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0. Summary*

Movement to the right is very different from movement to the left. Whereas Wh-movement (extraction) of NP internal PPs is severely constrained, these PPs can be extraposed quite freely, at least in Dutch. In this article, I will motivate a distinction between complement and adjunct PPs. It appears, then, that only adjunct PPs can be freely extraposed from NP. As for complement PPs, there does not seem to be a great difference between extraction and extraposition. I suggest that in all wh-constructions traces must be represented in order to avoid vacuous quantification, which leads to an ECP violation in the majority of cases. In extraposition constructions nothing forces the representation of traces in the case of adjunct PPs. In the case of complement PPs, traces must be present inside the NP because of the Theta Criterion or the Projection Principle, yielding the same ECP effects as in extraction from extraposition the issue is not to define the former as movement and the latter as base generation, as the distinction.

1. The facts

As is well known, PP extraction out of NPs in English is ungrammatical, except for PPs that can also appear in the position of Specifier of NP (Rizzi 1989):

- (1) a. *from which city did you meet [the man t]
- b. *the city's man
- (2) a. of which city did you witness [the destruction <u>t</u>]b. the city's destruction

The same phenomenon appears in Dutch:

(3)	a.	*uit welke stad heb jij [die man \underline{t}] ontmoet from which city did you that man meet						
	b.	*die stad-z'n man						
		that city-'s man						
(4)		van welke stad heb jij [de verwoesting <u>t</u>] meegemaakt						
		of which city did you the destruction witness						
	b.	die stad-z'n verwoesting						
		that city-'s destruction						

However, at least in Dutch, no such restriction holds for PP extraposition out of NP.

(5)	a.	dat	ik	(toen)	die	man	ontmoet	heb	uit	Barcelona
		that	I	then	that	man	met	have	from	Barcelona
	b.	dat	ik	de ve	verwoes		heb meeg	gemaał	t var	n Alexandrië
		that	I	the dea	struct	tion	have wit	tnesse	ed of	Alexandria

The English facts are less clear, but they seem to pattern along (see Guéron 1980 for discussion):

(6) a. I finally met that man last year from Barcelona, you know, the man I had been dying to see for so longb. I witnessed the destruction last year of Alexandria

(5a), compared with (3a), suggests that PP extraposition from NP is not as limited as PP extraction from NP. The following facts, all from Dutch, support this conclusion.

Adjunct PPs can never be extracted from NP, but they can be extraposed:

(7) dat Jan [die belofte van vorig jaar over dat roken]

that Jan that promise of last year about this to-smoke geschonden heeft broken has

- 'that Jan has broken last year's promise about smoking' a. *Van wanneer heeft Jan [die belofte <u>t</u> over dat roken] a. geschonden?
 - *Waarover heeft Jan [die belofte van vorig jaar t] b. geschonden

'Of when/about what has Jan that promise about smoking/of last year broken'

- (9) dat Jan [die belofte over dat roken] geschonden heeft a. van vorig jaar
 - b. dat Jan [die belofte van vorig jaar] geschonden heeft over dat roken

'that Jan that promise of last year/about smoking broken has about smoking/of last year'

More deeply embedded PPs cannot be extracted, but they can be extraposed: 1

- dat het [een weerlegging [van de kritiek op de NP-constraint]] bevatte (10) a. 'that it contained a disproof of the criticism of the NP
 - constraint' b. *Waarop bevatte het een weerlegging van de kritiek t 'Of what did it contain a disproof of the criticism'
 - dat het een weerlegging van de kritiek bevatte op de NPс. constraint 'that it a disproof of the criticism contained of the NP

PP extraction shows SSC effects, whereas PP extraposition does not:²

- dat jij [Chomsky's boek over taalkunde] gekocht hebt (11) a. 'that you have bought Ch.'s book on linguistics' *Waarover heb jij [Chomsky's boek <u>t</u>] gekocht b. 'On what have you bought Ch.'s book'
 - dat jij [Chomsky's boek] gekocht hebt over taalkunde с. 'that you Ch.'s book have bought on linguistics'

Finally, PP extraction seems sensitive to the character of the verb (Bach & Horn 1976), whereas PP extraposition shows no such effect:³

- Hij heeft [een boek over taalkunde] gepubliceerd/verbrand (12)'He has published/burned a book on linguistics'
- (13)Waarover heeft hij [een boek t] gepubliceerd/*verbrand
- 'On what has he published/burned a book' (14) Hij heeft een boek gepubliceerd/verbrand over taalkunde 'He has a book published/burned on linguistics'

Summarizing, whereas PP extraction from NP is severely constrained in Dutch, PP extraposition seems to enjoy great freedom in that language.

2. Extraposition is a syntactic phenomenon.

Constraint'

(8)

In view of the differences between extraction and extraposition it has been proposed that the latter is a stylistic rule, operating in the PF component of the grammar (a.o. Koster 1978, Rochemont 1982, Chomsky 1986). This would immediately explain why extraposition is not constrained by the locality principles syntactic operations like extraction are subject to.

However, if extraposition were a stylistic rule, it could not affect coreference possibilities. Guéron (1980) shows that it does:

- A picture of Mary_i was sent to her_i (15) a.
 - *A picture was sent to her, of Mary, b.

Chomsky (1986) replies that anaphor binding is not affected bv extraposition:

(16) a. $They_i$ desired that pictures of each other_i be painted b. They, desired that pictures be painted of each other,

But (16) doesn't prove anything, since it can be demonstrated that the binding domain for $\underline{each \ other}$ is the matrix IP in both (16a) and (16b). The

alternative would have to involve a PRO subject in the NP <u>pictures of each</u> <u>other</u>, to be controlled by <u>they</u>. But then the reading would have to be that the referent of <u>they</u> is the maker of the pictures, which is not necessarily the case in either sentence in (16). Neither can the embedded IP provide an antecedent for <u>each other</u>. An obvious candidate would be the implicit agent of the passive verb, but this agent need not corefer with <u>each other</u>, and, besides, the verb need not be passive:

- (17) a. They, desired that pictures of each other, be painted by ${\tt Miro}_i$
 - b. They, desired that pictures of each other, would be on sale.

Therefore, the subject NP <u>pictures of each other</u> cannot be the binding domain for <u>each other</u>, and neither can the embedded IP. Hence the domain must be larger, viz. the matrix IP.⁵ Extraposition in the embedded clause could never affect this, as it is a clause bounded phenomenon (see note 4). Hence (16) cannot be employed in order to show that extraposition has no effect on LF phenomena such as binding.

In view of (15), therefore, we must conclude that extraposition is a syntactic phenomenon. This again raises the question of why extraction and extraposition differ so much.

3. Why is extraction out of NP so difficult?

The inextractability of PPs out of NP is slightly problematic in the Barriers framework as laid down in Chomsky (1986). Chomsky assumes a version of the Empty Category Principle (ECP) requiring traces to be either antecedent governed or theta-governed. In a simple case like (1a), repeated here as (18), the trace of the extracted PP is presumably not theta governed.

(18) from which city did $[_{TP}$ you $[_{VP} \underline{t} [_{VP} meet [_{NP} the man \underline{t}]]]$

Nothing prevents antecedent government, however. NP is not a barrier because it is L-marked by meet, VP is not a barrier because it can be adjoined to, and this adjunction to VP makes IP transparent as well. Hence movement of from which city crosses no barriers, and the NP internal trace in (18) is antecedent governed by the intermediate trace in VP. (18) should be perfectly grammatical.⁶

In more recent work (Aoun, Hornstein, Lightfoot, & Sportiche 1987, Rizzi 1989), this conception of the ECP has slightly changed. In addition to the requirement that traces should be <u>antecedent governed or theta governed</u>, which is considered to be an LF requirement, a PF requirement has been formulated, according to which traces must be <u>canonically head governed</u>. This definition of the ECP pursues the idea that a trace should be licensed in two ways. Not only for reasons of identification, in relation to its antecedent, but also formally, in relation to the head of the maximal projection in which the trace is contained.

This two part ECP succeeds where the 'older' ECP fails. Especially, the additional head government requirement may account for the ungrammaticality of extraction out of L-marked, hence transparent, domains. If, for instance, NP is L-marked, the antecedent government requirement may be fulfilled, but this does not guarantee anything, unless the head government part is satisfied as well. The question therefore is: does N count as a head governor?

The fact that extraction out of NP is generally difficult seems to suggest that N is not a head governor, as Rizzi (1989) proposes (in his Appendix 2 to Chapter 3). I will adopt this proposal. It is supported by the observation that N is generally incapable of Case assignment. For reasons of space I must refer to Rizzi (1989) for further arguments. Rizzi furthermore accounts for the observation that PP extraction from NP is grammatical if the extracted phrase can obtain the specifier position in NP by positing that N may be turned into a head governor if the PP moves through the specifier position of NP. Assume that only those PPs can move through this specifier position that can show up in that position as a 'genitive' NP (see (1b)-(2b)). The moment such a PP moves through the specifier position of NP, N is activated by Spec Head Agreement, and turns

into a head governor. This would explain the difference between (1a) and (2a). 7

If this is correct, there are only two ways to get out of an NP. A PP may get out of an NP if it may show up as a prenominal genitive NP, and an NP may be extracted from NP if a language has preposition stranding. The latter possibility is very rare crosslinguistically, and lies beyond the scope of this article. As Rizzi (1989) suggests, P may exceptionally count as a head governor in English.⁸

Let us assume this analysis of PP extraction out of NP.

4. Why is extraposition out of NP so easy?

As we have seen in section 1, extraposition of PPs out of NP is not limited to those PPs that can appear in the position of specifier of NP (see (5) and (6)). This may lead to several conclusions, none of them very attractive. For instance, we might stipulate that N can be head governor if movement takes place to the right, or we might imagine that extraposition is subject to a less strict version of the ECP.

The former conclusion is very unattractive. I can think of no mechanism within the present framework that would make a head governer sensitive to the direction of movement of its governee. The latter conclusion is similarly unattractive, as it involves a relativized ECP. Suppose, for instance, that extraposition is subject to a less strict version of the ECP, say a disjunctive one, requiring either theta government or antecedent government. This does not seem to be the right train of thought. In the first place, it is unclear why two different versions of the ECP should be active simultaneously. Secondly, if extraposition leaves a trace to be licensed by antecedent government only, it is unclear why extraposition is strictly clause bounded (Ross's (1967) Right Roof Constraint, see note 4). Thirdly, it is not correct either to say that theta government suffices. In fact, there seems to be a kind of complement adjunct asymmetry in extraposition to the extent that complement PPs are harder to 'extraposit-. The relevant facts seem to shed some light on the phenomenon of extraposit-ion, so I will present them in greater detail in the next section.

4.1 A complement adjunct asymmetry in extraposition.

There are few sound tests for distinguishing complements from adjuncts in NPs. Nevertheless, there is an intuitive difference between the two PPs in (19), to the extent that <u>aan Marie</u> is a complement and <u>over dat roken</u> an adjunct.

(19) dat ik [die belofte [aan Marie][over dat roken] geschonden heb 'that I this promise to Mary about this to-smoke broken have'

Extraposition of these PPs yields a grammatical sentence in the 'adjunct' case, but a marked, and to most ungrammatical, sentence in the 'complement' case:

(20) a. dat ik die belofte aan Marie geschonden heb [over dat roken]
 b. *dat ik die belofte over dat roken geschonden heb [aan Marie]

Two questions arise. Firstly, we must make sure whether or not the difference in (20) is to be ascribed to a complement adjunct asymmetry. Secondly, we must reconsider the similarities an differences between extraposition and extraction, if we do find such an asymmetry.

According to Koster (1987), the Dutch reflexive <u>zich</u> behaves differently in adjunct PPs than in complement PPs (see also Reinhart & Reuland 1989). In complement PPs, <u>zich</u> cannot be bound by the subject of its own clause, but it can be bound by a subject one clause higher up:

(21) dat $\rm Jan_i$ [$\rm Piet_j$ [dat schot [op $\rm zich_{i/*j}$]] herhalen] liet 'that Jan Piet that shot at REFL repeat let'

However, in adjunct PPs zich can be bound by both subjects:

(22) dat Jan_i [Piet_i [die slang [naast zich_{i/i}]] knuffelen] liet

'that Jan Piet that snake next to REFL hug let'

If we apply this test to the PPs in (19), we seem to find that $\underline{aan Marie}$ is a complement and $\underline{over dat roken}$ an adjunct.

(23) a. dat Jan_i [$Piet_j$ [die belofte aan $zich_{i/*j}$] schenden] liet b. dat Jan_i [$Piet_j$ [die belofte over $zich_{i/j}$] schenden] liet

As was shown in (20), the <u>aan-PP</u> in sentences like (23a) allows extraposition, whereas the <u>over-PP</u> in sentences like (23b) does not. Further examples show a similar correlation between complement status of the PP and difficulties with its extraposition.

- (24) ?*dat Jan dat schot herhaald heeft [op Marie]
- 'that Jan that shot repeated has at Mary'
- (25) dat Jan die slang geknuffeld heeft [naast Piet] 'that Jan that snake hugged has next to Piet'

<u>Op Marie</u> in (24) is a complement PP according to the test in (21), and is not easily extraposed. On the other hand, <u>naast Piet</u>, which is an adjunct PP according to the test in (22), can be extraposed freely.⁹

Judgements for sentences like (21) through (23) are hard to obtain. But it seems clear that theta governed PPs (i.e. complements) are not more easy to extrapose than non theta governed PPs (i.e. adjuncts). Hence the difference between extraction and extraposition cannot be that the former requires satisfaction of both clauses of the ECP while the latter requires satisfaction of only one of the clauses of the ECP, viz. theta government. Moreover, it appears that extraposition of complement PPs is ungrammatical, just like extraction of complement PPs. The difference between extraction and extraposition therefore reduces to the case of adjunct PPs.

4.2 Base Generation versus Movement?

It has been attempted to explain the difference between extraposition and extraction by making a distinction between base generation and movement, the former characterizing extraposition, and differing from the latter in that it does not involve traces. But this distinction is greatly misleading. In a representational framework, which I assume without discussion (there does not seem to be much of an issue here), a distinction between base generation and movement does not make sense. In a representational approach, anything, lexical as well as empty categories, can be generated anywhere, as long as the resulting structure does not violate general grammatical principles. In a derivational approach, base generation of adjunct PPs, for instance, can be recoined as movement with subsequent deletion of traces, as nothing forces these traces to be present (Hoekstra 1987).

Considerations of economy of representation dictate that traces are only present if they are required by some general principle of the grammar. The ban on vacuous quantification seems to be such a principle. It requires traces to be generated whenever wh-phrases are generated (except for whphrases <u>in situ</u>). Wh-phrases are operators, that must bind variables in order to avoid vacuous quantification (Chomsky 1982). Thus, in a representational framework, traces must be generated in wh-constructions. On the other hand, extraposed phrases do not have the properties of operators, hence no traces need to be present if they are base generated in postverbal position (see Baltin (1987) for a different version of the same idea). This sufficiently distinguishes extraction from extraposition.

Another principle that may require the generation of traces is the Theta Criterion. I assume that this principle plays a major role in extraposition constructions.

It is a minimal assumption that nouns, like verbs, assign theta roles. We may also follow Emonds (1985), who states that nouns can assign theta roles only indirectly, via a preposition. It follows that certain prepositions will have the function of transmitting theta roles. It seems that exactly these PPs cannot be extraposed. Other prepositions do not have this function of transmitting theta roles. Hence they head adjunct PPs, which can be easily extraposed.

Adjunct PPs can in principle be generated in postverbal position, as they

are not dependent on the noun for theta role assignment to the PP internal NP. If they are interpreted as 'belonging to' that noun, this should probably count as a performance ability of language users. On the other hand, complement PPs are dependent on the noun for reasons of theta role assignment to the NP they contain.

In a representational approach, nothing prevents base generation of complement PPs in postverbal position either. But in view of the Theta Criterion this does not yield a grammatical sentence unless a trace is generated inside the NP and some relation is established between this trace and the postverbal PP, such that a theta role can be passed on (much in the same way as happens in extraction constructions).

Nothing prevents generating a trace in the NP. However, this trace, just like any other empty category, must satisfy the requirements of the ECP. Thus, it will have to be head governed. As we have seen in section 3, N is not a head governor. This statement is independently needed to account for the general impossibility of PP extraction out of NP. If N is not a head governor, the formal licensing part of the ECP can never be fulfilled for a trace generated inside NP.

In a derivational approach, the same result can be obtained by virtue of the Projection Principle. This principle requires traces of complement PPs to be present after movement has applied, whereas traces of adjunct PPs can be freely deleted, as long as this does not yield vacuous quantification.

Note that in this way the impossibility of complement PP extraposition from NP receives the same explanation as the impossibility of PP extraction from NP. If this is correct, we predict that those NP internal PPs that can be extracted can also be extraposed. This prediction is carried out:

(26) a. van welke stad heb jij [de verwoesting t] meegemaakt of which city did you the destruction witness
b. dat ik [de verwoesting t] heb meegemaakt van that I the destruction have witnessed of Alexandrië Alexandria

Note that <u>van</u> in (26) is typically a preposition which has the function of passing on a theta role the noun is unable to assign directly (Emonds 1985). Therefore it is not likely that <u>van Alexandrië</u> is generated postverbally without a trace being generated inside the NP <u>de verwoesting</u> at the same time.

It seems that in view of (26b) traces are needed in certain cases of extraposition as well. This lends clear support to an approach that does not distinguish between base generation and movement in this area. The difference between extraction and extraposition therefore is that in the former case traces are always generated, whereas in the latter case traces are only generated if complement PPs are base generated in postverbal position. This leads to ungrammaticality in exactly those cases where PP extraction leads to ungrammaticality, which must be due to the ECP.

Now the answer to the question heading this section 4 is straightforward. Extraposition is only easy as far as adjunct PPs are concerned. It is easy because in that case no trace needs to be present. In all other cases it is difficult, for the same reasons that make extraction difficult.¹⁰

4.3 Some further remarks.

Consider the following sentences:

- (27) a. dat jij een boek over Chomsky hebt gepubliceerd 'that you a book about Chomsky have published'
 - b. Over wie heb jij een boek <u>t</u> gepubliceerd? 'about whom...'
 - c. dat jij een boek hebt gepubliceerd over Chomsky 'that you a book have published about Chomsky'

In (27) extraction as well as extraposition of the PP <u>over Chomsky</u> yields a grammatical result. This is a problem, regardless the status of this PP. I assume, with Bach & Horn (1976) and Klein & Van den Toorn (1978), that in these cases the PP is not part of the NP <u>een boek</u>, but is a VP constituent.

This analysis is generally accepted for (28).

(28) Over wie heb jij een boek geschreven? 'about whom have you a book written'

V being a head governor, no difference between extraction and extraposition is expected. But if <u>over Chomsky</u> in (27) is a VP constituent, we do predict a certain sensitivity to the character of the verb. Thus, if no relation between the verb and the PP can be imagined, the PP will be interpreted as NP internal. Hence we expect the difference between extraction and extraposition to emerge again. This is what happens in (12)-(14), I claim.

Presumably, the same analysis applies to the sentences in (29).

- (29) a. dat Jan dat schot op Marie loste
 - 'that Jan that shot at Marie fired'
 - b. dat Jan die belofte aan Marie heeft gedaan 'that Jan that promise to Marie has made'

In these sentences, the PPs can be both extracted and extraposed:

- (30) a. op wie loste Jan dat schot?
 - b. aan wie heeft Jan die belofte gedaan?
- (31) a. dat Jan dat schot loste op Marie
 - b. dat Jan die belofte heeft gedaan aan Marie

These sentences therefore present no reason to modify the conclusions reached in section 4.2.

A second problem that must be adressed is that of why PPs that are base generated in postverbal position cannot be wh-moved from that position. This again must be ascribed to the ECP. I have not adressed the issue of the exact position of extraposed PPs. This is mainly due to the circumstance that in Dutch it is very difficult to distinguish the domain of V (VP) from the domain of I (IP) (Reuland 1990). However, the matter is not relevant here. If we assume that extraposed PPs are adjuncts to VP or IP (that is, sisters of VP or IP), a trace generated in these positions would not be head governed. This follows straightforwardly from the definition of head government under m-command, which we have assumed throughout. A sister to XP never shares all maximal projections with X^0 , hence cannot be head governed by X^0 . Thus we do not lose the explanation for the impossibility of adjunct PP extraction from NP if we assume that these PPs may be base generated in position.

5. Conclusion.

To conclude, extraction and extraposition differ in that in extraction cases it is the ban on vacuous quantification that requires the presence of traces, whereas in extraposition cases traces are only present in as far as required by the Theta Criterion (or the Projection Principle). As a result, there is no complement adjunct asymmetry in PP extraction from NP (if we ignore the special <u>van</u> cases), while PP extraposition from NP does show a complement adjunct asymmetry. We may also conclude that the ECP holds in full for both extraction and extraposition.

Notes

- * I would like to thank Peter Coopmans for his illuminating Barriers and Beyond course in Amsterdam, October 1989, as well as Norbert Corver, Eric Hoekstra, and Eric Reuland for comments. All errors are mine. This research is part of the VF research program 'Taaltheorie en Kennisrepresentatie' at the University of Groningen (LETT 8).
- 1. Extraposition of more deeply embedded PPs may yield a mild ungrammaticality, but there is a clear difference with extraction of such PPs. In English, there seems to be a subjacency violation in these cases (see Baltin 1983 and later work).
- 2. Again, this does not hold for English, as <u>I read Chomsky's book</u> <u>yesterday on linguistics</u> is judged ungrammatical.
- 3. Again, English seems to differ from Dutch in this respect. The

differences noted between Dutch and English should be telling, but lie beyond the scope of this article.

- 4. Not anything goes, however, as PP extraposition in Dutch does observe Ross's (1967) Right Roof Constraint: *<u>dat er een man zou binnenkomen zou</u> <u>me verbazen met groene ogen</u> 'for a man to appear would surprise me with green eyes'.
- 5. See also Coopmans & Roovers (1986), who reach the same conclusion along a different line of reasoning. Note that <u>picture</u>-NPs provide standard contexts for logophoricity (Reinhart & Reuland 1989). It is probably correct to consider <u>each other</u> as a logophor in sentences like (16) in the text. However, the matter is hard to decide, since the most reliable test for logophoricity (i.e. non-complementarity with pronominals) cannot be executed in the absence of pronominals providing the same pair readings as <u>each other</u>. If <u>each other</u> in (16) is a logophor, again no binding effects are expected from extraposition.
- 6. I ignore later revisions of the Barrier algorithm, which have the effect of turning N' into a barrier, and, consequently, L-marked NPs as well, by inheritance (Chomsky's class lectures 1987).
- 7. In this account, government is defined under m-command rather than ccommand. For this reason, the difference between (1a) and (2a) in the text cannot be the result of the head N governing complements only, not adjuncts.
- 8. It is an interesting and unexplained fact, that preposition stranding is impossible in case of extraposition.
- 9. This sentence is ambiguous. For our purpose, the reading in which the hugging takes place next to Piet is irrelevant.
- 10. One might wonder why cases of complement PP extraposition do not 'feel' like ECP violations. Probably, this is due to the fact that it is always possible not to represent a trace inside the NP. In that case, the extraposed PP is dangling somewhere to the right of the verb. The NP it contains must receive a theta role, either from a preposition which ordinarily has the function of transmitting a theta role, or by an infelicitous combination of the preposition and the verb. Both mechanisms may yield the relatively mild ungrammaticality of (20b) in the text.

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