

How Strict is the Cycle?*

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Chomsky (1995) proposes two ways of capturing cyclicity effects, which we will refer to as the Extension Condition and the strength conception of the cycle.¹ Chomsky (1995:248, 254) requires that both Merge and Move take place at the root only (the Extension Condition).² This conception of the basic syntactic operations of Merge and Move rules out all acyclic movement, lexical insertion, and assembling of separately built trees. In addition, Chomsky (1995: 233-234) proposes to derive at least some cyclicity effects through the definition of ‘strength’, the notion developed to force overt movement. He defines strong features as elements that are not tolerated by the derivation and therefore must be eliminated from the tree (almost) immediately upon insertion into the structure. More precisely, he defines strength in the following way:

(1) Suppose that the derivation D has formed Σ containing α with a strong feature F. Then, D is canceled if α is in a category not headed by α .

This conception of strength disallows acyclic checking of heads with strong features.

The Extension Condition and strength clearly overlap in their effects. For example, if in order to void relativized minimality effects with super-raising and wh-islands we acyclically insert the intervening specifiers in (2) (*whether* and *it*), we violate both the Extension Condition and (1).

(2) a. ??Who_i do you wonder whether John likes t_i?

b. *John_i seems it was told t_i that Peter likes Mary.

This redundancy is clearly conceptually problematic. Eliminating it would therefore be a desirable move. The Extension Condition (at least its application to Move) is problematic in several respects. In particular, LF movement and head-adjunction appear to freely violate the Extension Condition, which has led to exemption of these operations from the Extension Condition (see Chomsky 1993), a problematic move conceptually. Given the problematic nature of the Extension Condition, we suggest eliminating the redundancy between the Extension Condition and strength with respect to cyclicity effects by dispensing with the Extension Condition. Head-adjunction and LF movement are this way brought in line with the cycle. For example, no additional stipulations are now needed to accommodate overt V-to-I in French, which we assume is driven by strong feature checking. Also, since LF movement is, by definition, not driven by strong feature checking it is automatically

consistent with the strength conception of the cycle.³

An interesting property of this conception of the cycle is that it does not in principle ban elements that do not have any strong features from entering the structure acyclically. In this squib we will explore some empirical consequences of this effect of the strength approach to the cycle, suggesting that the effect may be empirically desirable.⁴

1. French wh-in-situ

We will start by examining the distribution of wh-in-situ in French. Consider the paradigm in (3-5).⁵

- (3) a. Tu as vu qui?
you have seen whom
'Who did you see?'
- b. Qui as-tu vu?
- (4) a. Pierre a demandé qui tu as vu.
Pierre has asked whom you have seen
- b. *Pierre a demandé tu as vu qui.
- (5) a. Qui que tu as vu?
whom C you have seen
'Who did you see?'
- b. *Que tu as vu qui?

Bošković (in press c) shows that the distribution of wh-in-situ in French can be accounted for rather straightforwardly under the minimalist view of lexical insertion, i.e., the operation Merge.

Merge, which includes lexical insertion, generally takes place in overt syntax. Chomsky (1995) observes that this follows without stipulation. Thus, if an NP such as *John* is inserted in LF the derivation crashes because LF cannot interpret the phonological features of *John*. If, on the other hand, *John* is inserted in PF, PF will not know how to interpret the semantic features of *John*. The only way to derive a legitimate PF and a legitimate LF is for *John* to be inserted before the "SS" is reached. PF will then strip off the phonological features of *John*, and the semantic features of *John* will proceed into LF. This line of reasoning allows lexical insertion to take place in PF and LF under certain conditions. To be more precise, it allows PF insertion of semantically null elements and LF insertion of phonologically null elements. Focusing on the second possibility, notice that phonologically null elements could in principle enter the structure in LF even if they bear a strong

feature under Chomsky's (1995) definition of strength.

Bošković (in press c) argues that this is exactly what happens in the French constructions under consideration. In particular, Bošković argues that C with a strong +wh-feature is inserted in the LF of (3a). Wh-movement then does not take place in (3a) overtly for a trivial reason: its trigger is not present overtly. The LF insertion of the strong +wh C triggers LF wh-movement, which checks the strong +wh-feature of C.⁶ In (4b) the LF insertion of the strong +wh C derivation, whose availability is a prerequisite for wh-in-situ in French under Bošković's (in press c) analysis, fails because it results in a violation of (1), and in (5b) because the complementizer is not phonologically null (i.e., the very fact that the complementizer is pronounced indicates that it has been inserted overtly, which should trigger overt wh-movement).⁷

Consider now the following data from Bošković (in press c):

- (6) a. *Jean et Pierre croient que Marie a vu qui?
Jean and Pierre believe that Marie has seen whom
'Whom do Jean and Pierre believe that Marie saw?'
- b. Qui Jean et Pierre croient-ils que Marie a vu?
- (7) a. ?*Jean ne mange pas quoi?
Jean neg eats neg what
'What doesn't John eat?'
- b. Que ne mange-t-il pas?

Notice first that under the LF C-insertion analysis of French wh-in-situ, French wh-in-situ constructions must involve LF wh-movement. Unselective binding is not an option in such constructions because it would leave the strong +wh feature of C, inserted in LF, unchecked (see fn 6). Given this, the contrasts in (6-7) appear to indicate that LF wh-movement is more local than overt wh-movement, which is the conclusion drawn in Bošković (in press a). That LF wh-movement is responsible for the ungrammaticality of (6a) and (7a) is confirmed by (8a-b).⁸

- (8) a. Qui croit que Marie a vu qui?
who believes that Marie has seen whom
- b. Qui ne mange pas quoi?
who neg eats neg what

Bošković (in press c) observes that (8a-b) are acceptable on the true question, pair-list reading. They

crucially differ from (6a) and (7a), which are degraded on the true question, non-echo reading, in that they contain another wh-phrase that is located overtly in the interrogative SpecCP. This wh-phrase can check the strong +wh-feature of C, so that there is no need for the wh-phrase in situ to move in LF. The wh-phrase in situ can then be unselectively bound. In (6a) and (7a), on the other hand, the wh-phrase in situ is the only element that can check the strong +wh-feature of C and is, therefore, forced to undergo LF wh-movement. Unselective binding by C is not an option in these constructions, since it would leave the strong +wh-feature of C unchecked. (The wh-phrase would never enter the checking domain of C.) The contrasts under consideration indicate that (at least in French) movement to SpecCP is driven by an "inadequacy" of the interrogative C, as suggested by Chomsky (1995). When this inadequacy is taken care of, as in (8a-b), the wh-phrase in situ does not have to move in LF. When the inadequacy of C is not taken care of, as in (6a) and (7a), the wh-phrase must move in LF. Given that the wh-phrase in situ needs to undergo LF wh-movement in (6a) and (7a) but not in (8a-b) it seems plausible to attribute the ungrammaticality of (6a) and (7a) to locality restrictions on movement. (6a) and (7a), which contrast with (3a), seem to indicate that, in contrast to V and INFL, C and negation have a blocking effect on LF wh-movement. Bošković (in press a,c) appeals to Move F to account for this blocking effect.

Chomsky (1995) observes that a natural consequence of the standard minimalist assumption that movement is driven by feature checking is that, all else being equal, the operation Move should apply to features and not to syntactic categories. Overt movement, which feeds PF, still has to apply to whole categories, given the natural assumption that lexical items with scattered features cannot be interpreted/pronounced at PF. Since considerations of PF interpretability are not relevant to LF, in LF the operation Move should apply only to features. Chomsky instantiates this feature movement as adjunction to X^0 -elements. He argues that in LF, formal features move to heads bearing matching features. Under a natural interpretation of this analysis, all LF movement necessarily involves head movement. Given this, LF wh-movement involves movement to C, and not to SpecCP. Adopting Rivero's (1991) and Roberts's (1992) proposal that relativized minimality applies to head as well as phrasal movement, LF wh-movement is movement to an A'-head position. It is then no surprise that it is blocked by intervening A' heads such as C and Neg, but not by intervening A-heads, such as V and INFL (see Bošković (in press a) for technical details of the analysis). Bošković's (in press a,c) analysis thus accounts for the contrast between (3a) and (6a, 7a). However, the analysis is

inconsistent with Chomsky's (1995, MIT lectures 1995) conceptually appealing proposal to reduce all checking configurations to the FF-head relation. Chomsky proposes that *every* time movement motivated by feature checking takes place, checking formal features adjoin to the head that induces the movement. This holds for both overt and covert syntax. Chomsky proposes that, in addition to the feature checking chain, in overt syntax a derivative category chain is formed, whose purpose is to ensure PF convergence; more precisely, to ensure that we do not end up with scattered lexical items in PF. In this system, formal features and categories form separate chains, formal features chains, which are constructed to satisfy the requirements of Attract F, being created in both covert and overt syntax, and category chains, which are constructed to ensure PF convergence, being created only in overt syntax (see Ochi in press and Agbayani in press for interesting empirical evidence for this approach). Since feature movement takes place in both covert and overt syntax, we can then reduce all checking configurations to a single configuration FF-head, an appealing move conceptually.

At first sight it appears that in this system we would not expect to find instances of LF movement that are more local than the corresponding overt movements, since both LF and overt movement involve Move F.⁹ The French facts discussed above thus appear to pose a challenge for the two movement hypothesis of Chomsky (1995).¹⁰ The strength approach to the cycle, which allows acyclic insertion of weak heads, eliminates the challenge. Under this analysis, LF and overt movement in French long-distance and negative questions take place in different structural environments. Whereas complementizer *que* and the negation must be present in the structure when LF movement takes place, they can be absent from the structure when overt movement takes place. Consider first (6). Since complementizer *que* plausibly does not have any strong features, nothing prevents it from entering the structure acyclically. In particular, nothing prevents it from entering the structure after overt wh-movement takes place.¹¹

(9) 1. Qui_i Jean et Pierre croient-ils Marie a vu t_i?

2. Qui_i Jean et Pierre croient-ils que Marie a vu t_i?

Although *que* can enter the structure acyclically, being phonologically realized it clearly must have entered the structure in (6) before LF. We then have a very simple explanation why *que* induces a blocking effect for LF, but not for overt wh-movement. *Que* must be present in the structure when LF wh-movement takes place, but not when overt wh-movement takes place. As a result, even if

both overt and covert syntax involve Move F, as argued by Chomsky, and even if complementizer *que* indeed has a blocking effect on wh-feature movement, as argued by Bošković (in press a,c), we can still account for the contrast between (6a) and (6b).¹²

The analysis of the contrast in (6) can be readily extended to (7) if French negation does not have any strong features, which would enable it to enter the structure acyclically. Since French negation is phonologically realized we know that it has entered the structure before spell-out in (7). It then must be present in the structure when LF movement takes place, but not necessarily when overt movement takes place, giving rise to the now familiar asymmetry.¹³

We conclude, therefore, that the strength approach to the cycle enables us to account for Bošković's (in press a,c) data concerning French wh-in-situ while still maintaining Chomsky's two movement hypothesis, which reduces all checking configurations to the FF-head relation.

Having shown how the proposal to capture cyclicity effects through (1) deals with French wh-in-situ constructions, in the next section we discuss some further consequence of this proposal. In particular, we show how the proposal enables us to account for some previously unexplained ECP/Subjacency asymmetries.

2. ECP/Subjacency asymmetries

Quite generally, traditional ECP violations with extraction of adjuncts go hand in hand with Subjacency violations with extraction of arguments. More precisely, quite generally, in the contexts in which extraction of adjuncts leads to an ECP violation, extraction of arguments leads to a Subjacency violation. This is illustrated in (10) with respect to several different types of islands.

- (10) a. ??What_i do you wonder [whether Peter bought t_i]?
b. *How_i do you wonder [whether Peter fixed the car t_i]?
c. ??Who_i did Mary leave for London [after Peter had visited t_i]?
d. *Why_i did Mary leave for London [after Peter had visited her t_i]?
e. ??What_i did you see [a tall man who fixed t_i]?
f. *How_i did you see [a tall man who fixed your car t_i]?

Continuing the research program that originated with Chomsky (1986), Chomsky and Lasnik (1993) develop a system in which traditional ECP violations with adjuncts and Subjacency violations with arguments reduce to the same economy condition, the only distinction between the two being that with argument Subjacency violations the offending trace is deleted in LF, whereas with adjunct ECP

violations it remains present in the final LF representation. In this system we would not expect to find a configuration in which extraction of adjuncts would lead to an ECP type violation, but extraction of arguments would not lead to a Subjacency type violation. It is well-known, however, that such configurations exist. For example, as discussed in Rizzi (1990), Pseudo-Opacity effects and Inner Island effects obtain with adjunct extraction, but not with argument extraction. We illustrate this in (11) with respect to Pseudo-Opacity:¹⁴

(11) a. [Combien de livres]_i a-t-il beaucoup consultés t_i?

‘How many of books did he a lot consult?’

b. *Combien_i a-t-il beaucoup consultés [t_i de livres]?

‘How many did he a lot consult of books?’

c. cf. Combien_i a-t-il consultés [t_i de livres]?

‘How many did he consult of books?’

The way of capturing cyclicity effects adopted above can explain this asymmetry between the ECP and Subjacency, which is unexpected in light of (10), provided that we adopt Lasnik and Saito’s (1984, 1992) proposal that adjunct traces are checked with respect to locality restrictions only in LF, whereas argument traces can be checked in overt syntax.¹⁵ Assuming that *beaucoup* does not have any strong features to check and is not required to be present in the structure to check strong features of another element, rather plausible assumptions, it could enter the structure acyclically in the current system. However, since *beaucoup* is phonologically realized we know that it must have entered the structure in overt syntax. Given Lasnik and Saito’s proposal, *beaucoup* then does not have to be present in the structure when argument chains are checked with respect to locality restrictions, but has to be present in the structure when adjunct traces are checked with respect to locality restrictions. The surprising asymmetry between ECP and Subjacency exhibited by Pseudo-Opacity is thus captured in a way that, as far as we can tell, does not have any undesirable consequences for (10).^{16,17}

3. Superiority

One potential problem for the view of the cycle adopted above is raised by superiority effects:

(12) ?*What_i did John persuade who to buy t_i?

A potentially problematic derivation involves wh-movement of *what* followed by acyclic insertion of *who*. At least under some approaches to Superiority (in particular, derivational approaches), including Chomsky’s (1973) original Superiority Condition and the economy account of superiority

(see Chomsky 1995, Bošković 1997, in press b, Cheng 1997, and Kitahara 1997, among others) we would not expect any superiority effects in (12) on this derivation.¹⁸ The potential problem, however, disappears if, as argued extensively in Bošković and Takahashi (1998) and Lasnik (1995c) (see also Hornstein 1998, in press), θ -roles are features and they are strong in English. This would prevent acyclic insertion of *who*, a θ -bearing element. Lasnik's (1995a,b,c) claim that Agr_o in English has a strong D feature would have the same effect, given that the relevant feature of the matrix Agr_o would have to be checked by *who*. Thus, either the strong features view of θ -roles or the obligatoriness of overt object shift in English would force *who* in (12) to enter the structure cyclically, since *who* would be involved in strong feature checking.¹⁹ The potential problem raised by constructions such as (12) is thus resolved.

Notes

*For helpful comments and thought-provoking questions, we thank two anonymous reviewers and the participants of a 1997 syntax seminar at the University of Connecticut.

1.Chomsky (1995:254) (see also Collins 1997) actually hints at an additional way of obtaining cyclicity effects based on Kayne's 1994 Linear Correspondence Axiom and Epstein's 1995 view of c-command.

2.The Extension Condition was originally proposed in Chomsky 1993. On the Extension Condition, see also Kitahara 1995.

3.There have been occasional arguments for a separate cycle in LF (see Bures 1993, Branigan and Collins 1993, Jonas and Bobaljik 1993, and Watanabe 1995). The existence of a separate LF cycle is inconsistent with minimalist approaches to cyclicity, which relate cyclicity to other independently motivated mechanisms (phrase structure building and strength) and therefore will not be assumed here. (Needless to say, this move requires reevaluation of arguments for an LF cycle, which to us do not seem overwhelming.) Ensuring the existence of a separate LF cycle would require postulation of the cycle as an independent principle along the lines of the definition of the cycle given in Chomsky (1973), which would be greatly redundant with the minimalist approaches discussed above. Furthermore, we will suggest below that under certain well-defined conditions syntactic operations can take place acyclically, which makes rigid definitions of the cycle such as that of Chomsky (1973), intended to rule out all acyclic operations, simply empirically inadequate.

4. Another recent work that appeals to acyclic lexical insertion in certain well-defined contexts is Hegarty (1994).

5. Note that overt C questions like (5a) are not acceptable in all dialects of French.

6. According to Chomsky (1995:382, n. 17), strength must be removed for convergence even if not embedded. We assume that this holds for both interface levels.

7. See fn. 6. Bošković (in press c) presents a slightly different analysis of (4b) and (5b). Notice that we cannot assume that the interrogative C in French is inserted overtly but that its +wh-feature can be either strong or weak. If we were to do that we would not be able to ever enforce the +wh-movement option, which would leave the ungrammaticality of (4b) and (5b) (see also (6-7) below) unaccounted for.

Two anonymous reviewers raise the question why the LF C-insertion derivation is not allowed in English. (The derivation would incorrectly yield *John bought what* as a well-formed true non-echo question.) Bošković (in press c) claims that the LF C-insertion derivation is blocked in English because English matrix interrogative complementizer is lexically specified as a phonological affix, which must be attached to a verbal element in PF. The presence of phonological information in the lexical entry prevents the complementizer from entering the structure in LF. (For an alternative analysis, see Chomsky 1995. Lasnik (in press b) and Bošković (in press c) show that the analysis is seriously flawed both empirically and conceptually and therefore cannot be maintained.) Evidence for the verbal affix status of the matrix interrogative complementizer in English is provided by the fact that the complementizer must always be adjacent to a verbal element in PF. (For discussion of embedded interrogative complementizer in English, which superficially appears not to be subject to the adjacency requirement, see Bošković in press c.) This is not the case in French, where the interrogative complementizer is not specified as a verbal affix. Thus, French (i) strongly contrasts with its English counterpart.

(i) Qui tu as vu?

whom you have seen

‘Who did you see?’

There are a number of other interesting questions that the LF C-insertion analysis raises (e.g., why are both wh-in-situ and overt wh-movement available in matrix null C questions in French) that we cannot go into here due to space limitations. They are discussed in detail in Bošković (in press c).

8. Notice that French differs from Iraqi Arabic, which never allows *wh*-phrases in situ within finite clauses (the counterparts of both (6a) and (8a) are bad in Iraqi Arabic; see Wahba 1991). As a result, Ouhalla's (1996) analysis of Iraqi Arabic that treats Iraqi Arabic *wh*-phrases as *wh*-anaphors, subject to Condition A (this is the reason why *wh*-phrases in Iraqi Arabic must *all* be close to their antecedent, +*wh* C), cannot be extended to French. Notice also that Ouhalla's analysis of Iraqi Arabic was prompted by a similarity in the morphological make-up of Iraqi Arabic *wh*-phrases and reflexive anaphors, which is not found in French.

9. The converse situation (overt movement being more local than covert movement) would not be unexpected since overt movement involves an additional operation, namely category pied-piping movement. For much relevant discussion on this point, see Ochi (in press).

10. Bošković's (in press a, c) in fact explicitly rejects the two movements hypothesis.

11. Interestingly, Chomsky (1973) and Lasnik and Uriagereka (1988) suggest that English complementizer *that* can be inserted acyclically.

12. A potential problem for this analysis is raised by certain facts concerning infinitival complementation in French. Bošković (in press a) shows that there is a dialectal split with respect to constructions such as (ia) (see also Boeckx in preparation).

(i) a. (*) *Avoir convaincu ses amis, Pierre le croit.*

‘To have convinced his friends, Pierre believes it.’

b. cf. *Pierre croit avoir convaincu ses amis.*

‘Pierre believes to have convinced his friends.’

Bošković (in press a) suggests that for the speakers who reject (ia) the infinitival complement is a CP, and for those who accept (ia), it is an IP. The ungrammaticality of (ia) for the first group of speakers would then reduce to the ungrammaticality of English (iia,c). (For accounts of these, see Stowell 1981, Pesetsky 1992, and Ormazabal 1995, among others, who argue that moving a complement headed by a null C results in a violation of licensing conditions on the null C.)

(ii) a. **John likes Mary is believed by everyone.*

b. cf. *That John likes Mary is believed by everyone.*

c. **John likes Mary Peter never believed.*

d. cf. *That John likes Mary Peter never believed.*

Bošković further observes that the speakers for whom *croire* takes a CP infinitival complement

reject constructions such as (iii) on the true question reading of the wh-phrase, whereas the speakers for whom *croire* takes an IP infinitival complement accept such constructions.

(iii) (*)Tu crois avoir vu qui?

you believe to have seen whom

These facts indicate that the null C, as well as the overt C, has a blocking effect on LF wh-movement. This is unexpected under the current analysis (though not under Bošković's (in press a) analysis). Assuming that the infinitival complementizer does not have any strong features, since the complementizer is phonologically null it appears that we should be able to delay its insertion until LF, i.e., we should be able to insert it even after LF wh-movement. Since the complementizer then would not be present in the structure at the point when *qui* moves in (iii), we would not expect it to affect the movement of *qui*. Clearly, we need a way of preventing the complementizer from entering the structure in LF. To do that, following a suggestion by Masao Ochi (personal communication), we speculate that the complementizer is lexically specified as a phonological affix. (The same proposal is actually made by Ormazabal 1995). The presence of phonological information in the lexical entry of the complementizer prevents it from entering the structure in LF.

13. We assume here that *ne* is either base-generated in its surface position, or is generated in some lower position and then undergoes PF cliticization.

14. As far as we can tell, our discussion of Pseudo-Opacity straightforwardly carries over to Inner Islands. For relevant discussion, see also Takahashi (1994).

15. See Lasnik and Saito for motivation for this proposal, and for a potential way to deduce this difference between adjuncts and arguments from independent mechanisms of the grammar. It remains to be seen how Lasnik and Saito's proposal can be incorporated into current approaches to locality of movement and trace licensing. The argument-adjunct asymmetry in grammaticality judgments as well as extraction out of non-relativized minimality islands in general are actually very difficult to capture in the current system. For a survey of issues and problems associated with them, see Lasnik (in press a).

16. It seems plausible to assume that the postverbal clause in (10c-d) would be considered an adjunct even without the presence of *after*, in which case the acyclic insertion of *after* would not void the Adjunct Condition effect in (10c-d).

17. An anonymous reviewer observes that under our analysis we might expect *beaucoup* to block LF movement of wh-arguments in constructions like (i).

(i) Il va beaucoup consulter quoi?

he is-going a lot to consult what

Our informants disagree about the status of (i) on the true question, non-echo reading. (For help with judgments, we thank Michèle Bacholle, Cédric Boeckx, and Viviane Déprez.) Accounting for the speakers who reject (i) on this reading is straightforward. We speculate that for the speakers who accept it, the direct object wh-phrase can undergo A-movement for accusative Case-checking while crossing *beaucoup*, which would void the blocking effect of *beaucoup*, an A'-element, given relativized minimality. Notice that the lack of the blocking effect of *beaucoup* on overt movement of argument wh-phrases cannot in its entirety be attributed to the possibility of movement for Case-checking across *beaucoup* feeding wh-movement, as indicated by (ii). The construction is accepted by all our informants, including the one who accepts (i) on the true question reading. (Our informants do not find any difference in grammaticality between (ii) and *Qui soupçonne-il beaucoup* 'Who does he suspect a lot?', involving short-distance wh-extraction.)

(ii) Qui soupçonne-il beaucoup que Marie a/ait vu?

who suspects he a lot that Marie has seen

'Who does he suspect a lot that Marie saw?'

It is clear that the accusative Case-checking position for the direct object wh-phrase in (ii) is below *beaucoup*. The wh-phrase then has to be undergoing wh-movement when crossing *beaucoup*. (The same test cannot be run for covert movement since covert movement of wh-phrases can never take place long-distance, as discussed in section 1).

18. Under representational approaches (for example, Lasnik and Saito's 1992 account), the possibility of acyclic insertion of *who* in (12) would not void the Superiority violation in (12).

19. The θ -theoretic approach might be necessary to account for the lack of the matrix clause reading of *when/where* in (i), presumably a Superiority effect. We can then prevent acyclic insertion of *when/where* by assuming that *when* and *where* are arguments, as argued convincingly by Murasugi (1991, 1992) and Murasugi and Saito (1993). (According to these authors, who argue against Huang's 1982 empty P analysis of *when* and *where*, *when* and *where* are arguments of Infl or the event predicate associated with V.)

(i) What did you prove John to have stolen when/where?

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