Two Types of Remnant Movement

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1. Introduction

This article is concerned with stating and accounting for differences between two types of remnant movement that have been proposed in the literature. Remnant movement is movement of an XP β from which extraction of α has taken place earlier in the derivation; cf. (1). This phenomenon has been argued to support a derivational approach to syntax (cf. Chomsky (1998)): Since remnant movement creates an unbound α trace that is separated from its antecedent by an XP in non-selected position (i.e., a barrier), the wellformedness of the resulting structure is unexpected under representational approaches that require proper binding of traces and check locality constraints at S-structure; but nothing is wrong with (1) under a derivational approach in which proper binding is replaced by strict cyclicity and locality is checked directly after each movement operation.

(1) $[_{\beta_2}$ ... t_1 ...] ... [... α_1 ... [... t_2 ...]]

Remnant movement has been suggested for two different kinds of constructions. On the one hand, Thiersch (1985) and den Besten & Webelhuth (1987; 1990) have argued that cases of incomplete category fronting like (2-a) in German should be analyzed as involving a combination of scrambling of NP_1 and remnant VP_2 topical-

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ization.[1] On the other hand, it has recently been proposed that remnant movement is a much more general phenomenon that also underlies certain other constructions where this may not be immediately obvious. Most notably, Kayne (1998) analyzes constructions like (2-b) in English as involving obligatory overt negative NP_1 preposing followed by TP-internal remnant VP_2 fronting.[2] Henceforth, I will refer to the two constructions as "primary" and "secondary" remnant movement, respectively.

(2) a. [$_{VP_2}$ t_1 Gelesen] hat das $Buch_1$ keiner t_2
    read has the book no-one
    "No-one read the book."

  b. John [$_{VP_2}$ reads t_1] no $novels_1$ t_2

The goal of this paper is twofold. In section 2, I will show that the two constructions exhibit radically different properties. In section 3, I will argue that a unified analysis is possible despite these differences if we assume that shape conservation (Williams (1999)) can be a trigger for movement, in addition to feature checking (Chomsky (1995)). In particular, we will see that whereas primary remnant movement is feature-driven, secondary remnant movement is a repair strategy that is triggered by shape conservation. This latter idea will be implemented in a restrictive model of optimality theory ("local optimization") for which I will present empirical support. Section 4 draws a conclusion. Finally, section 5 is an appendix that discusses extending the analysis to other cases of secondary remnant movement.

2. The Properties of Primary and Secondary Remnant Movement

This section highlights five differences between primary and secondary remnant movement. These differences are related to (i) independent availability, (ii) sec-

[1] Also see Stechow & Sternefeld (1988), Bayer (1996), Müller (1998), Grewendorf & Sabel (1994; 1999), and references cited there.

[2] Also see den Dikken (1996), Hinterhölzl (1997), Ordóñez (1997), Johnson (1998), Noonan (1999), and Koopman & Szabolcsi (2000) on related analyses for other constructions. In what follows, I will focus on Kayne's analysis of negative NP preposing. See the appendix for possible extensions.

ondary object fronting, (iii) extraction, (iv) movement types, and (v) successive cyclicity.

2.1. Independent Availability

In primary remnant movement constructions, movement of both β_2 and α_1 in (1) must be independently available. Thus, German remnant VP topicalization as in (2-a) presupposes that VP topicalization and NP scrambling are independent options in the language, which indeed they are:

(3) a. $[_{VP_2}$ Das $Buch_1$ gelesen] hat keiner t_2
the book read has no-one
"No-one read the book."

b. daß das $Buch_1$ keiner $[_{VP}$ t_1 gelesen] hat
that the book no-one read has
"that no-one read the book."

Similarly, the English primary remnant movement construction in (4-a) relies on the independent existence of VP topicalization and NP raising of the subject, as in (4-bc).

(4) a. $[_{VP_2}$ Criticized t_1 by his boss] $John_1$ has never been t_2

b. $[_{VP_2}$ Criticize John] he wouldn't t_2

c. $John_1$ has never been $[_{VP_2}$ criticized t_1 by his boss]

In line with this, English lacks the counterpart to the German remnant movement construction in (2-a), viz., (5-a), for the simple reason that although it has VP topicalization (cf. (5-b)), it does not have scrambling (cf. (5-c)):

(5) a. *$[_{VP_2}$ Kicked t_1] John never has the dog_1 t_2

b. $[_{VP_2}$ Kicked the dog_1] John never has t_2

c. *John never has the dog_1 $[_{VP_2}$ kicked t_1]

In contrast, in secondary remnant movement constructions like (6-a) (= (2-b)), movement of neither α_1 nor β_2 is independently available. This is clear for negative NP preposing; cf. (6-c). Given that independent VP_2 fronting in (6-b) would be string-vacuous, the question arises of whether this is an option. Since Kayne assumes that the "more emphatic, less neutral character" of sentences like (6-a) "must be correlated with VP-movement," and since it is unclear which feature could trigger TP-internal VP fronting in (6-b), we may conclude that it is not.[3] Consequently, none of the two movement operations in (6-a) is independently available in secondary remnant movement constructions.

(6) a. John $[_{\text{VP}_2}$ reads t_1] no novels$_1$ t_2

b. *John $[_{\text{VP}_2}$ likes that novel$_1$] t_2

c. *John no novels$_1$ $[_{\text{VP}_2}$ reads t_1]

2.2. Secondary Object Fronting

Double object constructions reveal a second difference. Primary remnant VP topicalization in German may carry along or strand (by scrambling) any of the two objects:

(7) a. $[_{\text{VP}_2}$ t_1 Ein Buch$_3$ zum Geburtstag geschenkt] hat sie dem Jason$_1$ t_2
a book$_{acc}$ for the birthday given has she ART Jason$_{dat}$
"She gave Jason a book as a birthday present."

b. $[_{\text{VP}_2}$ Dem Jason$_1$ t_3 zum Geburtstag geschenkt] hat sie ein Buch$_3$ t_2
ART Jason$_{dat}$ for the birthday given has she a book$_{acc}$

c. $[_{\text{VP}_2}$ t_1 t_3 Zum Geburtstag geschenkt] hat sie dem Jason$_1$ ein Buch$_3$ t_2
for the birthday given has she ART Jason$_{dat}$ a book$_{acc}$

In contrast to this, whether secondary remnant VP fronting carries along an NP in a double object construction or strands it prior to VP fronting depends on whether the pre-movement order is maintained. If the negative NP is the first object, the second object cannot be fronted together with the verb, but must leave the VP by an earlier operation that I will call "secondary object fronting" (indicated here by underlining); this operation targets a position below that of the negative NP,

[3]Kayne states that negative NP preposing will "in turn ... require the ... VP to prepose," which suggests that TP-internal VP fronting is not independently available in English.

thereby restoring the pre-movement order:[4]

(8) a. *John [$_{VP_2}$ gave t_1 to Mary$_3$] no books$_1$ t_2

b. John [$_{VP_2}$ gave t_1 t_3] no books$_1$ to Mary$_3$ t_2

c. *John [$_{VP_2}$ gave t_1 a book$_3$] no-one$_1$ t_2

d. John [$_{VP_2}$ gave t_1 t_3] no-one$_1$ a book$_3$ t_2

If, on the other hand, the negative NP is the second object, the first object must be fronted together with the verb, and cannot undergo secondary object fronting:

(9) a. John [$_{VP_2}$ gave the book$_1$ t_3] to no-one$_3$ t_2

b. *John [$_{VP_2}$ gave t_1 t_3] to no-one$_3$ the book$_1$ t_2

c. John [$_{VP_2}$ gave Mary$_1$ t_3] no books$_3$ t_2

d. *John [$_{VP_2}$ gave t_1 t_3] no books$_3$ Mary$_1$ t_2

2.3. Extraction

Both the remnant XP β_2 and the antecedent of the unbound trace α_1 in (1) are barriers for further extraction in primary remnant movement constructions. This is a standard freezing effect that is expected if (a) moved items end up in non-selected positions, where they are barriers (cf. Cinque (1990) vs. Lasnik & Saito (1992)), and (b) strict cyclicity ensures that extraction from an XP to a position γ cannot take place prior to XP-movement to a position ζ, where ζ is lower than γ (cf. Chomsky (1995) and references cited there). This is shown for the remnant XP β in (10) and (11), and for the antecedent of the unbound trace α in (12) (barriers are underlined).

(10) a. Ich denke [$_{CP}$ [$_{VP_2}$ t_3 t_1 gegeben] hat dem Fritz$_3$ das Buch$_1$ keiner t_2]
I think given has ART Fritz the book no-one
"I think that no-one gave Fritz the book."

b. *Wem$_3$ denkst du [$_{CP}$ [$_{VP_2}$ t_3 t_1 gegeben] hat das Buch$_1$ keiner t_2] ?
whom think you given has the book no-one
"To whom do you think that no-one gave the book?"

[4] Derivations of the type in (8-a) have sometimes been argued to underlie heavy NP shift; but this issue is clearly not relevant in the case at hand.

(11) a. I think that [$_{CP}$ [$_{VP_2}$ written t_1 for children$_3$] those books$_1$ could not possibly be t_2]

b. *Children$_3$ I think that [$_{CP}$ [$_{\underline{VP_2}}$ written t_1 for t_3] those books$_1$ could not possibly be t_2]

(12) a. [$_{VP_2}$ t_1 Gerechnet] hat gestern [$_{PP_1}$ da$_3$-mit] wieder keiner t_2
counted has yesterday there-with again no-one
"Again, no-one reckoned with it yesterday."

b. *[$_{VP_2}$ t_1 Gerechnet] hat da$_3$ gestern [$_{\underline{PP_1}}$ t_3 mit] wieder keiner t_2
counted has there yesterday with again no-one
"Again, no-one reckoned with it yesterday."

In contrast, neither the remnant XP β_2 nor the antecedent of the unbound trace α_1 is a barrier for further extraction in secondary remnant movement constructions; cf. *wh*-movement in (13-a) and topicalization in (13-b), respectively.[5] Given the interaction of barriers theory and strict cyclicity, this anti-freezing effect is a priori unexpected.

(13) a. Which book$_3$ did John [$_{\underline{VP_2}}$ give t_3 t_1] [$_{PP_1}$ to no-one] t_2 ?

b. About Nixon$_3$ John [$_{VP_2}$ read t_1] [$_{\underline{NP_1}}$ only one book t_3] t_2

2.4. Movement Types

It has often been noted that not all movement types seem to be able to affect (primary) remnant XPs equally well, the crucial distinction being that between middle field-external and middle field-internal movement operations. E.g., whereas topicalization of a remnant infinitival VP is possible in German (cf. (14-a)), scrambling of the same remnant VP leads to ungrammaticality (cf. (14-b)).[6]

(14) a. [$_{VP_2}$ t_1 Zu lesen] hat das Buch$_1$ keiner t_2 versucht
to read has the book no-one tried
"No-one tried to read the book."

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[5] Note that Kayne (1998) treats *only*-phrases on a par with negative NPs.

[6] See Fanselow (1991), Frank, Lee & Rambow (1992), Haider (1993), and Grewendorf & Sabel (1994; 1999).

b. *daß [$_{VP_2}$ t$_1$ zu lesen] das Buch$_1$ keiner t$_2$ versucht hat
that to read the book no-one tried has
"that no-one tried to read the book."

No such asymmetry arises with topicalization vs. scrambling of full, i.e., non-remnant, infinitival VPs:

(15) a. [$_{VP_2}$ Das Buch$_1$ zu lesen] hat keiner t$_2$ versucht
the book to read has no-one tried
"No-one tried to read the book."

b. daß [$_{VP_2}$ das Buch$_1$ zu lesen] keiner t$_2$ versucht hat
that the book to read no-one tried has
"that no-one tried to read the book."

Again, things are different with secondary remnant movement. Indeed, secondary remnant VP$_2$ fronting is not only permitted to target a middle field-internal (post-subject) landing site (cf. (16-a) = (2-b)); it is required to do so (cf. the failed attempt at topicalization in this context in (16-b)).

(16) a. John [$_{VP_2}$ reads t$_1$] no novels$_1$ t$_2$

b. *[$_{VP_2}$ Reads t$_1$] (I think that) John t$'_2$ no novels$_1$ t$_2$

2.5. Successive Cyclicity

Unbound intermediate traces that result from successive-cyclic movement via SpecC cannot occur in primary remnant movement constructions.[7] In (17-a), a complex VP$_2$ that is headed by a bridge verb and contains an argument CP$_3$ is topicalized across a *wh*-island. Complement topicalization from a *wh*-island typically results in a mild, Subjacency-like effect in German (cf. Fanselow (1987)), and VP$_2$ topicalization behaves as expected here. However, in (17-b), successive-cyclic *wh*-movement has taken place from CP$_3$ prior to complex VP$_2$ topicalization; the *wh*-island itself is created by the antecedent of the traces t$_1$, t$'_1$. In this case, an unbound intermediate trace t$'_1$ comes into being, and strong ungrammaticality arises.

[7] See den Besten & Webelhuth (1990), Fanselow (1993), Grewendorf (1994), and Bayer (1996).

(17) a. ?[$_{VP_2}$ Gesagt [$_{CP_3}$ daß sie Fritz$_1$ liebt]] weiß ich nicht [$_{CP}$ ob sie
said that she Fritz loves know I not whether she
t_2 hat]
has
"I do not know whether she said that she loves Fritz."

b. *[$_{VP_2}$ Gesagt [$_{CP_3}$ t'_1 daß sie t_1 liebt]] weiß ich nicht [$_{CP}$ wen$_1$ sie t_2
said that she loves know I not whom she
hat]
has
"I do not know who she said that she loves."

Note that the effect in (17-b) cannot be due to an intrinsic island property of VP_2 or CP_3: Successive-cyclic *wh*-movement is possible with VP_2 in situ and CP_3 in extraposed position:

(18) Ich weiß nicht [$_{CP}$ wen$_1$ sie [$_{VP_2}$ gesagt hat]] [$_{CP_3}$ t'_1 daß sie t_1 liebt]
I know not whom she said has that she loves
"I do not know who she said that she loves."

Again, the case is different with secondary remnant movement constructions. Kayne (1998) discusses examples like (19-a), which exhibit both a narrow scope reading for the negative NP (*force* > *no-one*), and a wide scope reading (*no-one* > *force*). The narrow scope reading involves local negative NP preposing within the infinitive and local secondary remnant VP preposing of exactly the type we have been concerned with so far; cf. (19-b). However, Kayne argues that to obtain the wide scope reading, the negative NP *no-one* must undergo long-distance movement into the matrix clause. By standard locality assumptions, this movement must proceed via SpecC. Hence, subsequent secondary remnant fronting of the matrix VP creates an unbound intermediate trace. This is shown in (19-c), where *no-one* takes scope over *force* (as a result of c-commanding a trace of the VP headed by *force*, i.e., via reconstruction).

(19) a. I will force you to marry no-one

b. I will force you [$_{CP}$ to [$_{VP_2}$ marry t_1] no-one$_1$ t_2] (narrow scope)

c. I will [$_{VP_3}$ force you [$_{CP}$ t'_1 to marry t_1]] no-one$_1$ t_3 (wide scope)

Thus, the difference between legitimate unbound intermediate traces with secondary remnant movement, as in (19-c), and illegitimate unbound intermediate traces with primary remnant movement, as in (17-b), is a priori unexpected.

To sum up this section, we have seen that primary and secondary remnant movement constructions differ radically. One might want to take this to indicate that one of the two approaches should be abandoned. Given that both approaches have their virtues, I will not draw this conclusion here. Rather, I will develop a unified approach that explains the diverging properties of primary and secondary remnant movement constructions by distinguishing between feature-driven movement and repair-driven movement.

3. A Unified Approach

3.1. Shape Conservation and Local Optimization

All movement operations can plausibly be viewed as being feature-driven in primary remnant movement constructions. Thus, (20-a) involves a combination of NP raising (triggered by the EPP feature) and VP topicalization (triggered by a topic feature); and (20-b) has NP scrambling (which I will here assume to be triggered by a specific scrambling feature[8]) followed by VP topicalization (again triggered by a topic feature). In contrast, in secondary remnant movement constructions, it looks as though only one movement operation is feature-driven; in the construction at hand, this is negative NP preposing. All other movement operations are parasitic – they depend on the first operation having taken place. The absence of a feature that triggers secondary remnant movement and secondary object fronting is illustrated in (20-c).

(20) a. [$_{VP_2}$ Criticized t_1 by his boss]-[top] $John_1$[-D] has never been t_2

[8]See Grewendorf & Sabel (1999) and Sauerland (1999). Arguably, there is more than one possible trigger for scrambling in German, and this fact might be formally encoded by assigning a complex internal structure to the scrambling feature. This would not affect the issue at hand, though.

b. [$_{VP_2}$ t_1 t_3 Zum Geburtstag geschenkt]-[top] hat sie dem Jason$_1$-[scr]
for the birthday given has she ART Jason
ein Buch$_3$-[scr] t_2
a book

c. John [$_{VP_2}$ gave t_1 t_3]-Ø no books$_1$-[neg] to Mary$_3$-Ø t_2

Then, given constraints like the FEATURE CONDITION (FC) in (21) and LAST RESORT (LR) in (22) (cf. Chomsky (1995)), a problem arises: Some instances of movement in secondary remnant movement constructions are not triggered by FC, and they thus violate LR. Consequently, a different trigger must be involved, and respecting this trigger must permit a violation of LR, which is otherwise impossible. Thus, secondary remnant movement emerges as a repair strategy: Exceptionally, LR can be violated so as to prevent even greater damage.

(21) FEATURE CONDITION (FC):
Strong features must be checked by overt movement.

(22) LAST RESORT (LR):
Overt movement must result in checking of a strong feature.

I would like to suggest that the trigger in question is the SHAPE CONSERVATION (SC) constraint that is proposed on independent grounds in Williams (1999). For the sake of concreteness, I will assume that SC basically demands that the shape of predicate phrases, or vPs, must be preserved in derivations:[9]

(23) SHAPE CONSERVATION (SC):
Feature checking must not change the linear order of lexical items established in vP.

[9]This presupposes that structures are linearized in syntax already, not at some later point (PF). For predecessors of this constraint, see Lakoff (1971), Kroch (1974), Huang (1982), Reinhart (1983), Lasnik & Saito (1992), Watanabe (1992), Haegeman (1995), Meinunger (1995), and Müller (2001). In general, these constraints are defined in structural rather than linear terms. This would not be sufficient for the present analysis – SC-driven movement restores linear order, not c-command.

The English vP shape that will be relevant is completely standard, and given in (24).[10]

(24) $[_{vP}$ NP_1 $[_{v'}$ v+V $[_{VP}$ NP_2 $[_{V'}$ t_V $\{NP_3/PP_3\}$]]]]

The analysis then relies on three assumptions. First, feature-driven movement of the negative NP_1 in (20-c) ends up in the specifier of a functional head Neg that bears a strong [neg] feature. Given SC, it follows that vP_2-[Ø] (and not VP, as assumed thus far) must be fronted to an outer specifier of Neg (i.e., to a position that precedes NP_1-[neg] within the same projection), as an instance of repair-driven movement.[11] We can also conclude that repair-driven movement of PP_3-[Ø] in (20-c) must end up in an inner specifier of the very same domain, NegP.

The second assumption concerns a qualification. Whereas negative NP preposing requires vP shape conservation, other movement operations do not. This is obvious in the case of *wh*-movement in English: Checking of [wh] with an object NP in the C domain does not trigger repair-driven movement of TP_4 to an outer specifier of C; cf. (25-a) vs. (25-b).

(25) a. $What_1$-[wh] did $[_{TP_4}$ you_3 $[_{vP_2}$ t_3 see t_1]] ?
b. *$[_{TP_4}$ You $[_{vP_2}$ t see t_1]]-Ø $what_1$-[wh] did t_4 ?

This means that SC either does not hold for *wh*-movement in English (and many other movement operations), or that it holds, but in a weaker form.[12] I will draw

[10]Here, v introduces the external argument, and V is obligatorily raised to v. Whether NP_2 occupies SpecV as a result of movement or base-generation in dative shift constructions is immaterial for present purposes – as long as there is no vP yet, all movement (including V-to-v raising) satisfies SC vacuously. As for German, I will postulate the vP shape in (i).

(i) $[_{vP}$ NP_1 $[_{v'}$ $[_{VP}$ NP_2 $[_{V'}$ t_V $\{NP_3/PP_3\}$]] v+V]]

This is essentially the same structure, the only difference being that v+V is right-peripheral in vP.

[11]This position follows typical adverb positions; cf. the evidence against V-to-T raising in English.

[12]An idea that does not strike me as completely implausible would be to assume that a derivation as in (25-b) might underlie certain *wh*-in situ languages for which it has been argued that *wh*-in

the second conclusion here and suggest that SC is to be split up, and made sensitive to feature classes: Features like [neg] obey a strong SC constraint that permits a violation of LR (cf. the references in footnote 2 and the appendix for other possible features with this property), whereas features like [wh] obey only a weaker SC constraint that does not permit a violation of LR (other features in this class include [top] and [scr]). It is tempting to conclude that the relevant distinction is between features that trigger A-movement and features that trigger A-bar movement. Indeed, most cases of NP raising to SpecT will automatically satisfy SC; cf. (26-a). NP raising in passive constructions as in (26-b) and successive-cyclic NP raising as in (26-c) may initially look problematic, though.

(26) a. $[_{\text{TP}}$ John$_1$ T $[_{\text{vP}}$ t$_1$ likes $[_{\text{VP}}$ t$_V$ Mary]]]

b. $[_{\text{TP}}$ John$_1$ was $[_{\text{vP}}$ kissed t$_1$]]

c. $[_{\text{TP}}$ John$_1$ T $[_{\text{vP}}$ seems $[_{\text{TP}}$ t$'_1$ to $[_{\text{vP}}$ t$_1$ like [t$_V$ Mary]]]]

Suppose first that v is present only if an external argument is present, i.e., that the root vPs in (26-bc) are actually VPs. Then, SC is vacuously respected in (26-b), and (26-c) is accounted for as well: the linear order of the three items *John*, *like*, and *Mary* is not changed by [D] feature checking with *John* in either the embedded or the matrix SpecT position. However, this approach is called into question by the observation that secondary remnant movement takes place in passive constructions

situ has properties commonly associated with overt chain formation; cf., e.g., Watanabe (1992) on Japanese. Given a vP shape as in German (with SOV order), secondary remnant movement would target an inner SpecC position, and secondary argument fronting, an outer SpecC position:

(i) $[_{\text{CP}}$ John-wa$_1$ $[_{\text{C'}}$ nani-o$_2$ $[_{\text{C'}}$ $[_{\text{vP}_3}$ t$_1$ t$_2$ kaimasita] $[_{\text{C}}$ ka] t$_3$]]] ?
John$_{top}$ what$_{acc}$ bought Q
"What did John buy?"

The main (but probably not insurmountable) problem with such an analysis would be the phenomenon of optional *wh*-scrambling. One might argue that such an approach would be in the spirit of Kayne's (1998) program, where apparent X-in situ that exhibits properties of X-movement is reanalyzed as X-movement with subsequent secondary remnant movement. However, I will not pursue this issue here.

in English.[13] This is indicative of SC and thus suggests that a vP is involved throughout (also see Chomsky (1999)).

(27) a. [$_{TP}$ The books$_1$ were [$_{vP_2}$ given t$_1$ t$_3$] to no-one$_3$ t$_2$]
b. *[$_{TP}$ The books$_1$ were to no-one$_3$ [$_{vP_2}$ given t$_1$ t$_3$]]

In view of this, I will assume that there is an intermediate movement step of NP$_1$ to Specv of the root clause in (26-b), (26-c), and (27-a) that determines the respective vP shapes. Then, we can conclude that SC is systematically respected by NP raising in English. In the same way, Scandinavian object shift is well known for its rigid order preservation.[14] Thus, let us assume that there are only two general SC constraints – SC$_A$ (including [D], [Neg]) and SC$_{\overline{A}}$ (including [wh], [top], [scr]).

Third, since the analysis involves the notion of repair and depends on the violability and ranking of constraints, it lends itself to an optimality-theoretic implementation. The implicit ranking just sketched can be made explicit as follows (the ranking of FC and SC$_A$ is not determined by the evidence discussed here):

(28) $\{$FC, SC$_A\} \gg$ LR $\gg$ SC$_{\overline{A}}$

Repair phenomena are certainly among those constructions where optimality theory has proven most successful, and the notion of repair itself can be given a precise characterization in this approach: A repair is a competition in which the optimal candidate incurs an (otherwise fatal) violation of a high-ranked constraint C$_i$ in order to respect an even higher-ranked constraint C$_j$. However, standard global optimization procedures as laid out in Prince & Smolensky (1993) induce complexity of a type that more recent versions of the minimalist program (those that do without transderivational constraints) manage to avoid (see Collins (1997) and Frampton & Gutman (1999), among others). In view of this, and deviating from the vast majority of work in optimality-theoretic syntax, I would like to suggest that syn-

[13] I am grateful to the reviewer for pointing this out.

[14] Multiple object shift strictly preserves vP shape, and it seems possible to reanalyze double object NP$_1$-Pronoun$_2$ orders as the result of feature-driven pronominal object shift accompanied by SC-driven NP$_1$ fronting. See Williams (1999), Müller (2001), and references cited there.

tactic optimization is local, not global, and takes place repeatedly throughout the derivation.[15]

For the sake of concreteness, suppose that syntactic derivations proceed as in Chomsky (1995, ch. 4): Merge and Move alternate, with each XP a cyclic node. Crucially, the subderivation from one cyclic node α to the next cyclic node β is subject to input/output optimization. An XP is optimal if the subderivation that creates it best satisfies an ordered set of violable constraints and respects inviolable constraints (like strict cyclicity), which can be conceived of as parts of the definitions of Merge and Move. Thus, an XP that is the optimal output of a subderivation forms the input for the next subderivation, together with a new lexical item Y (and possibly another optimal ZP if SpecY is to be filled by Merge). Optimization determines the new optimal output YP, which in turn shows up in the input of the next subderivation, and so on, until the optimal root is reached.[16] Based on these assumptions, the differences between primary and secondary remnant movement can now be explained.

3.2. Independent Availability and Secondary Object Fronting Revisited

Consider again a typical secondary remnant movement example like (29-c):

[15] Versions of multiple optimization in phonology are discussed in Prince & Smolensky (1993, ch.2), McCarthy (1999), Rubach (2000), and the contributions in Hermans & van Oostendorp (2000). Heck (2001) and Wilson (2001) assume multiple (but non-local) optimization in syntax – three times per sentence in the former case (to determine D-structure, S-structure, and LF), and twice in the latter case (to determine interpretation and syntactic expression). The specific approach adopted here is further developed in Heck & Müller (2000). Also note that there is a trade-off: Whereas there is more complexity with global optimization than there is with local optimization, local optimization in turn requires a large number of optimization procedures.

[16] One might envisage a third type of optimization that is more complex than the local approach based on iterated XP evaluation but still less complex than the standard, global approach, viz., an optimization of phases (i.e., vP and CP), as in Chomsky (1998; 1999). Such an approach is pursued in Fanselow & Ćavar (2001). However, the two problems raised below for the global approach also hold for a phase optimization approach (which implies that evaluation of NegP, TP, and CP takes place simultaneously).

(29) a. [$_{vP_2}$ John$_3$ reads [$_{VP_3}$ t$_V$ no novels$_1$]] + Neg →

b. [$_{NegP}$ [$_{vP_2}$ John$_3$ reads t$_1$] [$_{Neg'}$ no novels$_1$ [$_{Neg'}$ Neg t$_2$]]] + T →

c. [$_{TP}$ John$_3$ T [$_{NegP}$ [$_{vP_2}$ t$_3$ reads t$_1$] [$_{Neg'}$ no novels$_1$ [$_{Neg'}$ Neg t$_2$]]]]

What we want to derive is that NP$_1$ moves to SpecNeg to check a strong [neg] feature and thereby respect FC, and that vP$_2$ then raises to an outer SpecNeg position without feature checking in order to respect SC$_A$, even if this violates LR. The optimization procedure that is responsible for this outcome is the one that takes the optimal vP$_2$ in (29-a) and Neg as inputs and creates a set of NegPs as output candidates. The optimal NegP is the one in (29-b), which violates LR but respects FC and SC$_A$, and thus has a better constraint profile than its competitors, which fatally violate either FC (by not applying negative NP$_1$ preposing) or SC$_A$ (by not applying secondary remnant vP$_2$ movement). The local competition is shown in tableau T$_1$.

T$_1$: Local optimization of NegP: Secondary remnant movement

Input: [$_{vP_2}$ John$_3$ reads [$_{VP}$ t$_V$ no novels$_1$]], Neg	FC	SC$_A$	LR	SC$_{\overline{A}}$
☞O$_1$: [$_{NegP}$ [$_{vP_2}$ John$_3$ reads [$_{VP}$ t$_V$ t$_1$]] no novels$_1$ Neg t$_2$]			*	
O$_2$: [$_{NegP}$ no novels$_1$ Neg [$_{vP_2}$ John$_3$ reads [$_{VP}$ t$_V$ t$_1$]]]		*!		
O$_3$: [$_{NegP}$ – Neg [$_{vP_2}$ John$_3$ reads [$_{VP}$ t$_V$ no novels$_1$]]]	*!			
O$_4$: [$_{NegP}$ [$_{vP_2}$ John$_3$ reads [$_{VP}$ t$_V$ no novels$_1$]] Neg t$_2$]	*!		*	
O$_5$: [$_{NegP}$ reads$_4$ no novels$_1$ Neg [$_{vP_2}$ John$_3$ t$_4$ [$_{VP}$ t$_V$ t$_1$]]]		*!	*	

The optimal NegP O$_1$ is then merged with T, and subsequent TP optimization produces the expected result: The best subderivation fronts the subject NP$_3$ to SpecT and has v+V in situ (this output violates none of the constraints at hand). Note that *only* O$_1$ can be in the input for the next optimization procedure, not O$_2$–O$_5$ or other suboptimal outputs. It is this property that minimizes complexity: Under standard, global optimization, all these suboptimal outputs would have to be continued to the end (in representational terms: considered as substructures of the whole sentence) and would thereby give rise to exponential growth of the candidate set.

In addition to this conceptual difference, local optimization turns out to also yield a desirable empirical difference. In the present system, it is clear that V raising is not an alternative to remnant vP movement: Local V raising to SpecNeg as in O_5 does not satisfy SC_A, leading to VOS instead of SVO order; and non-local V-to-T raising later in the derivation can never satisfy SC_A within NegP. In contrast, under global optimization there would be no SC_A violation with, e.g., non-local V-to-T raising (violating LR), due to subsequent NP_3 raising to SpecT (which ultimately restores SVO order), and repair-driven V raising might incorrectly (given adverb placement facts) be permitted along with (or instead of) remnant vP movement.[17]

Next consider the case where secondary remnant movement is accompanied by secondary object fronting, as in the double object construction (30-c).

(30) a. $[_{\mathrm{vP}_2}$ John$_4$ gave $[_{\mathrm{VP}}$ no books$_1$ t_V to Mary$_3$]] + Neg →

b. $[_{\mathrm{NegP}}$ $[_{\mathrm{vP}_2}$ John$_4$ gave $[_{\mathrm{VP}}$ t_1 t_V t_3]] no books$_1$ to Mary$_3$ Neg t_2] + T →

c. $[_{\mathrm{TP}}$ John$_4$ T $[_{\mathrm{NegP}}$ $[_{\mathrm{vP}_2}$ t_4 gave $[_{\mathrm{VP}}$ t_1 t_V t_3]] no books$_1$ to Mary$_3$ Neg t_2]]

Again, the important subderivation is the step from vP in (30-a) to NegP in (30-b), and essentially the same reasoning applies as before. The optimal NegP is one in which NP_1 moves to SpecNeg to check the [neg] feature and thereby respect FC, and PP_3 and vP_2 undergo repair-driven movement to inner and outer specifiers of NegP, respectively, to respect SC_A. This incurs two violations of LR, but, as shown in tableau T_2, all competing subderivations fatally violate higher-ranked constraints. Note in particular that O_1 blocks O_5 as suboptimal; O_5 has secondary remnant vP

[17] Of course, V raising could still independently be filtered out by stipulating a higher-ranked constraint that, e.g., bans movement of a lexical category (cf. Grimshaw (1997), Vikner (2001), and Kayne (1998, fn. 11), who notes: "The lexical verb in English cannot raise by head movement, yet it must move, consequently the whole VP moves"), or – in the case of O_5 in T_1 – by resorting to an appropriate structure preservation requirement. Still, the point remains that local and global optimization differ empirically, and the former approach offers a simpler account in the case at hand.

movement but fails to apply secondary object fronting.[18]

T_2: Local optimization of NegP: Secondary remnant movement and object fronting

Input: $[_{vP_2}$ John$_4$ gave $[_{VP}$ no books$_1$ t_V to Mary$_3$]], Neg	FC	SC$_A$	LR	SC$_{\overline{A}}$
☞O$_1$: $[_{NegP}$ $[_{vP_2}$ J$_4$ gave $[_{VP}$ t_1 t_V t_3]] no books$_1$ to M$_3$ Neg t_2]			**	
O$_2$: $[_{NegP}$ no books$_1$ Neg $[_{vP_2}$ J$_4$ gave $[_{VP}$ t_1 t_V to M$_3$]]]		*!*		
O$_3$: $[_{NegP}$ Neg $[_{vP_2}$ J$_4$ gave $[_{VP}$ no books$_1$ t_V to M$_3$]]]	*!			
O$_4$: $[_{NegP}$ $[_{vP_2}$ J$_4$ gave $[_{VP}$ no books$_1$ t_V to M$_3$]] Neg t_2]	*!		*	
O$_5$: $[_{NegP}$ $[_{vP_2}$ J$_4$ gave $[_{VP}$ t_1 t_V to M$_3$]] no books$_1$ Neg t_2]		*!	*	
O$_6$: $[_{NegP}$ no books$_1$ to M$_3$ Neg $[_{vP_2}$ J$_4$ gave $[_{VP}$ t_1 t_V t_3]]]		*!***	*	

As before, the step from (30-b) to (30-c) is straightforward because a constraint conflict does not arise and FC, SC$_{A,\overline{A}}$, and LR can all be satisfied.

Furthermore, a second empirical argument for local optimization can be gained. Suppose that PP$_3$ in (30) bears a [top] feature. Then, local optimization proceeds exactly as shown here, creating (30-b) from (30-a) as in T$_2$, and then (30-c) from (30-b). The only difference is that later in the derivation, PP$_3$ is moved to the topic position, yielding (31).[19]

(31) $[_{CP}$ To Mary$_3$ C $[_{TP}$ John$_4$ T $[_{NegP}$ $[_{vP_2}$ t_4 gave $[_{VP}$ t_1 t_V t_3]] no books$_1$ t'_3 Neg t_2]]]

Viewed globally, SC$_A$ cannot be fulfilled by this sentence. This would threaten to undermine the motivation for remnant vP movement in this context.[20] In contrast,

[18] The number of SC$_A$ violations of a given output O is determined as follows: Given a linear precedence $\alpha \succ \beta$ in vP (where α, β are lexical items), an occurrence of $\beta \succ \alpha$ in O incurs a violation of SC$_A$, and multiple violations add up. Thus, O$_5$ in T$_2$ violates SC$_A$ exactly once because PP$_3$ precedes NP$_1$ (and all other instances of vP-internal linear precedence remain unchanged); O$_2$ in T$_2$ violates SC$_A$ twice because NP$_1$ precedes both NP$_4$ and V; and O$_6$ violates SC$_A$ four times because NP$_1$ precedes NP$_4$ and V, and PP$_3$ does the same.

[19] I am assuming here that English topicalization is movement to SpecC, but the same argument can be made if topicalization is adjunction to TP, movement to SpecTop, etc.

[20] It would not help to assume that SC can be fulfilled by traces like t'_3 because, if nothing else is said, this would mean that SC is trivially respected by all sentences, vP order always being

no problem arises if optimization is local: The subderivation from vP to NegP respects FC and SC_A by violating the lower-ranked LR, and the subderivation from TP to CP respects FC and LR by violating the lower-ranked $SC_{\overline{A}}$. Instead of giving a tableau that shows this latter optimization procedure, let me proceed to the case of primary remnant movement, where exactly the same reasoning applies. A simple example is (32-d) from German, with its derivation in (32-abc).[21]

(32) a. [$_{vP_2}$ der $Fritz_3$ ein $Buch_1$ gelesen] + [$_V$ hat] →
b. [$_{VP}$ ein $Buch_1$ [$_{vP_2}$ der $Fritz_3$ t_1 gelesen] [$_V$ hat]] + T →
c. [$_{TP}$ der $Fritz_3$ [$_{VP}$ ein $Buch_1$ [$_{vP_2}$ t_3 t_1 gelesen] [$_V$ t_V]] [$_T$ hat]] + C →
d. [$_{CP}$ [$_{vP_2}$ t_3 t_1 Gelesen] hat [$_{TP}$ der $Fritz_3$ ein $Buch_1$ t_2] t_V]
read has Fritz a book

Consider first the subderivation from vP_2 to VP in (32-ab); cf. tableau T_3. Assuming that the object NP_1 has an optional [scr] feature that is matched by [$_V$ *hat*] (and the subject NP_3 does not), the optimal VP is O_1. Here, NP_1 moves to SpecV (respecting FC), and NP_3 stays in situ (respecting LR and violating $SC_{\overline{A}}$): Whereas [neg] obeys SC_A, [scr] obeys $SC_{\overline{A}}$. This precludes repair-driven movement as in O_3.

T_3: Local optimization of VP: Scrambling

Input: [$_{vP_2}$ der $Fritz_3$ ein $Buch_1$ gelesen], [$_V$ hat]	FC	SC_A	LR	$SC_{\overline{A}}$
☞O_1: [$_{VP}$ ein $Buch_1$ [$_{vP_2}$ der $Fritz_3$ t_1 gelesen] [$_V$ hat]]				*
O_2: [$_{VP}$ [$_{vP_2}$ der $Fritz_3$ ein $Buch_1$ gelesen] [$_V$ hat]]	*!			
O_3: [$_{VP}$ der $Fritz_3$ ein $Buch_1$ [$_{vP_2}$ t_3 t_1 gelesen] [$_V$ hat]]			*!	
O_4: [$_{VP}$ der $Fritz_3$ [$_{vP_2}$ t_3 ein $Buch_1$ gelesen] [$_V$ hat]]	*!		*	

The optimal VP O_1 (= (32-b)) is subsequently merged with T. Assuming that the EPP feature can optionally be strong in German, and is strong in the case at hand,

recoverable with the help of vP-internal traces.

[21]The derivation given here rests on some decisions that are controversial and, to some extent, arbitrary (concerning the projection of auxiliaries, here identified with a vP-external VP; subject raising to SpecT; V raising to a right-peripheral T; etc.). The only important assumption is that both NP_1 scrambling and vP_2 topicalization are triggered by features that obey $SC_{\overline{A}}$.

the optimal output of the subderivation from VP to TP is (32-c), in which the subject NP_3 moves to SpecT (in addition, V moves to T). Since this subderivation respects FC, LR, and $SC_{A,\overline{A}}$, it is not necessary to illustrate the competition by a tableau. Finally, the optimal TP in (32-c) is merged with C. In V/2 languages, an empty finite declarative C bears a [top] feature (and a feature attracting V). Assuming that [top] is also instantiated on vP_2, the optimal output of the subderivation from TP to CP is (32-d), which involves remnant vP_2 movement to SpecC and respects FC and LR at the cost of violating the lower-ranked $SC_{\overline{A}}$ (cf. O_1 vs. O_3 in tableau T_4).

T_4: Local optimization of CP: Primary remnant VP movement

Input: $[_{TP}$ der $Fritz_3$ ein $Buch_1$ $[_{vP_2}$ t_3 t_1 gelesen] hat], $C_{[-wh]}$	FC	SC_A	LR	$SC_{\overline{A}}$
☞O_1: $[_{CP}$ $[_{vP_2}$ t_3 t_1 Gelesen] hat $[_{TP}$ der $Fritz_3$ ein $Buch_1$]]				*
O_2: $[_{CP}$ Hat $[_{TP}$ der $Fritz_3$ ein $Buch_1$ $[_{vP_2}$ t_3 t_1 gelesen]]]	*!			
O_3: $[_{CP}$ der $Fritz_3$ ein $Buch_1$ $[_{vP_2}$ t_3 t_1 gelesen] hat $[_{TP}$ t'_3 t'_1]]			*!*	
O_4: $[_{CP}$ der $Fritz_3$ $[_{vP_2}$ t_3 t_1 gelesen] hat $[_{TP}$ t'_3 ein $Buch_1$]]			*!	*

$SC_{\overline{A}}$ has not yet been fatally violated by a candidate; i.e., it has played no role in the analysis so far. However, there is evidence for a low-ranked $SC_{\overline{A}}$: As soon as two or more subderivations behave identically with respect to higher-ranked constraints, the decision is passed on to the low-ranked $SC_{\overline{A}}$. A particularly obvious case is the superiority effect in English:[22]

(33) a. (I wonder) $[_{CP}$ who_1 C $[_{TP}$ t_1 bought $what_2$]]
b. *(I wonder) $[_{CP}$ $what_2$ C $[_{TP}$ who_1 bought t_2]]

Suppose that C bears a strong [wh] feature here which is matched by weak [wh] features on both *wh*-phrases. Tableau T_5 then shows that the subderivation from TP to CP must involve movement of one *wh*-phrase to SpecC, so as to fulfill FC (cf.

[22] Other phenomena that lend themselves to the same kind of analysis are German weak pronoun fronting and multiple *wh*-movement in Bulgarian. These phenomena are covered by the violable constraint PAR-MOVE in Müller (2001); it seems that $SC_{\overline{A}}$ can do all the work that was attributed to that constraint.

O_3), and must leave one *wh*-phrase in situ, so as to fulfill LR (cf. O_4). O_1 and O_2 (= (33-ab)) meet both requirements, and they vacuously fulfill SC_A. However, only O_1 respects $SC_{\overline{A}}$ by maintaining vP order with [wh] feature checking; therefore, it blocks O_2. Thus, the superiority effect is derived without recourse to constraints like the ECP or the MLC.[23]

T_5: Local optimization of CP: The superiority effect

Input: [$_{TP}$ who$_1$ [$_{vP}$ t$_1$ bought what$_2$]], $C_{[+wh]}$	FC	SC_A	LR	$SC_{\overline{A}}$
☞O_1: [$_{CP}$ who$_1$ C [$_{TP}$ t$'_1$ [$_{vP}$ t$_1$ bought what$_2$]]]				
O_2: [$_{CP}$ what$_2$ C [$_{TP}$ who$_1$ [$_{vP}$ t$_1$ bought t$_2$]]]				*!
O_3: [$_{CP}$ – C [$_{TP}$ who$_1$ [$_{vP}$ t$_1$ bought what$_2$]]]	*!			
O_4: [$_{CP}$ who$_1$ what$_2$ C [$_{TP}$ t$'_1$ [$_{vP}$ t$_1$ bought t$_2$]]]			*!	

3.3. Extraction Revisited

Recall that both the remnant XP β_2 in (34-a) and the antecedent of the unbound trace α_1 in (34-b) are barriers for extraction of some element δ_3 in primary remnant movement constructions (a freezing effect; cf. (10)–(12)), and that neither β_2 nor α_1 is a barrier for extraction in secondary remnant movement constructions (an anti-freezing effect; cf. (13)).

(34) a. δ_3 ... [$_{\underline{\beta_2}}$ ... t$_3$ ... t$_1$ ...] ... α_1 ... [... t$_2$ ...]
b. δ_3 ... [$_{\underline{\alpha_1}}$ ... t$_3$ ...]$_{...}$ [... t$_2$ ...]

Assuming that XPs in derived positions are barriers, the freezing effect with primary remnant movement can be accounted for. But how can secondary remnant movement escape this effect? The key to a solution is that secondary remnant movement is triggered by SC_A rather than by FC. Hence, secondary remnant movement

[23] As in approaches that rely on the ECP or the MLC, the question arises of why German does not exhibit superiority effects (at least not with *wh*-phrases that are clause-mates). I will have nothing new to say about this here, and merely confine myself to pointing out that many of the existing accounts that reconcile the absence of (clause-bound) superiority effects in German with the ECP/MLC can be transferred into the present approach. See, e.g., Fanselow (1997).

always restores local relations that existed earlier in the derivation. Thus, if α_1, β_2 are not barriers in situ, they will not be turned into barriers in secondary remnant movement constructions because each selected XP will still be in the same minimal domain as the head that selects it. To execute this idea, let us assume the BARRIERS CONDITION (BC) in (35-a), and define barriers as in (35-b); this definition differs from standard approaches (cf. Cinque (1990) and references cited there) mainly in replacing the notion of *sisterhood* in (35-b.(ii)) by the slightly more liberal notion of *same minimal domain* (see Chomsky (1995, 178)).[24]

(35) BARRIERS CONDITION (BC):

a. Movement must not cross a barrier.

b. An XP γ is a barrier unless there is a non-derived head σ such that:[25]

(i) σ selects γ.

(ii) σ and γ are in the same minimal domain.

Thus, extraction from α_1, β_2 does not violate BC in secondary remnant movement constructions. However, given that feature-driven movement in primary remnant movement constructions typically has the effect that an XP γ and its selecting head σ are not in the same minimal domain anymore, extraction from α_1, β_2 violates BC in this case. To derive ungrammaticality from this violation, one could postulate that BC is an inviolable constraint (part of the definition of Move), or that it is ranked high. Let us assume the latter. The optimal subderivation from YP to ZP (where SpecZ is the landing site of δ_3 in (34)) can then be one that yields an empty output (which vacuously respects BC/FC and violates a lower-ranked ban on empty

[24]Whereas the notion "minimal domain" plays a role in the definition of barriers, it must not replace the more restrictive notion of "minimal residue" in the definition of checking domains; otherwise, movement to a specifier position would not be a prerequisite for feature checking by an XP anymore.

[25]By "non-derived head" I mean a head in a base position (which may be a trace, as in the case of v-to-V movement, where the trace of V suffices to make an object transparent for *wh*-extraction). The confinement to non-derived heads in (35-b) ensures that γ may not become transparent by accidentally ending up in the same domain as σ after non-local movement; cf. (10-b).

outputs) – the derivation cannot continue; it crashes.[26]

We expect that movement in primary remnant movement constructions does not create barriers if it is extremely local. As noted by den Besten & Webelhuth (1990), this prediction is borne out. Whereas PP_1 is a barrier for extraction in (36-a) (= (12-b)), it is transparent in (36-b), where it has undergone extremely local string-vacuous scrambling.

(36) a. *[$_{vP_2}$ t_1 Gerechnet] hat da_3 gestern [$_{\underline{PP_1}}$ t_3 mit] wieder keiner t_2
counted has there yesterday with again no-one
"Again, no-one reckoned with it yesterday."

b. [$_{vP_2}$ t_1 Gerechnet] hat da_3 gestern wieder keiner [$_{\underline{PP_1}}$ t_3 mit] t_2
counted has there yesterday again no-one with
"Again, no-one reckoned with it yesterday."

3.4. Movement Types Revisited

Based on examples like those in (14), I have so far assumed that middle field-internal movement (e.g., scrambling) cannot affect remnant XPs, whereas middle field-external movement (e.g., topicalization) can. This generalization has proven problematic in the light of secondary remnant movement, which is obligatorily middle field-internal; cf. (16-a) vs. (16-b). The illformedness of (16-b) can now be accounted for by invoking the fact that SC_A-driven movement is strictly local.[27] However, the difference between illegitimate primary remnant scrambling in (14-b)

[26] Alternatively, one could assume that the optimal subderivation removes the features that triggers δ_3-movement and, e.g., changes a [+wh] *wh*-element into a [–wh] indefinite, and a [+wh] C into a [–wh] C. Then, δ_3 can remain in situ without violating BC or FC, at the cost of a violation of a lower-ranked faithfulness constraint; this amounts to neutralization of a [±wh] distinction in the input.

[27] This is a necessary condition, but not yet a sufficient one. To completely rule out (16-b) on this basis, we can make the standard assumption that finite vPs cannot bear a [top] feature. However, as noted by the reviewer, it might be that a bit more must be said to exclude cases like (i-b), formed via (i-a).

(i) a. $John_3$ has [$_{vP_2}$ t_3 read t_1] no $novels_1$ t_2

b. *[$_{vP_2}$ t_3 Read t_1] $John_3$ has t'_2 no $novels_1$ t_2

and legitimate local secondary remnant movement in (16-a) still calls for an explanation. This turns out to be straightforward. Note that the above generalization is not quite correct: Remnant scrambling is in fact possible if the antecedent of the unbound trace has not also undergone scrambling, but another type of movement, e.g., weak pronoun fronting; cf. (37-a) (= (14-b)) vs. (37-b).

(37) a. *daß [$_{vP_2}$ t_1 zu lesen] das $Buch_1$ keiner t_2 versucht hat
that to read the book no-one tried has
"that no-one tried to read the book."

b. daß [$_{vP_2}$ t_1 zu lesen] es_1 keiner t_2 versucht hat
that to read it no-one tried has
"that no-one tried to read it."

Similarly, middle field-external remnant *wh*-movement is impossible if the antecedent of the unbound trace has also undergone *wh*-movement, and possible if it has undergone another type of movement, e.g., scrambling; cf. (38-a) vs. (38-b).

(38) a. *[$_{NP_2}$ Was für ein Buch t_1] fragst du dich [$_{CP}$ [$_{PP_1}$ über wen] du t_2 lesen sollst] ?
what for a book ask you REFL about whom you read should
"*What kind of book do you wonder about whom to read?"

b. [$_{NP_2}$ Was für ein Buch t_1] hast du [$_{PP_1}$ über die Liebe] t_2 gelesen ?
what for a book have you about the love read
"What kind of book did you read about love?"

The strong illformedness of (38-a) cannot solely be due to the *wh*-island. This is shown by (39). Here, a complete *wh*-phrase is extracted from the *wh*-island, and the result is much improved.

Participle vPs can in principle undergo topicalization (i.e., bear a [top] feature) in English. Thus, unless there is an intervening factor responsible for the illformedness of (sentences like) (i-b), one might conclude that remnant XPs are frozen in place if they have undergone secondary remnant movement (but not if they have undergone primary remnant movement). Technically, this could be implemented by stipulating that movement operations that violate LR strip off all remaining movement features – an assumption that is not innocuous in view of some cases discussed in Heck & Müller (2000), and in view of the speculation in footnote 30 below. I will leave this issue open.

(39)??[$_{NP_2}$ Welches Buch über die Liebe] fragst du dich [$_{CP}$ ob du t_2
which book about the love ask you REFL whether you
lesen sollst] ?
read should

The same contrast between remnant and non-remnant *wh*-movement shows up in English, as noted by Barss (1986) and Saito (1989), among others; cf.:

(40) a. *[$_{NP_2}$ Which picture of t_1] do you wonder [$_{CP}$ who_1 John likes t_2] ?
b.??[$_{NP_2}$ Which picture of Mary] do you wonder [$_{CP}$ whether John likes t_2] ?

Thus, the data suggest that the following generalization is the correct one: A remnant XP cannot undergo a given type of feature-driven movement if the antecedent of the unbound trace has undergone the same type of movement earlier in the derivation; it is neither necessary nor possible to invoke specific stipulations as to which movement type may affect remnant XPs. This generalization can be captured by a constraint like UNAMBIGUOUS DOMINATION (UD) in (41).[28]

(41) UNAMBIGUOUS DOMINATION (UD):
In ... [$_\alpha$ ... β ...] ..., α and β cannot check the same kind of feature (outside α).

It can easily be verified that UD is violated in cases like (37-a) and (38-a), but respected in (37-b), (38-b), and typical primary remnant movement constructions that involve a combination of scrambling (or NP raising) and topicalization. Furthermore, it is now clear why secondary remnant movement as in (16-a) can never violate UD: The problem that α and β check the same feature can never arise if α does not check a feature at all.

[28]UD is from Müller (1998, ch. 5). To ensure ungrammaticality of subderivations that violate UD, the same reasoning applies as in the case of BC: The optimal subderivation respects UD by either violating a ban on empty outputs (crash), or by deleting the features that trigger the offending movement operation (neutralization). For more empirical evidence and attempts to derive (something like) this constraint from even more general assumptions, see Takano (1993), Koizumi (1995), Kitahara (1997), and Müller (1998, ch. 5).

3.5. Successive Cyclicity Revisited

Recall the above generalization according to which unbound intermediate traces resulting from successive-cyclic movement via SpecC cannot occur in primary remnant movement constructions, whereas they can occur in secondary remnant movement constructions (cf. (17-b) vs. (19-c)). In contrast to what turned out to be the case with the original movement type generalization discussed in the preceding section, this generalization is not directly falsified by empirical evidence. However, it seems clear that a ban on unbound intermediate A-bar traces in primary remnant movement constructions should not be stated as such; rather, it should be derived from more general assumptions. Elsewhere, I have argued that it can be derived by a conspiracy of extraction and extraposition (cf. Müller (1998, ch. 6; 1999)). Here, I will confine myself to presenting the basic idea, so as to show that there is no principled, construction-specific difference between primary and secondary remnant movement in this domain either. Consider two examples that illustrate the ban on unbound intermediate traces with primary remnant topicalization in German. (42-a) has been discussed above (cf. (17-b)); (42-b) differs from (42-a) in that CP_3 is topicalized, not vP_2.

(42) a. *[$_{vP_2}$ t_3 Gesagt [$_{CP_3}$ t_1' daß sie t_1 liebt]] weiß ich nicht [$_{CP}$ wen$_1$ sie t_2 hat]
said that she loves know I not whom she has
"I do not know who she said that she loves."

b. *[$_{CP_3}$ t_1' Daß sie t_1 liebt] weiß ich nicht [$_{CP}$ wen$_1$ sie [$_{vP_2}$ t_3 gesagt] hat] t_3'
that she loves know I not whom she said has
"I do not know who she said that she loves."

The crucial assumption we need to make is that argument CPs are base-generated to the left of v+V in German. In principle, they may then either remain in situ, within vP (cf. (43-a)), or undergo extraposition to a vP-, TP-, or CP-adjoined position (cf.

(43-b)), with a clear stylistic preference for the latter option:[29]

(43) a. daß sie [$_{CP_2}$ daß sie Fritz liebt] gesagt hat
that she that she$_{nom}$ Fritz$_{acc}$ loves said has
'that she said that she loves Fritz .'

b. daß sie t_2 gesagt hat [$_{CP_2}$ daß sie Fritz liebt]
that she said has that she$_{nom}$ Fritz$_{acc}$ loves
'that she said that she loves Fritz.'

However, if extraction takes place from CP_2, CP_2 extraposition is obligatory rather than stylistically preferred. This is shown by the contrast in (44).

(44) a. *(Ich weiß nicht) wen$_1$ sie [$_{CP_2}$ t_1' daß sie t_1 liebt] gesagt hat
I know not who$_{acc}$ she that she$_{nom}$ loves said has
"I do not know who she said that she loves."

b. (Ich weiß nicht) wen$_1$ sie t_2 gesagt hat [$_{CP_2}$ t_1' daß sie t_1 liebt]
I know not who$_{acc}$ she said has that she$_{nom}$ loves
"I do not know who she said that she loves."

Thus, obligatory CP extraposition can be viewed as a reflex of successive-cyclic movement from SpecC to SpecC in German, on a par with other (primarily morpho-phonologocial) reflexes affecting the C system in languages such as Modern Irish, Basque, Ewe, Spanish, and Malay. For present purposes, it is immaterial why this reflex arises in German; what is important here is the mere fact that there is such a reflex. Given this state of affairs, the only thing that needs to be shown is that obligatory CP extraposition forced by successive-cyclic *wh*-movement must lead to ungrammaticality in the examples in (42), in contrast to what is the case in (44-b). As a matter of fact, the illformedness of (42-a) follows from strict cyclicity: *Wh*-extraction from CP_3 must take place prior to CP_3 extraposition (because of the BARRIERS CONDITION). Strict cyclicity then implies that CP_3 extraposition must target a position that is not lower than the landing site of *wh*-movement of *wen*$_1$; i.e., CP_3 extraposition must minimally end up in the next higher CP domain. However,

[29] CP extraposition to vP is possible only if CP does not interrupt a TP-internal V cluster; i.e., if vP is topicalized. For an account of this and ample evidence in support of deriving V CP structures by CP extraposition in German, cf. Büring & Hartmann (1997).

the fact that the extraposed CP_3 is carried along with vP_2 under vP_2 topicalization shows that the landing site of CP_3 was lower than that, in violation of strict cyclicity. Similarly, obligatory extraposition accounts for the illformedness of (42-b). As before, given successive-cyclic *wh*-extraction from CP_3, we know that CP_3 has to undergo extraposition (to the CP domain, given strict cyclicity). Remnant CP_3 topicalization then takes place not from the in situ-position of CP_3, but from the extraposition site. This mixing of A-bar movement types (CP_3 extraposition followed by CP_3 topicalization) then qualifies as an an instance of improper movement. Such improper movement can be blocked in various ways (see, e.g., the Principle of Unambiguous Binding (PUB) in Müller & Sternefeld (1993), which requires A-bar traces to be bound from one type of position only; or the transderivational constraint that minimizes optional features in Chomsky (1995, 294; 1999, 28)).

Evidently, the notion of an unbound intermediate trace does not play a role in this approach to (42). There is no ban on unbound intermediate traces as such; rather, the problems with examples like (42-a) and (42-b) are solely due to obligatory CP extraposition triggered by successive-cyclic *wh*-movement. Since obligatory CP extraposition is not an issue in English, derivations like the one in (19-c) are unproblematic.[30]

4. Conclusion and Outlook

I have tried to show that the different properties of primary and secondary remnant movement do not force us to abandon one of the two concepts. Most of the differences follow from the fact that primary remnant movement is feature-driven, whereas secondary remnant movement is not: It is a repair strategy forced by Shape Conservation and the Feature Condition, in violation of Last Resort. As a consequence of this, secondary object fronting may also be required; Barriers

[30]Under an approach to improper movement that relies on feature minimization, even obligatory CP extraposition after *wh*-extraction in some language would be predicted to be unproblematic for secondary remnant movement in this language. The reason is that ensuing "secondary CP fronting" would be a repair strategy forced by SC that does not involve feature checking.

Condition violations can be avoided; and Unambiguous Domination violations do not show up. Furthermore, an apparent difference between primary and secondary remnant movement with respect to the legitimacy of unbound intermediate traces was shown to be spurious; what distinguishes the two constructions is the presence vs. absence of obligatory CP extraposition.

On a more general note, I have argued that since repair-driven secondary remnant movement presupposes constraint violability and ranking, it lends itself to an optimality-theoretic analysis. What is more, it provides evidence that syntactic optimization is local, not global (as is standardly assumed): On the one hand, there are ill-formed derivations that are indeed locally suboptimal, but globally optimal (cf. T_1). And on the other hand, there are well-formed derivations that are locally optimal, but globally suboptimal (cf. T_2). In general, it seems that syntactic repair is typically a local phenomenon: An "offending" property is removed instantaneously, not at some earlier or later stage in the derivation. This holds for other cases of repair-driven movement that have been proposed in the literature; cf. Heck & Müller (2000), where arguments are given for local analyses of, e.g., semantically vacuous QR that is forced by a higher-ranked parallelism constraint (Fox (1995)), and *wh*-scrambling that is forced by a higher-ranked Neg-intervention constraint (Beck (1996)). Moreover, many other cases of syntactic repair that have been approached in terms of global optimization (cf., e.g., Grimshaw (1997) on *do*-support, Pesetsky (1998) and Legendre, Smolensky, & Wilson (1998) on resumptive pronouns, Schmid (1998) on the Westgermanic "Ersatzinfinitiv") can be treated by local optimization. It remains to be seen, though, whether local optimization can (or should) do all the work that global optimization has been held responsible for in syntax.

Finally, a discussion of parametrization options in the present system has been conspicuously absent in the preceding pages. Basically, two possibilities arise. The approach has inherited both the concept of feature strength from the minimalist program, and the concept of constraint reranking from optimality theory. At present, I take it to be an open question whether both concepts are needed, or whether one can (or should) be dispensed with in favour of the other.

5. Appendix: Other Cases of Secondary Remnant Movement

As noted in footnote 2, secondary remnant movement has found applications beyond Kayne's (1998) treatment of negative NPs; cf. den Dikken (1996), Hinterhölzl (1997), Ordóñez (1997), Johnson (1998), Noonan (1999), and Koopman & Szabolcsi (2000), among others. What has been said above about secondary remnant movement in Kayne's (1998) approach also holds for other analyses, to various degrees. In what follows, I will briefly discuss aspects of three of these analyses, viz., Johnson (1998), Noonan (1999), and Koopman & Szabolcsi (2000), and point out their consequences for the present approach.

5.1. Quantifier Raising in Johnson (1998)

Johnson proposes an approach to quantifier raising (QR) that is in many respects similar to Kayne's (1998) approach to negative NPs. He suggests that quantifier raising can take place overtly in English; but the effects of this operation are masked by subsequent remnant VP (or "VC," for "verbal complex" – this projection may contain negation, e.g.) fronting to a higher position. This is shown in (45-a).

(45) a. Jill [$_{VP_2}$ didn't answer t_1] [$_{NP_1}$ two thirds of the questions] t_2

b. Jill [$_{VP_2}$ didn't answer [$_{NP_1}$ two thirds of the questions]] t_2

By assumption, overt QR is necessary to give NP_1 scope over negation in (45) (by virtue of c-commanding a trace of VP_2 that contains negation; i.e., under VP_2 reconstruction). Narrow scope with respect to negation is accomplished by leaving NP_1 in situ. Still, VP_2 is assumed to obligatorily undergo fronting. Of course, in this case, the fronting is string-vacuous and non-remnant; cf. (45-b). Thus, there are two substantial differences to (my reconstruction of) Kayne's analysis. First, if we assume that QR is driven by a feature [quant] (cf. Chomsky (1995, ch. 4)), we have to conclude that this feature is only optionally strong, in contrast to [neg]. Second, in contrast to what is the case in Kayne's approach, remnant VP fronting is in fact not assumed to be a repair strategy; rather, there must be some feature that triggers this movement. However, it seems that the main motivation behind VP fronting in Johnson's analysis is the illformedness of (46), where overt QR is not accompanied by remnant VP movement.

(46) *Jill [$_{NP_1}$ two thirds of the questions] [$_{VP_2}$ didn't answer t_1]

Moreover, the combination of optional overt QR and obligatory VP fronting in English does not suffice to predict all orders correctly. This becomes obvious when we consider double object constructions. Suppose that (the extended) VP contains negation, that the first object is a quantified NP and the second object a proper name, and that the quantified NP takes scope over negation by QR. If nothing else is said, Johnson's approach wrongly predicts the ungrammatical surface orders in (47-ac). Thus, as in Kayne's approach, secondary object fronting to a lower position must apply, yielding (47-bd) (as before, this process is indicated by underlining).

(47) a. *Jill [$_{VP_2}$ didn't give t_1 to $John_3$] two $books_1$ t_2
b. Jill [$_{VP_2}$ didn't give t_1 t_3] two $books_1$ $\underline{\text{to John}_3}$ t_2
c. *Jill [$_{VP_2}$ didn't give t_1 her new $book_3$] two $friends_1$ t_2
d. Jill [$_{VP_2}$ didn't give t_1 t_3] two $friends_1$ $\underline{\text{her new book}_3}$ t_2

Clearly, the search for a feature as a trigger is futile here – whether or not secondary object fronting applies depends solely on what NP QR has applied to. This is shown by the impossibility of secondary object fronting in cases where the quantified NP taking wide scope is the second object, not the first one; cf.:

(48) a. Jill [$_{VP_2}$ didn't give her new $book_3$ t_1] to two $friends_1$ t_2
b. *Jill [$_{VP_2}$ didn't give t_3 t_1] to two $friends_1$ $\underline{\text{her new book}_3}$ t_2
c. Jill [$_{VP_2}$ didn't give $John_3$ t_1] two $books_1$
d. *Jil [$_{VP_2}$ didn't give t_3 t_1] two $books_1$ $\underline{\text{John}_3}$

Hence, we may conclude that something like SC must play a role in Johnson's approach anyway. Since there does not appear to be substantial independent evidence in support of string-vacuous non-remnant clause-internal VP fronting in English, we may conclude that it is possible to treat remnant VP fronting in this approach exactly like remnant VP fronting in Kayne's approach, as a repair strategy forced by SC.[31] Given that [quant] is an A-feature that may be strong in English, this follows without further assumptions. It is then expected that secondary remnant movement in Johnson's approach shares other properties with secondary remnant movement in Kayne's analysis. This seems to be the case. Since QR is usually clause-bound, unbound intermediate traces cannot be tested easily. However, VP fronting in Johnson's approach does not give rise to UD effects. In addition, neither the remnant VP nor the antecedent of the unbound trace is a barrier for further extraction in constructions in which the quantified NP takes scope over negation. This anti-freezing is illustrated for *wh*-extraction in (49-a) (with respect to VP_2), and for topicalization in (49-b) (with respect to NP_1).

(49) a. (I wonder) which new book$_3$ Jill [$_{\underline{VP_2}}$ didn't give t_3 t_1] to two friends$_1$ t_2
b. This man$_3$ Jill [$_{VP_2}$ has not seen t_1] [$_{\underline{NP_1}}$ many pictures of t_3] t_2

5.2. CP Fronting in Noonan (1999)

Noonan's goal is to show that cases of long-distance *wh*-movement in Modern Irish should be reanalyzed as involving CP fronting and secondary remnant movement. Consider the following example.

(50) [$_{CP}$ Céard$_1$ a chreideann Seán [$_{CP}$ t'_1 a dhéanfá pro t_1]] ?
what aL believes Séan aL would say-2s
"What does Sean believe that you would say?"

(50) is the structure that is standardly assigned to this kind of sentence; but this is not the structure that Noonan argues for. Specifically, she proposes that *wh*-movement from a CP always involves an object-shift-like operation applying to CP

[31] Johnson assumes that German also has overt QR, but no VP fronting; i.e., no obligatory movement that masks the effects of QR and reestablishes the pre-movement order. This could be accounted for under either of the options of parametrizing SC-driven movement that were briefly sketched above.

in Irish (also cf. the above suggestion for German). This CP shift is reflected by the marker *aL* in the higher clause (which is thus indicative of CP movement, and not of *wh*-movement per se, as is standardly assumed); and it triggers secondary remnant movement that restores the original order. The first relevant step in the derivation of (50) that Noonan postulates is local, feature-driven DP preposing of *céard* ('what') to the embedded SpecC position in (51-a) (accompanied by V raising). Next, by assumption, CPs that contain *wh*-phrases must undergo feature-driven movement to a focus/Case head in the matrix clause; cf. (51-b) (accompanied by V raising in the matrix clause). Third, Noonan assumes that the *wh*-phrase *céard* moves to the matrix SpecC position, as in (51-c). Finally, secondary remnant FP movement to a position between the matrix SpecC position and the fronted CP_2 restores the word order and yields the string in (50); cf. (51-d).

(51) *Noonan's derivation*:

a. [$_{CP_2}$ céard$_1$ a dhéanfá pro t$_1$] → ... →
b. [$_{CP_2}$ céard$_1$ a dhéanfá pro t$_1$] [$_{FP_3}$ a chreideann Séan t$_2$] →
c. [$_{CP}$ céard$_1$ [$_{CP_2}$ t$'_1$ a dhéanfá pro t$_1$] [$_{FP_3}$ a chreideann Séan t$_2$]] →
d. [$_{CP}$ Céard$_1$ [$_{FP_3}$ a chreideann Séan t$_2$] [$_{CP_2}$ t$'_1$ a dhéanfá pro t$_1$] t$_3$]

As it stands, this derivation is not directly compatible with the approach developed above. The reason is that CP_2 fronting in the second step is the movement operation that triggers secondary remnant movement; but the repair operation is not local – it occurs in the last step, preceded by *wh*-movement. (*Wh*-movement in turn cannot trigger secondary remnant movement in Irish; cf. (51-a).) Interestingly, there is another peculiarity with the last two steps in (51): Remnant FP_3 fronting violates strict cyclicity. This, as such, is not a problem for Noonan (1999) because she explicitly assumes that remnant FP fronting in (51) is a post-cyclic rule, triggered by (unspecified) prosodic considerations. However, suppose now that the trigger for remnant FP fronting is not prosody, but SC, and that the last two movement operations in (51) are reversed, as required by strict cyclicity. Then, we obtain the following derivation:

(52) *Derivation required by SC_A:*

a. [$_{CP_2}$ céard$_1$ a dhéanfá pro t$_1$] → ... →

b. [$_{CP_2}$ céard$_1$ a dhéanfá pro t$_1$] [$_{FP_3}$ a chreideann Séan t$_2$] →

c. [$_{FP_3}$ a chreideann Séan t$_2$] [$_{CP_2}$ céard$_1$ a dhéanfá pro t$_1$] t$_3$ →

d. [$_{CP}$ Céard$_1$ [$_{FP_3}$ a chreideann Séan t$_2$] [$_{CP_2}$ t_1' a dhéanfá pro t$_1$] t$_3$]

Feature-driven fronting of CP_2 in (52-b) immediately triggers secondary remnant movement of FP_3 to an outer specifier of the same domain in (52-c); finally, *wh*-extraction from CP_2 takes place (cf. (52-d)). Assuming that FP can be equated with vP (Noonan suggests TP, but the difference is probably not crucial, with a proviso concerning local V raising), and that the feature checked by CP_2 fronting is an A-feature, the basic properties of Noonan's analysis are derived: As in Kayne's approach, secondary remnant movement is a repair strategy that is parasitic on another, feature-driven movement operation (CP_2 fronting; cf. the role of negative NP preposing in Kayne (1998)). Furthermore, the moved CP_2 is not a barrier for *wh*-extraction because CP_2 fronting and secondary remnant movement of FP_3 end up in the same domain; hence, the anti-freezing effect is accounted for. Finally, UD cannot block clause-internal remnant FP_3 movement because this movement operation is not feature-driven. (Since CP fronting is always clause-bound in Noonan's analysis, repair-driven remnant FP_3 movement as such will never be successive-cyclic either; for this reason, it is difficult to test whether unbound intermediate traces are possible in this construction.)

5.3. Verbal Complexes in Koopman & Szabolsci (2000)

Based on Hinterhölzl (1997) and others, Koopman & Szabolsci set out to develop a principled account of verb cluster formation in languages like Hungarian, Dutch, and German. This account crucially rests on (a) the postulation of extremely articulated syntactic structures, and (b) massive remnant movement (and pied piping). I will not try to sketch this approach here, or to give a sample derivation of verb cluster formation that would illustrate it. I would like to confine myself to pointing out that, despite of what one might think at first sight, most of the instances of remnant movement envisaged by Koopman & Szabolsci (2000) actually behave like primary remnant movement, not like secondary remnant movement: They are feature-driven, they show freezing effects (e.g., a remnant XP that is moved to a specifier position is a barrier for further extraction), and they obey a constraint like UD in a non-trivial way (being feature-driven). Still, there is one type of movement (remnant or other) that behaves differently. In order to ensure that all derivations respect strict cyclicity, Koopman & Szabolsci (2000, ch. 4.2) introduce "stacking positions," i.e., positions that provide landing sites that XPs can reach without feature checking. Of these positions, they say: "The [stacking] positions ... are not extrinsically ordered, rather, movement into them is constrained by the convention that it must replicate the already existing linear order of the pertinent XPs." Movement which is not feature-driven and replicates pre-movement order is of course strongly reminiscent of secondary movement forced by SC. However, at present I would like to leave open the question of whether a simple application of SC is possible for Koopman & Szabolsci's order-preserving movements to stacking positions.

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