Backward Binding and the C-T Phase: A Case of Syntactic Haplology^{*}

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1. Introduction

In this paper I will contribute to the theme of this volume by investigating a surprising difference between V2 languages and other languages, a difference that seems to be a consequence of the distribution of functional projections: whereas V2 languages do not accept backward binding, see (1) below, this phenomenon is found in non-V2 languages. As I will claim, the reason is that non-V2 languages have an A-bar position within the I(nfl)-domain, called SpecSubjP in Cardinaletti (2004), that is non-existent in V2-languages, presumably a result of the V2 condition (V-to-C movement). Thus, a conclusion of my investigation is that concepts like CP and TP/IP are still useful even in a cartographic approach.¹

The term *Backward binding* refers to a phenomenon found in sentences with a certain kind of Psych-verbs, the so called *worry*-type or *preoccupare*-type, where the Experiencer is the object. This object may bind an anaphor in the subject,² as shown in the following examples, see also Giorgi (1984), Pesetsky (1987) and Belletti & Rizzi (1988); see also Belletti & Rizzi (this volume).

- (1) a. Questi pettegolezzi su di sé_i preoccupano Gianni_i piú di ogni altra cosa. (Italian) these gossips about himself_i worry Gianni_i more than anything else These gossips about himself worry Gianni more than anything else.
 - b. Each other's health worried the students. (Pesetsky (1987:127))
 - c. Pictures of himself_i worry John_i/him_i. (Belletti & Rizzi (1988:317))

Various ways to account for this exceptional binding phenomenon have been proposed over the years, some of which will be summarized below. None of these approaches take into consideration, however, that backward binding seems to be blocked in V2 languages:³

At least on the surface, these data go against the account of backward binding that I am developing here.

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¹ Although my analysis is based on a simplified clausal structure with a single C projection and a single T projection but with multiple specifiers, it can easily be translated into a cartographis account.

² Note that only embedded anaphors may be backward binded:

⁽i) *Each other worry the students.

This has led some linguistis to assume logophoricity in these cases and not ordinary Binding.

³ Dutch may be an exception. Whereas most of my Dutch informants reject backward binding, Norbert Corver (p.c.) points out that although examples like (2b) are out, the following ones are grammatical in his grammar. See also Corver, Driessen, Koster & van Mierlo (1987).

 $[\]begin{array}{cccc} \hbox{(i) a.} & Elkaars_i & gezondheid\ verontrustte} & de\ taalkundigen_i. \\ & each\ other's\ health & worried & the\ linguists \end{array}$

b. Zijn succes beangstigde Jan/hem. (compare (3)) REFL.POSS success frightened Jan/him.

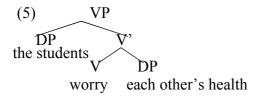
- (2) a. *Varandras hundar skrämde flickorna. (Swedish)
 each other's dogs frightened girls.DEF
 Each other's dogs frightened the girls.
 - b. *Elkaars honden beangstigden de meisjes. (Dutch) each other's dogs frightened the girls Each other's dogs frightened the girls.
 - c. * Hundar hvorrar annarrar hræddu stelpunar. (Icelandic)⁴ dogs each other's frightened girls.DEF Each other's dogs frightened the girls.
- (3) a. *Sin framgång skrämde honom. (Swedish)
 REFL.POSS success frightened him
 His success frightened him.
 - b. *Árangur sinn hræddi hanum. (Icelandic) success REFL.POSS frightened him His success frightened him.
- (4) a. *Bilder på sig själv oroar John. (Swedish)
 pictures.DEF of himself worry John
 Pictures of himself worry John.
 - b. *Myndir af (sjálfum) sér ollu Jóni áhyggjum. (Icelandic) pictures of self REFL.POSS cause Jon.DAT worry Pictures of himself worry John.
 - c. *Bilder von einander beunruhigten die Linguisten. (German) pictures of each other worried the linguists/ACC Pictures of each other worried the linguists.
 - d. *Bilder von einander gefielen den Linguisten. (German) pictures of each other pleased the linguists/DAT Pictures of each other pleased the linguists.

In this paper I will present an account of backward binding which explains why this phenomenon is not possible in V2 languages. Since there is no reason to believe that V2 languages differ from non-V2 languages like English and Italian with respect to the argument structure of the relevant type of Psych-verbs, I will only briefly discuss problems concerning linking and binding principles, claiming that an explanation of the cross-linguistic variation illustrated in (1)-(4) must be found in the C-T phase, not in the vP phase.

2. Previous attempts to account for Backward Binding

Examples like (1) pose a problem for most versions of the Binding theory, where anaphors are assumed to be c-commanded by their antecedent. In cases like (1), the anaphor is included in the subject, and presumably bound by the object. In its surface position, the anaphor is not bound by the object, hence some kind of reconstruction or similar mechanism is called for. Belletti & Rizzi (1988), see also Belletti & Rizzi (this volume), suggest, for instance, that both the subject and the object are merged within VP, and that the Experiencer is in a higher position than the Theme, thus being a possible binder. The VP-part of (1b) could then be assigned the following structure, deviating in details but not in spirit from Belletti & Rizzi (1988):

⁴ That backward binding is impossible in Icelandic was shown in Ottósson (1991). Backward binding is impossible in Icelandic also in embedded clauses, which indicates, given the account of the present paper, that Icelandic has V-to-C in embedded clauses, and not just V-to-T, which should be compatible with backward binding. See also Holmberg & Platzack (1995:83 ff.).



A problem with a solution like (5) is that it states that the Theme DP is promoted to subject, bypassing the Experiencer DP. In general, we expect an intervention effect in such cases, so any solution must be exceptional in some way or other. Some linguists, like Giorgi (1991), Reinhart and Reuland (1993), Reuland and Koster (1991), Hellan (1991), and Kiss (1991) among others, have argued that binding theory should make crucial reference to the thematic structure in an effort to explain the different binding phenomena across languages, and Grimshaw (1990) has suggested that the relative prominence of an argument is determined in both the thematic and the aspectual dimension. Brlletti & Rizzi (this volume) suggest a solution in terms of *smuggling*, as proposed by Collins (2005). None of these attempts explains why English differs from the V2 Germanic languages with respect to backward binding, however. With Chomsky (1995:184f.) I will here simply assume that the specifier and the complement of a head are equidistant from a higher c-commanding head.⁵

Pesetsky (1987) tries to by-pass the intervention effect by suggesting that this fronting is in fact a blend of A- and A-bar fronting (although he does not use these terms). It is well known that an anaphor is allowed in an A-bar fronted DP both in English and in the Germanic V2 languages; Pesetsky refers to this phenomenon as **Connectivity**. Note that Topicalization, as we have here, is an effect of A-bar movement.

- (6) a. Pictures of himself I know John likes.
 - b. Sin bror träffade Johan i London. (Swedish) REFL.POSS brother met Johan in London His brother Johan met in London.

Pesetsky goes on to observe that almost all Psych-verbs with Experiencer object license an infinitival clause with *Tough* Movement, as shown in (7b).

- (7) a. It annoys me to have to look at these pictures.
 - b. These pictures annoy me to have to look at.

When the *Tough* moved element contains an anaphor, we get the connectivity phenomenon illustrated in (8b). Note that in this case the DP showing connectivity is A-moved, given a movement analysis of *Tough* movement. It is not surprising that we get a connectivity effect also when the *Tough* movement construction is based on a Psych-verb with Experiencer object (8c). Cases like (1), then, Pesetsky claims, are *Tough* movement cases where the infinitival clause is left out (8d).

- (8) a. It is not hard for us_i [PRO_i to draw pictures of each other_i].
 - b. Pictures of each other, were not hard for us_i [PRO_i to draw e].
 - c. Pictures of each other, annoy the politicians, [PRO, to look at e].
 - d. Pictures of each other annoy the politicians.

Although the fronted DP in (7) and (8) is the subject of the matrix clause, it gets its theta-role from the verb in the infinitival clause. In this case there is no intervention effect. Likewise, there is no intervention effect when a DP object is topicalized (A-bar-moved), as in (9):

"If α , β are in the same minimal domain, they are equidistant from γ ."

⁵ Chomsky (1995: 184) defines equidistance in the following way:

(9) This book, John would like to read.

However, Pesetsky's account fails to explain the absence of backward binding in V2 languages. Notice in particular that there is no connectivity effect with *Tough* movement in a V2 language like Swedish, hence cases corresponding to (8b) are ungrammatical:

(10) *Sin_i bror var lätt för honom_i [att PRO_i träffa *e* i London] (Swedish)⁶ REFL.POSS brother was easy for him to meet in London His brother was easy for him to meet in London.

Hence V2 languages seem to have a connectivity effect with A-bar fronting, but not with A-fronting. It follows that a *Tough* movement analysis in line with Pesetsky (1987) cannot explain why the Germanic V2-languages lack backward binding.

3. A New Account of Backward Binding

Whether or not Pesetsky (1987) is right in claiming that the subject of verbs like *worry* and *frighten* in English (and Italian) is merged within an infinitival clause and raised to subject position of the main clause, it seems to be the case that English has a connectivity effect both with A-moved DPs (examples like (1) and (8b,c)) and A-bar moved DPs (examples like (6a)), whereas Swedish and other V2 languages only have connectivity with A-bar moved DPs (examples like (6b)). In this section I will show that the approach developed in Chomsky (2008) and especially his view that A/A-bar chains may be formed by parallel movement, can be used to explain why languages like English and Italian, but not languages like Swedish, have backward binding.

Chomsky (2008) suggests that T inherits its features from C, arguing that in a sentence like (11a) with the structure (11b), both subject movement to Spec-TP and wh-movement to Spec-CP are triggered by C: "The φ -features of C seek the goal *who* and raise it to SPEC-T (by means we still have to determine), and the edge-feature of C can also seek the goal *who* and raise it in parallel to SPEC-C":

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(11) a. Who saw John?
b. who<sub>i</sub> [C [ who<sub>i</sub> [ T [ who<sub>k</sub> [ v* [see John]]]]]]
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Since there is parallel movement, it follows that there is no direct connection between who_i and who_j . Instead, there is one A-chain $who_j - who_k$, and one A'-chain, $who_i - who_k$. However, as seen in (11a), only one of the wh-words in Spec-CP and Spec-TP is pronounced in this case, whereas in the case where the element in Spec-CP is different from the element in Spec-TP, both are pronounced:

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(12) a. Who did John see?b. who; [C [ John [ T [ John [ v* [see who;]]]]]]
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In (12), it is easy to see that the pronounced entities are *who* in Spec-CP and *John* in Spec-TP, whereas in a case like (11) it is not clear whether it is who_i or who_j that is pronounced. Chomsky (2008) states that the pronounced entity is who_i in Spec-CP, and I will follow this sugges-

⁶ Note that if we have an expletive subject in the matrix, the result is grammatical. In that case, *sin bror* 'REFL.POSS brother' is A-bar moved to first position, and we have a proper case of connectivity. See the discussion around (17).

⁽i) Sin bror var det lätt för Johan att träffa i London. REFL.POSSbrother wa it easy for Johan to meet in London His brother, it was easy for Johan to meet him in London Thanks to Henrik Rosenkvist (p.c.) for pointing this out.

tion here. In the rest of this paper, I will indicate unpronounced material by striking it through.

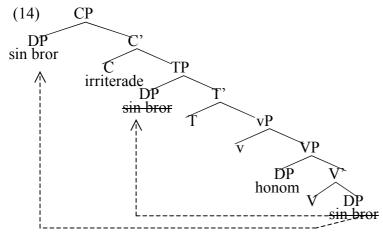
Consider now the derivation in (14) of the ungrammatical Swedish example in (13), given Chomsky (2008) and especially the parallel movement hypothesis. Note that the VP part of this structure is identical to the one given in (5) above; I will assume that the reflexive possessor is bound by *honom* 'him' in the position where it is merged, i.e. in the complement of V.

Since Swedish is a V2 language, the finite verb turns up in C; I will assume that this movement takes place in narrow syntax contrary to Chomsky (2001), and that it is triggered by a finiteness feature in C, see e.g. Eide (2007). No head copies (in T, v and V) are shown. The dotted arrows indicate A-movement to Spec-TP, and the parallel A-bar movement to Spec-CP. As already mentioned, Chomsky (2008) suggests that A-bar movement is triggered by an edge feature in C, and A-movement by a ϕ -feature in C, inherited by T. See the discussion of (11) above.

(13) *Sin bror irriterade honom.

REFL.POSS brother irritated him.

His brother irritated him.



In line with the discussion of (11) we assume that only the first instance of *sin bror* 'REFL.POSS brother' is pronounced.

Topicalization in V2 languages always results in inversion, i.e. the subject turns up in Spec-TP when it is not in first position, see the placement of *Johan* in (6b). In a subject first sentence, it can naturally be discussed if there is an invisible instance of the subject in Spec-TP, as I have assumed in (14) and as Chomsky (2008) assumes for (11). An alternative would be that a sentence initial subject in a V2 language is in Spec-TP and the finite verb in T, and that C is activated only if something else than the subject is fronted, as suggested for Dutch by Zwart (1993). Such a description seems to miss generalizations, however, when applied to other V2 languages. One case is the observation that the subject in a finite Swedish clause cannot be omitted, as illustrated in (15); like English, Swedish does not accept null subjects:

(15) Han_i kom fram till huset. Där stannade $*\emptyset_i$ och lyssnade. he came up to house.DEF there stopped and listened. He came up to the house. There he stopped and listened.

⁷ In some Romance varieties, like Monnese, studied by Benincà (1997) and Benincà & Poletto (2005), the element *chi* 'who' is not followed by the verb but by a complementizer, indicating that the pronounced element is the one in Spec-CP.

⁸ This description presupposes, naturally, that the edge feature in C can find the complement of V without violating PIC (the *Phase-Impenetrability Condition*), see Chomsky (2001:13).

The exception is cases with Topic drop, see Mörnsjö (2002): subjects may be deleted from sentence initial position, as shown in (16):

(16) Han_i kom fram till huset. \emptyset_1 Stannade där och lyssnade. he came up to house. DEF stopped there and listened He came up to the house. (There) he stopped and listened.

In the case of (16), the Spec-CP instance of the subject has been deleted, but in line with the analysis in (14), we can claim that there is a subject in Spec-TP (the head of the A-chain) though without phonological features. The generalization that Swedish Spec-TP always must host the head of an A-chain cannot be maintained if we had assumed that subject first declaratives are only TPs.⁹

We must now ask why (13) is ungrammatical, whereas (17) is well-formed:

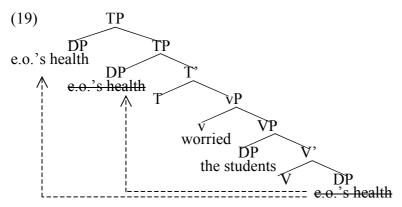
(17) Sin bror träffade Johan i London. (= (6b))
REFL.POSS brother met Johan in London
His brother Johan met in London.

The obvious difference between (13) and (17) is that an instance of the DP containing the anaphor is A-moved to Spec-TP in (13) (not pronounced, though), but not in (17), where Spec-TP is occupied by *Johan*. Assuming that connectivity is possible only with A-bar movement, the presence of an A-moved element in the I-domain containing an anaphor in (13) will lead to ungrammaticality.

If it is correct that a DP with an anaphor is not allowed in the I-domain unless it is the head of an A-bar chain, and that backward binding in the Germanic V2-languages is out since there is no way in these languages to prevent the subject A-chain from heading Spec-TP, we must ask ourselves why this is not so also in English and Italian. Since English is not a V2 languages, the evidence for CP is less prominent, especially in subject first sentences. There are two main alternatives to derive a sentence like (1b), here repeated as (18):

(18) Each other's health worried the students.

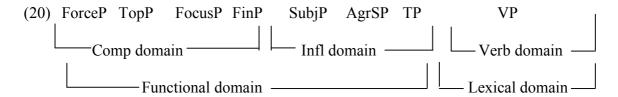
One option is that the structure is identical to the one we have in (14), with the difference that the tensed verb is not in second positon. As in (14), Spec-TP is the head of the A-chain, hosting an anaphor, which we have just claimed will lead to ungrammaticality. The alternative will be to assume that CP is not made visible in a case like (18), and that the relevant structure is the one given in (19):



As in the V2 case (14), the single visible subject can be analyzed as consisting of two chains, one A-chain and one A-bar chain, the difference being that both chains involve the T-domain in (19), but are divided between the C- and the T-domain in (14). The analysis in (19) is in-

⁹ See Craenenbroeck & Haegeman (2007) for further arguments against Zwart's proposal.

spired by Cardinaletti (2004), who has claimed that there are at least two positions within TP for preverbal subjects, one in what she calls SpecSubjP, hosting DPs, strong pronouns and weak pronouns, and another one in SpecAgrSP, hosting weak pronouns and *pro*. See (20), corresponding to (17) in Cardinaletti (2004:121):



The subject in the first position, the strong subject position, is identified by Cardinaletti (2004) as the Subject of predication, whereas the subject in the weak subject position is said to check φ -features and Case. As in (14), only the first position is visible. An argument for assuming two positions given by Cardinaletti (2004) is the fact that only the strong subject can precede parentheticals, as shown in (21):

- (21) a. John/He (as you know) is a nice guy.
 - b. It (*as you know) rained the whole day.

This argument cannot be used to show that there are two subject positions in the T-domain in a V2-language. In such a language, a subject to the right of the tensed verb is in the T-domain. In this position, both a strong and a weak subject may precede a parentheticals, as shown by the Swedish examples in (22):

- (22) a. Nu är Johan som du vet en trevlig kille. now is Johan as you know a nice guy Now Johan is, as you know, a nice guy.
 - b. Nu regnade det som du vet hela dagen. now rained it as you know whole day.DEF Now it rained, as you know, the whole day.¹⁰

I take these examples to indicate that Swedish (and presumably other V2 languages as well, with Dutch as a possible exception (see footnote 1), only has one subject position in TP.¹¹

If the account of English subject-first declaratives in (19) is correct, we would expect backward binding also from inverted position in such cases in English where C is visible, as in yes/no-questions. As shown in (23), this is also what we get, according to my English informants:

- (23) a. [?]Did each other's health worry the students?
 - b. Might these pictures of himself be difficult to tell Bill about?

b. ??Det som du vet regnade hela dagen. it as you knowrained whole day.DEF

(i) Waarom verontrustte [elkaars gezondheid] de taalkundigen zo erg? Why woried each other's health the linguists so much

¹⁰ An asymmetry between a strong and a weak subject is found in the position preceding C, as illustrated in (ia,b):

⁽i) a. Johan, som du vet, är en trevlig kille.

Johan as you know is a nice guy

Johan as you know, is a nice guy.

¹¹ Note that Dutch, according to Norbert Corver (p.c.), also accepts backward binding from inverted position:

Returning to backward binding, we want to know why backward binding is possible in (19) but not in (14). As claimed above, connectivity seems to be possible with A-bar chains but not with A-chains. The important difference between (14) and (19) is that both instances of the subject DP are found in the T/Infl-domain in (19), but not in (14), and that both instances of this DP host an anaphor. We will claim that a kind of *haplology* takes place in such a situation, enabling connectivity and thereby backward binding, i.e. the connectivity effect connected to the A-bar chain spills over to the A-chain exactly in the case where both the head and the tail of an A-chain and an identical A-bar chain are in the same domain, in this case the T/Infl-domain (see (20)). This is not possible in a V2-language, where the A-bar chain and the A-chain target different projections (C and T, respectively). Hence, English, Italian and other languages where both the strong and the weak subject position are in the same functional domain, will allow backward binding.

4. Summary and Conclusion

The Germanic V2 languages differ from English and Italian in not allowing backward binding. In this paper I have tried to account for this cross-linguistic variation in terms of a recent proposal by Chomsky (2008) that A-chains and A-bar chains should be held strictly apart, and that A-movement and A-bar movement sometimes may take place in parallel. With respect to backward binding, I have claimed that this is a connectivity effect, only possible when we have an A-bar chain. Observing with Cardinaletti (2004) that there are at least two subject positions in front of the verb (disregarding V2), the relevant difference between V2-languages and English and Italian seems to be that these positions are divided between Spec-CP and Spec-TP in V2 languages, but not in English/Italian, where both subject positions are in the T/Infl-domain, enabling a kind of syntactic haplology. Thus, English and Italian, but not the Germanic V2-languages, allow backward binding. If this is on the right track, the absence of backward binding in V2-languages indicates that concepts like CP and TP/InflP are still useful even in a cartographic approach.

¹² As Ángel Gallego (p.c.) has pointed out to me, the my account of backward binding is similar in nature to attempts in the 1980's and 90's to capture Binding differences between Romance and Germanic languages by assuming that T/Infl has A-bar properties in the former. See e.g. Rizzi (1982) and Uribe-Etxebarria (1992).

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