Remarks on Cyclic Linearization and Order Preservation

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1. Introduction

The goal of this paper is to compare the approach to order preservation in Fox & Pesetsky (2004) with the approach I develop in Müller (2000) on the basis of Williams (1999, 2003) and an earlier study of mine. I will proceed as follows. In section 2, I briefly sketch main features of Fox & Pesetsky's (2004) analysis. Against this background, I discuss some of the properties of the approach developed in Müller (2000) in section 3. In section 4, the two approaches are compared. Section 5 draws a conclusion.

2. Order Preservation as a Consequence of Phase Linearization

Follwing Chomsky (2000, 2001), Fox & Pesetsky (2004) presuppose that spell-out applies cyclically, to phases; the relevant spell-out domains are CP, VP (with vP envisaged as an alternative possibility), and DP. The crucial assumption they make is a very simple and, I think, natural one: Once a phase is completed and its elements are linearized, subsequent operations in the derivation cannot alter any of the linearization statements that have been established. This assumption can then be shown to yield a number of far-reaching, very attractive consequences. First, the generalization is derived that movement which leaves a phase must apply successive-cyclically, via the edge of the phase, with no recourse to a specific locality constraint (like Chomsky's (2001) Phase Impenetrability Condition (PIC)) being necessary. The reason is that, say, a *wh*-phrase originating in VP can only end up in a SpecC position (where it precedes all other items of a clause) without contradicting the ordering statements for the spell-out domain VP if it first moves to the left-peripheral edge in VP. Second, the order-preservation property with both simple and multiple object shift (see Holmberg (1986, 1998), Vikner (1990, 1994), Johnson (1991), Collins & Thráinsson (1996), among many others) is derived straightforwardly, even in more subtle cases, given that object shift cannot target a phase edge position. For instance, an object pronoun that follows the verb in VP will also have to follow the verb in the next phase, after object shift to a position preceding an adverbial; similarly, an object pronoun that follows another object pronoun in the VP will have to follow it in the next phase. Third, an anti-order preservation effect with quantifier movement in the Scandinavian languages can be derived in the same way if we assume that quantifier movement, unlike object shift, proceeds via the edge of a phase: If quantifier movement first targets the edge of VP (and thereby precedes the verb), all subsequent operations will have to result in orders in which the quantifer also precedes the verbs, which blocks verb raising to a higher position after quantifier movement to a TP-internal (but VP-external) landing site. Finally, it is correctly predicted that a viable alternative to order preservation in movement is deletion.

3. Order Preservation as a Consequence of Violable Constraints

In Müller (2001), I present evidence for a Parallel Movement constraint. This constraint states that c-command relations between arguments must be preserved from one level of

representation (in the sense of Chomsky (1981)) to the next one (e.g., from D-structure to S-structure). Parallel Movement was designed to capture the order preservation properties with a number of movement operations (which had in some cases previously been accounted for by construction-specific predecessors, most notably Lakoff's (1971) global rule for quantifier lowering), among them object shift and *wh*-movement in cases where there is an initial ambiguity (i.e., more than one *wh*-phrase that could in principle be moved, as in superiority contexts). Since the Parallel Movement constraint is formulated in a general way and not relativized to specific movement operations (or the features that play a part in them), it cannot possibly be surface-true. Otherwise, there could be no movement of a *wh*-object across a non-*wh*-subject, as in (1).

(1) What$_1$ did she give t$_2$ to John ?

Consequently, the assumption was that Parallel Movement is a constraint that is minimally violable if this is the only way to respect other requirements, in particular, the triggers for movement operations like *wh*-movement. This in turn necessitates an approach that envisages minimal violability and ranking of constraints; consequently, to the extent that Parallel Movement was plausible, it could be viewed as an argument for an optimality-theoretic organization of grammar.

Parallel Movement succeeds in deriving superiority (-like) effects with *wh*-movement, and order preservation effects with multiple object shift in Scandinavian, and with multiple pronoun fronting in German. However, since the constraint is exclusively concerned with arguments, it does not yet capture the dependence of object shift on verb movement (i.e., Holmberg's generalization); as noted by Williams (1999, 2003), this can also straightforwardly be conceived of as an instance of order preservation. In Müller (2000) (written after Müller (2001), and adopting Williams's terminology), Parallel Movement is replaced by Shape Conservation:

(2) *Shape Conservation*:
Feature checking must not change the linear order of lexical items established in vP.

The basic motivation for adopting this constraint was to force "secondary", apparently non-feature driven movement operations as they seem to be required in approaches in which movement operations that have often been assumed to be covert are in fact treated as applying overtly. The negative XP fronting operation postulated in Kayne (1998) is a case in point. The assumption here is that the direct object DP *no books* in (3) is overtly fronted. Clearly, this necessitates additional movement operations applying to the indirect object and the remnant VP so as to restore the original order; and it does not seem to be possible to find an inherent (e.g., feature-related) trigger for these secondary movement operations (also see Koopman & Szabolcsi (2000) for this general consequence).

(3) John [$_{\text{VP}_2}$ gave t$_1$ t$_3$] no books$_1$ to Mary$_3$ t$_2$

Assuming that the constraint prohibiting non-feature driven movement is violable in favour of Shape Conservation, movement of VP$_2$ and DP$_3$ (to outer and inner specifiers of the landing site, respectively) can be forced in (3). Still, the analysis must be further restricted so as to ensure that, e.g., *wh*-movement of an object to SpecC is not wrongly predicted to trigger subsequent secondary movement operations to outer and inner specifiers of C, resulting in the order in (4) (instead of the order in (1)).

(4) *She$_2$ [$_{\text{VP}}$ give t$_1$ t$_3$] what$_1$ to John$_3$ did t$_2$ t$_3$

The solution adopted in Müller (2000) is this: Shape Conservation is split up into two constraints, one holding for A-movement (like, by assumption, Kayne's (1998) negative XP fronting), which is ranked higher than the constraint against non-feature driven movement and may thus force secondary movement operations, and one holding for A-bar movement, which is ranked lower than this constraint. As before, this presupposes an organization of grammar in which constraints are violable and ranked. However, even a low-ranked Shape Conservation constraint for A-bar movement succeeds in deriving superiority effects: The two candidates in (5-ab) pattern in the same way with respect to all higher-ranked constraints; and Shape Conservation then prefers (5-a) over (5-b). (Note that (5-b) and (1) violates Shape Conservation in the same way, but the violation is non-fatal in the latter case because there is no alternative candidate that satisfies the featural trigger for *wh*-movement.)

(5) a. (I wonder) who$_1$ t$_1$ bought what$_2$
b. *(I wonder) what$_2$ who$_1$ bought t$_2$

Note finally that, even though this approach has not specifically been developed with object shift in mind, it is supposed to capture the basic facts (in particular, Holmberg's generalization and order preservation with multiple fronting; see Müller (2000, 530-531)). Consider, e.g., the Danish data in (6) (from Vikner (1994, 499)).

(6) a. Hvorfor købte Peter den$_1$ ikke t$_1$?
why bought Peter it not
b. *Hvorfor købte Peter ikke den$_1$?
why bought Peter not it
c. *Hvorfor har Peter den$_1$ ikke købt t$_1$?
why has Peter it not bought
d. Hvorfor har Peter ikke købt den$_1$?
why has Peter not bought it

Given that object shift is an A-movement operation, Shape Conservation cannot be violated by a well-formed candidate involving object shift. At this point, it is important to clarify what the local domain is in which Shape Conservation holds. The assumption in Müller (2000) is that the local domain is the phrase; this would imply that after object shift to the specifier of some vP-external projection, the verb and the subject (or a remnant verb phrase) must be fronted to an outer specifier of the same projection, and subsequently move further from these specifier positions. Alternatively, one might assume the local domain in which Shape Conservation holds to be somewhat larger (e.g., to have the size of a phase); in that case, object shift could be saved by ordinary verb movement to T or C and subject raising to SpecT (on the potential problem of the order reversal of subject and verb in verb-second structures, see below). Thus, (6-a) (with verb movement) respects Shape Conservation, whereas (6-c) (without verb movement) does not. As in other approaches, something extra needs to be said about the fact that object shift can apparently fail to apply if there is no way that it could be saved by verb movement (see (6-b) vs. (6-d); also see Erteschik-Shir (2004) on the issue of variable optionality with object shift that this observation is related to).

In the same way, Shape Conservation accounts for other order preservation effects with object shift like, e.g., the strict maintenance of vP-internal object order after multiple object shift; the Danish examples in (7-ab) are from Vikner (1990).

(7) a. Peter viste hende$_1$ den$_2$ jo t_1 t_2
Peter showed her it indeed
b. *Peter viste den$_2$ hende$_1$ jo t_1 t_2
Peter showed it her indeed

Furthermore, the fact that bare verb (participle) topicalization in the presence of an auxiliary can render object shift legitimate (see Holmberg (1998), Fox & Pesetsky (2004)) is to be expected under a Shape Conservation approach.

To conclude, in the approach developed in Müller (2000), Shape Conservation in (2) takes vP as the basic linearization domain, and states that (feature-driven) movement operations cannot change linearization statements established for this domain. Therefore, it might at first sight look as though this approach is similar to the one developed in Fox & Pesetsky (2004). Let us now see whether this is the case.

4. Comparison

An obvious difference is that the analysis based on Shape Conservation presupposes constraint violability and constraint ranking, which the analysis in Fox & Pesetsky (2004) does not. This basic difference is responsible for the different treatment of the fact that the order preservation property cannot possibly be assumed to be surface-true in all cases. In Fox & Pesetsky's (2004) analysis, this is accounted for by postulating an intermediate step of movement to the phase edge that is available for certain movement types but not others. In contrast, in the analysis in Müller (2000), this is accounted for by splitting up the Shape Conservation constraint and ranking the version of it that is relevant for the movement types for which order preservation is not surface-true lower. Thus, where one approach attributes exceptions from strict order preservation to abstract intermediate structures, the other approach attributes them to constraint violability. This instantiates a well-known trade-off between classical derivational theories and optimality-theoretic systems (see Prince & Smolensky (1993), Halle (1995), Grimshaw (1997), and McCarthy (2002), among others). In both approaches, it is necessary to specify for which movement operations order preservation does not have to be surface-true, and for which it must be. In Müller (2000), the assumption is that the difference between movement types relevant here is the A- vs. A-bar distinction. At least as a first approximation, one can assume the same for the analysis in Fox & Pesetsky (2004) (see, e.g., their remarks in section 4): A-bar movement (which then would have to include Scandinavian quantifier movement) targets the phase edge before reaching its ultimate landing site, whereas A-movement (including object shift) does not. Of course, it remains to be shown how this result can be achieved in the general kind of approach that Fox & Pesetsky (2004) adopt. I believe that this task will eventually turn out to be far from trivial. However, Fox and Pesetsky are well aware of the problem (cf. their pertinent remark in section 6: "Our proposals say nothing in themselves, however, about the circumstances under which movement to these left-edge positions is allowed or prohibited."); and I think they are correct in assuming that the matter is strictly speaking orthogonal to their main claims.

So, I would like to contend that this difference in handling cases where order preservation is not a surface-true property of movement types is essentially framework-induced, and as such thus not as fundamental as it may initially look. However, closer inspection reveals that the two devices used for accounting for cases where order preservation is not

surface-true yield empirical consequences that are quite different.

On the one hand, it has been argued that there is independent evidence for the use of edge positions of (vP/VP) phases as intermediate landing sites of A-bar movement. Such evidence involves reconstruction effects (see Fox (2000)), instances of stranding of parts of *wh*-phrases (see Barbiers (2002)), and occurrences of morphological markers that can be interpreted as reflexes of successive-cyclic A-bar movement (see Cole & Hermon (2000)). Thus, given that the intermediate movement steps required in the analysis that derives order preservation from cyclic spell-out of phases are independently motivated, they provide a strong argument for this approach.

On the other hand, the solution in terms of a low-ranked Shape Conservation constraint for A-bar movement makes it possible without further ado to account for superiority effects. The reason is a general property of optimality-theoretic systems: Low-ranked constraints are never switched off and may become decisive after all in contexts where higher-ranked constraints do not distinguish the competing candidates. Thus, even a low-ranked Shape Conservation constraint for A-bar movement, which is violable in contexts where there is only one *wh*-phrase that qualifies as a potential item to undergo movement, will succeed in deriving the contrast in (5), where there is an initial ambiguity. In contrast, there is no obvious way to derive superiority effects in Fox & Pesetsky's (2004) approach: Here, order preservation becomes an issue only after the phase is completed; but at this point, it is too late to distinguish between a derivation in which the higher *wh*-phrase has been moved to the edge of the phase, and another derivation in which the lower *wh*-phrase has been moved to that position, even though the former derivation minimizes a disruption of the pre-movement order. It seems that the only possible way to make these kinds of superiority effects follow from cyclic linearization would be to reduce the size of linearization domains further, to the sub-phase level. But then, ordinary *wh*-movement across a non-*wh*-phrase will be a problem. At the heart of this problem is the fact that different kinds of categories (in the case at hand: *wh*-phrases and non-*wh*-phrases) are not treated differently from the point of view of linearization. (Thus, one could speculate that what is called for is a concept of 'relativized linearization domain', but it is far from clear that this idea could be given a conceptually attractive implementation.) – That said, one might argue that there is reason not to treat superiority effects as instances of order preservation; see in particular Williams (2003, 140ff.).

Another difference between the two approaches is also directly related to the basic differences in underlying grammar design: As has been mentioned above, in the approach in Müller (2000), the Shape Conservation may in fact force "secondary", non-feature driven movement that restores the pre-movement order. In theories in which there is a constraint that demands all movement to be feature-driven (which holds, in one way or another, for both approaches currently under consideration), such secondary movement clearly presupposes that this constraint can be violated. Since Fox & Pesetsky (2004) do not envisage constraint violability, it is clear that there can be no "secondary" movement driven solely by order preservation properties. Everything then depends on how good the evidency for order-preservation driven movement then turns out to be. I take this issue to be unresolved at this point.

Next, consider Scandinavian quantifier movement. In Fox & Pesetsky's (2004) analysis, it follows from the assumptions that (a) the quantifier phrase precedes the finite verb in VP, and (b) the ultimate landing site of the quantifier phrase follows the target position of verb-second, that quantifier movement is incompatible with verb-second movement of

the main verb (see their example (38)). This result strikes me as quite attractive; and I do not see how it could be derived on the basis of the approach in Müller (2000) (the reason is that Scandinavian quantifier movement must fall under the lower-ranked Shape Conservation constraint; but then, it cannot possibly block feature-driven verb-second movement of a main verb).

A general property of optimality-theoretic systems is that of factorial typology; i.e., unless a fixed order among constraints can independently be ensured (e.g., by harmonic alignment; see Smolensky (1995)), we expect free re-ranking. Thus, we expect languages in which Shape Conservation for A-bar movement is ranked higher than Shape Conservation for A-movement, in a system like that in Müller (2000). However, this would result in peculiar patterns which do not seem to be attested. In contrast, there is no comparable room for variation in the system assumed in Fox & Pesetsky (2004), and hence, no prediction of order preservation with A-bar movement in the absence of order preservation with A-movement.

Finally, and perhaps most importantly, in the approach developed in Müller (2000), order preservation is accounted for by postulating an explicit constraint that demands just this. In contrast, Fox & Pesetsky (2004) make do without a specific constraint; they succeed in deriving order preservation from an independently motivated basic grammatical architecture involving cyclic spell-out, enriched only by the natural assumption that linearization statements established for spell-out domains cannot subsequently be modified.

In my view, these considerations favour the analysis in Fox & Pesetsky (2004) over the one in Müller (2000). Still, I would like to end these remarks with a few related considerations that may point in the opposite direction. The first one concerns verb-second structures in an SOV language like German. The problem is how to ensure that verb-second clauses in German may exhibit a word order in which the finite main verb precedes the object (see (8-a)), whereas the object precedes a main verb which has not undergone verb-second (see (8-b)).

(8) a. Gestern las$_1$ Maria [$_{VP}$ (t_1) ein Buch$_2$ (t_1)]
yesterday read Maria$_{nom}$ a book$_{acc}$
b. dass Maria gestern [$_{VP}$ ein Buch$_2$ las$_1$ (t_2)]
that Maria$_{nom}$ yesterday a book$_{acc}$ read

A standard analysis of (8-a) would involve verb-second movement from a position to the right of the object DP across VP (see Haider (1993)). However, it seems that such an analysis cannot be maintained in Fox & Pesetsky's (2004) approach: A VP spell-out domain in which the object precedes the verb prohibits a subsequent linearization in which the verb precedes the object. To solve this problem, one might assume that the verb is merged to the left of the object in VP in (8-ab). On this view, surface OV orders as in (8-b) might be derived by leftward object raising across the verb; such movement must be blocked in verb-second clauses in which the main verb moves (unless the object ends up in SpecC). An analysis along these lines may prove viable; but it seems clear that many technical problems will need to be addressed to avoid overgeneration. Furthermore, if analyses of this type that rely on highly abstract linearization domains (that are never attested on the surface) are available for the SOV language German, one might wonder why they are not for the Scandinavian SVO languages, where a surface-oriented approach seems crucial. In contrast, verb-second movement in SOV languages is unproblematic for the Shape Conservation-based approach if it is assumed that head movement patterns with

A-bar movement (rather than with A-movement) for the purposes of this constraint.

Second, given that spell-out domains are phases, that phases can be given a semantic motivation (Chomsky (2001)), and that this motivation implies that the position in which an external argument is merged is phase-internal, it strikes me as potentially problematic to assume that the verbal spell-out domain of the Scandinavian languages is VP rather than vP. It seems that Fox and Pesetsky's main reason for doing so nonetheless is theory-internal: "Since the Scandinavian languages freely raise the main verb to C over the subject, the subject is presumably not linearized in Scandinavian with respect to the main verb before CP is constructed" (section 5). In this context, it is also instructive to consider evidence from pronoun fronting in German. Fronting of unstressed pronouns is obligatory in German. On the other hand, NP raising to SpecT is optional throughout. As shown in (9-ab), a fronted subject pronoun must precede a fronted object pronoun.

(9) a. dass sie_1 es_2 wahrscheinlich t_1 t_2 gelesen hat
that she_{nom} it_{acc} probably read has
b. *dass es_2 sie_1 wahrscheinlich t_1 t_2 gelesen hat
that it_{acc} she_{nom} probably read has

Given that the order preservation effect visible here cannot result from obligatory subject raising to SpecT (as it may in comparable cases in the Scandinavian languages), it seems that the most straightforward conclusion on the basis of Fox & Pesetsky's (2004) analysis is that cyclic linearization of spell-out domains is responsible. This implies that vP is the spell-out domain in German. However, this reinforces the problem with verb-second in SOV languages noted above because it suggests that the (verbal) spell-out domain in German also includes the base position of the subject.

Note finally that German also has order-changing scrambling, even to landing sites in front of the base position of subjects (such scrambling cannot affect unstressed pronouns). But again, a finite main verb can move to C in verb-second clauses and precede scrambled objects from this position, which is again unexpected from the point of view of cyclic linearization; see (10).

(10) Gestern gab_1 das $Buch_2$ wahrscheinlich niemand dem Fritz t_2 t_1
yesterday gave the $book_{acc}$ probably $no\text{-}one_{nom}$ the $Fritz_{dat}$

Here, the direct object seems to have left the verbal spell-out domain (be it VP or vP); for this to be possible, it must have targetted the phase edge first. But then, we wrongly predict verb-second movement of the main verb to be ill formed, on a par with the restriction on Scandinavian quantifier movement derived in Fox & Pesetsky (2004, ex. (38)); and this effect should take place independently of whether the basic structure of OV languages is OV or VO. In contrast, neither of these cases poses a problem for the Shape Conservation-based approach: All relevant movement types involved here can be argued to fall under the lower-ranked, A-bar version of the constraint, which implies that order preservation needs only to be respected to the extent that this is possible without violating higher-ranked constraints.

5. Conclusion

These last considerations nothwithstanding, I think that Fox & Pesetsky's (2004) idea that cyclic linearization of phases explains order preservation phenomena is indeed a major,

innovative contribution to syntactic theory. Certain questions will ultimately have to be pursued in more depth (especially those concerning the size of spell-out domains and the OV/VO distinction). Also, I do not wish to claim that it is completely impossible to come up with theories in which order preservation effects with movement types like object shift emerge as a result of interacting constraints that are not at all related to linearization (e.g., minimality conditions of one kind or another; see, e.g., Collins & Thráinsson (1996), Richards (2001)). However, I would like to contend that among the existing theories that do account for order preservation effects by directly invoking linearization requirements, Fox & Pesetsky's (2004) analysis is unmatched in elegance and simplicity.

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