer is not relevant for the government of the trace. In section six I will discuss the anti-*that-trace effects in English relative clauses and their counterpart in Norwegian relative clauses. In section seven I will briefly compare two previous proposals to the same phenomenon, Rizzi (1990) and Taraldsen (1986). Finally, in section eight I will explore the possibility that the requirement for subject wh-phrases to move in Norwegian is tied to verb second in that language.

1.   Movement of Subject Wh-Phrases

The analysis of anti-*that-trace effects in Norwegian and their absence in English embedded clauses I propose crucially depends on the hypothesis that a difference between English and Norwegian is that in English subject wh-phrases do not move, while in Norwegian subject wh-phrases must move. In English subject wh-phrases in both matrix and embedded clauses will be in the specifier of the tensed verb. That is in the specifier of VP if the sentence has no auxiliary or in the Specifier of IP if there is an auxiliary. They do not move to the specifier of CP as object wh-phrases do. This follows from the fact that subject wh-phrases can satisfy OP-SPEC without moving. In Norwegian I propose that subject wh-phrases do move to the specifier of a higher phrase. This difference is not predicted given only the constraint OP-SPEC. However, I propose that the difference between Norwegian and English can be achieved with the same constraints used by Grimshaw (to appear) to account for English wh-movement with one additional constraint which forces wh-movement in subject questions. For the purposes of discussion, I formulate this constraint as MOVE-WH.

3. MOVE-WH   A wh-phrase cannot remain in situ.[1]

In section 1.1 I will show that non-subject wh-phrases move in both languages, giving direct evidence for the ranking of OP-SPEC above STAY in these languages. Since both languages rank OP-SPEC above STAY, the difference between the two languages cannot reside here. In section 1.2 I will provide evidence that subject wh-phrases remain in situ in English and move in Norwegian. Evidence for this claim comes from the lack of *do*-support in subject wh-questions in English and the placement of adverbs in Norwegian. This evidence motivates the presence of MOVE-WH.

1.1.   *Non-subject wh-movement*

With respect to wh-movement, English and Norwegian are extremely similar. Both English and Norwegian have overt wh-movement of non-subject wh-phrases. Therefore, in both languages, OP-SPEC dominates STAY. One difference that is not crucial for the discussion here is that in non-subject wh-questions English has *do*-support while Norwegian has subject-verb inversion. This difference follows from the different relative ranking between NO-LEX-MVMNT and FULL-INT in the two languages. Although this difference is not crucial for the discussion here, both phenomenon provide evidence for wh-movement in the respective languages. Here I will briefly compare the two systems of wh-movement in English and Norwegian.

It is a well-known property of English that in non-subject wh-questions the wh-phrase must move to the front of the clause (Ross 1967, Chomsky (1981)).

4. a. Who did Bill see?
   b. *Bill saw who?[2]
   c. *Who saw Bill? (object reading of wh-phrase)

The example in (4b) shows that the wh-phrase cannot remain in situ in English. This data indicates that for English, OP-SPEC must dominate STAY. The example in (4c) shows that verb movement is not available in English. This is consistent with the ranking proposed by Grimshaw for English (Grimshaw (to appear); 3). The partial ranking in (5) is a fragment of the complete ranking Grimshaw proposes for the grammar of English. However, it is sufficient for our discussion here.

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[1] At present this constraint is admittedly ad-hoc. In section seven I discuss the possibility of deriving the effects of this constraint from the constraint responsible for verb second effects in Norwegian. C.f. Vikner's (1996) verb second constraint 'V2'.

[2] (b) is grammatical if the wh-phrase is stressed as in 'Bill saw WHO?'. I will not consider these cases here.

5 . *Partial Constraint Ranking for English*

NO-LEX-MVMNT   OP-SPEC

OB-HD
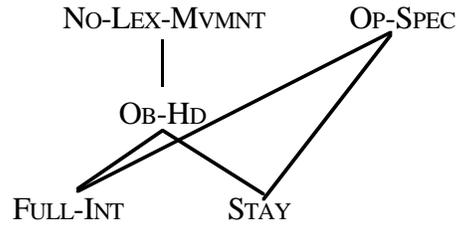
FULL-INT   STAY

The ranking between OP-SPEC and STAY indicates that English has wh-movement in general. If OP-SPEC cannot be satisfied by a wh-phrase in situ, it will be moved forcing a violation of STAY. With OP-SPEC also dominating FULL-INT, wh-movement will occur even at the expense of inserting a dummy element (forced by OB-HD). The ranking of OB-HD above FULL-INT allows *do*-support to satisfy the structural requirement of headship imposed by OB-HD. The ranking of NO-LEX-MVMNT above FULL-INT indicates that moving a verbal head will always be less optimal than inserting the dummy verb *do*. The other rankings are supported by different aspects of English syntax, and are not directly relevant for the discussion here.

The tableau (T1) shows how the optimal candidate is chosen. The two government constraints (T-GOV and T-LEX-GOV) are not relevant for the trace of the moved wh-phrase in this case since it is in a governed position (complement of the verb)[3]. PURE-EP is not relevant since this is a matrix clause. In addition I have omitted HD-LFT from the tableaux since it is not violated by the optimal candidate. The ranking for this constraint given below in section three is consistent with the results presented here.

(T1) English object movement, Input = ‹see ‹x,y›, x = Bill, y = who, Tns = PST›

Candidates	NO-LEX-MVMNT	OP-SPEC	OB-HD	FULL-INT	STAY
a. ☞ $[_{CP}$who$_i$ did$_j$ $[_{IP}$Bill$_k$ t$_j$ $[_{VP}$t$_k$ see t$_i$]]]				*	***
b. $[_{XP}$who$_i$ $[_{VP}$Bill saw t$_i$]]			*!		*
c. $[_{VP}$Bill saw who]		*!			
d. $[_{XP}$who$_i$ saw$_j$ $[_{VP}$Bill t$_j$ t$_i$]]]	*!				**

Candidate (a) is optimal since it violates only the low ranked FULL-INT and STAY. Subordinating any of the other three constraints to FULL-INT and STAY will result in one of the other candidates being optimal.

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[3] The optimal candidate also has subject movement to satisfy the constraints CASE and SUBJ (see Grimshaw (to appear)). The trace of subject movement does not satisfy T-LEX-GOV since it is governed by the non-lexical *do*. I have factored out the ranking between these constraints for presentational purposes. However, it is consistent with the ranking given here.

English provides two pieces of evidence that wh-movement takes place. The most obvious is that the wh-phrase is at the front of the clause. Second is the *do*-insertion forced by the requirements of OB-HD. In Norwegian we see similar evidence for wh-movement.

As can be shown by non-subject wh-questions, Norwegian also requires the wh-phrase to move (Taraldsen (1983)).

6. a. Hvem så Bill?   (object reading of wh-phrase)
      who saw B.
   b. *Bill så hvem?[4]
      B.   saw who
   c. *Hvem gjorde Bill se?
      Who did   B.   see

   'Who did Bill see?'

Again, (6b) shows that the wh-phrase may not remain in situ, direct evidence that it must move. This indicates that OP-SPEC must dominate STAY in Norwegian as well. One difference between English and Norwegian is the availability of verb movement in Norwegian and the lack of *do*-insertion as indicated by (6a and c). This indicates that NO-LEX-MVMNT is subordinate to both OB-HD and FULL-INT in Norwegian. The fact that subject-verb inversion takes place in Norwegian provides further evidence that movement has taken place. Taking the constraints used above for English we get the following partial ranking for Norwegian.

7. *Partial Constraint Ranking for Norwegian*

OP-SPEC, OB-HD, FULL-INT

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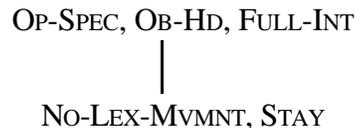
NO-LEX-MVMNT, STAY

The three constraints, OP-SPEC, OB-HD and FULL-INT must dominate the two movement constraints NO-LEX-MVMNT and STAY. This ranking accounts for the fact that wh-phrases move in Norwegian and that verb movement is preferred to *do*-insertion to satisfy the structural constraint OB-HD.

The tableau (T2) gives the ranking argument for Norwegian.

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[4] As in English, the in situ candidate is available if the wh-phrase is stressed. I have nothing to say about this option.

(T2) Norwegian object wh-movement, Input = ‹se ‹x,y›, x = Bill, y = hvem, Tns = PST›

Candidates	Op-Spec	Ob-Hd	Full-Int	No-Lex-Mvmnt	Stay
a. ☞ [$_{XP}$hvem$_i$ så$_i$ [$_{VP}$Bill t$_i$ t$_i$]]]				*	**
b. [$_{VP}$Bill så hvem]	*!				
c. [$_{IP}$hvem$_i$ gjorde [$_{VP}$Bill se t$_i$]]]			*!		*
d. [$_{CP}$hvem$_i$ gjorde$_k$ [$_{IP}$ t$_i$ t$_k$ [$_{VP}$Bill se t$_i$]]]			*!		***
e. [$_{XP}$hvem$_i$ [$_{VP}$ Bill så t$_i$]]		*!			*

In Norwegian we know that each of the three constraints, OP-SPEC, OB-HD and FULL-INT must dominate both NO-LEX-MVMNT and STAY. Comparing candidates (a) and (b) shows that OP-SPEC dominates NO-LEX-MVMNT and STAY. Candidates (a) and (c) or (d) show that FULL-INT dominates NO-LEX-MVMNT and STAY. Finally, candidates (a) and (e) show that OB-HD dominates NO-LEX-MVMNT and STAY.

We see that both English and Norwegian have wh-movement for non-subjects. Direct evidence for this claim comes from the fact that wh-phrases cannot remain in situ. Indirect evidence comes from *do*-insertion in English and subject-verb inversion in Norwegian. A difference between the two languages is that Norwegian allows verb movement, while English resorts to *do*-support. This difference results from reranking of FULL-INT and NO-LEX-MVMNT. In the next section I will show that a relevant difference between the two languages is whether subject wh-phrases move or stay in situ.

1.2.   Subject wh-movement

Direct evidence of subject wh-movement is not possible, since the in situ candidate and the moved candidate produce the same linear order. However, indirect evidence from *do*-support and the placement of adverbs is available. This indirect evidence will show that in English subject wh-phrases remain in situ while in Norwegian they move to a higher position.

1.2.1. English subject wh-phrases do not move: evidence from *do*-support.

Above I noted that English non-subject wh-phrases show *do*-support triggered by the need to fill the head of the higher projection created by wh-movement. If *do*-support does not occur, this is evidence that movement has not taken place, since there is no higher projection whose head must be filled. In English, subject wh-questions do not allow *do*-support as in (8a and b), in contrast to non-subject wh-questions.

8. a. *Who did see Bill?
   b. Who saw Bill?

Therefore it can be concluded that the subject wh-phrase remains in situ. This analysis follows from the constraint ranking given above for English. The wh-phrase satisfies OP-

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SPEC in situ. Movement of the wh-phrase would result in a violation of STAY with no improvement on OP-SPEC. Therefore the wh-phrase stays in situ since moving would not allow the candidate to do better on OP-SPEC. Since the wh-phrase does not move, OB-HD does not need to force the presence of a dummy head. Thus, there is no *do*-support. For subjects the optimal candidate given this input is a simple VP, as in (9).

9.   a.

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              VP
            /    \
          DP      V´
          |      /   \
         who    V     DP
                |      |
               saw    Bill
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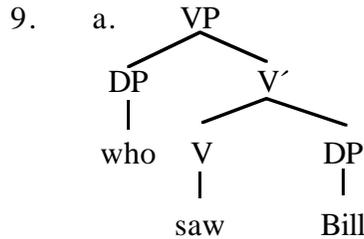
It is quite possible that the optimal candidate is an IP with the subject wh-phrase in the specifier of IP and empty I^0 head as in Vikner (1996) under the assumption that lack of V to I movement does not force *do*-support. What is crucial here is that the subject wh-phrase does not move to CP, forcing *do*-support. However, given the partial constraint ranking in (5), the VP analysis in (9) is the optimal candidate since it violates none of the constraints.[5]

Tableaux (T3) indicates that (9) satisfies all of the constraints in (5).

(T3) English subject movement, Input = ‹see ‹x,y›, x = who, y = Bill, Tns = PST›

Candidates	OP-SPEC	NO-LEX-MVMNT	OB-HD	FULL-INT	STAY
a. ☞$[_{VP}$Who saw Bill]					
b. $[_{IP}$who$_i$ did $[_{VP}$t$_i$ see Bill]]]				*!	*!
c. $[_{CP}$who$_i$ did$_k$ $[_{IP}$ t$_i$ t$_k$ $[_{VP}$t$_i$ see Bill]]]				*!	*!**
d. $[_{XP}$who$_i$ $[_{VP}$ t$_i$ saw Bill]]			*!		*
e. $[_{XP}$who$_i$ saw$_j$ $[_{VP}$t$_i$ t$_j$ Bill]]]		*!			**

Candidate (a) does not violate any of the constraints in the partial ranking and is optimal. In this candidate, the wh-phrase may remain in situ and satisfy OP-SPEC. Therefore the other candidates cannot better this candidate on OP-SPEC and their violations of other constraints are gratuitous.

The analysis of English wh-movement sketched here is not homogeneous. This contrasts with in Norwegian where I propose that wh-questions are homogeneous. In English there are different optimal parses for subject wh-questions and non-subject wh-questions. Subject wh-questions are simple VPs or IPs. The wh-phrase remains in situ. Non-subject wh-questions are full-blown CPs always. In the next section I will argue that all Norwegian wh-phrases move to the Specifier of CP.

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[5] The optimal candidate does violate the constraint HD-LFT since the verb is a perfect head which is not leftmost in its projection. I will explore the position of HD-LFT in the hierarchy in section three below.

1.2.2. Norwegian subject wh-phrases move: evidence from adverbial placement

Again, the question of direct evidence for subject wh-phrases arises. In Norwegian, the lack of *do*-support cannot be used as evidence since Norwegian does not have *do*-support with non-subject wh-phrases (see above). Unfortunately, subject-verb inversion cannot provide evidence since it is exactly the movement of the subject which triggers verb movement in this case (the verb inverts with the trace of the subject). Therefore, the in situ candidate and the moved candidate produce the same string. Fortunately, the position of the verb with respect to medial adverbs[6] or negation gives evidence for whether or not the verb has moved (Holmberg (1986), Vikner (1995)).

10. a. Bill   så   faktist   et   romskip.
    B.   saw   actually   a   spaceship

   b. *Bill faktist   så   et   romskip.
    B.   actually   saw   a   spaceship

   'Bill probably saw a spaceship.'

   c. Jeg   tror   at   Bill faktist   så   et romskip.
    I   believe   that   B.   actually   saw   a   spaceship

   d. *Jeg   tror   at   Bill   så   faktist   et   romskip.
    I   believe   that   B.   saw   actually   a   spaceship

   'I believe that Bill really saw a spaceship.'

In main clauses the inflected verb appears to the left of medial adverbs or negation as in (10a). It cannot appear to the right of them as in (10b). In embedded sentences the situation is reversed, the inflected verb must appear to the right of a medial adverb or negation and cannot appear to the left of them.[7]

The exact position of adverbs is not clear. Under an Emonds/Pollock type analysis (Emonds (1978), Pollock (1989)), adverbs are adjoined to VP.[8] Grimshaw (to appear) proposes that they may in some cases be adjoined to V´. While Travis (1988) argues that they are adjoined to V^0. In all cases, adverbs are assumed to be to the left of the V head. Therefore, despite the uncertainty over the exact position of adverbs, if the verb appears to the left of adverbs this is evidence that it has moved from its position inside VP. Under this analysis, (10c) indicates that in embedded clauses the verb remains inside VP. Indeed as (10d) shows, it must remain there. In main clauses the verb must move out of the VP (10a

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[6] According to Vikner (1995; 46), medial adverbs are those that occur between the subject and the verb complement and cannot appear initially or finally.

[7] Evidence from adverbs is not available for English since there adverbs always appear to the right of an inflected auxiliary or to the left of the verb.

[8] But see Williams (1994) for arguments against this position.

and b) given its relative position with the adverb. This is also true of subject wh-questions as (11) shows.

11. a. Hvem så faktist et romskip?
   who saw actually a spaceship

   b. *Hvem faktist så et romskip?
   who actually saw a spaceship

   'Who really saw a spaceship?'

Therefore there is good evidence that in Norwegian, subject wh-phrases cannot remain inside the VP but must be in the specifier of a higher projection. The relative position of the adverb and the verb in English also supports the analysis that the verb doe not move in that language.

I assume that the verb moves into C^0, following den Besten (1977), Thiersch (1978), Holmberg (1986), Taraldsen (1986), Holmberg and Platzack (1990), and Vikner (1995). Furthermore, I will follow Holmberg and Platzack (1990) who argue that the Mainland Scandinavian languages (Danish, Swedish and Norwegian) differ from Icelandic in that they do not have independent V to I movement. Given that these languages have V to C movement, there are several ways to capture this fact in a phrase structure tree, three of which I will discuss here. The first possibility is to have the verb move through I on its way to C as in (12a). A second possibility is for the verb to skip over I on its way to C as in (12b). A third possibility is for the IP level not to be projected as in (12c).

12. a.

b.

c.
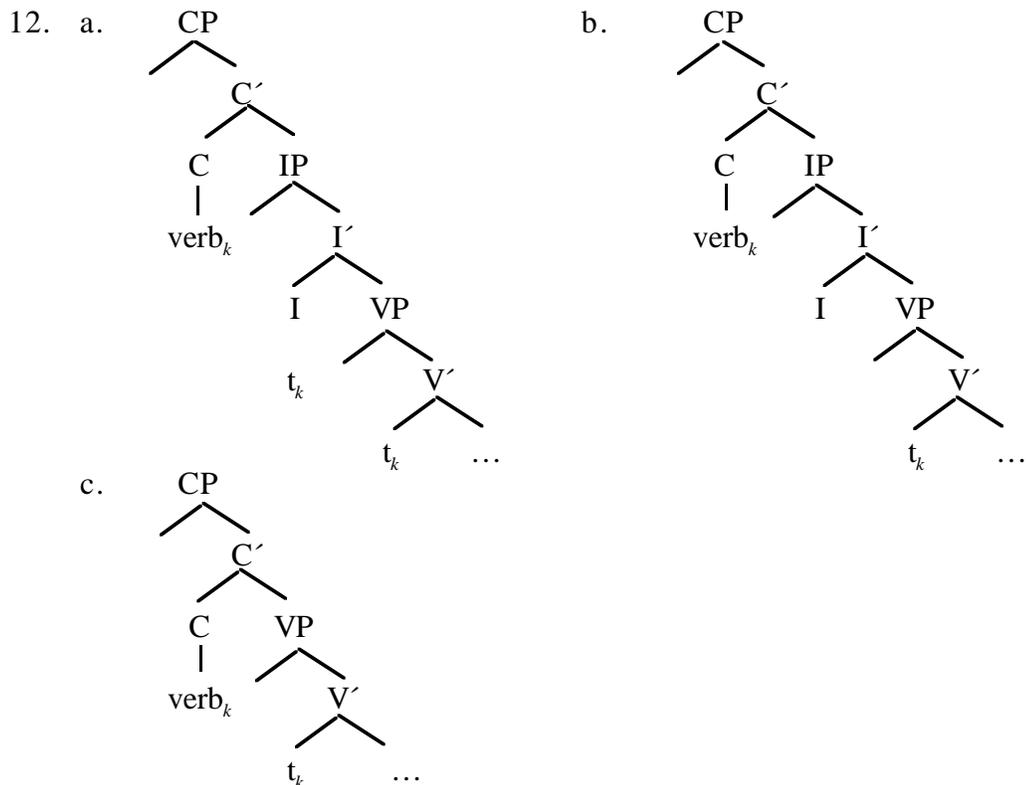
These three possibilities each have their advantages and drawbacks. For example, (12a) and (12c) satisfy the Head Movement Constraint (HMC) of Travis (1984) or Relativized Minimality (Rizzi (1990)) which Vikner (1996) assumes is an OT constraint. However, (12a) includes one extra movement compared to the other two possibilities. (12c) on the other hand violates ordering restrictions on C. That is C is generally assumed to precede IP, not VP. In a theory like OT, these drawbacks do not necessarily rule out each of these possibilities. Rather, if principles like the HMC or the selectional requirements of C are violable constraints, the optimal structure in a given grammar for a given input depends on the relative ranking of these constraints. In this paper I will assume that (12c) is the proper characterization of Norwegian verb movement since it has the minimal amount of STAY violations and obeys the HMC. This move facilitates reading of the tableaux. However, keep in mind that it is arbitrary and either of (12a or b) may also be the structure for Norwegian. This choice does not affect the argument I present.[9]

That said, I will be assuming a phrase structure like that in (13) for a sentence like (11a) in Norwegian.

13.

```
                CP
              /    \
          DP_i      C´
           |      /    \
         hvem   C        VP
                |      /    \
              så_k   t_i      V´
                            /    \
                          t_k     DP
                                  /\
                                Bill
```
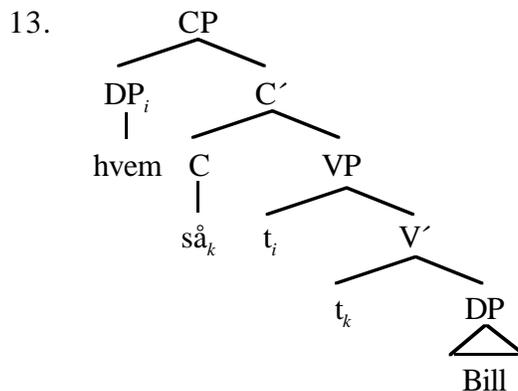
The partial ranking proposed in (5) for Norwegian does not predict (13) to be optimal. Under this ranking the optimal candidate is the VP analysis, whereas in Norwegian, the optimal parse is one which contains the CP projection above the VP. The tableau (T4) shows how the wrong candidate is optimal.

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[9] It does however, affect the formulation of the MOVE-WH constraint. If we assume that there is an IP between VP and CP, then under the current formulation of MOVE-WH, the wh-phrase should stop in the specifier of IP and not move to the specifier of CP. This is because further movement would unnecessarily violate STAY. However, by assumption, V to I movement does not occur, so we predict the wrong candidate to be optimal. Therefore, MOVE-WH would have to be formulated in a way that forces V to C, not just V to I.

(T4) Norwegian subject movement, Input = ‹se ‹x,y›, x = hvem, y = Bill, Tns = PST›

Candidates	OP-SPEC	OB-HD	FULL-INT	NO-LEX-MVMNT	STAY
a. ●※[$_{CP}$hvem$_i$ så$_j$ [$_{VP}$ t$_i$ t$_j$ Bill]]]				**!	*!*
b. ☞ [$_{VP}$ hvem så Bill]					
c. [$_{IP}$hvem$_i$ gjorde [$_{VP}$t$_i$ se Bill]]]			*!		*
d. [$_{CP}$hvem$_i$ gjorde$_k$ [$_{IP}$ t$_i$ t$_k$ [$_{VP}$t$_i$ se Bill]]]			*!		***
e. [$_{CP}$hvem$_i$ [$_{VP}$ t$_i$ så Bill]]		*!			*

Candidate (b), the winner in English, threatens to be the winner in Norwegian. Again, because it does not violate any of the constraints.[10] The question is how to make the observed candidate optimal under the constraint ranking.

In an OT grammar are two potential answers to this problem. One possibility is that reranking of constraints can get the right result. The second possibility is to introduce a new constraint which the optimal candidate satisfies but the sub-optimal candidate violates. I will discuss in detail in section three why the first option is not available in this situation. Instead, I propose that there is a constraint that is not active[11] (i.e. ranked low enough with respect to other constraints not to have its effects felt) in English, but which is active in Norwegian which forces subject wh-phrases to move from their VP internal positions. For the purposes of discussion, in this section I will define the constraint as in (14).

14.   MOVE-WH   A wh-phrase cannot remain in situ.

The constraint requires that a wh-phrase be part of a movement chain.

With MOVE-WH ranked above NO-LEX-MVMNT and STAY in Norwegian, the optimal candidate for Norwegian will indeed be optimal.

(T5) The effects of MOVE-WH, Input = ‹se ‹x,y›, x = hvem, y = Bill, Tns = PST›

Candidates	OP-SPEC	MOVE-WH	OB-HD	FULL-INT	NO-LEX-MVMNT	STAY
a. ☞ [$_{CP}$hvem$_i$ så$_j$ [$_{VP}$ t$_i$ t$_j$ Bill]]]					**	**
b. [$_{VP}$ hvem så Bill]		*!				
c. [$_{IP}$hvem$_i$ gjorde [$_{VP}$t$_i$ se Bill]]]				*!		*
d. [$_{CP}$hvem$_i$ gjorde$_k$ [$_{IP}$ t$_i$ t$_k$ [$_{VP}$t$_i$ se Bill]]]				*!		***
e. [$_{CP}$hvem$_i$ [$_{VP}$ t$_i$ så Bill]]			*!			*

By introducing a new constraint which crucially dominates NO-LEX-MVMNT and STAY, we get the right optimal output. Since (b) violates this new constraint, its gains on the two movement constraints are offset by the loss on MOVE-WH. Therefore, candidate (a) is

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[10] I will take up the issue of the HD-LFT violation in section three.

[11] Prince and Smolensky (1993; 107) define an active constraint as follows:

(i) **Definition of Active**.

Let $\mathbb{C}$ be a constraint in a constraint hierarchy $\mathbb{CH}$ and let i be an input. $\mathbb{C}$ is *active on* i *in* $\mathbb{CH}$ if $\mathbb{C}$ eliminates from consideration some candidate parses of i.

optimal since it satisfies MOVE-WH, despite its multiple movement violations. In English, reranking of MOVE-WH and STAY will result in (b) being optimal.

2. Anti-*that-trace

Given the ranking of MOVE-WH with respect to the other constraints proposed by Grimshaw (to appear) in Norwegian, the anti-*that-trace effects follow. The outline of the analysis is as follows. Because wh-subjects cannot stay in situ due to MOVE-WH, they leave a trace in subject position. This trace is subject to the proper government constraints T-GOV and T-LEX-GOV. The definition of government along with the ranking of other constraints make lexical government from either the embedded verb or the matrix verb impossible. This is discussed in detail below. Therefore the non-lexical government by the complementizer is the optimal solution to governing the trace.

The two proper government constraints from Grimshaw (to appear) are central to the analysis of anti-*that-trace effects presented here. Before showing how these constraints fit into the ranking for Norwegian, I will discuss their formulation.

15. *Government Constraints*
   TRACE IS GOVERNED (T-GOV)   A trace is properly governed
   TRACE IS LEXICALLY GOVERNED (T-LEX-GOV)   a trace is properly governed by a lexical head

T-GOV and T-LEX-GOV are related to the Formal Licensing component of Rizzi's (1990) conjunctive ECP. In order for a trace to be licensed formally, it must be properly head governed. The core case of proper government is "Government by X^0 in X‴" (Rizzi, 1990; 31). This characterization of proper government ensures that complements are governed. In addition it will be crucial that specifiers of complements can also be governed in order for the complementizer to govern the trace in the specifier of its complement. I will assume this to be true, leaving technical details to section 4.2.

In the system proposed by Grimshaw, government comes in two flavors. T-GOV is a general head (lexical and functional) government requirement. T-LEX-GOV is the more restrictive lexical government requirement . These two constraints capture the idea that traces prefer to be properly governed by a lexical element. However, if head government cannot be achieved due to a conflict with a higher ranked constraint, they will be satisfied with proper government by any head. Any trace that satisfies the more restrictive T-LEX-GOV will also satisfy the general T-GOV. However, a trace may satisfy the general T-GOV and fail T-LEX-GOV. In this case, the trace which is lexically governed will be more harmonic (i.e. do better on the constraints) since it has no violations, than the non-lexically governed trace. Consider the tableau in (T6).

(T6) Government of traces

		T-Gov	T-Lex-Gov
a.	☞ Lexically governed trace		
b.	Non-lexically governed trace		*!
c.	Not governed	*!	*!

If no other constraints come into play, the lexically governed trace will be optimal, i.e. candidate (a). However, candidate (b) is second best since it satisfies at least T-Gov. Candidate (c) is the worst candidate, violating both constraints. No ranking between these two constraints is motivated, since both (a) and (b) satisfy the T-Gov constraint.[12] They only conflict on T-Lex-Gov, which decides between them. The formulation of the two government constraints captures the idea that lexical government is the preferred situation. However, I will argue that in the anti-*that*-trace effect lexical government is blocked and non-lexical government is preferred to no government.

The fact that the complementizer is obligatory in Norwegian embedded subject wh-questions, shows that leaving the wh-phrase in situ is not available. If leaving the wh-phrase in situ were an option in Norwegian, the candidate with the complementizer would lose to the complementizerless candidate with the wh-phrase in situ. This is parallel to the result for matrix clauses shown above in (T6). Therefore the constraint responsible for subject wh-movement in main clauses, Move-Wh, must dominate the government constraint T-Lex-Gov and Stay since the latter are violated in the optimal candidate. We already know that Stay is subordinate to Move-Wh from the analysis of matrix clauses.

16.   Move-Wh » {T-Lex-Gov, Stay}

The tableau (T7) shows the ranking argument for (16).

(T7) Input = ‹vet ‹x,y›, x = jeg, y = ‹vinne ‹x›, x = hvem, Tns = PST›, Tns = PRSNT›

Candidates		Move-Wh	T-Lex-Gov	Stay	T-Gov
a.	☞ Jeg vet [$_{CP}$ hvem$_i$ som [$_{VP}$ t$_i$ vant]]		*	*	
b.	Jeg vet [$_{CP}$ hvem$_i$ [$_{VP}$ t$_i$ vant]]		*	*	*!
c.	Jeg vet [$_{VP}$ hvem vant]	*!			

Comparing candidates (a) and (c) shows that Move-Wh must dominate T-Lex-Gov and Stay, since it forces violation of these constraints. The presence of T-Gov chooses candidate (a) with the complementizer over candidate (b) without on the assumption that the complementizer can govern into the specifier of VP. There is no ranking argument for placing T-Gov since the only difference between the optimal candidate (a) and the non-optimal candidate (b) is that (b) violates T-Gov. In all of the candidates, Op-Spec is

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[12] That is not to say that the two constraints cannot be ranked with respect to one another. In this case, either ranking will produce the same result. In order to rank the two constraints, a third constraint must be

satisfied, therefore it does not play a role in the decision here. In this tableau I do not consider the candidate where the verb moves to the head of C, *Jeg vet [CP hvem_i vant_k [VP t_i t_k]]*. This candidate is ruled out by PURE-EP as discussed below in section four.

In English, the ranking between these two constraints is reversed, so that T-LEX-GOV or STAY dominates the MOVE-WH constraint. This is consistent with what we know about matrix clauses since STAY must dominate MOVE-WH there. Since we know from matrix clauses that STAY dominates MOVE-WH, The ranking of the government constraints cannot be determined from this data.

(T8) Input = ‹know ‹x,y›, x = I, y = ‹win ‹x›, x = who, Tns = PST›, Tns = PRSNT›

Candidates	T-LEX-GOV	T-GOV	STAY	MOVE-WH
a.　　　　I know [_{XP} who_i som [_{VP} t_i won]]	*!		*!	
b.　　　　I know [_{XP} who_i [_{VP} t_i won]]	*!	*!	*!	
c.　　　　☞ I know [_{VP} who won]				*

With STAY ranked above MOVE-WH, candidates (a) and (b) are ruled out. Again, there is no ranking argument for T-GOV since it is satisfied by the optimal candidate and there is no candidate that violates it without violating T-LEX-GOV.

Through reranking of the two constraints T-LEX-GOV and MOVE-WH, we account for the difference between English and Norwegian with respect to anti-*that*-trace effects. Norwegian has anti-*that*-trace effects because the subject wh-phrase must move, leaving a trace that must be governed. English does not have anti-*that*-trace effects because the wh-phrase must remain in situ due to the ranking of STAY above MOVE-WH.

3.　　HD-LFT: A possible reranking argument for Norwegian vs. English

In this section I will discuss the constraint HD-LFT and its ranking in English with respect to T-LEX-GOV and NO-LEX-MVMNT. This ranking raises the question of whether the difference between Norwegian and English can be captured through reranking of already proposed constraints, without positing a new constraint. The facts from Norwegian embedded questions will show that this is not possible.

The optimal candidate in English, a simple VP with the subject wh-phrase in the specifier of VP, does violate the constraint HD-LFT.

17.　HEAD LEFT (HD-LFT)　　Overt perfect heads are leftmost in their projections; where perfect heads are those heads that match the projection in all respects (i.e. the constraint holds of unmoved heads)

HD-LFT is one constraint in a family of constraints based on head positions in X´ structure (see Grimshaw's discussion of Travis (1989)). The family of constraints have the form X-

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shown to dominate one and not the other. This will provide an indirect ranking argument for these two constraints. See the discussion of resumptive pronouns in Swedish.

LEFT or X-RIGHT, where X ranges over perfect heads (Grimshaw (1991)) and specifiers. HD-LFT requires that perfect heads be leftmost. It militates against having a specifier or a complement to the left and a perfect head in the same projection. HD-LFT can be satisfied by not having either a specifier or a complement to the left or by not having a perfect head. I will not consider other constraints from this family, such as HEAD-RIGHT, assuming them to be low ranked in Norwegian and English.[13] The wh-phrase in situ necessarily causes a HD-LFT violation since it is in a specifier position to the left of the verbal head which is a perfect head.

Because of the HD-LFT violation, subject wh-movement provides evidence for another set of constraint rankings in English which are not discussed in Grimshaw (to appear), but consistent with her proposed partial constraint ranking. In subject extraction, the government constraint T-LEX-GOV, which was not relevant with object extraction since the verb acts as lexical governor of the wh-trace, plays an important role. Any attempt to reconcile the HD-LFT violation through moving the wh-phrase (the trace of the moved wh-phrase is not a visible to HD-LFT) brings at least one T-LEX-GOV violation. Therefore, T-LEX-GOV must dominate HD-LFT. NO-LEX-MVMNT must also dominate HD-LFT since moving the verb is a way to satisfy both T-LEX-GOV and HD-LFT. The trace of the moved verb is not a perfect head and the moved head is in a position to govern the trace of wh-movement. Moved heads are not perfect heads and thus satisfy the HD-LFT constraint. Tableau (T9) shows the ranking argument.

(T9) English subject movement, Input = ‹see ‹x,y›, x = who, y = Bill, Tns = PST›

Candidates	T-LEX-GOV	NO-LEX-MVMNT	HD-LFT
a. ☞[$_{VP}$Who saw Bill]			*
b. [$_{IP}$who$_i$ did [$_{VP}$t$_i$ see Bill]]]	*!		*
c. [$_{CP}$who$_i$ did$_k$ [$_{IP}$ t$_i$ t$_k$ [$_{VP}$t$_i$ see Bill]]]	*!**		
d. [$_{CP}$who$_i$ [$_{VP}$ t$_i$ saw Bill]]	*!		
e. [$_{CP}$who$_i$ saw$_i$ [$_{VP}$t$_i$ t$_i$ Bill]]]		*!	

Candidates (b) through (d) show that T-LEX-GOV must dominate HD-LFT. Here I assume that *do* is not a lexical item, and so cannot lexically govern the trace. This assumption is consistent with how Grimshaw treats *do* with respect to the constraint NO-LEX-MVMNT. Moving *do* does not violate NO-LEX-MVMNT. It is also consistent with having *do* inserted under I, a non-lexical head. Moving the main verb would allow you to satisfy T-LEX-GOV, at the expense of NO-LEX-MVMNT. Candidate (e) shows that NO-LEX-MVMNT must dominate HD-LFT. The revised partial constraint ranking for English is as in (18).

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[13] Since English and Norwegian are SVO languages, HEAD-LEFT must dominate HEAD-RIGHT, giving complements to the right. Also, SPEC-LEFT dominates HEAD-LEFT and SPEC-RIGHT, giving specifiers to the left.

18. *Partial Constraint Ranking for English (Revised)*

No-Lex-Mvmnt, T-Lex-Gov   Op-Spec

Hd-Lft

Ob-Hd

Full-Int   Stay
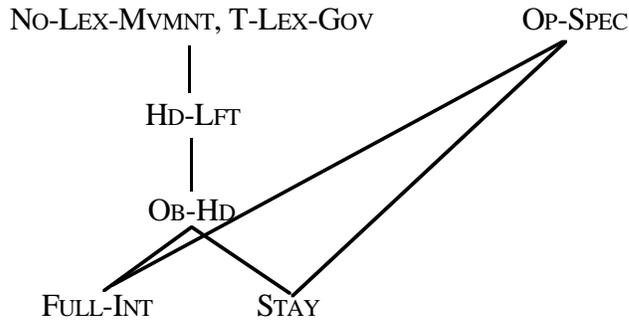
This partial ranking is completely compatible with that proposed by Grimshaw (to appear).

The effect of ranking Hd-Lft over No-Lex-Mvmnt would be to choose candidate (e) as optimal. Thus, constraint reranking appears to be able to capture the difference between English and Norwegian. Reranking Hd-Lft and No-Lex-Mvmnt gives us Norwegian with the wh-phrase and the verb in a projection above VP.

(T10) Norwegian subject movement, Input = ‹se ‹x,y›, x = hvem, y = Bill, Tns = PST›

Candidates	T-Lex-Gov	Hd-Lft	No-Lex-Mvmnt	Stay
a. $[_{VP}$ Hvem så Bill]		*!		
b. $[_{IP}$ Hvem$_i$ gjorde $[_{VP}$t$_i$ se Bill]]]	*!	*!		*
c. $[_{CP}$ Hvem$_i$ gjorde$_k$ $[_{IP}$ t$_i$ t$_k$ $[_{VP}$t$_i$ se Bill]]]	*!**			***
d. $[_{CP}$ Hvem$_i$ $[_{VP}$ t$_i$så Bill]]]	*!			*
e. ☞ $[_{CP}$ Hvem$_i$ så$_j$ $[_{VP}$t$_i$ t$_j$ Bill]]]			*	**

under this analysis, T-Lex-Gov and Hd-Lft must dominate No-Lex-Mvmnt (and Stay) in Norwegian. There is no argument for the ranking between T-Lex-Gov and Hd-Lft since the optimal candidate does not violate either of them. A revised partial ranking for Norwegian is given in (19).

19. *Partial Constraint Ranking for Norwegian*

Op-Spec, Ob-Hd, Full-Int, T-Lex-Gov, Hd-Lft
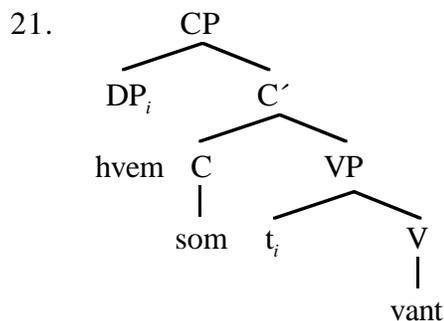
No-Lex-Mvmnt, Stay
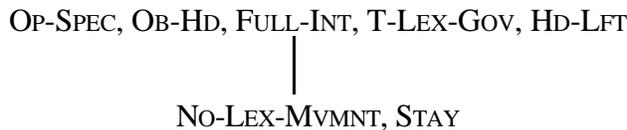
The addition of T-Lex-Gov and Hd-Lft to the top of the hierarchy is motivated by subject wh-questions.

Despite the plausibility of this analysis, evidence from anti-*that-trace effects indicates that it is not the complete story. The data in (20) shows that the wh-phrase must move even when the verb does not move, and no improvement is made on Hd-Lft.

20. *Embedded questions*
   a. Jeg vet   hvem som   ikke   vant.
      I   know who   COMP   not   won
   b. *Jeg vet   hvem som   vant   ikke.
      I   know who   COMP   won   not

   'I know who didn't win.'

We know that the verb does not move in embedded clauses since it appears to the right of medial adverbs and negation, indicating it has not moved over them. Consider the structure of the clause *hvem som vant* in (20a and c). The data in (20) indicates that the subject wh-phrase has moved to comp, while the verb has remained in situ. This is the structure in (21).

21.

The wh-phrase *hvem* has moved from its VP internal position to the specifier of CP, however, the verb has not moved to the head C. Instead the complementizer *som* fills the C head. In this case NO-LEX-MVMNT is not violated since the verb has not moved. In addition, there is still a HD-LFT violation since *som* is the perfect head of C, but not leftmost in CP. The partial ranking in (19) does not predict (21) as the optimal output.

(T11) Norwegian subject movement in embedded clauses,
Input = ‹vet ‹x,y›, x = jeg, y = ‹vinne ‹x›, x = hvem, Tns = PST›, Tns = PRSNT›

Candidates	OP-SPEC	OB-HD	T-LEX-GOV	HD-LFT	NO-LEX-MVMNT	STAY
a. …[$_{VP}$hvem vant]				*!		
b. …[$_{CP}$hvem$_i$ som [$_{VP}$t$_i$ vant]]]			*!	*!		*
c. …[$_{CP}$hvem$_i$ [$_{VP}$ t$_i$ vant]]]		*!	*!			*
d. ☞ …[$_{CP}$ hvem$_i$ vant$_j$ [$_{VP}$ t$_i$ t$_j$]]]					*	**

Indeed (d) emerges as optimal under this partial ranking, predicting the ungrammatical **Jeg vet hvem vant*.

Candidate (d), which is optimal under the partial constraint ranking violates PURE-EP.

22.   PURITY OF EXTENDED PROJECTION (PURE-EP)   No movement into the head of a subordinate clause

18

PURE-EP is a specific economy constraint which prohibits movement into the head of a subordinate clause. It is based on work by Rizzi and Roberts (1989) and McCloskey (1992) which is a furthering of the Projection Principle proposed in Chomsky (1981). See Grimshaw (to appear; 23-24) for a complete discussion of this constraint. Candidate (d) violates this constraint since the verb moves into the head of the embedded CP.

No ranking of PURE-EP with respect to the other constraints can make candidate (b) optimal. To see this, consider what would have to hold in order or (b) to be optimal. In order for candidate (b) to beat candidate (d), PURE-EP must dominate both T-LEX-GOV and HD-LFT since (d) satisfies both of these constraints and (b) fails them. However, there is another candidate that satisfies one of these two constraints, candidate (a). Therefore the ranking of PURE-EP above T-LEX-GOV and HD-LFT reduces the potential optima to (a) and (b). However, no ranking between T-LEX-GOV and HD-LFT can make (b) optimal. Candidate (b) violates both of these constraints, while candidate (a) only violates HD-LFT. Since the two candidates tie on HD-LFT, T-LEX-GOV makes the decision between them in favor of (a). Again, without the introduction of another constraint, (b) cannot be optimal. Therefore I propose it is necessary to assume the analysis with MOVE-WH.

3.1. The position of HD-LFT in the MOVE-WH analysis

Despite the fact that a ranking solution with respect to HD-LFT is not available, the ranking of HD-LFT must be determined under the analysis with MOVE-WH. The optimal candidate, $...[_{CP}hvem_i \; som \; [_{VP}t_i \; vant]]]$, violates HD-LFT, so the constraint must be dominated in Norwegian. The presence of the complementizer *som* satisfies T-GOV at the expense of HD-LFT. I will argue in sections 4.1 and 4.2 that T-LEX-GOV cannot be satisfied in any way given this input. Therefore T-GOV must dominate HD-LFT.

(T12) Input = ‹vet ‹x,y›, x = jeg, y = ‹vinne ‹x›, x = hvem, Tns = PST›, Tns = PRSNT›

Candidates	OP-SPEC	MOVE-WH	T-LEX-GOV	T-GOV	HD-LFT	NO-LEX-MVMNT	STAY
a. …[$_{VP}$hvem vant]		*!			*		
b. ☞…[$_{CP}$hvem$_i$ som [$_{VP}$t$_i$ vant]]]			*		*		*
c. …[$_{CP}$hvem$_i$ [$_{VP}$ t$_i$ vant]]			*	*!			*

(T12) shows the ranking argument between T-GOV and HD-LFT. The other rankings have been established above. The in situ candidate, (a), loses because it violates Move-Wh, while (b) and (c) satisfy this constraint. The next two constraints that (b) and (c) conflict on are T-GOV and HD-LFT. Since (b) is optimal, HD-LFT must be subordinate to T-GOV.

The tableau (T12) does not provide an exhaustive list of competing candidates. I have focused on the competition between (b) and (c) in order to explicate the ranking

argument between T-GOV and HD-LFT. For example, one candidate that satisfies HD-LFT and the government constraints has verb movement to the head of the embedded CP. This candidate violates PURE-EP, so the ranking of that constraint must be determined. I will take up the ranking of PURE-EP in section 4.1.

To Summarize, we have seen that the following rankings must hold in Norwegian.

23.   *Partial Constraint ranking for Norwegian (Revised)*

OP-SPEC, MOVE-WH, FULL-INT

T-LEX-GOV   T-GOV

HD-LFT

OB-HD

NO-LEX-MVMNT, STAY
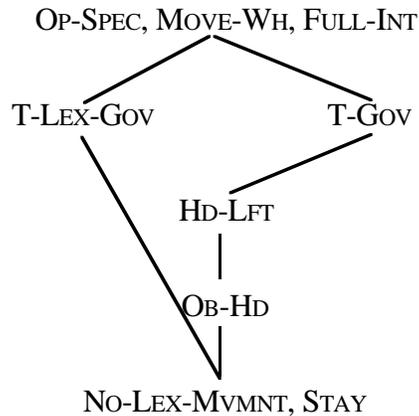
OP-SPEC and MOVE-WH sit atop the hierarchy, giving a number of effects, most notably wh-movement (even of subjects). FULL-INT is also high ranked, ruling out *do*-support in object wh-questions. T-GOV dominates HD-LFT giving anti-*that-trace effects. HD-LFT dominates OB-HD making complementizers ungrammatical in embedded non-subject wh-questions. The relative low ranking of NO-LEX-MVMNT and STAY is supported by the general availability of wh-movement and verb movement.

4.   Other Possible Sources of Head Government

The main aspect of the analysis of anti-*that-trace effects presented here is that the configuration Comp - t is the best candidate. That is it is superior to the candidate without a complementizer. Above I have shown that one candidate with no complementizer, the candidate without movement, is sub-optimal due to the relative ranking of MOVE-WH and T-LEX-GOV in Norwegian. In this section I will consider two other possibilities for satisfying the government constraints on the trace in the specifier of VP. One possibility is moving the verb to the head of C, thus giving the trace a lexical governor. The second is the possibility of government from the embedding verb. Both of these possibilities would result in lexical government by a verb and are therefore potentially better candidates since they would satisfy both T-GOV and the more restrictive T-LEX-GOV. In both cases relative ranking of constraints accounts for the ungrammaticality.

4.1.   Verb movement

Verb raising satisfies both T-LEX-GOV and T-GOV in main clauses. We see this above in (T5). In embedded clauses PURE-EP prevents this option. In Norwegian, PURE-EP must dominate T-LEX-GOV since moving the verb into the head of the embedded clause would allow it to lexically govern the trace in spec of VP.[14] It must also dominate HD-LFT since moving the verb allows HD-LFT to be satisfied both in the VP and the CP.

24.   PURE-EP » {T-LEX-GOV, HD-LFT}

The tableau (T13) shows this ranking argument.

(T13) Input = ‹vet ‹x,y›, x = jeg, y = ‹vinne ‹x›, x = hvem, Tns = PST›, Tns = PRSNT›

Candidates	PURE-EP	T-LEX-GOV	HD-LFT
a. ☞ Jeg vet [$_{CP}$ hvem$_i$ som [$_{VP}$ t$_i$ vant]]		*	*
b. Jeg vet [$_{CP}$ hvem$_i$ vant$_k$ [$_{VP}$ t$_i$ t$_k$]]	*!		

Both candidates satisfy OP-SPEC and MOVE-WH, since the wh-phrase is in the specifier of CP in both. Both candidates also satisfy T-GOV, since the traces are governed. Similarly, OB-HD is satisfied in both candidates, since the head of each projection is present. Although candidate (b) does worse on the movement constraints, these constraints have been shown to be subordinate to T-LEX-GOV and HD-LFT above. Therefore, they are irrelevant to the discussion here. Given that, the ranking between PURE-EP and T-LEX-GOV and HD-LFT must be as in (24).

Another possibility for avoiding a PURE-EP violation is to have protective phrasal layer above the embedded clause. In this way verb movement is not to the head of the clause and PURE-EP is satisfied. See Grimshaw's (to appear) discussion of *that-trace effects and their amelioration with adjunction. In addition T-LEX-GOV is satisfied by the verb. This candidate threatens to be optimal. Therefore, OP-SPEC must dominate T-LEX-GOV and HD-LFT to prevent *Jeg vet som hvem vant. from being grammatical. We already know this.

25.   OP-SPEC » {T-LEX-GOV, HD-LFT}

The tableau (T14) shows this ranking argument.

(T14) Input = ‹vet ‹x,y›, x = jeg, y = ‹vinna ‹x›, x = hvem, Tns = PST›, Tns = PRSNT›

Candidates	OP-SPEC	PURE-EP	T-LEX-GOV	HD-LFT
a. ☞ Jeg vet [$_{CP}$ hvem$_i$ som [$_{VP}$ t$_i$ vant]]			*	*
b. Jeg vet [$_{CP}$ som [$_{CP}$ hvem$_i$ vant$_k$ [$_{VP}$ t$_i$ t$_k$]]]	*!			

---

[14] This is assuming that moved verbs can function as lexical governors. This seems to be correct given that verb movement occurs in main clauses, and complementizers are ungrammatical there. This follows if verbs are lexical governors since they would satisfy both T-LEX-GOV and T-GOV.

Again, with respect to MOVE-WH, T-GOV, and OB-HD, the two candidates tie. Also, the movement constraints are not relevant since they have been shown above to be subordinate to OP-SPEC. The (b) candidate violates OP-SPEC since the wh-phrase is not in a scope position. A scope position is one where the operator c-commands the entire extended projection where it takes scope (Bakovic (1995), Müller (1995), Legendre, Wilson, Smolensky, et al. (1995)). It is quite possible that the scope requirement is a separate constraint (OP-SCOPE) from the positional requirement (see refs. cited above). If OP-SPEC were split into OP-SPEC and OP-SCOPE, it would be possible to rank them separately, predicting languages which move wh-phrases to the front of the clause but not to a specifier position, or where wh-movement goes to a specifier position, but not to the front of the clause. If OP-SCOPE were ranked below T-LEX-GOV then candidate (b) could be optimal, for example. For the purposes of this paper I will assume that these requirements form one constraint, OP-SPEC, since neither English nor Norwegian has these properties.

4.2.   *Government from the embedding verb*

Government from the embedding verb is a distinct possibility. If the embedding verb can govern into the VP, then a candidate with no complementizer could satisfy T-LEX-GOV. Consider the structure in (26), which shows the relevant part of such a candidate.

26.
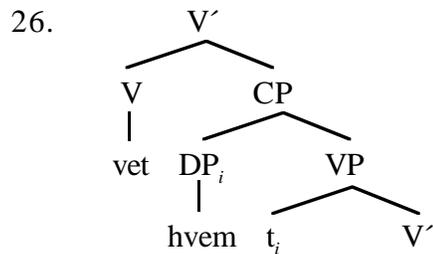
As noted above, the verb must at least be able to govern into the specifier of its complement, CP. What prevents it from governing further into the specifier of VP and thus making the complementizer superfluous? We cannot appeal to relativized minimality since by hypothesis no other head intervenes between the verb and the trace in the specifier of VP. The solution to this problem requires sharpening our definition of government. The hypothesis I will pursue is that government from the embedding verb fails due to the opacity of the embedded clause.

The definition in (27) formalizes the notion of government in X´, with c-command (following Rizzi (1990)).

27. *Proper Government*

α governs β iff

(i) α is a head

(ii) α c-commands β

Proper government has two conditions. First of all the governor must be a head. Secondly, it must c-command the governee. In addition to these two conditions, I will assume a locality requirement from Deprez (1989, 1991, 1994). The locality requirement states that the domain of government cannot extend past a Barrier (Chomsky (1986)), where all maximal projections are barriers. The government domain can be extended across a barrier if it is made transparent. There are two ways a barrier can become transparent for the puroposes of head government. One way to render a barrier transparant is through L-marking. This allows, for example, verbs to govern into their complements since the complements of verbs are L-marked by the verb. The second possibility arises through *non-distinctness* (Deprez (1994). Two maximal projection will be non-distinct if the they share the same features.[15]

To see how the new definition of government works, consider the cases we have seen so far. In Matrix subject wh-questions, both the wh-phrase and the verb move out of VP to CP. In (28) is the optimal output for the subject question *hvem vant* 'who won'.

28.
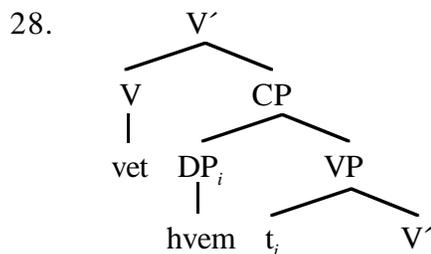
Both traces inside the VP need to be governed. The moved verb is coindexed with its trace and the trace of the wh-phrase through spec-head agreement (Chomsky (1986), Rizzi (1990)). Therefore, CP and VP are non-distinct because their heads share the same features. The government domain for the verbal head is extended into the VP. In this case, both traces satisfy T-GOV and T-LEX-GOV. The same account holds of non-subject matrix extractions.

In embedded subject wh-questions, only the wh-phrase moves out of VP, leaving a trace in the specifier of VP. This trace is also subject to the government constraints. The

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[15] Deprez (1994) restricts non-distinctness to functional projections (Deprez, 1994; 125). Since I do not assume that IP is neccesarily present in Norwegian clauses, this relation has to hold between CP and VP. That is, it must also hold of lexical projections.

difference is that now a complementizer appears to govern the trace. The relevent part of the structure of anti-*that*-trace effects given in (21) above is repeated here as (29).

29.
```
                CP_i
          ┌──────┴──────┐
        DP_i           C´
         │        ┌─────┴─────┐
       hvem      C_i         VP_i
                 │       ┌─────┴─────┐
                som     t_i          V
                                     │
                                   vant_i
```
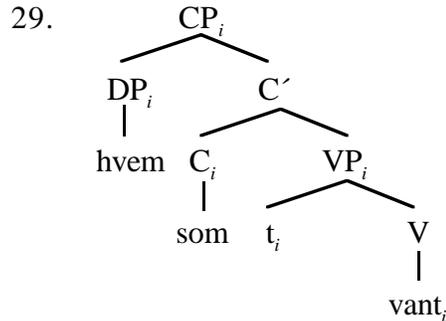
The VP obtains the index of the wh-phrase either through percolation or through spec-head agreement with the verb. However, the wh-phrase is also in the specifier of CP. There it can transfer its index to the C^0. Through these two agreements, the C^0 head agrees with the VP. Therefore, the VP is rendered transparent for government from C^0 since they share features. The C^0 can govern the trace in the specifier of VP. This candidate satisfies T-GOV, but fails T-LEX-GOV since C^0 is not lexical.

In (26), repeated here as (30), we see that the embedding verb is outside the domain of the wh-phrase.

30.
```
                V´
          ┌──────┴──────┐
         V            CP_i
         │       ┌──────┴──────┐
        vet     DP_i          VP
                 │        ┌─────┴─────┐
               hvem      t_i          V´
```
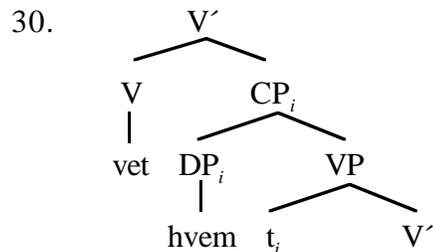
The embedding verb cannot get coindexed with the wh-phrase through spec-head agreement since the wh-phrase does not move out of the embedded CP. Therefore, the CP is opaque to government by the outside verb. Since the CP is a barrier, the trace in specifier of VP cannot be governed by the outside verb. For this reason candidate (b) in (T7) cannot pass T-LEX-GOV. In section 5.2 I will show another case where government fails due to this definition.

This system predicts that when the wh-phrase moves into the higher clause, lexical government from the embedding verb is possible. This is due to the fact that L-marking can also render a barrier transparent and that the CP layer is not obligatory. This is exactly the *that*-trace effect.

I analyze the *that*-trace effects following Deprez (1994) and Grimshaw (to appear). When the extraction site is an embedded subject position, the government constraints will conspire to choose the complementizer-less clause over the clause headed by a

complementizer. This is due to the presence of the embedding verb which is a lexical governor.

The examples in (31) show that when the extraction site for a wh-phrase is an embedded subject position, no complementizer can head the embedded clause.

31. a. * hvem   tror   du   som   vant.
        who   think   you   COMP   won

    b. hvem   tror   du   vant.
       who   think   you   won

     'Who do you think won.'

This is exactly what is expected, given the constraint ranking proposed so far for Norwegian and the definition of government.

In the grammatical form, (31b), the embedding verb *tror* 'think L-marks the embedded clause. Therefore the embedded clause is transparent to govenrment from that verb, as (32) shows.

32.
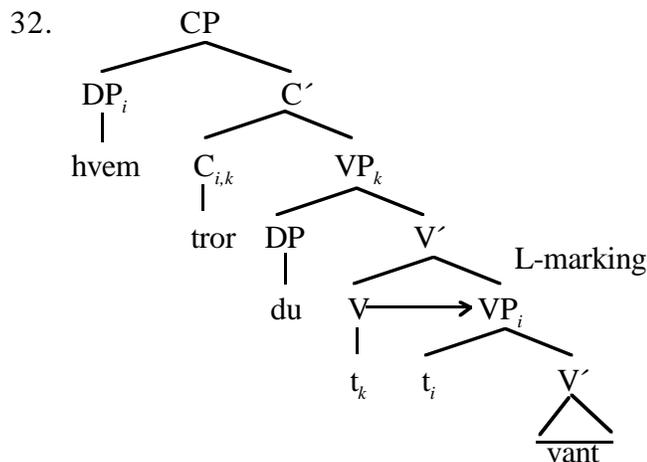
The example is made slightly more complicated by the effects of verb movement. The verb in C^0 can govern into the first verb phrase for the reasons given above in (29). Its government domain also extends into the embedded VP because L-marking makes that phrase transparent. Therefore lexical government of the trace t_i by *tror* 'think' is possible. Note here that we do not need to assume that it is the trace of the verb that is governing the trace of the wh-phrase. Instead, the verb in C^0 can govern into the embedded VP, assuming that its own trace does not create a minimlaity barrier.

The tableaux (T15) indicates how the ranking chooses (32) as optimal.

(T15) *that*-trace effects in Norwegian
Input = ‹tror ‹x,y›, x = du, y = ‹vinne ‹x›, x = hvem, Tns = PST›, Tns = PRSNT›

Candidates	OP-SPEC	PURE-EP	MOVE-WH	T-LEX-GOV	T-GOV	STAY
a. ☞ hvem$_i$ tror du [$_{VP}$ t$_i$ vant]]						*
b. hvem$_i$ tror du [$_{CP}$ t$_i$ [$_{VP}$ t$_i$ vant]]						**!
c. hvem$_i$ tror du [$_{CP}$ som [$_{VP}$ t$_i$ vant]]				*!		*
d. hvem$_i$ tror du [$_{CP}$ vant$_k$ [$_{VP}$ t$_i$ t$_k$]]		*!				**
e. Du tror [$_{VP}$ hvem vant]]	*!		*!			

Again, the ranking between the two constraints OP-SPEC, MOVE-WH and STAY forces the wh-phrase to move. This gives further support for these rankings. Comparing (a) and (c) we see that even though low ranked and regularly violated in anti-*that*-trace effects, the constraint T-LEX-GOV exerts itself in Norwegian as predicted. A similar situation arises with respect to STAY. Here we see an example of minimal violation. Although (a) and (b) both satisfy the other constraints, STAY can decide between them since (a) has one less violation than (b).

In this section I have showed that in anti-*that*-trace effects the possibility of satisfying both T-LEX-GOV and T-GOV is not available. Raising the embedded verb to provide a lexical governor is ruled out by ranking PURE-EP above T-LEX-GOV. The definition of government renders the embedded clause opaque to government from the higher verb. Therefore the only possibility is to satisfy T-GOV and violate T-LEX-GOV. The system that emerges is one in which if lexical government is impossible, then the complementizer is used as a governor. If lexical government is possible as in matrix clauses and *that*-trace effects, then the complementizer is ungrammatical since it unnecessarily violates T-LEX-GOV. In the next section, I will show that when government of the trace is not an issue, for example the trace is in object position where it is governed by the verb, the complementizer is also ungrammatical.

5.   Government Not an Issue: The emergence of HD-LFT

When the government constraints are not an issue, as in non-subject extraction and multiple embedded questions, the structural constraint HD-LFT demands the absence of the complementizer even at the expense of an OB-HD violation.

5.1.   Non-subject extraction

As shown in (33), *som* is ungrammatical in embedded questions that are not local subject extractions.

33. *Embedded Questions*
 a. *Jeg vet hvem som du så.
   I know who SOM you saw

 b. Jeg vet hvem du så.
   I know who you saw

 'I know who you saw.'

 c. *Jeg vet hvem som du tror vant.
   I know who SOM you believe won

 d. Jeg vet hvem du tror vant.
   I know who you believe won

 'I know who you believe won'

The data in (33) indicates that HD-LFT must dominate OB-HD. When the extraction site is not the local subject, the government constraints are irrelevant because they are either satisfied or failed by all candidates. In the case of object extraction, the verb lexically governs the trace, so all candidates pass both government constraints. With adjunct extraction the trace is not governed at so all candidate fail both candidates. Since government is not at issue the relative ranking between HD-LFT and OB-HD makes the decision on whether the complementizer is required.

   In non-subject extraction, the wh-phrase also moves to the specifier of CP. This is the result of the high ranking of OP-SPEC. The ranking we have established above, narrows the candidate set down to two candidates

(T16) Non-subject extraction is movement to Spec of CP
Input = ‹vet ‹x,y›, x = jeg, y = ‹se ‹x, y›, x = Bill, y = hvem, Tns = PST›, Tns = PRSNT›

Candidates	OP-SPEC	MOVE-WH	PURE-EP	T-LEX-GOV	T-GOV	STAY
a. ☞ Jeg vet [CP hvem$_i$ [VP Bill så t$_i$]]						*
b. ☞ Jeg vet [CP hvem$_i$ som [VP Bill så t$_i$]]						*
c. Jeg vet [CP hvem$_i$ så$_k$ [VP Bill t$_k$ t$_i$]]			*!			**
d. Jeg vet [VP Bill så hvem]]	*!					
e.Jeg vet [CP som [CP hvem$_i$ så$_k$ [VP Bill t$_k$ t$_i$]]]	*!					**
f. Jeg vet [VP Bill så hvem]	*!	*!				

Here we see further evidence for the ranking of OP-SPEC, MOVE-WH and PURE-EP above T-LEX-GOV and STAY. The top three constraints winnow the candidate set down to two candidates which differ only with respect to whether the complementizer is present or not. That (a) is optimal in Norwegian is evidence that HD-LFT dominates OB-HD.

(T17) HD-LFT decides when government not an issue

Input = ‹vet ‹x,y›, x = jeg, y = ‹se ‹x, y›, x = Bill, y = hvem, Tns = PST›, Tns = PRSNT›

Candidates	HD-LFT	OB-HD
a. ☞ Jeg vet [$_{CP}$ hvem$_i$ [$_{VP}$ Bill så t$_i$]]		*
b. Jeg vet [$_{CP}$ hvem$_i$ som [$_{VP}$ Bill så t$_i$]]	*!	

As a functional projection, the complementizer does not parse the input. Therefore it is free to present or absent in the output. In this case however, HD-LFT forces it to be absent.

The ranking between HD-LFT and OB-HD predicts that whenever a conflict arises between HD-LFT and OB-HD due to a phrase requiring both a specifier and a head and the head is not forced to be present because of a higher ranked constraint (such as T-Gov) or because it parses the input (in the case of a verbal head), that the head will be absent. However, the effects of this ranking will be difficult to see since as was established in section one, OB-HD must dominate NO-LEX-MVMNT and STAY. Therefore the head or the specifier can always raise to a higher projection and thus the ranking between HD-LFT and OB-HD plays no role.

One place where the relative ranking between HD-LFT and STAY plays a role is in noun phrases. Consider the case of a nominal head which has a single internal argument in the input as in (34a).

34. a. Input = ‹bok ‹x›, x = hans›
    b. Output = [$_{DP}$ boken [$_{NP}$ hans t$_N$]]

The ranking proposed for Norwegian in (23) above predicts (34b) to be the optimal output. The tableau is given in (T18).

(T18) Optimal output for (33a) in Norwegian

Candidates	FULL-INT	T-LEX-GOV	T-GOV	HD-LFT	OB-HD	STAY	NO-LEX-MVMNT
a. ☞ [$_{DP}$ boken$_k$ [$_{NP}$ hans t$_k$]]						*	*
b. [$_{DP}$ hans$_i$ boken$_k$ [$_{NP}$ t$_i$ t$_k$]]						*!*	*
c. [$_{NP}$ hans boken]				*!			
d. [$_{DP}$ [$_{NP}$ hans boken]]				*!	*		
e. [$_{DP}$ hans$_i$ [$_{NP}$ t$_i$ boken]]		*!	*!		*	*	
f. [$_{DP}$ hans$_i$ den [$_{NP}$ t$_i$ book]]	*!	*!				*	

The optimal parse, (a) violates STAY minimally and satisfies the higher ranked constraints FULL-INT, T-LEX-GOV, T-GOV, HD-LFT, and OB-HD. Any attempt to alleviate the STAY violations will lead to a violation of one of the these higher ranked constraints.

Taraldsen (1990) and (1991) argues that (34b) repeated in (35) is the correct analysis for postnominal genitives in Norwegian of the type given in (36).

35.　　　　DP
　　　　　　|
　　　　　　D´
　　　　　／＼
　　　　D　　NP
　　　　|　／＼
　　boken$_k$　hans　N´
　　　　　　　　　|
　　　　　　　　　t$_k$
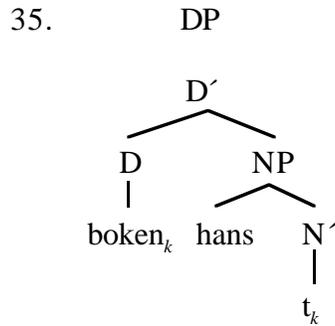
36. a. boken　　　hans　　　　　　　　　　　　Taraldsen (1991)
　　　 book-DET　his
　　　 'his book'
　　b. bilen　　　til　Per[16]
　　　 car-DET　to　P.
　　　 'Per's car'

The most obvious counter proposal to (35) is to assume that the possesive is merely a complement to the noun head and no movement has taken place, as in (37) (see Fiva (1987)).

37.　　NP
　　　　|
　　　　N´
　　　／＼
　　N　　NP
　　|　　|
　boken　hans
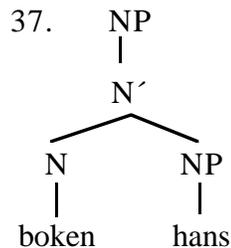
Evidence for the structure in (35) and against that in (37) comes from case assignment properties, c-command asymmetries and conjunction facts. Here I will review the arguments from case assignment and c-command asymmetries given in Taraldsen (1991).

　　In (37), the genitive is a complement to the noun. Some nouns may take complements that are not genitives, as in (38).

38. a. plasseringen　*av　bildet*　　i　　skuffen　　　　Taraldsen (1991)
　　　 placing-DET　of　picture-DET　in　drawer-DET
　　　 'the placement of the picture in the drawer'

---

[16] Genitive case on pronouns is realized morphologically as in (35a). On nouns it is realized by the preposition *til* 'to'. When *til* is used as the genitive case marker, it cannot appear with pronouns.
　　　i.　　　*boken til ham
　　　　　　　book-DET to him
However, when it is used as a direction preposition there is no such restriction.
　　　ii.　　　brevet til ham
　　　　　　　letter-DET to him

b. valget   *av Per*   til   leder
election-DET   of   P.   to   leader
'the election of Per to leader'

These complements show up as a prepositional phrase headed by *av* 'of'. As (39) shows, these complements must be adjacent to the noun.

39. a. *plasseringen i   skuffen   *av bildet*   Taraldsen (1991)
    placing-DET   in   drawer-DET   of   picture-DET
    'the placement of the picture in the drawer'

    b. *valget   til   leder   *av Per*
       election-DET   to   leader   of   P.
       'the election of Per to leader'

Taraldsen (1991) argues that the ungrammaticality of (39) is the result of an adjacency restriction on case assignment. That is, the noun and the preposition *av* 'of' must be adjacent. However, this account cannot be maintained with the structure in (37) since the grammaticality of (40) would be unexplained.

40. a. plasseringen *vår*   av   bildet   i   skuffen   Taraldsen (1991)
    placing-DET   our   of   picture-DET   in   drawer-DET
    'the placement of the picture in the drawer'

    b. valget   *vårt*   av   Per   til   leder
       election-DET   our   of   P.   to   leader
       'the election of Per to leader'

However, the structure in (35) allows us to maintain the adjacency requirement on case since the *av*-phrase can be a complement to the noun, with the genitive in the specifier of NP. The noun head then raises to the head of DP, giving the surface word order.

If (35) is the correct analysis, then the postnominal genitive should asymmetrically c-command other complements of the noun. The examples in (41) show that a post-nominal genitive can bind an anaphor in a post-nominal complement.

41. a. beskrivelsen   hans$_i$ av seg selv$_i$ Taraldsen (1991)
    description-DET   his   of   himself
    'his description of himself'

    b. forfremmelsene   til Per$_i$ av sine$_i$ venner
       promotions-DET   to   P.   of   his   friends
       'Per's promotions of his friends'

In addition, the post-nominal genitive cannot be coreferential with a non-reflexive pronoun as in (42).

42. a. *beskrivelsen   hans$_i$ av ham$_i$ Taraldsen (1991)
    description-DET   his   of   him
    'his description of himself'

b. *forfremmelsene til Per$_i$ av hans$_i$ venner
   promotions-DET to P. of his friends
   'Per's promotions of his friends'

These facts follow from the Binding Theory if the post-nominal genitive c-commands the complements in (41) and (42). C-command does not appear to hold from the complement to the genitive phrase however. A non-genitive complement cannot bind an anaphoric genitive phrase, as in (43).

43. a. *beskrivelsen sin$_i$ av ham$_i$ Taraldsen (1991)
       description-DET his (refl.) of him
       'his description of him'
    b. *forfremmelsene til sine$_i$ venner av Per$_i$
       promotions-DET to his(refl.) friends of P.
       'his friends' promotions of Per'

Again these facts follow from the binding theory if the genitive asymmetrically c-commands the post-nominal complement.

The low ranking of STAY and NO-LEX-MVMNT with respect to HD-LFT in Norwegian makes it possible for the nominal head to move to D^0, thus avoid a HD-LFT violation. The other option, of moving the subject *hans* to DP is ruled out since this would either require moving the noun head as well to satisfy OB-HD, or incurring a higher ranked OB-HD violation. Therefore, noun phrases provide independent evidence for the ranking posited above based on the verbal extended projection.[17]

5.2. *Multiple extraction*

In multiple extractions from embedded clauses where the subject is moved long distance and the object is moved locally, the complementizer is ungrammatical. This fact is puzzling since there is a trace in the subject position which looks similar to what we see in anti-*that*-trace effects. The trace cannot be governed by the higher verb and so we expect a complementizer to be present.

---

[17] Two potential problems for this claim have been pointed out to me by Sten Vikner (p.c.). The first is that Norwegian also has prenominal genitives as in (i).

    i.   hans   bok
          his   book
          'his book'

This problem may be avoided if prenominal genitives are the optimal output for a different input. Note that the noun head in (i) is indefinite while the noun head in (35) is definite. The second problem is that the related languages Danish and Standard Swedish do not have post-nominal genitives, while presumably they have the same verbal clause structure. This problem is more difficult, but a serious answer to it would require a more in depth analysis of the three languages than is possible here.

44. *Multiple embedded wh-questions*

a. [$_{CP}$Hvilket ord$_i$ vet   du   ikke [$_{CP}$hva$_j$ [$_{VP}$t$_i$ betyr t$_j$]]]
     which word know you not   what   means

b. *[$_{CP}$ Hvilket ord$_i$ vet   du   ikke [$_{CP}$hva$_j$ som [$_{VP}$ t$_i$ betyr t$_j$]]]
     which word   know you   not   what COMP   means

'Which word don't you know what means.'

c. *[$_{CP}$ Petter$_j$ vet   jeg ikke [$_{CP}$ hvilken man$_i$ [$_{VP}$ t$_i$ kjenner t$_j$]]]
     P.   know I   not   which man   knows

d. [$_{CP}$ Petter$_j$ vet   jeg ikke [$_{CP}$ hvilken man$_i$ som [$_{VP}$t$_i$ kjenner t$_j$]]]
     P.   know I   not   which man   COMP   knows

'Peter, I don't know which man knows.'

In (44d) where the subject extraction is local, the complementizer is required as expected. I propose that (44a) is best understood as complete failure of government both lexical and non, and thus further evidence for the ranking of Hᴅ-Lꜰᴛ over Oʙ-Hᴅ.

When a subject is extracted over a wh-phrase in an embedded comp, government from C is impossible due to the opacity of the VP. Consider the structure of such an example in (45).

45.
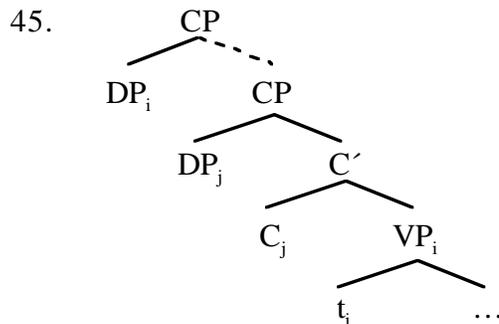
The embedded VP is coindexed through spec-head agreement with the subject wh-phrase which is extracted. The comp is coindexed with the wh-phrase in its specifier. Therefore VP is opaque to government by C^0. (44a and b) have exactly the structure in (45). Since government from comp is blocked the relative ranking between Hᴅ-Lꜰᴛ and Oʙ-Hᴅ determines the output.

(T19) Failure of government due to Spec-head agreement
Input = ‹vet ‹x,y›, x = jeg, y = ‹kjenne ‹x, y›, x = hvilken man, y = Petter, Tns = PRSNT›, Tns = PRSNT›

Candidates	OP-SPEC	MOVE-Wh	PURE-EP	T-LEX-GOV	T-GOV	STAY
a. ☞ Petter$_j$ … [$_{CP}$ hvilken man$_j$ [$_{VP}$ t$_i$ kjenner t$_j$]]				*	*	**
b. ☞ Petter$_j$ … [$_{CP}$ hvilken man$_j$ som$_j$ [$_{VP}$ t$_i$ kjenner t$_j$]]				*	*	**
c. Petter$_j$ … [$_{CP}$ hvilken man$_j$ kjenner$_k$ [$_{VP}$ t$_i$ t$_k$ t$_j$]]			*!			***
d. Petter$_j$ … [$_{VP}$ t$_i$ kjenner hvilken man]	*!	*!				*
e. Petter$_j$ … [$_{VP}$ hvilken man$_j$ [$_{VP}$ t$_i$ kjenner t$_j$]]	*!					**

A potentially dangerous candidate is (e). If the wh-phrase *hvilken man* 'which man' is adjoined to the lower VP, then the government constraints can be satisfied since the embedding verb can govern into the embedded VP. Also, MOVE-WH and PURE-EP are satisfied in this candidate. However, since the wh-phrase is adjoined, it fails OP-SPEC. As above, the potential optima are reduced to two by the three top ranked constraints. Here however, the two winning candidates fail both government constraints since the trace in subject position cannot be governed by the complementizer or the empty head.

(T20) Complementizer absent due to HD-LFT
Input = ‹vet ‹x,y›, x = jeg, y = ‹kjenne ‹x, y›, x = hvilken man, y = Petter, Tns = PRSNT›, Tns = PRSNT›

Candidates	HD-LFT	OB-HD	STAY
a. ☞ Petter$_j$ … [$_{CP}$ hvilken man$_j$ [$_{VP}$ t$_i$ kjenner t$_j$]]		*	**
b. Petter$_j$ … [$_{CP}$ hvilken man$_j$ som$_j$ [$_{VP}$ t$_i$ kjenner t$_j$]]	*!		**

However, HD-LFT decides in favor of candidate (a) without the complementizer. Again, PURE-EP must dominate HD-LFT to rule out candidate (c) in (T19).

Evidence that the position of the subject trace in (44a) is an ungoverned position comes from Swedish. In parallel cases in Swedish, a resumptive pronoun is found (Engdahl (1985)).

46. *Swedish resumptive pronouns in embedded wh-questions*
    a. Vilket ord   vet   du   inte   vad   det betyder
       which word   know   you   not   what   it   means
       'Which word do you not know what it means.'

On the assumption that resumptive pronouns are a last resort phenomenon (Shlonsky (1992)), only used when government fails, this supports the idea that this position is ungoverned. In Norwegian, however, the constraint against resumptive pronouns must be ranked above the government constraints making their violation preferable. Here I will sketch an analysis of the Swedish facts. I will assume that resumptive pronouns are militated against by the constraint NO RESUMPTIVE PRONOUN.

47.   NO RESUMPTIVE PRONOUN (*RES)   Do not have a resumptive pronoun.

I will make the minimal assumption that the rankings in Swedish are as in Norwegian except for the ranking of *RES. In Swedish, *RES must be ranked below one of the government constraints, allowing resumptive pronouns where government is not an option. If *RES is ranked below T-GOV, but above T-LEX-GOV, then we can account for Swedish resumptive pronouns.

The tableau (T21) shows that a resumptive pronoun is optimal in cases like (46).

(T21) Swedish resumptive pronouns
Input = ‹vet ‹x,y›, x = du, y = ‹betyda ‹x, y›, x = vad, y = vilket ord, Tns = PRSNT›, Tns = PRSNT, NEG›

Candidates	PURE-EP	T-GOV	*RES	T-LEX-GOV	HD-LFT[18]	OB-HD
a. ☞ vilket ord$_i$ vet du inte [$_{CP}$ vad$_j$ [$_{VP}$ det$_i$ betyder t$_j$]]			*			*
b. vilket ord$_i$ vet du inte [$_{CP}$ vad$_j$ som[$_{VP}$ t$_i$ betyder t$_j$]]		*!		*	*	
c. vilket ord$_i$ vet du inte [$_{CP}$ vad$_j$ [$_{VP}$ t$_i$ betyder t$_j$]]		*!		*		*
d. vilket ord$_i$ vet du inte [$_{CP}$ vad$_j$ betyder$_k$ [$_{VP}$ t$_i$ t$_k$ t$_j$]]	*!				*	

All of the candidates satisfy OP-SPEC and MOVE-WH. Similarly they all violate STAY and NO-LEX-MVMNT to some degree. The candidate with the resumptive pronoun in the subject position, (a), wins since it only violates the lower ranked *RES. It vacuously satisfies both T-LEX-GOV and T-GOV since there is no trace. Candidate (b) fails T-GOV since the complementizer cannot govern in this case.

In contrast to the example in (46), Swedish does not have resumptive pronouns if subject extraction is local. In these cases, Swedish shows exactly the same anti-*that-trace effects as Norwegian, as shown in (48).

48. *Embedded Questions in Swedish*
    a. Jag vet vem som vann.
        I know who COMP won
    b. *Jag vet vem vann.
        I know who won

    'I know who won.'

These facts follow from the fact that the complementizer can govern the trace in embedded clause. Since *RES dominates T-LEX-GOV, In anti-*that-trace effects, the trace can be governed. Given that ranking, government is preferable to a resumptive pronoun. Therefore the complementizer will be optimal. The tableau (T22) shows the ranking argument.

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[18] I am only counting HD-LFT violations inside the CP.

(T22) Swedish anti-*that*-trace effects
Input = ‹vet ‹x,y›, x = jag, y = ‹vinna ‹x ›, x = vem, Tns = PRSNT›, Tns = PST, NEG›

Candidates	PURE-EP	T-GOV	*RES	T-LEX-GOV	HD-LFT	OB-HD
a.　　　　Jag vet [CP vem_i [VP det_i vann]]			*!			*
b.　☞ Jag vet [CP vem_i som [VP t_i vann]]				*	*	
c.　　　　Jag vet [CP vem_i vann_k [VP t_i t_k]]	*!					
d.　　　　Jag vet [CP vem_i [VP t_i vann]]		*!		*		*

Again, all the candidates satisfy MOVE-WH and OP-SPEC. Furthermore, they all violate the movement constraints to some degree. The crucial difference is that candidate (b) now satisfies T-GOV. The decision between (a) and (b) is made by *RES which chooses (b).

In this section I have argued that in Norwegian the effects of HD-LFT become apparent when the government constraints cannot make the decision. This arises in two situations. The first is in non-subject extractions, where the presence or absence of the complementizer does not affect the government of the trace. The second is in multiple embedded questions, where government from comp is blocked. This also renders the presence or absence of the complementizer ineffective. In both cases, HD-LFT dominating OB-HD chooses complementizer-less clause over the clause with a complementizer. In addition I have provided a sketch of an analysis for Swedish resumptive pronouns.

6.　Empty Operator Constructions: Relative Clauses, Clefts and Comparatives

Here I will examine three constructions discussed in Chomsky (1977) that are assumed to contain an empty operator; relative clauses, clefts and comparatives. Surprisingly the facts with respect to anti-*that*-trace effects in both English and Norwegian for empty operator constructions are the same. Clefts and relatives show anti-*that*-trace effects. Comparatives do not show these effects. I will make a few assumptions about empty operators which I outline here. These assumptions for the basis of an analysis of clefts and relative clauses. However, comparatives remain problematic for the analysis provided here.

I assume that empty operators are subject to a constraint like MOVE-WH. I give the constraint in (49).

49.　MOVE EMPTY OPERATOR (MOVE-EO)　Empty operators cannot remain in situ.

The purpose of this constraint is to rule out relative clauses which contain an in situ subject empty operator. In both English and Norwegian, this constraint is crucially ranked above STAY and T-LEX-GOV constraints. Its effect is to make all empty operator relatives *that*-relatives.　This constraint could be seen as a member of a constraint family that includes

MOVE-WH. For example it could be related to the subhierarchy proposed in Bakovic (1995). Or it could be a separate licensing condition on empty operators. This latter option is more likely if the effects of MOVE-WH arise from the verb second constraint.

Furthermore, I assume that empty operators behave like traces with respect to the positional constraint HD-LFT.

Table 2

	Satisfies OB-HD?	Violates HD-LFT?	Able to head govern?	Violates STAY?
trace	yes	no	?	yes
empty operator	NA	no	no	no
radically empty	no	no	no	no

As table two shows, the main difference between traces and empty operators is their status with respect to the constraint STAY. Traces violate STAY, while empty operators do not. Otherwise, we can assume that there are still only two types of emptiness. On the one hand there are traces and empty operators, which are structurally present but phonetically absent. On the other hand there is structurally and phonetically emptiness. What I call radical emptiness.

6.1.   Relatives and Clefts[19]

Doherty (1993), based on stacking effects and adjunction facts, argues that relative clauses without overt operators are divided into two types. According to Doherty, relative clauses without the complementizer *that* (Doherty, following Jespersen refers to these as contact clauses) are bare IPs, without an empty operator. Relative clauses with the complementizer *that* he argues are CPs and contain an empty operator. I will be assuming this distinction in what follows.

Consider the English relative clause cases given in (50). The distribution of English *that* is exactly the same as the distribution of *som* in Norwegian embedded subject *wh*-questions. The complementizer *that* is obligatory with immediate subject extractions in relative clauses and clefts.

50. *Relative Clauses*
     a．the man that knows Bill
     b．*the man knows Bill
     Clefts
     c．It is Mary that knows Bill.
     d．*It is Mary knows Bill.

These facts are surprising since English does not have anti-*that*-trace effects in embedded questions. In non-subject relative clauses and clefts, the complementizer is optional.

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[19] This section has benefitted greatly from discussions with Eric Bakovic. All errors are of course mine.

51. *English Object Relative Clauses*
    a. the man that Bill knows
    b. the man Bill knows
    Clefts
    c. It is Mary that Bill knows.
    d. It is Mary Bill knows.

This contrasts with Norwegian embedded clauses where the complementizer is ungrammatical as in (33) above.[20]

Norwegian shows exactly the same pattern of obligatory and optional complementizer in relatives and clefts. Here, *som* is also obligatory with immediate subject gaps.

52. *Relatives*
    a. mannen   som bu   i   huset
          man-Det COMP live in   house-DET
    b. *mannen bu   i   huset
          man-Det live in   house-DET

      'the man that lives in the house'

    Clefts
    c. Det er   Per som   elsker Maria.
          it   is   P.   COMP loves   M.
    d. *Det er   Per elsker   Maria.
          it   is   P.   loves   M.

      'It is Per that loves Maria.'

With non-subject relatives and clefts, the complementizer is optional.

53. *Relatives*
    a. huset   (som) jeg bu   i
          house-DET SOM   I   live in
          'the house (that) I live in'

    Clefts
    b. Det er   Per (som)   Maria elsker.
          it   is   P. SOM   M.   loves
          'It is Per that Maria loves.'
    c. Det er   Per (som)   Maria tror   elsker Ulla.
          it   is   P. SOM   M.   believes loves U.
          'It is Per (that) Maria believes loves Ulla.'

---

[20] In Swedish and Danish, the complementizer in non-subject embedded wh-questions is also optional. The following examples are from Swedish.
    i.   a. Jag vet   vem (som) Martin gillar   inte
            I   know who (SOM) M.   likes   not
            'I know who Martin doesn't like.'
        b. Martin undrade   vad (som) Per hadde drukket
            M.   wondered what (SOM) P.   had   drank
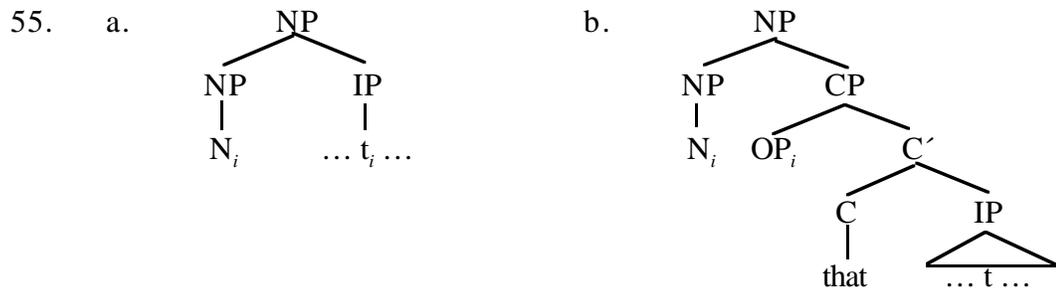   'Martin wondered what Per had drunk.'

Again, there is a contrast with embedded object questions where the complementizer is ungrammatical as in (33).

One way in which Norwegian differs from English is that Norwegian does not have relative clauses introduced by an overt operator.

54. a. *mannen   hvem$_i$ jeg   kjenner
       man-Det   who   I   know
       'The man who I know'

    b. mannen   som   jeg   kjenner
       the man   COMP I   know
       "the man that I know'

    c. mannen   jeg   kjenner
       the man   I   know
       'the man I know'

I will not discuss this distinction in any detail here. See Kayne (1995), and Pesetzky (1995) for a discussion of the same situation in French.

If we focus only on relatives with a non-overt operator, the facts are the same in both English and Norwegian. With non-subject relatives and clefts, both contact clauses (55a) and empty operator relatives (55b) are grammatical. While with subject relatives and clefts, only empty operator relatives (55b) are grammatical.

55.   a.   NP   b.   NP

            NP   IP   NP   CP

            N$_i$ … t$_i$ …   N$_i$ OP$_i$ C´

                                                              C   IP

                                                             that   … t …

This situation brings up two issues that, on the surface at least, are problematic for an OT analysis, ineffability and optionality. The solution to these problem lies in a reconsideration of the assumptions regarding the input and the candidate set. Legendre, Smolensky, and Wilson (1995) provide an analysis of ineffability which relies on allowing an unconstrained set of inputs and allowing LF-inequal candidates to compete with one another. Similarly, Bakovic (1996) provides an analysis of optionality where the two winning candidates are the result of competitions from different inputs. I will assume this type of analysis for the optionality and ineffability in (55).

This approach to ineffability and optionality has three distinctive features. First of all it assumes 'richness of the base' (Prince and Smolensky, 1993; 191). That is, the input is unconstrained. All possible inputs are considered. Secondly, the candidate sets are

exhaustive. The candidate set for each input contains all of the possible outputs for any given input. Finally, it relies on the notion of Faithfulness. The set of output candidates is compared on how well each candidate matches the particular input. In what follows, I assume a general FAITHFULNESS constraint which regulates input-output relations
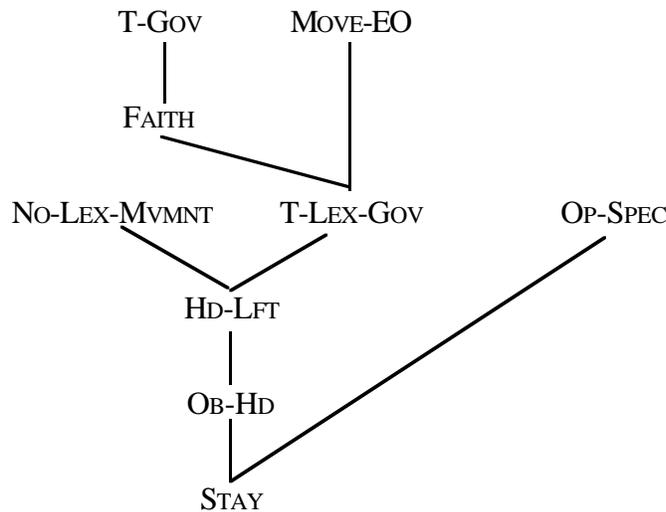
56.　　FAITHFULNESS (FAITH)　Match the input.

This constraints militates against outputs which delete or change the input specification. For example, if the input contains an empty operator and the output has no operator, this is a violation of FAITH. Or, if the input contains an overt operator and the output contains an empty operator, this is also a violation of FAITH. This version of Faithfulness merges the properties of the phonological faithfulness constraints MAX (don't delete a segment) and IDENT (don't change feature specifications) proposed in McCarthy and Prince (1995). Whether these notions need to be separated in the syntax as well remains to be seen.

In the case of relative clauses, we must consider three possible inputs. One input is specified for an empty operator, one for an overt operator and one for no operator. In non-

subject relatives in English[21], each of these three inputs surfaces with a faithful parse. The input with an overt operator leads to an optimal output with an overt operator, etc. In subject relatives the three inputs are neutralized to two outputs in English. The candidates created by these inputs are eveluted over the following constraint ranking which is consistent with the ranking propoed for English in (18) above.

57. *Partial Constraint Ranking for Relative Clauses in English*

```
     T-GOV          MOVE-EO
       |               |
     FAITH             |
        \              |
         \             |
  NO-LEX-MVMNT   T-LEX-GOV        OP-SPEC
          \       /                 /
           HD-LFT                  /
             |                    /
           OB-HD                 /
              \                 /
               \               /
                    STAY
```

The crucial new rankings are that FAITH and MOVE-EO dominate T-LEX-GOV and that T-GOV dominates FAITH. These rankings also hold in Norwegian, so that both languages behave the same with respect to empty operator relative clauses.

First, consider the case of non-subject relatives. If the input contains an empty operator, the optimal output will have the empty operator in the specifier of CP, with *that* heading the CP. The tableaux (T23) shows this.

(T23) empty operator: /… OP …/

Candidates	OP-SPEC	T-GOV	FAITH	MOVE-EO	T-LEX-GOV	HD-LFT	OB-HD	STAY
a.　　　　N [OP$_i$ [… t$_i$ …]]							*!	*
b.　☞ N [OP$_i$ that [… t$_i$ …]]								*
c.　　　　　N[… OP$_i$ …]	*!			*				
d.　　　　　N [… t$_i$ …]			*!					*
e.　　N [wh$_i$ [… t$_i$ …]]			*!				*	*
f.　　N [wh$_i$ that [… t$_i$ …]]			*!			*	*	*
g.　　　　　N[… wh$_i$ …]	*!		*					

The first three candidates are faithful to the input. Candidates (d) through (g) are ruled out by FAITH and/or OP-SPEC. Of the remaining three candidates, (b) wins since it satisfies all of the constraints. Note that since the empty operator does not violate HD-LFT, the

---

complementizer is obligatory due to OB-HD. Relative clauses with an empty operator therefore differ from embedded questions in English since the former require a complementizer while the latter require the absence of the complementizer.

Second, consider the case where the input contains no operator. Again, the faithful candidate wins. The tableaux (T24) shows this.

(T24) no operator: /… t …/

	OP-SPEC	T-GOV	FAITH	MOVE-EO	T-LEX-GOV	HD-LFT	OB-HD	STAY
a. ☞ N [… t_i …]								*
a´. ☞ N [that [… t_i …]								*
b. N [OP$_i$ [… t_i …]]			*!				*	*
c. N [OP$_i$ that [… t_i …]]			*!					*
d. N[… OP$_i$ …]	*!		*	*				
e. N [wh$_i$ [… t_i …]]			*!				*	*
f. N [wh$_i$ that [… t_i …]]			*!			*		*
g. N[… wh$_i$ …]	*!		*					

Under the assumption that the complementizer is free, the two faithful candidates are (a) and (a´)[22]. These candidate also satisfy all of the constraints. The other candidates are out because they either violate faithfulness or some other constraint in addition to FAITH. Since (a) and (a´) do not violate any constraints, this analysis predicts that languages will universally have relative clauses which lack operators. Whether this prediction is borne out remains to be seen.

Finally, for English, we must consider the case where the input contains an overt operator.

(T25) overt operator: /… wh …/ (English only)

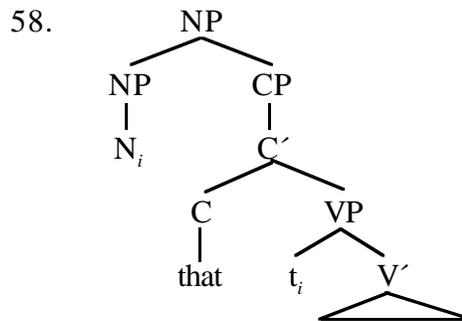|	OP-SPEC	T-GOV	FAITH	MOVE-EO	T-LEX-GOV	HD-LFT	OB-HD	STAY
a. N [OP$_i$ [… t_i …]]			*!				*	*
b. N [OP$_i$ that [… t_i …]]			*!					*
c. N [… t_i …]			*!					*
d. N[… OP$_i$ …]	*!		*	*				
e. ☞ N [wh$_i$ [… t_i …]]							*	*
f. N [wh$_i$ that [… t_i …]]						*!		*
g. N[… wh$_i$ …]	*!							

Candidates (a) through (c) are ruled out by FAITH. Candidate (d) is particularly bad, since it violates FAITH, OP-SPEC, and MOVE-EO. Of the remaining three candidates, (e) wins since it violates only the lower ranked OB-HD. Note this is same ranking responsible for the lack of

complementizers in embedded questions. Reranking FAITH below HD-LFT could give us Norwegian, which lacks overt wh-relatives. However, a full exploration of this reranking is beyond the scope of this paper.

When the relative gap is the topmost subject of the relative clause, the complementizer is obligatory in English and Norwegian. This is another case of an anti-*that-trace effect. Under the assumptions I have made about government, this means that only the empty operator candidate will be grammatical for the input with an empty operator and the input without an empty operator in English and for all inputs in Norwegian. The possibility of adding a complementizer above a contact clause is not available in either language. This follows since, if we assume that a relative clause without an overt operator has simply a trace in the gap of the relative clause and no empty operator binding that trace. For example, (55a) could be (58).

58.
```
                NP
             /      \
          NP         CP
          |           |
          N_i         C´
                    /    \
                   C       VP
                   |      /   \
                 that   t_i    V´
                              /  \
                             /____\
```

Government from the lexical noun head fails since the relative clause is adjoined to NP. The complementizer *that* cannot govern the trace however. Under the definition of government presented above however, the VP is a barrier to government from C. The VP is a maximal projection, and it does not share any features with the complementizer. Therefore, the trace in (58) fails both government constraints. If we examine the same three types of inputs, but consider subject relatives, we see that two of the inputs neutralize.

If the input contains an empty operator, the faithful parse is again optimal.

(T26) empty operators: /… OP …/

Candidates	OP-SPEC	T-GOV	FAITH	MOVE-EO	T-LEX-GOV	HD-LFT	OB-HD	STAY
a. $\quad$ N [OP$_i$ [t$_i$ …]]		*!			*		*	*
b. $\quad$ ☞ N [OP$_i$ that [t$_i$ …]]					*			*
c. $\quad$ N [t$_i$ …]		*!	*		*			*
d. $\quad$ N[OP$_i$ …]				*!				
e. $\quad$ N [wh$_i$ [t$_i$ …]]		*!	*		*		*	*
f. $\quad$ N [wh$_i$ that [t$_i$ …]]			*!		*	*		*
g. $\quad$ N[wh$_i$ …]			*!			*		

The only difference between (T26) and (T23) is that the optimal candidate in (T23) now violates T-LEX-GOV. However, since FAITH is ranked below T-LEX-GOV, this candidate is

still optimal. All of the other candidates violate either T-GOV or the FAITH. If FAITH and T-LEX-GOV were reranked the optimal candidate would be (g) (candidate (f) is harmonically bound by (g) since it also violates T-LEX-GOV). In such a language, empty operator relatives would be ungrammatical in subject relatives only.

When the input contains an overt operator, the faithful parse is also optimal. This results from the fact that the government constraints can be satisfied by leaving the wh-phrase in situ, as in matrix and embedded wh-questions discussed above.

(T27) overt operator: /… wh …/

Candidates	OP-SPEC	T-GOV	FAITH	MOVE-EO	T-LEX-GOV	HD-LFT	OB-HD	STAY
a.　　　　N [wh$_i$ [t$_i$ …]]		*!			*		*	*
b.　N [wh$_i$ that [t$_i$ …]]					*!	*		*
c.　　　☞ N [wh$_i$ …]						*		
d.　　　　　N [t$_i$ …]		*!	*		*			*
e.　　　N [OP$_i$ [t$_i$ …]]		*!	*		*		*	*
f.　N [OP$_i$ that [t$_i$ …]]			*!		*			*
g.　　　　N [OP$_i$ …]			*	*!				

Candidate (c) wins since it satisfies both of the government constraints and FAITH. Reranking T-LEX-GOV and FAITH would not affect the outcome in this case. However, reranking HD-LFT and FAITH would make (f) grammatical if the other rankings were held constant. This may be Norwegian.

Finally, consider an input where there is no operator specified in the input. The optimal output for this input in English will have an overt operator.

(T28) no operator: /… t …/

Candidates	OP-SPEC	T-GOV	FAITH	MOVE-EO	T-LEX-GOV	HD-LFT	OB-HD	STAY
a.　　　　N [wh$_i$ [t$_i$ …]]		*!	*		*		*	*
b.　N [wh$_i$ that [t$_i$ …]]			*		*!	*		*
c.　　　☞ N [wh$_i$ …]			*			*		
d.　　　　　N [t$_i$ …]		*!			*			*
d´.　　　N [that [t$_i$ …]		*!			*			*
e.　　　N [OP$_i$ [t$_i$ …]]		*!	*		*		*	*
f.　N [OP$_i$ that [t$_i$ …]]			*!		*			*
g.　　　　N [OP$_i$ …]			*	*!				

The most faithful parse, (e) violates the T-GOV constraint and thus is put out of the running. The decision is passed on to the other constraints, all of the remaining candidates violate the FAITH constraint. Of those remaining candidates, MOVE-EO and T-LEX-GOV eliminate all but (c). Candidate (d´) has the same constraint profile as (d) since as I discussed above with respect to (57), the addition of the complementizer does not allow government of subject trace. Reranking FAITH and T-GOV would result in the faithful parse

being optimal. Reranking HD-LFT and T-LEX-GOV will result in (f) being optimal. Again, this may be the ranking for Norwegian.

In the analysis presented here, absolute ungrammaticality is treated as neutralization of two inputs to the same output. In this way, the faithful parse of one input is blocked, and cannot emerge as grammatical. Optionality emerges when the two inputs do not neutralize. That is each output leads to a different grammatical output. The advantage of such an approach is that it does not rely on adding machinery to the theory such as filters on the output or restrictions on the input. Rather, this approach relies on the cornerstone of OT, constraint ranking.

An alternative analysis to the one just presented is Grimshaw's (to appear). In this analysis the complementizer in (58) can govern the trace of the subject. In order to reconcile this analysis with my analysis of Government, the complementizer must be coindexed with the relative head. Since the relative head is coindexed with the trace, the VP then becomes transparent to government from the complementizer. Therefore, the complementizer is obligatory in immediate subject extractions. This is nearly equivalent to saying that the complementizer is the operator, as in Taraldsen (1983, 1986). The problem with this analysis is that if the complementizer can be an operator in relative clauses, what stops it from being an operator in embedded question. I discuss this problem below with respect to Taraldsen's (1986) analysis of the anti-*that-trace effects.

What both of these approaches share is the idea that in subject relatives, the presence of an empty operator is directly linked to the presence of the complementizer. Either there is a constraint requiring the operator to move to the specifier of CP causing the presence of a complementizer, or the complementizer is the operator itself and through coindexing with the relative head can govern the trace in the relative clause. This connection deserves further research.

6.2.   *Comparatives*

Comparatives pose a problem for my analysis. If we follow the traditional analysis of Chomsky (1977), comparative clauses such as those in (59a and b) have the structure in (59c).

59. a. John is taller than Mary is.
    b. Mary is different that she was five years ago.

    c. $[_{PP}$ than $[_{CP}$ OP$_i$ $[_{IP}$ … t$_i$ …]]]

Chomsky (1977) provides two pieces of evidence for the structure in (59c). First of all, some dialects of English allow overt operators in comparative clauses. In these dialects, overt operators follow the comparative preposition as in (60).

60. a. John is taller than *what* Mary is.   (Bresnan (1972))
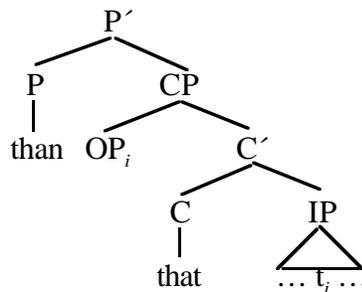
b. Mary is different than *what* she was five years ago.

Second of all, this analysis allows a PP analysis of simple comparatives like those in (61).

61. a. John is taller [$_{PP}$ than [$_{NP}$ Bill]]

These two facts seem to support the analysis in (59c).

The problem with incorporating the analysis proposed in Chomsky (1977) into the analysis presented here is that it predicts that the complementizer should be optional in comparatives. Consider the structure of a comparative with an empty operator, given in (62).

62.

```
            P´
          /    \
         P      CP
         |     /   \
       than  OP_i    C´
                    /   \
                   C     IP
                   |     /\
                  that  ... t_i ...
```

The constraint ranking given for relative clauses would choose (62) as the optimal output for an input which contains an empty operator.

(T29) empty operator: /… OP …/

Candidates	OP-SPEC	T-GOV	FAITH	MOVE-EO	T-LEX-GOV	HD-LFT	OB-HD	STAY
a. P [wh$_i$ […t$_i$ …]]			*!				*	*
b. P [wh$_i$ that […t$_i$ …]]			*!			*		*
c. P […wh$_i$ …]	*!		*			*		
d. P […t$_i$ …]			*!					*
e. P [OP$_i$ […t$_i$ …]]							*!	*
f. ☞ P [OP$_i$ that […t$_i$ …]]								*
g. P […OP$_i$ …]	*!			*				

As in the relative clause case, the candidate with the complementizer, (f), satisfies all the constraints. However, in both English or Norwegian, comparatives with an overt complementizer are ungrammatical.

63. *English*

   a. *John is taller than that Mary is.
   b. *Mary is different than that she was five years ago.

64. *Norwegian*

   a. *Georg er   høyere   enn   som   Andreas er.
       G.   is   taller   than COMP   A.   is
       'George is taller than Andreas is.'

   b. *Det   er større   enn   som   du   tror.
       it   is bigger   than COMP   you   think
       'It is bigger than you think.'

Neither language allows a complementizer to follow the preposition, *than/enn*, introducing the comparative phrase.

In addition to this problem, Chomsky's (1977) analysis also predicts that we should get anti-*that-trace effects in subject comparatives. Consider the tableaux (T30), which shows the optimal output for an input with an empty operator.

(T30) empty operators: /… OP …/

Candidates	OP-SPEC	T-GOV	FAITH	MOVE-EO	T-LEX-GOV	HD-LFT	OB-HD	STAY
a.　　　　P [OPᵢ [tᵢ …]]		*!			*		*	*
b. ☞ P [OPᵢ that [tᵢ …]]					*			*
c.　　　　　P [tᵢ …]			*!					*
d.　　　　　P [OPᵢ …]				*!				
e.　　P [whᵢ [tᵢ …]]		*!	*		*		*	*
f.　　P [whᵢ that [tᵢ …]]			*!		*	*		*
g.　　　　P [whᵢ …]			*!			*		

The optimal candidate given this output will have a complementizer, exactly as in relative clauses. this result obtains because of the ranking between FAITH and T-LEX-GOV. This ranking is exactly the ranking needed to get relative clauses. However, in both English and Norwegian, there are no anti-*that-trace effects in subject comparatives, as is shown in (65) and (66).

> 65. *English*
>   a. More students bought the book than copied it.
>   b. *More students bough the book than that copied it.

> 66. *Norwegian*
>   a. Flere studenter har kjøpt boken　　enn har　　kopiert　den
>   more students have bought book-DET than have copied   it
>   b. *Flere studenter har kjøpt boken　　enn som　har kopiert den
>   more students have bought book-DET than Comp have copied it
>
>   'More students have bought the book than have copied it.'

The fact that there are no anti-*that-trace effects in subject comparatives is puzzling given the analysis of comparatives in Chomsky (1977). Unfortunately, reranking FAITH and T-LEX-GOV cannot help here without losing the relative clause facts.

An alternative to Chomsky's (1977) analysis is argued for in Huang (1982), Lasnik and Saito (1994) and Dubinsky and Williams (1995) which assumes that the preposition is in the complementizer position as in (67).

> 67. [CP OPᵢ than [IP … tᵢ …]]

One strong argument for this position is the complementary distribution between complementizers and prepositions, not only in comparatives but also in temporal prepositional phrases as in (68).

68. *English*
   a. I spoke to Bill after he came back from Philadelphia.
   b. *I spoke to Bill after that he came back from Philadelphia.
   c. Bill saw Al before he went to Mexico.
   d. *Bill saw Al before that he went to Mexico.

The complementary distribution would follow directly if in both comparatives and temporal prepositional phrases the preposition is in the head of Comp.[23]

There are two problems with this analysis. First of all there are dialects of English where an overt operator in comparatives is licit. As I showed above in (60), in these dialects, the overt operator follows the preposition. Norwegian also allows examples like these as is shown in (69).

69. a. Georg er høyere   enn   hva   Andreas   er.
       G.   is taller   than   what   A.   is
       'George is taller than Andreas is.'

   b. Det er større   enn   hva   du   tror.
      it is bigger   than   what   you   think
      'It is bigger than you think.'

Again, the operator follows the preposition. The position of the operator is unexpected if the preposition is the head of Comp, since the operator is in the specifier of Comp. The second problem arises in Norwegian, where the complementizer and the preposition in temporal prepositional phrases are not necessarily in complementary distribution.

70. *Norwegian*
   a. Jeg snakket med Arne etter at han kom hjem fra   Oslo.
      I   spoke   with A.   after that he   came home from Oslo

   b. *Jeg snakket med Arne etter han kom hjem fra Oslo.
      I   spoke   with A.   after he came home from Oslo.
      'I spoke with Arne after he came home from Oslo.'

   c. *Jeg snakket med Arne før   at han kom hjem fra Oslo.

---

[23] Haung (1982) also notes that there apear to be *that-trace effects with temporal prepositional phrases, as in (67).

   i. *English*   Lasnik and Saito (1994)
      a. ??who$_i$ did you leave for London after you visited t$_i$.
      b. * who$_i$ did you leave for London after t$_i$ visited you.

Norwegian, shows the same facts.
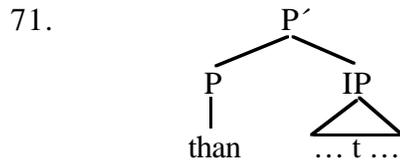
   ii. *Norwegian*
      a. Hvem$_i$ skrev du doktoravhandlingen etter at du snakket med   t$_i$?
         who   wrote you dissertation-Det   after that you spoke   with
         'Who did you write your dissertation after you spoke with?'

      b. *Hvem$_i$ skrev du doktoravhandlingen etter at t$_i$ snakket med dig?
         who   wrote you dissertation-Det   after that   spoke   with you
         'Who did you write your dissertation after spoke with you?'

This is problematic for the analysis of *that-trace effects presented in this paper. However, I have nothing to say about it at this time.

47

		I	spoke	with	A.	before	that	he	came	home	from	Oslo
	b. Jeg	snakket	med	Arne	før	han	kom	hjem	fra	Oslo.		
		I	spoke	with	A.	before	he	came	home	from	Oslo.	

'I spoke with Arne before he came home from Oslo.'

As (70a and b) show, with the preposition *etter* 'after', the complementizer *at* 'that' is obligatory[24]. The fact that the complementizer and the preposition cooccur, indicates that they are not in the same position. The examples in (70c and d) indicate that some prepositions cannot cooccur with the complementizer. Both the position of overt operators in English dialects and Norwegian and the fact that Norwegian allows prepositions to cooccur with complementizers argue against the analysis of prepositions as complementizers and for Chomsky's (1977) analysis.

One possible solution to this problem is to assume that there are no empty operators in comparatives. That is, the optimal output for comparatives, given any input, is as in (71).

71.

```
                P´
             /      \
           P          IP
           |         /  \
         than     … t …
```

This captures the lack of complementizers in comparatives in both English and Norwegian. Furthermore, it captures the fact that overt operators, when they occur, follow the preposition. Finally, it also predicts the absence of anti-*that-trace effects, since the preposition L-marks the IP it can govern into the specifier of the IP.

In order for this solution to work, inputs with an empty operator or an overt operator (in those dialects where overt operators are ungrammatical in comparatives) must neutralize to the output with no operator. This cannot be achieved through any reranking of the current constraints, because of the facts with respect to relative clauses. Therefore it

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[24] In fact, Norwegian generally requires the complementizer to be present when the clause is a complement to a preposition (Holmberg (1986)).

		Jeg	er	sikker	på	at	Per	ljuger.
i.	a)	I	am	certain	on	that	P.	lies

		*Jeg	er	sikker	på	Per	ljuger.
	b)	I	am	certain	on	P.	lies

'I am certain that Per lies.'

		Per	er	overbevist	om	at	Maria	elsker	Jan.
ii.	a)	P.	is	convinced	of	that	M.	loves	J.

		Per	er	overbevist	om	Maria	elsker	Jan.
	b)	P.	is	convinced	of	M.	loves	J.

'Per is convinced that Maria loves Jan.'

must be achieved through the introduction of a new constraint. A full analysis of this problem is beyond the scope of this paper, so I leave this for future research.

7.   Other Analyses: Rizzi (1990), Taraldsen (1986)

The analysis of anti-*that*-trace effects given in this paper turns on two essential ideas. One is that the difference between English and Norwegian is that Norwegian subject wh-phrases must move. Movement of the wh-phrase in Norwegian creates the need for the complementizer in embedded questions. Non-movement of these same wh-phrases in English blocks insertion of the complementizer in embedded questions. Thus Norwegian has anti-*that*-trace effects and English does not. This difference is mirrored in matrix clauses where Norwegian has verb second with subject wh-phrases and English does not (i.e. there is no *do* support with subject wh-questions).

The second idea is captured in the government constraints, T-Lex-Gov and T-Gov. As I noted above, these two constraints are related to the ECP. However, they differ in two ways. Where the ECP is a hard constraint that is inviolable, the government constraints are violable. The second difference is that the ECP is generally formulated to require the more restrictive lexical government, while these two constraints form a hierarchy. When lexical government fails non-lexical government is preferred to no government at all. In this light it is interesting to compare the analysis given here with two other well-known ECP-based analyses, Rizzi (1990) and Taraldsen (1986). In ECP-based accounts there is tension to allow the complementizer to be proper governor in the anti-*that*-trace effects but not in *that*-trace effects.

7.1.1. Rizzi (1990)

Rizzi attempts to alleviate this tension by modifying the ECP. In Rizzi's (1990) account, a complementizer may govern a subject trace through agreement. The agreement may be passed to the complementizer if it agrees with another element (either its specifier, or the relative head).

Complementizers are specified for two features:

72. a. $\pm wh$
    b. $\pm$pred

A given Comp may be underspecified for a feature. For example a null comp (Ø) is underspecified for both features. The comp *that* is underspecified for [$\pm$pred]. Furthermore, English *that* is "the spell out of *-wh* in tensed environments"(p.68). Therefore we have the typology of complementizers in (73).

73. a. +*wh* -pred: (I wonder)   what   Ø   [you saw t]
    b. +*wh*+pred: the thing   which   Ø   [you saw t]
    c. -*wh* +pred: the thing   that   [you saw t]
    d. -*wh* -pred: (I know)   that   [you saw it]

Comp can be expanded three ways, into either *that* , AGR or nothing.

Subject extraction in English embedded questions works in the following way. Expansion of Comp as a null complementizer with agreement as in (74) is licit.

74.   I know [$_{CP}$ what Ø$_{AGR}$[$_{IP}$ t happened.]]

The null complementizer (Ø) is turned into a proper governor for the trace in the specifier of IP through spec-head agreement with the wh-phrase in the specifier of CP. The expansion of Comp as *that* , as in (75a), or not expanding, as in (75b), is illicit.

75.   a.   *I know [$_{CP}$ what that$_{AGR}$ [$_{IP}$ t happened.]]
        b.   *I know [$_{CP}$ what [$_{IP}$ t happened.]]

Both *that* and unexpanded Comp are inert for government, therefore the trace in the specfier of IP is ungoverned and both structures in (75) fail the ECP.[25] This system also captures the **that*-trace effect.

With long distance extraction from embedded clauses we again have three choices for expanding Comp. Again, the only licit possibility is to expand it as a null AGR as in (76).

76.   Who$_i$ do you think [$_{CP}$ t$_i$ Ø$_{AGR}$ [$_{IP}$ t$_i$ left.]]

The trace is properly governed by AGR in Comp. The other two choices, *that* and an unexpanded Comp, leave the trace ungoverned as in (75) above.

Rizzi proposes that Norwegian *som* is the spell out of a [+pred] C^0 with both A and A´-Agr. This approach clearly makes the wrong predictions. Under this approach, *som* should occur only in relative clauses, and with both an overt and a non-overt operator. In fact, *som* occurs in both relative clauses and questions, but is blocked from relative clauses with an overt operator.

77. a. +*wh* -pred: Jeg vet   hvem   som   [t såg dig]
                      I know   who   COMP   [t saw you]
    b. +*wh*+pred: byen   i hvilket (*som)   [du bor t]
                      town-DET   in which   (*COMP)   [you live t]
    c. -*wh* +pred: byen   (som)   [du bu i t]
                      town-DET   (COMP)   [you live in t]
    d. -*wh* -pred: Jeg vet   *som   [du såg det]
                      I know   *COMP   [you saw it]

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[25] Rizzi must allow *that* to A-agree and become a proper governor to account for subject extraction in relative clauses where *that* is required.
   i.   the thing [$_{CP}$ OP$_i$ that$_{AGR}$ [$_{IP}$ t$_i$ happened]] is terrible.

Under Rizzi's analysis (77a) should be ungrammatical since it is a [-pred] structure with a [+pred] Comp. Similarly (77b) should be grammatical with *som* since it has A´-Agr. His approach does capture the facts in (77c and d). Note that making *som* [±pred] does not help since this would correctly allow (77a) but would incorrectly predict (77b) and (77d) to be grammatical with *som*.

In addition, Rizzi cannot account for the multiple embedded questions in (44) above without resorting to '…inherent governing capacity of Comp in Norwegian' (1990; 53, fn. 21). However this move opens the possibility of allowing a Null Comp in subject relative clauses in Norwegian, as in (78).

> 78.   *Mannen   [OP$_i$ Ø [t$_i$ vant]]
>   man-DET   won

If Comp is an inherent governor in Norwegian, this structure should be licit. This fact is easily captured in the analysis presented here following the analysis given for the similar phenomenon in English in Grimshaw (to appear).

Rizzi's analysis fails to capture the Norwegian data. Furthermore it offers no principled difference between English and Norwegian.

7.1.2. Taraldsen (1986)

Taraldsen (1986) mitigates the tension in the ECP-based account by reducing the distribution of *som* to the binding theory. Taraldsen analyzes the anti-**that*-trace effect as a result of the ECP and binding theory. For this analysis to go through, he must make three assumptions. First the definition of variables and anaphors must be stated as in (79).

> 79.*Definition of Variable and Anaphor*
>   a. e_i is a variable $=_{def}$ e_i is locally bound by an operator.
>   b. e_i is an anaphor $=_{def}$ e_i is locally bound by a non-operator

The definition in (79) differs from that in Chomsky (1980) in that the distinction is whether the empty element is locally bound by an operator or a non-operator, not whether the empty element is locally A´-bound or A-bound. Secondly, the definition of an operator must be as in (80).

> 80. *Definition of Operator*
> α is an OPERATOR in $\beta = \dots \alpha_i\ [_{S'} \dots e_i \dots] =_{def}$ (a) α_i determines which value assignments to e_i making S´ true make β true, or there is $\beta' = \alpha'_i\ [_{S'} \dots e_i \dots]$ formed from β by replacement of a Wh-phrase in α_i such that α'_i is an operator in β' by clause (a).

Clause (a) captures the standard definition of operator such as universal or existential quantifiers. It also allows topicalized phrases to be operators. Clause (b) allows

wh-phrases to be operators. Finally, Taraldsen assumes that *som* can be either an operator or an expletive. Given these assumptions, the distribution of *som* reduces to the Binding Theory.

In embedded wh-questions such as (81a), *som* is potentially an expletive non-operator or an operator.

81. *Embedded Subject Questions*
    a. Jeg vet   hvem som   t   vant.
        I   know who   SOM   t   won
    b. *Jeg vet   hvem t   vant.
        I   know who   t   won

    'I know who won.'

Taraldsen wants to derive the fact that *som* is not an operator in (81a) from a general constraint against vacuous quantification. If both *hvem* and *som* are operators, the vacuous quantification constraint would be violated. Therefore one of the elements is not an operator. *Hvem* is by virtue of being a wh-phrase always an operator. Since, by hypothesis, *som* can be either an operator or an expletive, it must be an expletive in this case. The trace in (81a) is anaphoric, since it is bound locally by *som*, the governing category for the trace being CP. It satisfies Condition A. The trace in (81b) fails the ECP, thus accounting for the ungrammaticality of that sentence.

In non-subject embedded questions as in (82), *som* is also potentially an expletive or an operator.

82.   *Embedded Non-subject Questions*
    a. *Jeg vet   hvem som   du   så   t.
        I   know who   SOM   you saw t
    b. Jeg vet   hvem du   så   t.
        I   know who   you saw   t

    'I know who you saw.'

If we take *som* to be an operator, again we run into a case of vacuous quantification. Therefore, *som* must be an expletive here as well.[26] However, if *som* is a non-operator, the sentence is still ungrammatical. Taraldsen proposes that the trace in (82a) is not a variable, but an anaphor. The GC of the trace is the embedded IP since it contains a governor (the verb) and a SUBJECT. Since both *som* and the wh-phrase are outside of the GC, the trace must be an anaphor. That is, it cannot be a variable since it is not locally bound by an operator. Therefore, (82a) is ruled out by Principle A, since the trace is not bound in its GC. Taking this approach however, ruins any chance of accounting for the grammatical (82b). The ungrammaticality of (82a) does not depend at all on the presence or absence of

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[26] *Som* is only an operator in relative clauses.

som, but on the characterization of the trace. In order to make (82b) grammatical the trace must be a variable. However, the GC for (82b) is exactly the same as that in (82a). Therefore, the trace must be an anaphor in (82b) as well. This predicts (82b) to be ungrammatical due to Principle A. Taraldsen does not address this issue.

In cases of multiple wh-extraction as in (44) above Taraldsen suggests that wh-phrases in Norwegian move outside of Comp as argued for in Taraldsen (1983). He gives the sentence in (83a) the structure in (83b).[27]

83. *Extraction over embedded wh-phrases*
    a. Det er   en   mann som vi   ikke skjønner   hva   sier
       that is   a   man   that we   not   understand what   says

    'That is a man that we don't understand what says.'

    b. Det er en mann$_i$ [$_{S'}$ som$_i$ vi ikke skjønner [hva$_j$ [$_{S'}$ t´$_i$ [$_S$ t$_i$ sier t$_j$]]]]

He suggests that the trace t´ in the embedded S´ properly governs the trace in S. However, this analysis does not predict the ungrammatical (84).

84. *Det er   en   mann som vi   ikke skjønner   hva   som   sier
    that is   a   man   that we   not   understand what   COMP says

    'That is a man that we don't understand what says.'

Som can also govern the trace in S. If *som* is an expletive in (84), there is nothing in principle which forces the complementizer to be absent.

Taraldsen's account can capture the Norwegian data, except for the problems noted. However, even if these problems can be overcome, the analysis does not generalize to English. In order to account for the lack of anti-*that*-trace effects in English embedded questions, we have to assume, as with Rizzi's account, that English simply lacks the proper complementizer. In addition, some other mechanism to account for lack of ECP effects in English subject wh-questions must be appealed to.

7.1.3. Summary

In both analyses, the difference between English and Norwegian is accidental, and not related to any other difference between the two grammars. In Rizzi's analysis it is not clear why English does not have an overt element that agrees for both A-Agr and A´-Agr. In Taraldsen's analysis it is unclear why English does not have a complementizer like *som* that is both an operator when needed and a non-operator when needed. In the analysis presented here, the fact that English does not have Anti-*that*-trace effects follows from the constraint ranking which is independently motivated by matrix clauses.

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[27] Taraldsen does not label the projection outside of Comp that the wh-phrase moves to.

8.   Why must the wh-phrase move?

I have put off discussing the constraint MOVE-WH so that the main point of the analysis of anti-*_that_-trace effects could be shown more clearly. In this section I will explore some plausible formulations of the constraint that forces wh-movement of subjects in Norwegian. There are two possibilities that present themselves for this constraint. One is that the constraint is one which is specific to wh-phrases. Under this formulation the constraint would require movement of the wh-phrase. The requirement could be direct, as I have assumed in the MOVE-WH phrase, or indirect, as in a constraint which requires the wh-phrase to be in a specific position. The other possibility is that the movement of wh-phrases is part of a larger difference between the two languages. The most promising avenue here is to relate the movement of subject wh-phrases to verb second since Norwegian is a verb second language and English is not. It is this last option that I will explore here.

One possibility which does relate the movement of subject wh-phrases to a further difference between Norwegian and English is to analyze it as a case of verb second. English is a 'residual V2' language which according to Rizzi (1990b) have two properties, verb second only with wh-phrases and no verb second with subjects. Norwegian on the other hand is a full verb second language that is, verb second with topicalization and wh-movement and subject verb second. The key is that verb second must also occur with subjects. If we know that subjects must move independently in the language, then we do not need to rely on a constraint specific to wh-phrases to account for the anti-*_that_-trace effects.

The exact formulation of a verb second constraint is tricky. Many mechanisms have been put forward to capture verb second in the GB literature (den Besten (1977), Thiersch (1978), Holmberg (1986), Taraldsen (1986), and Holmberg and Platzack (1990)). These are summarized in Vikner (1995). In order for a verb second constraint to account for both verb second and anti-*_that_-trace effects, it must have must have two characteristics:

> 85.   *Characteristics of verb second*
> (i) account for verb second in main clauses including; transitive expletives, topicalization, and adverb fronting.
> (ii) Still active when verb movement blocked by PROJ-PRIN in embedded clauses.

The second characteristic is crucial for accounting for the anti-*_that_-trace effects.   For example, we saw that verb second cannot be the result of forced verb movement by HD-LFT dominating the movement constraints. Such an approach fails exactly on (ii).

A priori several possibilities present themselves. The verb second constraint could either require an 'extra' specifier position above the verb phrase. This is essentially what

the MOVE-WH constraint does, although it is specific to wh-phrases. A more general constraint might say simply that there must be a specifier of CP present in the clause. Given the presence of that specifier, other constraints like OP-SPEC or SUBJ could force different elements to move to that specifier. Also, OB-HD could force verb movement to the second position. Similarly, the verb second constraint could require an 'extra' head position above the verb phrase. This is essentially what ranking HD-LFT above the movement constraints does. However, the verb second constraint would still have to require the head to be filled by a complementizer in embedded sentences, where verb movement is blocked by PURE-EP. The simplest verb second constraint, would require an 'extra' phrasal projection while other constraints like OB-HD, SUBJ, OP-SPEC, etc. decide what material, if any, fills that projection. Which of these three possibilities is the correct characterization of verb second remains to be seen.

9.   Conclusion

In this paper I have argued that the difference between Norwegian and English with respect to the anti-*that-trace effects is best understood as a difference of the requirements on subject wh-phrases in the two languages. In Norwegian, subject wh-phrases may not remain in situ and so the anti-*that-trace effects arise. In English however, subject wh-phrases do remain in situ and no such effects arise. I have also put forth the idea that the requirement that subject wh-phrases move in Norwegian is best thought of as part of the general verb second phenomena in that language.

References

Åfarli, T. 1994. A Promotion Analysis of Restrictive Relative Clauses. *The Linguistic Review* 11: 81-100.

Bakovic, E. 1995. Optimality and inversion in Spanish. Ms. Rutgers University, New Brunswick, New Jersey.

Bakovic, E. 1996. Complementizers and Optionality. Ms. Rutgers University, New Brunswick, NJ.

Bresnan, J. 1972. Syntax of the Co mparative Clause Construction in English. *Linguistic Inquiry* 3, 275-343.

Chomsky, N. 1977. On Wh-Movement. in Formal Syntax. T. W. a. A. A. P. Culicover Ed., Academic Press.

Chomsky, N. 1981. Lectures on Government and Binding. Dordrecht:, Foris.

Chomsky, N. 1995. The Minimalist Program. Cambridge:, MIT Press.

den Besten, H. 1977. On the Interaction of Root Transformations and Lexical Deletive Rules. Ms. University of Amsterdam.

Deprez, V. 1994. A Minimal Account of the That-t Effect. in Paths Towards Universal Grammar. J. K. Guglielmo Cinque, Jean-Yves Pollock, Luigi Rizzi, Rafaella Zanuttini Ed. Washington DC, Georgetown University Press.

Doherty, C. 1993. Clauses without *that*: the case for bare sentential complementation in English. Doctoral Dissertation, University of California, Santa Cruz.

Dubinsky, S. and K. Williams 1995. Recategorization of Prepostions as Complementizers: The case of Temporal Prepositions in English. *Linguistic Inquiry* 26, 125-137.

Emonds, J. 1978. The Verbal Complex of V´-V in French. *Linguistic Inquiry* 9, 151-175.

Engdahl, E. 1985. Parasitic gaps, resumptive pronouns, and subject extractions. *Linguistics* 23: 3-44.

Erteschik-Shir, N. 1985. *Der*. *Working Papers in Scandinavian Syntax* 17: 1-29.

Fiva, T. 1987. *Possesor Chains in Norwegian*. Oso, Novus.

Grimshaw, J. 1990. Argument Structure. Cambridge:, MIT Press.

Grimshaw, J. to appear. Projection, heads and optimality. *Linguistic Inquiry*.

Grimshaw, J. and V. Samek-Lodovici 1995. Optimal Subjects and Subject Universals. *University of Massachusetts Occasional Papers in Linguistics* 18: 589-605.

Grimshaw, J. and V. Samek-Lodovici 1996. Optimal Subjects and Subject Universals. *MIT Working Papers in Linguistics*.

Holmberg, A. 1983. The finite sentence in English and Swedish. *Working Papers in Scandinavian Syntax* 3.

Holmberg, A. 1986. Word order and syntactic features. Doctoral Dissertation, University of Stockholm, Stockholm.

Holmberg, A. and C. Platzack 1990. On the Role of Inflection in Scandinavian Syntax. in Issues in Germanic Syntax. W. Abraham, W. Kosmeijer and E. Reuland Eds.,93-118. Berlin, Mouton de Gruyter.

Huang, C.-T. J. 1982. Logical Relations in Chinse and the Theory of Grammar. Doctoral Dissertation, MIT.

Kayne, R. 1995. The Antisymmetry of Syntax. Cambridge, MIT Press.

Keer, E. and E. Bakovic. 1996. Sometimes two heads are better than one (or none). Ms. Rutgers University, New Brunswick, NJ.

Lasnik, H. and M. Saito 1992. Move α: Conditions on Its Applications and Outputs. Cambridge, MIT Press.

Legendre, G., P. Smolensky, and C. Wilson 1995 When is Less More? Faithfulness and Minimal Links in *wh*-Chains.

Legendre, G., C. Wilson, P.Smolensky, K. Homer and W. Raymond 1995. Optimality and *Wh*-Extraction. *University of Massachusetts Occasional Papers in Linguistics* 18.

McCarthy, J. and A. Prince 1995. Faithfuness and Reduplicative Identity. Ms. Rutgers University, New Brunswick, NJ.

McCloskey, J. 1990 Resumptive Pronouns, A´-Binding and Levels of Representation in Irish. in The Syntax and Semantics of Modern Celtic Languages, Syntax and Semantics 23. Academic Press, San Diego, CA.

McCloskey, J. 1992. Adjunction, Selection and Embedded Verb Second. *Linguistics Research Report* LRC-92007. University of California ar Santa Cruz, Santa Cruz, CA.

Müller, G. 1995. Partial Wh-Movement and Optimality Theory. Handout, CGSW 11. Rutgers University, New Brunswick, NJ.

Nølke 1982. Clefting in Danish? in Topics in Danish Syntax. F. S. a. L. Heltoft Ed. Roskilde, Akademisk Forlag.

Pesetsky, D. 1995. Some Optimality Principles of Sentence Pronounciation. in Barbosa, Fox, Hagstrom, McGinnis and Pesetsky eds. *Is the Best Good Enough*. MITWPL/MIT Press.

Platzack, C. 1986. COMP, INFL and Germanic word order. in Topics in Scandinavian Syntax. L. Hellan and K. K. Christensen Eds. Dordrecht, Reidel.

Pollock, J.-Y. 1989. Verb Movement, Universal Grammar, and the Structure of IP. *Linguistic Inquiry* 20: 365-424.

Prince, A. and P. Smolensky. 1993. Optimality Theory: Constraint interaction in generative grammar. Ms. Rutgers University, New Brunswick, NJ and University of Colorado at Boulder, Boulder, CO.

Rizzi, L. 1990. Relativized Minimality. Cambridge, MIT Press.

Rizzi, L. 1990b. Speculations on Verb Second. in J. Mascaro and M. Nespor eds. *Grammar in Progress*, GLOW Essays for Henk van Riemsdijk. Foris, Dordrecht. 375-386.

Rizzi, L. and I. Roberts 1989. Complex Inversion in French. *Probus* 1.1, 1-30.

Ross, J. 1967. Constraints on Variables in Syntax. Ph.D., MIT.

Safir, K. 1993. Perception, Selection and Structural Economy. *Natural Language Semantics* 2: 47-70.

Samek-Lodovici, V. 1996. Constraints on Subjects: an Optimality Theoretic Analysis. Doctoral Dissertation, Rutgers University, New Brunswick, NJ.

Schwartz, B. and S. Vikner 1989. All verb second clauses are CPs. *Working Papers in Scandinavian Syntax* 43.

Shlonsky, U. 1992 Resumptive Pronouns as a Last Resort. *Linguistic Inquiry* 23: 443-468.

Suñer, M. 1994. V-movement and the Licensing of Argumental Wh-phrases in Spanish. *Natural Language and Linguistic Theory* 12: 335-372.

Taraldsen, K. 1983. Parametric Variation in Phrase Structure: A Case Study. Doctoral Dissertation, University of Tromsø, Tromsø.

Taraldsen, T. 1986. On verb second and the functional content of syntactic categories. in Verb second phenomena in Germanic languages. H. Haider and M. Prinzhorn Eds. Dordrecht, Foris.

Taraldsen, T. 1986. Som and the binding theory. in Topics in Scandinavian Syntax. L. Hellan and K. K. Christensen Eds. Dordrecht, Reidel.

Taraldsen, T. 1991. Two Arguments for Functional Heads. *Lingua* 84, 85-108.

Thiersch, C. 1978. Topics in German Syntax. Ph.D., MIT.

Travis, L. 1984. Parameters and Effects of Word Order Variation. Ph.D., MIT.

Travis, L. 1988. The Syntax of Adverbs. *McGill Working Papers in Linguistics* 280-310.

Travis, L. 1989. Parameters of Phrase Structure. In Alternative Conceptions of Phrase Structure. M. Baltin and A. Kroch eds. Chicago, University of Chicago Press.

Vikner, S. 1995. <u>Verb Movement and Expletive Subjects in the Germanic Languages</u>. Oxford, Oxford University Press.

Vikner, S. 1996. Optimality Theory and V2, V^0-to-I^0 Movement, and 'Do'-Insertion in Danish, Icelandic, French and English. Handout. Rutgers University, New Brunswick, NJ.

Williams, E. 1994. A Reinterpretation of Evidence for Verb Movement in French. in <u>Verb Movement</u>. D. Lightfoot and N. Hornstein, eds. Cambridge, Cambridge University Press.