Feature Stacks and Binding Relations

Silke Fischer (Universität Stuttgart)
The Fine Structure of Grammatical Relations, Universität Leipzig
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1. Introduction

Background:

In Fischer (2004b, 2006) a derivational theory of binding has been developed which relies on the mechanism of local optimization; hence, an optimality-theroretic framework has been adopted in these papers. However, many central insights of these works do not, in fact, involve any competition, and although OT provides smart strategies to capture, in particular, crosslinguistic variation and optionality by means of constraint reranking and tied constraints, the aim of this talk is to show that a theory of binding in the spirit of Fischer (2004b, 2006) can alternatively be implemented in a different, competition-free way.

1.1 Underlying Assumptions I – On the Phase Model and Edge Features

Framework:

⇒ minimalist phase model plus Müller's (2010) *Edge Feature Condition*

Central principles: (i) *Phase Impenetrability Condition* + (ii) *Edge Feature Condition*

(1) *Phase Impenetrability Condition* (PIC):[1]
The domain of a head X of a phase XP is not accessible to operations outside XP; only X and its edge are accessible to such operations.

(2) The *domain* of a head corresponds to its c-command domain.

(3) The *edge* of a head X is the residue outside X′; it comprises specifiers and elements adjoined to XP.

(4) All phrases are *phases*.

Consequences:

a. Apart from the fact that there is no look-ahead in the course of the derivation (a typical property of derivational theories), access to earlier parts of the derivation is also restricted by the PIC.
b. Once it is assumed that we only have access to a small piece of the structure at once, it seems reasonable to make the system as restrictive as possible by minimizing search space. This can be achieved by assuming that the PIC extends to all phrases; cf. (4).[2]

[1] Cf. Chomsky (2000) and subsequent work.

[2] In fact, there are two possibilities how this can be implemented. It can either be assumed that instead of (1) a slightly modified version holds in which the term phase is replaced by the term phrase (cf. Müller 2004, Fischer 2004b, 2006); alternatively, we can stick to the formulation in (1) and assume that all phrases are phases (cf. also Müller 2010).

A note on Müller (2010):

Intermediate movement to the phase edge:

⇒ triggered by edge features

Ordering of features:

a. Features on heads are listed on feature stacks. Only features on the top of these stacks are accessible!
b. There are structure-building features (= edge features and subcategorization features; notation: [•X•]) and probe features (triggering Agree; notation: [*X*]). They are listed on different feature stacks.

Deletion of features:

A discharged feature is deleted; hence, the next feature becomes the "derivation's next top feature" and can now be dealt with (since it becomes accessible).

(5) *Edge Feature Condition (EFC)*:
An edge feature [•X•] can be assigned to the head γ of a phase only if (a) and (b) hold:
  a. γ has not yet discharged all its structure-building or probe features (i.e., γ is still *active*).
  b. [•X•] ends up on top of γ's list of structure-building features.

1.2 Underlying Assumptions II – On Binding

Basic ideas (following Fischer 2004b, 2006):

(i) In the numeration, it is encoded which elements will establish a binding relation (but we do not know anything about the ultimate syntactic configuration); the bound element is encoded as x.

(ii) The concrete realization of x (as SELF anaphor, SE anaphor, or pronoun) is determined in the course of the derivation, depending on how local the binding relation is in the end.

(iii) In the beginning, x is associated with all possible specifications (SELF/SE/pron); in the course of the derivation, they are successively deleted until either the binding relation is established or only one feature is left.

(iv) Binding is sensitive to domains of different size;[3] whenever one of these domains is completed, feature deletion might take place (depending on parametrization).

(v) Since we do not know in the beginning at which point the antecedent enters the derivation, x has to be dragged along in order to remain accessible.

(vi) Technically, the binding relation is encoded in terms of feature checking between the antecedent and the bound element x[4] (involved feature: [β]); the probe feature [*β *] is associated with the antecedent, the goal feature [β] is associated with x.

(vii) When the binding relation is established, the concrete realization form of x is deter-

[3] Cf. also, among others, Manzini & Wexler (1987), Dalrymple (1993), Fischer (2004a), Büring (2005).
[4] Cf. also, among others, Reuland (2001), Schäfer (2010).

mined.[5]

(viii) Once the form of x is known, the whole chain it heads can be aligned and x can then be spelled out in the appropriate position.

2. Technical Implementation in this Framework

Assumptions:

(i) x = the feature stack $\begin{vmatrix} SELF \\ SE \\ pron \end{vmatrix}$

⇒ This means that feature stacks are not restricted to phase heads.

(ii) Only the topmost feature is accessible.

(iii) As in Fischer (2004b, 2006), features might be deleted when a binding-relevant domain is completed.

(iv) When the antecedent enters the derivation and binding takes place, the topmost feature determines the realization form of x.

(v) Consequence: If binding is relatively local, the realization as SELF anaphor is most probable; the less local the binding relation gets, the more probable a realization as pronoun gets.

Domains:

⇒ The smallest domain whose definition is satisfied and which has not yet been taken into account determines feature deletion.

(6) *θ-domain*:
XP is a *θ-domain* of x if it contains x and the head that θ-marks x plus its external argument (if there is one).

(7) *Case domain*:
XP is a *Case domain* of x if it contains x and the head that bears the Case features against which x checks Case.

(8) *Subject domain*:
XP is a *subject domain* of x if it contains x and a subject distinct from x which does not contain x.

(9) *Clausal domain*:
XP is a *clausal domain* of x if it contains x and the top node of a clause.

Technical questions:

A. What triggers intermediate movement of x to the edge of the current phase?
B. How is feature deletion from x's feature stack triggered?

[5] I assume that this operation takes place at PF prior to *Late Insertion* (cf. Halle & Marantz 1993 and subsequent work on Distributed Morphology).

Answers:

ad A:
Intermediate movement is triggered by EFs. The concrete appearance of the EF depends on x's feature stack: it corresponds to the its topmost feature, hence it can be [•SELF•], [•SE•], or [•pron•].

ad B:
Whether a phase corresponds to one of the binding-relevant domains can already be determined when x is moved to the phase's edge, i.e. before the phase is finally completed (cf. the analyses in section 3). If a domain is reached in which deletion of the topmost feature is required, it is really checked against the corresponding EF on the head (under Spec-head agreement) and thereby deleted.

Parametrization:

For each domain a given language determines as to whether feature deletion takes place or not; cf. also the summary in section 3.6.

3. Analysis

3.1 The data

Note:

In the following I will consider binding in the θ-domain (cf. (10-a)-(12-a)), Case domain (cf. (10-b)-(12-b)), subject domain (cf. (10-c)-(12-c)), and clausal domain (cf. (10-d)-(12-d)) in English, German, and Dutch.

(10) *English:*
- a. Max_1 hates **himself**$_1$/***him**$_1$.
- b. Max_1 heard **himself**$_1$/***him**$_1$ sing.
- c. Max_1 glanced behind **himself**$_1$/**him**$_1$.
- d. Max_1 knows that Mary likes **him**$_1$/***himself**$_1$.

(11) *German:*
- a. Max_1 hasst **sich selbst**$_1$/**sich**$_1$/*ihn$_1$.
- b. Max_1 hört **sich selbst**$_1$/**sich**$_1$/*ihn$_1$ singen.
- c. Max_1 schaut hinter ??sich selbst$_1$/**sich**$_1$/*ihn$_1$.
- d. Max_1 weiß, dass Maria *sich selbst$_1$/*sich$_1$/**ihn**$_1$ mag.

(12) *Dutch:*
- a. Max_1 haat **zichzelf**$_1$/*zich$_1$/*hem$_1$.
- b. Max_1 hoorde **zichzelf**$_1$/**zich**$_1$/*hem$_1$ zingen.
- c. Max_1 keek achter *zichzelf$_1$/**zich**$_1$/**hem**$_1$.
- d. Max_1 weet dat Mary *zichzelf$_1$/*zich$_1$/**hem**$_1$ leuk vindt.

3.2 Binding in the θ-domain

(13)
- a. *English:* Max_1 hates himself$_1$/*him$_1$.
- b. *German:* Max_1 hasst sich selbst$_1$/sich$_1$/*ihn$_1$.
- c. *Dutch:* Max_1 haat zichzelf$_1$/*zich$_1$/*hem$_1$.

Note:

As regards the phrase structures in this and the subsequent sections, I will use the English derivations as illustration.

(14) **VP phase:**

$$[_{\text{VP}} \text{ hates} \begin{vmatrix} SELF \\ SE \\ pron \end{vmatrix}_{[\beta]}]; \text{Num}=\{\text{Max}_{[*\beta*]}\}$$

Assumption:

Since V is inactive, x cannot move to the edge of the phase. However, following Müller (2010:52, fn. 24), last-merged complements might also be part of the accessible domain; I follow this assumption and suppose that x is still accessible in the next phase (cf. (15)).

(15) **vP phase:** *V-to-v movement*

$$[_{\text{vP}} \text{ hates}_{[\bullet D\bullet]} [_{\text{VP}} \text{ t}_{hates} \begin{vmatrix} SELF \\ SE \\ pron \end{vmatrix}_{[\beta]}]]; \text{Num}=\{\text{Max}_{[*\beta*]}\}$$

(16) *EF insertion*

$$[_{\text{vP}} \text{ hates}_{[\bullet SELF\bullet \succ \bullet D\bullet]} [_{\text{VP}} \text{ t}_{hates} \begin{vmatrix} SELF \\ SE \\ pron \end{vmatrix}_{[\beta]}]]; \text{Num}=\{\text{Max}_{[*\beta*]}\}$$

Note:

At this point in the derivation, the phase head v is active (cf. [•D•]), hence an EF can be inserted.

(17) *Movement of x to the phase edge*

$$[_{\text{vP}} \begin{vmatrix} SELF \\ SE \\ pron \end{vmatrix}_{[\beta]} \text{ hates}_{[\cancel{\bullet SELF\bullet} \succ \bullet D\bullet]} [_{\text{VP}} \text{ t}_{hates} \text{ t}_x]]; \text{Num}=\{\text{Max}_{[*\beta*]}\}$$

Relevant domain:

vP = θ-domain
(this is apparent at this point in the derivation, since the [•D•]-feature on v and locality restrictions on θ-role assignment indicate that the external argument of the verb will enter the derivation in this phase)

Parametrization – θ-domain:

languages A: no deletion from x's feature stack (= English, Dutch, German_1)
languages B: deletion of x's topmost feature (= German_2)[6]

[6] The notation $\text{German}_1/\text{German}_2$ is to be understood in the following way: German either opts for option 1 or for option 2; it does not mean that we are talking of two different varieties.

Result:

English, Dutch, German$_1$: $x = \left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}$

German$_2$: $x = \left|\begin{array}{c} SE \\ pron \end{array}\right|_{[\beta]}$

(18) *Deletion of x's topmost feature depending on parametrization*

A. $[_{\text{vP}} \left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}$ hates$_{[\bullet \cancel{SELF} \bullet \succ \bullet D \bullet]}$ $[_{\text{VP}}$ t$_{hates}$ t$_x$]]; Num={Max$_{[*\beta*]}$}

B. $[_{\text{vP}} \left|\begin{array}{c} \cancel{SELF} \\ SE \\ pron \end{array}\right|_{[\beta]}$ hates$_{[\bullet \cancel{SELF} \bullet \succ \bullet D \bullet]}$ $[_{\text{VP}}$ t$_{hates}$ t$_x$]]; Num={Max$_{[*\beta*]}$}

(19) *External merge of the antecedent*

A. $[_{\text{vP}}$ Max$_{[*\beta*]}$ $[_{\text{v'}} \left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}$ hates$_{[\bullet \cancel{D} \bullet]}$ $[_{\text{VP}}$ t$_{hates}$ t$_x$]]]

B. $[_{\text{vP}}$ Max$_{[*\beta*]}$ $[_{\text{v'}} \left|\begin{array}{c} SE \\ pron \end{array}\right|_{[\beta]}$ hates$_{[\bullet \cancel{D} \bullet]}$ $[_{\text{VP}}$ t$_{hates}$ t$_x$]]]

Binding:

At this point in the derivation, the β-feature can be checked, since [$*\beta$ *] and [β] are accessible at the same time; this means that the binding relation between *Max* and x is established.

Realization form of x:

Languages A: x is spelt out as SELF anaphor (= x's topmost feature).
Languages B: x is spelt out as SE anaphor (= x's topmost feature).

Language:	Realization:
English	SELF anaphor
German	SELF/SE anaphor
Dutch	SELF anaphor

3.3 Binding in the Case domain

(20) a. *English:* Max$_1$ heard himself$_1$/*him$_1$ sing.
b. *German:* Max$_1$ hört sich selbst$_1$/sich$_1$/*ihn$_1$ singen.
c. *Dutch:* Max$_1$ hoorde zichzelf$_1$/zich$_1$/*hem$_1$ zingen.

(21) **vP**$_{emb.}$ **phase:** *External merge of the embedded subject = x*

$[_{\text{vP}} \left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}$ sing$_{[\bullet \cancel{SELF} \bullet]}$]; Num={Max$_{[*\beta*]}$, heard}

Note:

The [•SELF•] feature in (21) is not an EF but an inherent feature on v which selects x as external argument. Since at this stage a binding-sensitive domain is already reached, the SELF-feature on v is needed to ensure feature checking and therefore potential feature deletion from x's feature stack.[7] (Note that this innovation does not have any consequences for the outcome of the analysis in the previous section.)

Relevant domain:

$vP_{emb} = \theta$-domain

Parametrization – θ-domain:

languages A: no deletion from x's feature stack (= English, Dutch, $German_1$)
languages B: deletion of x's topmost feature (= $German_2$)

Result:

English, Dutch, $German_1$: $x = \left| \begin{array}{c} SELF \\ SE \\ pron \end{array} \right|_{[\beta]}$

$German_2$: $x = \left| \begin{array}{c} SE \\ pron \end{array} \right|_{[\beta]}$

(22) *Deletion of x's topmost feature depending on parametrization*

A. $[_{vP} \left| \begin{array}{c} SELF \\ SE \\ pron \end{array} \right|_{[\beta]}$ sing$_{[\cancel{\bullet SELF \bullet}]}$]; Num={$Max_{[*\beta*]}$, heard}

B. $[_{vP} \left| \begin{array}{c} \cancel{SELF} \\ SE \\ pron \end{array} \right|_{[\beta]}$ sing$_{[\cancel{\bullet SELF \bullet}]}$]; Num={$Max_{[*\beta*]}$, heard}

(23) **VP_{matrix} phase:** *Insertion of the matrix verb*

A. $[_{VP}$ heard $[_{vP} \left| \begin{array}{c} SELF \\ SE \\ pron \end{array} \right|_{[\beta]}$ sing]]; Num={$Max_{[*\beta*]}$}

B. $[_{VP}$ heard $[_{vP} \left| \begin{array}{c} SE \\ pron \end{array} \right|_{[\beta]}$ sing]]; Num={$Max_{[*\beta*]}$}

Note:

It has to be made sure that V is not yet inactive at this point in the derivation since movement of x to the edge has to be ensured. This is not only relevant for binding – it is required independently for Case licensing: the subject of the embedded clause and matrix v have to establish an Agree relation ([Acc]/[*Acc*]), which means that the embedded subject must still be accessible when v enters the derivation. Since the base position of the embedded subject (Specv of the embedded clause) is no longer accessible when v is inserted, the subject has to

[7] Alternatively, it could be assumed that the subcategorization feature selecting x is not [•SELF•] but [•D•]. On this assumption, not the embedded vP counts as θ-domain where feature deletion might take place, but the matrix VP; cf. (23).

move to SpecV.

Consequence:

I assume that the matrix V and the embedded v establish an Agree relation in ECM contexts reflecting their special relationship (here: "hear-sing").[8] Hence, matrix V bears the additional probe feature [*ECM*] in (23), and EF insertion is therefore possible; cf. (24) (which replaces (23)).

(24)

A. $[_{\text{VP}}\ \text{heard}_{[*ECM*]}\ [_{\text{vP}} \left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}\ \text{sing}_{[ECM]}]];\ \text{Num}=\{\text{Max}_{[*\beta*]}\}$

B. $[_{\text{VP}}\ \text{heard}_{[*ECM*]}\ [_{\text{vP}} \left|\begin{array}{c} SE \\ pron \end{array}\right|_{[\beta]}\ \text{sing}_{[ECM]}]];\ \text{Num}=\{\text{Max}_{[*\beta*]}\}$

(25) *EF insertion*

A. $[_{\text{VP}}\ \text{heard}_{[*ECM*],[\bullet SELF\bullet]}\ [_{\text{vP}} \left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}\ \text{sing}_{[ECM]}]];\ \text{Num}=\{\text{Max}_{[*\beta*]}\}$

B. $[_{\text{VP}}\ \text{heard}_{[*ECM*],[\bullet SE\bullet]}\ [_{\text{vP}} \left|\begin{array}{c} SE \\ pron \end{array}\right|_{[\beta]}\ \text{sing}_{[ECM]}]];\ \text{Num}=\{\text{Max}_{[*\beta*]}\}$

(26) *Discharge of the probe feature*

A. $[_{\text{VP}}\ \text{heard}_{\cancel{[*ECM*]},[\bullet SELF\bullet]}\ [_{\text{vP}} \left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}\ \text{sing}_{\cancel{[ECM]}}]];\ \text{Num}=\{\text{Max}_{[*\beta*]}\}$

B. $[_{\text{VP}}\ \text{heard}_{\cancel{[*ECM*]},[\bullet SE\bullet]}\ [_{\text{vP}} \left|\begin{array}{c} SE \\ pron \end{array}\right|_{[\beta]}\ \text{sing}_{\cancel{[ECM]}}]];\ \text{Num}=\{\text{Max}_{[*\beta*]}\}$

Note:

The probe feature has to be discharged before the EF in order to satisfy the Strict Cycle Condition (cf. also Müller 2010:51).

(27) *Movement of x to the phase edge*

A. $[_{\text{VP}} \left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}\ \text{heard}_{\cancel{[\bullet SELF\bullet]}}\ [_{\text{vP}}\ t_x\ \text{sing}]];\ \text{Num}=\{\text{Max}_{[*\beta*]}\}$

B. $[_{\text{VP}} \left|\begin{array}{c} SE \\ pron \end{array}\right|_{[\beta]}\ \text{heard}_{\cancel{[\bullet SE\bullet]}}\ [_{\text{vP}}\ t_x\ \text{sing}]];\ \text{Num}=\{\text{Max}_{[*\beta*]}\}$

[8] The goal feature could alternatively also be located on the embedded V; in this case, Agree could be established in a successive-cyclic manner (as regards successive-cyclic Agree, cf. also Müller 2010:49).

(28) **vP$_{matrix}$ phase:** *V-to-v movement*

A. $[_{\text{vP}}\ \text{heard}_{[\bullet D\bullet]}\ [_{\text{VP}} \begin{vmatrix} SELF \\ SE \\ pron \end{vmatrix}_{[\beta]}\ \text{t}_{heard}\ [_{\text{vP}}\ \sout{\text{t}_x \text{ sing}}]]];\ \text{Num}=\{\text{Max}_{[*\beta*]}\}$

B. $[_{\text{vP}}\ \text{heard}_{[\bullet D\bullet]}\ [_{\text{VP}} \begin{vmatrix} SE \\ pron \end{vmatrix}_{[\beta]}\ \text{t}_{heard}\ [_{\text{vP}}\ \sout{\text{t}_x \text{ sing}}]]];\ \text{Num}=\{\text{Max}_{[*\beta*]}\}$

(29) *EF insertion*

A. $[_{\text{vP}}\ \text{heard}_{[\bullet SELF\bullet \succ \bullet D\bullet]}\ [_{\text{VP}} \begin{vmatrix} SELF \\ SE \\ pron \end{vmatrix}_{[\beta]}\ \text{t}_{heard}\ [_{\text{vP}}\ \sout{\text{t}_x \text{ sing}}]]];\ \text{Num}=\{\text{Max}_{[*\beta*]}\}$

B. $[_{\text{vP}}\ \text{heard}_{[\bullet SE\bullet \succ \bullet D\bullet]}\ [_{\text{VP}} \begin{vmatrix} SE \\ pron \end{vmatrix}_{[\beta]}\ \text{t}_{heard}\ [_{\text{vP}}\ \sout{\text{t}_x \text{ sing}}]]];\ \text{Num}=\{\text{Max}_{[*\beta*]}\}$

(30) *Movement of x to the phase edge*

A. $[_{\text{vP}} \begin{vmatrix} SELF \\ SE \\ pron \end{vmatrix}_{[\beta]}\ \text{heard}_{[\sout{\bullet SELF\bullet} \succ \bullet D\bullet]}\ [_{\text{VP}}\ \text{t}_x\ \text{t}_{heard}\ [_{\text{vP}}\ \sout{\text{t}_x \text{ sing}}]]];\ \text{Num}=\{\text{Max}_{[*\beta*]}\}$

B. $[_{\text{vP}} \begin{vmatrix} SE \\ pron \end{vmatrix}_{[\beta]}\ \text{heard}_{[\sout{\bullet SE\bullet} \succ \bullet D\bullet]}\ [_{\text{VP}}\ \text{t}_x\ \text{t}_{heard}\ [_{\text{vP}}\ \sout{\text{t}_x \text{ sing}}]]];\ \text{Num}=\{\text{Max}_{[*\beta*]}\}$

Relevant domain:

vP$_{matrix}$ = Case domain
(v bears the Accusative Case features against which the embedded subject checks Case)

Parametrization – Case domain:

languages A: no deletion from x's feature stack (= English, Dutch$_1$, German$_1$, German$_2$)
languages B: deletion of x's topmost feature (= Dutch$_2$)

Result:

English, Dutch$_1$, German$_1$: $x = \begin{vmatrix} SELF \\ SE \\ pron \end{vmatrix}_{[\beta]}$

German$_2$, Dutch$_2$: $x = \begin{vmatrix} SE \\ pron \end{vmatrix}_{[\beta]}$

(31) *External merge of the antecedent*

A. $[_{\text{vP}}\ \text{Max}_{[*\beta*]} \begin{vmatrix} SELF \\ SE \\ pron \end{vmatrix}_{[\beta]}\ \text{heard}_{[\sout{\bullet D\bullet}]}\ [_{\text{VP}}\ \text{t}_x\ \text{t}_{heard}\ [_{\text{vP}}\ \sout{\text{t}_x \text{ sing}}]]]$

B. $[_{\text{vP}}\ \text{Max}_{[*\beta*]} \begin{vmatrix} SE \\ pron \end{vmatrix}_{[\beta]}\ \text{heard}_{[\sout{\bullet D\bullet}]}\ [_{\text{VP}}\ \text{t}_x\ \text{t}_{heard}\ [_{\text{vP}}\ \sout{\text{t}_x \text{ sing}}]]]$

Binding:

At this point in the derivation, the β-feature can be checked: the binding relation between *Max* and x is established.

Realization form of x:

Languages A: x is spelt out as SELF anaphor (= x's topmost feature).
Languages B: x is spelt out as SE anaphor (= x's topmost feature).

Language:	Realization:
English	SELF anaphor
German	SELF/SE anaphor
Dutch	SELF/SE anaphor

3.4 Binding in the subject domain

(32) a. *English:* Max_1 glanced behind $\text{himself}_1/\text{him}_1$.
b. *German:* Max_1 schaut hinter sich_1/??sich selbst_1/*ihn_1.
c. *Dutch:* Max_1 keek achter *$\text{zichzelf}_1/\text{zich}_1/\text{hem}_1$.

(33) **PP phase:**

$$[_{\text{PP}} \text{ behind}_{[\bullet \cancel{SELF} \bullet]} \begin{vmatrix} SELF \\ SE \\ pron \end{vmatrix}_{[\beta]}];\ \text{Num}=\{\text{Max}_{[*\beta*]}, \text{glanced}\}$$

Note:

As in (21), the discharged feature on P is not an EF but a subcategorization feature.

Relevant domain:

PP = θ-domain

Parametrization – θ-domain:

languages A: no deletion from x's feature stack (= English, Dutch, German_1)
languages B: deletion of x's topmost feature (= German_2)

Result:

A: English, Dutch, German_1: $x = \begin{vmatrix} SELF \\ SE \\ pron \end{vmatrix}_{[\beta]}$

B: German_2: $x = \begin{vmatrix} SE \\ pron \end{vmatrix}_{[\beta]}$

(34) *Deletion of x's topmost feature depending on parametrization*

A. $[_{\text{PP}} \text{ behind}_{[\bullet \cancel{SELF} \bullet]} \begin{vmatrix} SELF \\ SE \\ pron \end{vmatrix}_{[\beta]}];\ \text{Num}=\{\text{Max}_{[*\beta*]}, \text{glanced}\}$

B. $[_{\text{PP}}$ behind$_{\cancel{[\bullet SELF \bullet]}}$ $\left|\begin{array}{c} \cancel{SELF} \\ SE \\ pron \end{array}\right|_{[\beta]}$]; Num={Max$_{[*\beta*]}$, glanced}

(35) **VP phase:**

A. $[_{\text{VP}}$ glanced $[_{\text{PP}}$ behind $\left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}$]]; Num={Max$_{[*\beta*]}$}

B. $[_{\text{VP}}$ glanced $[_{\text{PP}}$ behind $\left|\begin{array}{c} SE \\ pron \end{array}\right|_{[\beta]}$]]; Num={Max$_{[*\beta*]}$}

Note:

On the assumption that the last-merged complement of the preceding phase is still accessible (cf. above), x is in the accessible domain in (35). (So it is not problematic that P is inactive at this point.)

Problem:

However, if V does not bear any additional features either apart from the subcategorization feature selecting its complement (here: [•P•]), no EFs can be inserted on V, which means that x cannot move to the edge of VP and is thus no longer accessible after VP has been completed. Note that this scenario arises independently of binding – it also occurs, for instance, in the case of preposition stranding, where the complement of P also needs to be accessible after the completion of VP.[9]

Conclusion:

There must be a probe feature [*F*] on V which agrees with a goal feature [F] on P. As a result, it is possible to insert an EF on V, and thus the complement of P can move to the edge of V and stays accessible after the completion of VP.

(36) *Replacing (35)*

A. $[_{\text{VP}}$ glanced$_{[*F*]}$ $[_{\text{PP}}$ behind$_{[F]}$ $\left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}$]]; Num={Max$_{[*\beta*]}$}

B. $[_{\text{VP}}$ glanced$_{[*F*]}$ $[_{\text{PP}}$ behind$_{[F]}$ $\left|\begin{array}{c} \cancel{SELF} \\ SE \\ pron \end{array}\right|_{[\beta]}$]]; Num={Max$_{[*\beta*]}$}

(37) *EF insertion*

A. $[_{\text{VP}}$ glanced$_{[*F*],[\bullet SELF \bullet]}$ $[_{\text{PP}}$ behind$_{[F]}$ $\left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}$]]; Num={Max$_{[*\beta*]}$}

B. $[_{\text{VP}}$ glanced$_{[*F*],[\bullet SE \bullet]}$ $[_{\text{PP}}$ behind$_{[F]}$ $\left|\begin{array}{c} SE \\ pron \end{array}\right|_{[\beta]}$]]; Num={Max$_{[*\beta*]}$}

[9] Cf. also Müller (2010:51f.) as regards this mechanism to avoid barrierhood of clausal projections without a regular specifier.

(38) *Discharge of the probe feature*

A. $[_{\text{VP}}$ glanced$_{\cancel{[*F*]},[\bullet SELF\bullet]}$ $[_{\text{PP}}$ behind$_{\cancel{[F]}}$ $\begin{vmatrix} SELF \\ SE \\ pron \end{vmatrix}_{[\beta]}$ $]]$; Num=$\{\text{Max}_{[*\beta*]}\}$

B. $[_{\text{VP}}$ glanced$_{\cancel{[*F*]},[\bullet SE\bullet]}$ $[_{\text{PP}}$ behind$_{\cancel{[F]}}$ $\begin{vmatrix} SE \\ pron \end{vmatrix}_{[\beta]}$ $]]$; Num=$\{\text{Max}_{[*\beta*]}\}$

(39) *Movement of x to the phase edge*

A. $[_{\text{VP}}$ $\begin{vmatrix} SELF \\ SE \\ pron \end{vmatrix}_{[\beta]}$ glanced$_{\cancel{[\bullet SELF\bullet]}}$ $[_{\text{PP}}$ behind $t_x]]$; Num=$\{\text{Max}_{[*\beta*]}\}$

B. $[_{\text{VP}}$ $\begin{vmatrix} SE \\ pron \end{vmatrix}_{[\beta]}$ glanced$_{\cancel{[\bullet SE\bullet]}}$ $[_{\text{PP}}$ behind $t_x]]$; Num=$\{\text{Max}_{[*\beta*]}\}$

Relevant domain:

VP = Case domain
(smallest domain that has not yet been taken into account: we can still see that PP qualified as θ-domain before)

Parametrization – Case domain:

languages A: no deletion from x's feature stack (= English, Dutch_1, German_1, German_2)
languages B: deletion of x's topmost feature (= Dutch_2)

Result:

A: English, Dutch_1, German_1: $x = \begin{vmatrix} SELF \\ SE \\ pron \end{vmatrix}_{[\beta]}$

B: German_2, Dutch_2: $x = \begin{vmatrix} SE \\ pron \end{vmatrix}_{[\beta]}$

(40) **vP phase:** *V-to-v movement*

A. $[_{\text{vP}}$ glanced$_{[\bullet D\bullet]}$ $[_{\text{VP}}$ $\begin{vmatrix} SELF \\ SE \\ pron \end{vmatrix}_{[\beta]}$ $t_{glanced}$ $[_{\text{PP}}$ ~~behind t_x~~$]]]$; Num=$\{\text{Max}_{[*\beta*]}\}$

B. $[_{\text{vP}}$ glanced$_{[\bullet D\bullet]}$ $[_{\text{VP}}$ $\begin{vmatrix} SE \\ pron \end{vmatrix}_{[\beta]}$ $t_{glanced}$ $[_{\text{PP}}$ ~~behind t_x~~$]]]$; Num=$\{\text{Max}_{[*\beta*]}\}$

(41) *EF insertion*

A. $[_{\text{vP}}$ glanced$_{[\bullet SELF\bullet \succ \bullet D\bullet]}$ $[_{\text{VP}}$ $\begin{vmatrix} SELF \\ SE \\ pron \end{vmatrix}_{[\beta]}$ $t_{glanced}$ $[_{\text{PP}}$ ~~behind t_x~~$]]]$

B. $[_{\text{vP}}$ glanced$_{[\bullet SE\bullet \succ \bullet D\bullet]}$ $[_{\text{VP}}$ $\begin{vmatrix} SE \\ pron \end{vmatrix}_{[\beta]}$ $t_{glanced}$ $[_{\text{PP}}$ ~~behind t_x~~$]]]$; Num=$\{\text{Max}_{[*\beta*]}\}$

(42) *Movement of x to the phase edge*

A. $[_{\text{vP}} \left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}$ glanced$_{[\cancel{\bullet SELF \bullet} \succ \bullet D \bullet]}$ $[_{\text{VP}}$ t'$_x$ t$_{glanced}$ $[_{\text{PP}}$ ~~behind t_x~~$]]]$

B. $[_{\text{vP}} \left|\begin{array}{c} SE \\ pron \end{array}\right|_{[\beta]}$ glanced$_{[\cancel{\bullet SE \bullet} \succ \bullet D \bullet]}$ $[_{\text{VP}}$ t'$_x$ t$_{glanced}$ $[_{\text{PP}}$ ~~behind t_x~~$]]]$; Num=$\{$Max$_{[*\beta*]}\}$

Relevant domain:

vP = subject domain
(we know at this point that a subject will enter the derivation in this phase)

Parametrization – subject domain:

languages A: no deletion from x's feature stack (= English$_1$, German$_2$)
languages B: deletion of x's topmost feature (= Dutch$_1$, Dutch$_2$, German$_1$, English$_2$)

Result:

English$_1$: $x = \left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}$

German$_1$, German$_2$, Dutch$_1$, English$_2$: $x = \left|\begin{array}{c} SE \\ pron \end{array}\right|_{[\beta]}$

Dutch$_2$: $x = \left| pron \right|_{[\beta]}$

(43) *External merge of the antecedent*

A. $[_{\text{vP}}$ Max$_{[*\beta*]}$ glanced $[_{\text{VP}} \left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}$ t$_{glanced}$ $[_{\text{PP}}$ ~~behind t_x~~$]]]$

B. $[_{\text{vP}}$ Max$_{[*\beta*]}$ glanced $[_{\text{VP}} \left|\begin{array}{c} SE \\ pron \end{array}\right|_{[\beta]}$ t$_{glanced}$ $[_{\text{PP}}$ ~~behind t_x~~$]]]$

C. $[_{\text{vP}}$ Max$_{[*\beta*]}$ glanced $[_{\text{VP}} \left| pron \right|_{[\beta]}$ t$_{glanced}$ $[_{\text{PP}}$ ~~behind t_x~~$]]]$

Binding:

At this point in the derivation, the β-feature can be checked: the binding relation between *Max* and x is established.

Realization form of x:

Languages A: x is spelt out as SELF anaphor (= x's topmost feature).
Languages B: x is spelt out as SE anaphor (= x's topmost feature).
Languages C: x is spelt out as pronoun (= x's topmost feature).

A note on English$_2$:

Since English does not have SE anaphors, x is realized as pronoun in the case of English$_2$ (following the subset principle).

Language:	Realization:
English	SELF anaphor/pronoun
German	SE anaphor
Dutch	SE anaphor/pronoun

3.5 Binding in the clausal domain

(44) a. *English:* Max_1 knows that Mary likes him_1/*himself_1.
b. *German:* Max_1 weiß, dass Maria ihn_1/*sich_1/*sich selbst_1 mag.
c. *Dutch:* Max_1 weet dat Mary *zichzelf_1/*zich_1/hem_1 leuk vindt.

(45) **VP phase:**

$$[_{\text{VP}} \text{ likes} \left| \begin{array}{c} SELF \\ SE \\ pron \end{array} \right|_{[\beta]}]; \text{Num}=\{\text{Max}_{[*\beta*]}, \text{knows, that, Mary}\}$$

(46) **vP phase:** *V-to-v movement*

$$[_{\text{vP}} \text{ likes}_{[\bullet D \bullet]} [_{\text{VP}} \text{ t}_{likes} \left| \begin{array}{c} SELF \\ SE \\ pron \end{array} \right|_{[\beta]}]]$$

(47) *EF insertion*

$$[_{\text{vP}} \text{ likes}_{[\bullet SELF \bullet \succ \bullet D \bullet]} [_{\text{VP}} \text{ t}_{likes} \left| \begin{array}{c} SELF \\ SE \\ pron \end{array} \right|_{[\beta]}]]$$

(48) *Movement of x to the phase edge*

$$[_{\text{vP}} \left| \begin{array}{c} SELF \\ SE \\ pron \end{array} \right|_{[\beta]} \text{ likes}_{[\cancel{\bullet SELF \bullet} \succ \bullet D \bullet]} [_{\text{VP}} \text{ t}_{likes} \text{ t}_x]]$$

Relevant domain:

$\text{vP}_{emb} = \theta$-domain

Parametrization – θ-domain:

languages A: no deletion from x's feature stack (= English, Dutch, German_1)
languages B: deletion of x's topmost feature (= German_2)

Result:

English, Dutch, German_1: $x = \left| \begin{array}{c} SELF \\ SE \\ pron \end{array} \right|_{[\beta]}$

German_2: $x = \left| \begin{array}{c} SE \\ pron \end{array} \right|_{[\beta]}$

(49) *Deletion of x's topmost feature depending on parametrization*

A. $[_{\text{vP}} \left| \begin{array}{c} SELF \\ SE \\ pron \end{array} \right|_{[\beta]}$ likes$_{\sout{[\bullet SELF \bullet} \succ \bullet D \bullet]}$ $[_{\text{VP}}$ t_{likes} $t_x]]$

B. $[_{\text{vP}} \left| \begin{array}{c} \sout{SELF} \\ SE \\ pron \end{array} \right|_{[\beta]}$ likes$_{\sout{[\bullet SELF \bullet} \succ \bullet D \bullet]}$ $[_{\text{VP}}$ t_{likes} $t_x]]$

(50) *External merge of the embedded subject*

A. $[_{\text{vP}}$ Mary $\left| \begin{array}{c} SELF \\ SE \\ pron \end{array} \right|_{[\beta]}$ likes$_{\sout{[\bullet D \bullet]}}$ $[_{\text{VP}}$ t_{likes} $t_x]]$; Num={Max$_{[*\beta*]}$, knows, that}

B. $[_{\text{vP}}$ Mary $\left| \begin{array}{c} SE \\ pron \end{array} \right|_{[\beta]}$ likes$_{\sout{[\bullet D \bullet]}}$ $[_{\text{VP}}$ t_{likes} $t_x]]$; Num={Max$_{[*\beta*]}$, knows, that}

(51) **TP phase:**

A. $[_{\text{TP}}$ T$_{[\bullet D \bullet]}$ $[_{\text{vP}}$ Mary $\left| \begin{array}{c} SELF \\ SE \\ pron \end{array} \right|_{[\beta]}$ likes $[_{\text{VP}}$ $\sout{t_{likes}\ t_x}]]]$

B. $[_{\text{TP}}$ T$_{[\bullet D \bullet]}$ $[_{\text{vP}}$ Mary $\left| \begin{array}{c} SE \\ pron \end{array} \right|_{[\beta]}$ likes $[_{\text{VP}}$ $\sout{t_{likes}\ t_x}]]]$

Note:

The [•D•]-feature on T is not an EF but an inherent feature (= EPP feature); it attracts the subject, whose target position is SpecT – hence, this is not intermediate movement.

(52) *EF insertion*

A. $[_{\text{TP}}$ T$_{[\bullet SELF \bullet \succ \bullet D \bullet]}$ $[_{\text{vP}}$ Mary $\left| \begin{array}{c} SELF \\ SE \\ pron \end{array} \right|_{[\beta]}$ likes $[_{\text{VP}}$ $\sout{t_{likes}\ t_x}]]]$

B. $[_{\text{TP}}$ T$_{[\bullet SE \bullet \succ \bullet D \bullet]}$ $[_{\text{vP}}$ Mary $\left| \begin{array}{c} SE \\ pron \end{array} \right|_{[\beta]}$ likes $[_{\text{VP}}$ $\sout{t_{likes}\ t_x}]]]$

(53) *Movement of x to the phase edge*

A. $[_{\text{TP}} \left| \begin{array}{c} SELF \\ SE \\ pron \end{array} \right|_{[\beta]}$ T$_{\sout{[\bullet SELF \bullet} \succ \bullet D \bullet]}$ $[_{\text{vP}}$ Mary t'$_x$ likes $[_{\text{VP}}$ $\sout{t_{likes}\ t_x}]]]$

B. $[_{\text{TP}} \left| \begin{array}{c} SE \\ pron \end{array} \right|_{[\beta]}$ T$_{\sout{[\bullet SE \bullet} \succ \bullet D \bullet]}$ $[_{\text{vP}}$ Mary t'$_x$ likes $[_{\text{VP}}$ $\sout{t_{likes}\ t_x}]]]$

Relevant domain:

TP_{emb} = Case domain
(it can be seen that vP qualified as θ-domain before, and the Case assigner v is still accessible)

Parametrization – Case domain:

languages A: no deletion from x's feature stack (= English, $Dutch_1$, $German_1$, $German_2$)
languages B: deletion of x's topmost feature (= $Dutch_2$)

Result:

A: English, $Dutch_1$, $German_1$: $x = \left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}$

B: $German_2$, $Dutch_2$: $x = \left|\begin{array}{c} SE \\ pron \end{array}\right|_{[\beta]}$

(54) *Movement of "Mary" to the phase edge*

A. $[_{\text{TP}}\ \text{Mary} \left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}\ \text{T}_{\cancel{[\bullet D \bullet]}}\ [_{\text{vP}}\ \text{t}_{Mary}\ \text{t'}_x\ \text{likes}\ [_{\text{VP}}\ \cancel{\text{t}_{likes}\ \text{t}_x}]]]$

B. $[_{\text{TP}}\ \text{Mary} \left|\begin{array}{c} SE \\ pron \end{array}\right|_{[\beta]}\ \text{T}_{\cancel{[\bullet D \bullet]}}\ [_{\text{vP}}\ \text{t}_{Mary}\ \text{t'}_x\ \text{likes}\ [_{\text{VP}}\ \cancel{\text{t}_{likes}\ \text{t}_x}]]]$

(55) **CP phase:**

A. $[_{\text{CP}}\ \text{that}_{[*F*]}\ [_{\text{TP}}\ \text{Mary} \left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}\ \text{T}_{[F]}\ [_{\text{vP}}\ \cancel{\text{t}_{Mary}\ \text{t'}_x\ \text{likes}\ [_{VP}\ \text{t}_{likes}\ \text{t}_x}]]]]$

B. $[_{\text{CP}}\ \text{that}_{[*F*]}\ [_{\text{TP}}\ \text{Mary} \left|\begin{array}{c} SE \\ pron \end{array}\right|_{[\beta]}\ \text{T}_{[F]}\ [_{\text{vP}}\ \cancel{\text{t}_{Mary}\ \text{t'}_x\ \text{likes}\ [_{VP}\ \text{t}_{likes}\ \text{t}_x}]]]]$

(56) *EF insertion*

A. $[_{\text{CP}}\ \text{that}_{[\bullet SELF \bullet],[*F*]}\ [_{\text{TP}}\ \text{Mary} \left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}\ \text{T}_{[F]}\ [_{\text{vP}}\ \cancel{\text{t}_{Mary}\ \text{t'}_x\ \text{likes}\ [_{VP}\ \text{t}_{likes}\ \text{t}_x}]]]]$

B. $[_{\text{CP}}\ \text{that}_{[\bullet SE \bullet],[*F*]}\ [_{\text{TP}}\ \text{Mary} \left|\begin{array}{c} SE \\ pron \end{array}\right|_{[\beta]}\ \text{T}_{[F]}\ [_{\text{vP}}\ \cancel{\text{t}_{Mary}\ \text{t'}_x\ \text{likes}\ [_{VP}\ \text{t}_{likes}\ \text{t}_x}]]]]$

(57) *Agree*

A. $[_{\text{CP}}\ \text{that}_{[\bullet SELF \bullet]\cancel{,[[*F*]}}\ [_{\text{TP}}\ \text{Mary} \left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}\ \text{T}_{[\cancel{F}]}\ [_{\text{vP}}\ \cancel{\text{t}_{Mary}\ \text{t'}_x\ \text{likes}\ [_{VP}\ \text{t}_{likes}\ \text{t}_x}]]]]$

B. $[_{\text{CP}}\ \text{that}_{[\bullet SE \bullet]\cancel{,[[*F*]}}\ [_{\text{TP}}\ \text{Mary} \left|\begin{array}{c} SE \\ pron \end{array}\right|_{[\beta]}\ \text{T}_{[\cancel{F}]}\ [_{\text{vP}}\ \cancel{\text{t}_{Mary}\ \text{t'}_x\ \text{likes}\ [_{VP}\ \text{t}_{likes}\ \text{t}_x}]]]]$

(58) *Movement of x to the phase edge*

A. [$_{\text{CP}}$ $\left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}$ that~~$_{[\bullet SELF \bullet]}$~~ [$_{\text{TP}}$ Mary t”$_x$ T [$_{\text{vP}}$ ~~t$_{Mary}$ t’$_x$ likes [$_{VP}$ t$_{likes}$ t$_x$]~~]]]]

B. [$_{\text{CP}}$ $\left|\begin{array}{c} SE \\ pron \end{array}\right|_{[\beta]}$ that~~$_{[\bullet SE \bullet]}$~~ [$_{\text{TP}}$ Mary t”$_x$ T [$_{\text{vP}}$ ~~t$_{Mary}$ t’$_x$ likes [$_{VP}$ t$_{likes}$ t$_x$]~~]]]]

Relevant domain:

CP$_{emb}$ = subject domain (the subject *Mary* is in the accessible domain)

Parametrization – subject domain:

languages A: no deletion from x's feature stack (= English$_1$, German$_2$)
languages B: deletion of x's topmost feature (= Dutch$_1$, Dutch$_2$, German$_1$, English$_2$)

Result:

English$_1$: $x = \left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}$

German$_1$, German$_2$, Dutch$_1$, English$_2$: $x = \left|\begin{array}{c} SE \\ pron \end{array}\right|_{[\beta]}$

Dutch$_2$: $x = \left| pron \right|_{[\beta]}$

(59) **VP$_{matr}$ phase:**

A. [$_{\text{VP}}$ knows$_{[*F*]}$ [$_{\text{CP}}$ $\left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}$ that$_{[F]}$ [$_{\text{TP}}$ ~~Mary t”$_x$ T [$_{vP}$ t$_{Mary}$ t’$_x$ likes [$_{VP}$ t$_{likes}$ t$_x$]~~]]]]]

B. [$_{\text{VP}}$ knows$_{[*F*]}$ [$_{\text{CP}}$ $\left|\begin{array}{c} SE \\ pron \end{array}\right|_{[\beta]}$ that$_{[F]}$ [$_{\text{TP}}$ ~~Mary t”$_x$ T [vP t$_{Mary}$ t’$_x$ likes [$_{VP}$ t$_{likes}$ t$_x$]~~]]]]]

C. [$_{\text{VP}}$ knows$_{[*F*]}$ [$_{\text{CP}}$ $\left| pron \right|_{[\beta]}$ that$_{[F]}$ [$_{\text{TP}}$ ~~Mary t”$_x$ T [vP t$_{Mary}$ t’$_x$ likes [$_{VP}$ t$_{likes}$ t$_x$]~~]]]]]

(60) *EF insertion*

A. [$_{\text{VP}}$ knows$_{[\bullet SELF \bullet],[*F*]}$ [$_{\text{CP}}$ $\left|\begin{array}{c} SELF \\ SE \\ pron \end{array}\right|_{[\beta]}$ that$_{[F]}$ [$_{\text{TP}}$ ~~Mary t”$_x$ T [$_{vP}$ t$_{Mary}$ t’$_x$ likes [$_{VP}$ t$_{likes}$ t$_x$]~~]]]]]

B. [$_{\text{VP}}$ knows$_{[\bullet SE \bullet],[*F*]}$ [$_{\text{CP}}$ $\left|\begin{array}{c} SE \\ pron \end{array}\right|_{[\beta]}$ that$_{[F]}$ [$_{\text{TP}}$ ~~Mary t”$_x$ T [$_{vP}$ t$_{Mary}$ t’$_x$ likes [$_{VP}$ t$_{likes}$ t$_x$]~~]]]]]

C. [$_{\text{VP}}$ knows$_{[\bullet pron \bullet],[*F*]}$ [$_{\text{CP}}$ $\left| pron \right|_{[\beta]}$ that$_{[F]}$ [$_{\text{TP}}$ ~~Mary t”$_x$ T [$_{vP}$ t$_{Mary}$ t’$_x$ likes [$_{VP}$ t$_{likes}$ t$_x$]~~]]]]]

(61) *Agree*

A. $[_{\text{VP}}$ knows$_{[\bullet SELF\bullet],\cancel{[*F*]}}$ $[_{\text{CP}}$ $\begin{vmatrix} SELF \\ SE \\ pron \end{vmatrix}_{[\beta]}$ that$_{\cancel{[F]}}$ $[_{\text{TP}}$ ~~Mary t”$_x$ T [$_{vP}$ t$_{Mary}$ t’$_x$ likes [$_{VP}$ t$_{likes}$ t$_x$]]~~]]]]

B. $[_{\text{VP}}$ knows$_{[\bullet SE\bullet],\cancel{[*F*]}}$ $[_{\text{CP}}$ $\begin{vmatrix} SE \\ pron \end{vmatrix}_{[\beta]}$ that$_{\cancel{[F]}}$ $[_{\text{TP}}$ ~~Mary t”$_x$ T [$_{vP}$ t$_{Mary}$ t’$_x$ likes [$_{VP}$ t$_{likes}$ t$_x$]]~~]]]]

C. $[_{\text{VP}}$ knows$_{[\bullet pron\bullet],\cancel{[*F*]}}$ $[_{\text{CP}}$ $\begin{vmatrix} pron \end{vmatrix}_{[\beta]}$ that$_{\cancel{[F]}}$ $[_{\text{TP}}$ ~~Mary t”$_x$ T [$_{vP}$ t$_{Mary}$ t’$_x$ likes [$_{VP}$ t$_{likes}$ t$_x$]]~~]]]]

(62) *Movement of x to the phase edge*

A. $[_{\text{VP}}$ $\begin{vmatrix} SELF \\ SE \\ pron \end{vmatrix}_{[\beta]}$ knows$_{\cancel{[\bullet SELF\bullet]}}$ $[_{\text{CP}}$ t”’$_x$ that $[_{\text{TP}}$ ~~Mary t”$_x$ T [$_{vP}$ t$_{Mary}$ t’$_x$ likes [$_{VP}$ t$_{likes}$ t$_x$]]~~]]]]

B. $[_{\text{VP}}$ $\begin{vmatrix} SE \\ pron \end{vmatrix}_{[\beta]}$ knows$_{\cancel{[\bullet SE\bullet]}}$ $[_{\text{CP}}$ t”’$_x$ that $[_{\text{TP}}$ ~~Mary t”$_x$ T [$_{vP}$ t$_{Mary}$ t’$_x$ likes [$_{VP}$ t$_{likes}$ t$_x$]]~~]]]]

C. $[_{\text{VP}}$ $\begin{vmatrix} pron \end{vmatrix}_{[\beta]}$ knows$_{\cancel{[\bullet pron\bullet]}}$ $[_{\text{CP}}$ t”’$_x$ that $[_{\text{TP}}$ ~~Mary t”$_x$ T [$_{vP}$ t$_{Mary}$ t’$_x$ likes [$_{VP}$ t$_{likes}$ t$_x$]]~~]]]]

Relevant domain:

VP$_{matrix}$ = clausal domain (it contains the top node of a clause (= embedded CP))

Parametrization – clausal domain:

languages A: no deletion from x’s feature stack (= Dutch$_2$)
languages B: deletion of x’s topmost feature (= Dutch$_1$, German$_{1+2}$, English$_{1+2}$)

Result:
English$_1$: $x = \begin{vmatrix} SE \\ pron \end{vmatrix}_{[\beta]}$

German$_1$, German$_2$, Dutch$_1$, Dutch$_2$, English$_2$: $x = \begin{vmatrix} pron \end{vmatrix}_{[\beta]}$

(63) **vP$_{matr}$ phase:** *V-to-v movement + external merge of the antecedent*

A. $[_{\text{vP}}$ Max$_{[*\beta*]}$ knows$_{\cancel{[\bullet D\bullet]}}$ $[_{\text{VP}}$ $\begin{vmatrix} SE \\ pron \end{vmatrix}_{[\beta]}$ t$_{knows}$ $[_{\text{CP}}$ ~~t”’$_x$ that [$_{TP}$ Mary t”$_x$ T [$_{vP}$ t$_{Mary}$ t’$_x$ likes [$_{VP}$ t$_{likes}$ t$_x$]]]~~]]]

B. $[_{\text{vP}}$ Max$_{[*\beta*]}$ knows$_{\cancel{[\bullet D\bullet]}}$ $[_{\text{VP}}$ $\begin{vmatrix} pron \end{vmatrix}_{[\beta]}$ t$_{knows}$ $[_{\text{CP}}$ ~~t”’$_x$ that [$_{TP}$ Mary t”$_x$ T [$_{vP}$ t$_{Mary}$ t’$_x$ likes [$_{VP}$ t$_{likes}$ t$_x$]]]~~]]]

Binding:

At this point in the derivation, the β-feature can be checked: the binding relation between *Max* and x is established.

Realization form of x:

x is spelt out as pronoun; derivation A also yields a pronominal representation since it exemplifies English_1, which lacks SE anaphors.

Language:	Realization:
English	pronoun
German	pronoun
Dutch	pronoun

3.6 Summary: Parametrization

The reduction of x's feature stack in the course of the derivation:

	θ-domain	Case domain	subject domain	clausal domain
English	*SELF* *SE* *pron*	*SELF* *SE* *pron*	*SELF* *SE* *pron* or *SE* *pron*	*SE* *pron* or *pron*
German	*SELF* *SE* *pron* or *SE* *pron*	*SELF* *SE* *pron* or *SE* *pron*	*SE* *pron*	*pron*
Dutch	*SELF* *SE* *pron*	*SELF* *SE* *pron* or *SE* *pron*	*SE* *pron* or *pron*	*pron*

Number of feature deletions when binding-relevant domains are completed:

	θ-domain	Case domain	subject domain	clausal domain
English_1	0	0	0	1
English_2	0	0	1	1
German_1	0	0	1	1
German_2	1	0	0	1
Dutch_1	0	0	1	1
Dutch_2	0	1	1	0

4. Problems & Outlook

4.1 Long Distance Anaphora

Observation:

The analysis above does not yet take into account long distance anaphora (LDA) as they can be found in languages other than those discussed here. LDA can generally be described as follows: In these cases, the occurrence of a reflexive is licit although it is not locally bound.

Different occurrences of LDA:

a. antecedent in matrix clause + LDA in infinitival complement clause
b. antecedent in matrix clause + LDA in subjunctive complement clause
c. antecedent in matrix clause + LDA in indicative complement clause

d. LDA is not syntactically bound.[10]

Consequence:

In order to distinguish different types of embedded clauses, it is not sufficient to subsume them under the notion of clausal domain (as in the previous analysis); on the assumption that all three syntactically bound LDA involve syntactic factors, three different domains have to be distinguished (cf. also Fischer 2004a,b; 2006).

(64) *Crucial point in the derivation:*

$$[_{matrixVP} \left| \begin{array}{c} SELF \\ SE \\ pron \end{array} \right|_{[\beta]} \text{V}_{matr.}\ [_{\text{CP}}\ \text{t'''}_x\ \text{C}\ [_{\text{TP}}\ \sout{\text{subject}_{emb.}\ \text{t''}_x\ \text{T}\ [_{vP}\ \text{t}_{emb.subj.}\ \text{t'}_x\ \text{Verb}_{emb.}\ [_{VP}\ \text{t}_{emb.verb}\ \text{t}_x]]}]]]$$

A possible way out:

There is not necessarily overt material in the accessible domain which tells us whether the complement clause contains an infinitive, subjunctive, or indicative. However, since this makes a difference at this point in the derivation, it must be assumed that this information is encoded in one of the accessible nodes; I assume that this might be CP as top node of the complement clause.

4.2 Barriers

Observation:

One inherent property of Müller's (2010) theory is that extraction out last-merged constituents in a phase (= typically subjects) is not possible (→ causes a PIC violation in the next phase, i.e. the current phase can be considered to be a barrier). Hence, the obvious question arises as to how this affects the binding theory developed here (– and, ideally, we would want to make use of it).

Note:

Since anaphors are typically not separated from their antecedents by barriers, this is not problematic for anaphoric binding.

Pronouns:

a. Unbound pronouns:

In order to account for unbound pronouns in complex subjects, for instance, it has to be assumed that their realization form is already given in the numeration; i.e., they do not start out as a feature stack and are then derived by feature discharge.[11]

[10] Unbound LDA are generally analysed as logophors. As far as the other occurrences are concerned, different analyses have been proposed involving syntactic and/or pragmatic factors; in any case, it seems to be undisputed that syntactic factors cannot be neglected completely. Hence, a syntactic theory of binding also has to take into account LDA.

[11] By contrast, in Fischer (2004b, 2006) unbound pronouns are derived in the same way as bound pronouns; there it is assumed that the [β]-feature they bear is checked against the head of the highest phrase. As a result, all binding-relevant domains must have been crossed before and all anaphoric features have been stripped off.

b. Bound pronouns:

For the time being it looks as if bound pronouns in complex subjects (as in (65-a)) have to pattern like unbound pronouns and must thus be handled differently from other bound pronouns. ⇒ Not satisfactory![12]

(65) a. *Binding:*
Max$_1$ knows that Mary likes him$_1$. Num $=\{x_{[\beta]}, ...\}$
b. *Coreference:*
Max$_1$ knows that pictures of him$_1$ sell well. Num $=\{$him, ...$\}$

Logophors:

We also find reflexive forms inside complex subjects, but they are typically used logophorically and do not involve an anaphoric dependency.[13]

Some ideas:

It is no coincidence that we do not find anaphoric uses of reflexives in these positions: They would have to move out of the subject in order to establish a binding relation, which is illicit.

⇒ Reflexives that are used logophorically also start out as feature stacks; however, they do not involve a $[\beta\ ]$-feature that would have to be checked.

⇒ As a result, the barrier status of the complex subject is not problematic, and since no features are deleted, they are correctly predicted to be realized as SELF reflexives.

Note:

Of course, the occurrence of logophors is additionally governed by discourse factors such as point of view, as (66) illustrates.

(66) *Logophoric use of 'himself':*[14]
a. John$_1$ was going to get even with Mary. That picture of himself$_1$ in the paper would really annoy her, as would the other stunts he had planned.
b. *Mary was quite taken aback by the publicity John$_1$ was receiving. That picture of himself$_1$ in the paper had really annoyed her, and there was not much she could do about it.

Loose ends:

This kind of analysis cannot be transferred one-to-one to languages in which the SE form might be used logophorically.

[12] Note that binding across barriers constitutes a general problem for binding theories which are based on movement (like Hornstein 2001, Kayne 2002, Zwart 2002, Fischer 2004b), and different solutions have been proposed.

[13] As to the formal distinction between reflexives and anaphors cf., for instance, Kiss (2009).

[14] The data are taken from Pollard & Sag (1992).

5. Appendix: Central Distinctions from Fischer (2004b, 2006)

A. Competition-based approach:

Intermediate movement steps are triggered by the constraint *Ph(r)ase Balance* (cf. Müller 2004).

A. Feature stack approach:

Intermediate movement steps are triggered by edge features.

B. Competition-based approach:

In the domain in which binding takes place, no features are deleted anymore.

B. Feature stack approach:

In the phase in which the antecedent enters the derivation, features might be deleted from x's feature stack (depending on parametrization). This is relevant because of examples like (67):

(67) a. Tom knows that Max_1 likes himself_1,
b. $[_{\text{vP}}\ x$ likes $\text{t}_x]$; Num={Tom, $\text{Max}_{[*\beta*]}$, ...}

At this point we do not know yet whether the antecedent enters the derivation in this phase or later, and the question of whether a feature is deleted or not must not depend on the continuation of the derivation.

C. Competition-based approach:

If a phrase satisfies the definition of several binding-relevant domains, all constraints referring to these domains apply at once; as a result, feature deletion might take place more quickly in these examples.

C. Feature stack approach:

Here, only one feature can be deleted per phrase; i.e., even if a domain satisfies more than one definition of the binding-relevant domains, feature deletion cannot be accelerated. Hence, only the smallest domain whose definition is satisfied and which has not yet been taken into account is considered, and the subsequent phrases have to fall within the definition of the bigger domains.

D. Competition-based approach:

Movement triggered by the binding feature $[\beta\ ]$ is special in that it is not restricted by the typical barriers we find otherwise (like subjects; cf. also section 4) – hence, bound pronouns within subjects (and also unbound pronouns) can be analysed along the same lines as anaphors and bound pronouns in other positions.

D. Feature stack approach:

Movement out of these positions is impossible for principled reasons (cf. also section 4).

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silke.fischer@ifla.uni-stuttgart.de