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A Calculus for Reconstruction and Anti-reconstruction

1 Introduction

Dislocation is known to systematically affect aspects of truth conditional interpretation. On the one hand, movement affords quantificational terms with new scope options (*Ever movie seemed to some critic to be interesting*), isolates pied-piped referential DPs from disjoint reference requirements (*Which picture near John*$_2$ *did he*$_2$ *like?*), and provides variables with new binders (A-scrambling). On the other hand, natural language expressions that do not reside in their canonical environments retain interpretive properties of positions they have previously occupied in the syntactic representation. Reconciling these two faces of movement represents the main desideratum of the theory of reconstruction. Moreover, if it turns out that the analysis of the phenomena includes timing effects, providing evidence for a sequencing of discrete derivational steps in the analysis, the theory of reconstruction should also predict at which point of the derivation relevant subsets of these properties emerge.

The present contribution pursues two interrelated objectives pertaining to the theory of reconstruction. In the first part, I will briefly review arguments for the view that movement can indeed be undone at two different points of the derivation, either in syntax or in the semantic component. In Lechner (1996, 1998) (see also Sharvit 1998), this observation has been taken to indicate that the grammar includes two separate reconstruction mechanisms, a syntactic one, usually implemented in terms of Copy Theory and a semantic one which can be modeled by β-conversion into higher type traces (*semantic reconstruction*; Cresti 1990, Rullmann 1995, Ruys 2015, i.a.). While the resulting hybrid theory of reconstruction accounts for dissociations between quantifier scope and binding domains that prove recalcitrant for Copy Theory, it also leads to overgeneration (Romero 1998, Fox 1999). As a result, the system needs to be supplemented by two independently motivated assumptions regulating the distribution of higher type traces and the internal make up of copies. The condition on higher type traces will further be

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seen to have important, more general consequences for the representation of scope inversion.

The second goal of this paper consists in presenting a calculus, that is a complete formal system operating on purely syntactic representations, which derives the basal scope and (anti-)reconstruction properties of canonical word orders in English and German, and scrambled word orders in German. In line with previous research (Hornstein 1995, Johnson & Tomioka 1998), scope inversion in transitive clauses of flexible scope languages will be argued to be the result of reconstruction and short type driven object QR. The typological difference between free scope languages (English) and scope rigid ones like German can then be reduced to the timing of overt movement. While in German, all movement operations apply in overt syntax, possibly by Overt Covert Movement, English has the option of postponing QR to LF. Moreover, a small adjustment in the theory of anti-reconstruction proposed in Takahashi (2006) and Takahashi & Hulsey (2009) will be seen to account for the fact that short scrambling reconstructs for scope but not for binding. Together, these analyses represent the first algorithmic account of the central characteristics of scope, scope rigidity, reconstruction and anti-reconstruction.

The paper is structured as follows. In section 2, I review two arguments from the literature for the claim that scope reconstruction is not necessarily accompanied by binding reconstruction and introduce two conditions on reconstruction from Lechner (2011, 2013). Section 3 explores empirical ramifications of one of these conditions for analyzing the scope potential of subjects and small clauses subjects (Johnson & Tomioka 1998; for consequences of the other condition see Lechner 2011, 2013). In section 4, I integrate the analysis of scope into a theory of anti-reconstruction.

2 Dissociations between scope and binding

There are at least two environments demonstrating that the scope of quantificational determiners does not necessarily coincide with the positions in which their restrictor arguments are interpreted (see also Keine & Poole 2018). One context is extensional, manifesting itself, among others, in the shape of short object-over-object scrambling in languages like German and attests to the fact that scope reconstruction is not dependent upon reconstruction for variable binding (Lechner 1996, 1998). The second class of constructions implicates intensional contexts in which a quantifier is construed referentially transparent with respect to predicates outside its scope domain. Moreover, in such constellations, the domain of referential opacity tracks the domain in which the principles of Binding Theory are computed

(Sharvit 1998). Together, these findings support two conclusions. First, the system evaluating quantifier scope is distinct from the system which is responsible for the evaluation of binding, coreference and referential opacity, in support of a hybrid theory of reconstruction which includes semantic reconstruction in addition to syntactic Copy Theory. Second, the hybrid theory must be properly constrained in order to account for the synchronicity between binding and referential opacity.

Turning to the extensional contexts first, scope ambiguity in scope rigid languages like German, Japanese or Mandarin is dependent upon overt movement of the lower quantifier over the higher one (Hoji 1985, Frey 1993, Aoun & Li 1993, Büring 1997, Krifka 1998, Bobaljik & Wurmbrand 2012). To exemplify, the scrambled word order in German (1)a admits a distributive, narrow scope reading which is absent from the canonical serialization (1)b. Moreover, while the direct object in (1)a optionally reconstructs for scope, the reciprocal inside the scrambled DP cannot be bound by the dative it has crossed over (Lechner 1996, 1998; individual observations due to Frey 1993), indicating that scope reconstruction does not entail binding reconstruction.

(1) *Short scrambling: scope reconstruction, no binding reconstruction*

a. weil wir$_1$ [einige Freunde von *einander*$_{1/*3}$]$_2$ *allen Kollegen*$_3$ t_2/T_2
since we some friends$_{ACC}$ of each other all colleagues$_{DAT}$
vorstellen wollten
introduce wanted
"since we wanted to introduce some friends of each other to every colleague" ($\exists > \forall$ / $\forall > \exists$)

b. weil wir$_1$ [einigen Kollegen$_3$] [alle Freunde von *einander*$_{1/3}$]
since we some colleagues$_{DAT}$ all friends$_{ACC}$ of each other
vorstellen wollten
introduce wanted
"since we wanted to introduce to some colleagues all friends of each other" ($\exists > \forall$ / $*\forall > \exists$)

A natural explanation of (1)a resides with the hypothesis that the overtly moved quantifier optionally binds a generalized quantifier type variable which is valued by the object in semantics by β-conversion (T_2), resulting in semantic reconstruction (SemR). Since in the syntacto-centric T-model adopted here (Chomsky 1995) scope diminishment by SemR in (1)a applies subsequent to the verification of binding relations at LF, the analysis yields the effect of scope reconstruction without binding reconstruction.

Intensional contexts add two further facets to the analysis. To begin with, it has been observed that Binding Theory reconstruction co-varies with referential opacity and not scope, as stated by the two generalizations in (2) (Sharvit 1998, Romero 1998, Lechner 2009):

(2) *Two restrictions on SemR*

a. If a moved DP is construed referentially opaque with respect to a lower predicate P, it reconstructs into the c-command domain of P for the evaluation of Binding Theory.

b. If a dislocated DP reconstructs for Binding Theory into the c-command domain of a predicate P, it is construed referentially opaque with respect to P.

Evidence for (2)a comes from the raising paradigm in (3), which introduces logical consistency as an additional condition reacting to the LF-position of the subject (Lechner 2009, 2011, 2013). While (3)a can, on the intended coreferential interpretation for the pronouns, either express a consistent *de dicto* or a contradictory *de re* proposition, sentence (3)b, in which *his* has been substituted by *John*, only admits the latter construal:

(3) a. [*His*$_2$ height] seemed to *him*$_2$ to exceed his actual height.
(consistent *de dicto*/contradictory *de re*)

i. *de dicto* construal of *his height*: "It seemed to John that John is taller than he actually is."

ii. *de re* construal of *his height*: "John obtained the impression: I am in actuality taller than I actually am."

b. [*John*$_2$'s height] seemed to *him*$_2$ to exceed his actual height.
(*consistent *de dicto*/contradictory *de re*)

Before proceeding, two remarks regarding the semantic system are in order. The discussion to follow presupposes an extensional Ty2 meta language (Gallin 1975) enriched with explicit object language representation for situation variables (Percus 2000). I will moreover adopt the widely held view that the contrast between referentially opaque, *de dicto* and transparent, *de re* subjects in (3) is determined by the choice of binder for these situation arguments inside the subject restrictor, such that *de dicto* readings are the product of the s-variable being bound by the λ-abstractor associated with the raising predicate, while *de re* results from long distance binding by a higher λ-operator (Percus 2000, Heim & von Fintel 2005, Anand 2006, i.a).[1]

1 For a non-structural, presuppositional account of the *de dicto/de re* distinction see e.g. Maier (2009).

For present purposes, (3)b is of particular interest because it reveals the systematic link between scope and Binding Theory expressed by (2)a. If the subject *John's height* is construed *de dicto*, the restrictor must, as detailed by the LF-representation (4)a, reconstruct to a position c-commanded by the λ-binder of *seem* (λ_1), which in turn induces a disjoint reference effect between *John* and *him*.[2] By contrast, the intended coreference pattern is compatible with the transparent, contradictory reading, relevant parts of which are given in (4)b, because a *de re* subject is interpretable in its surface position and therefore remains outside the c-command domain of the experiencer:

(4) a. *de dicto reading of (3)b*
λ_0 [seemed-in-s_0 [to *him*$_2$ $\underline{\lambda_1}$ [$_{TP}$ [*John*$_2$'s height-in-$\underline{s_1}$] exceeds-in-s_1 his height-in-s_0]]]

b. *de re reading of (3)b*
$\underline{\lambda_0}$ [$_{TP}$ [*John*$_2$'s height-in-$\underline{s_0}$]$_3$ seemed-in-s_0 [to *him*$_2$ λ_1 [$_{TP}$ t_3 exceeds-in-s_1 his height-in-s_0]]]

Similar structures can be employed in testing generalization (2)b. In (5), the presence of the reciprocal inside the fronted DP triggers subject reconstruction into the embedded clause.[3] Moreover, the observation that the sentence lacks the contradictory *de re* reading (cf. (3)a) signals that the s-variable inside the lower subject copy must be identified locally, below *seem*:

(5) [*Each others*$_2$'s height] seemed to *the boys*$_2$ to exceed their actual height.
(consistent *de dicto*/*contradictory *de re*)

a. *de dicto* construal of *each other's height*: "It seemed to each boy that the others are taller than they actually are."

b. *de re* construal of *each other's height*: "Each boy had the impression: the other boys are in actuality taller than they actually are."

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2 Details orthogonal to the discussion are suppressed. First, the raising predicate is generated below the experiencer, from where it moves to its surface position, as in (i):

(i) [seem$_3$ [to him$_2$ [t_3 [λ_1 ...]]]]

Second, *to*-PPs are assumed to be transparent for c-command (Bruening 2014). Finally, *res* movement and concept generators will be ignored throughout (for recent discussion see Charlow & Sharvit 2014).

3 The situation is more complex, as the experiencer is merged above the base position of *seem* (see fn. 2). This leaves the option that the subject reconstructs below the experiencer, but above the raising verb. I assume, as is common, that such an intermediate VP-internal landing site for movement is not available.

In Lechner (2011, 2013), it is suggested to explain the two conditionals in (2) as the consequence of two general principles. The first requirement ensures that binding relations out of movement copies are always maximally local, as maintained by the *Condition on Extraction from Copies* (*CEC;* for independent motivation and an attempt to derive the CEC see Lechner 2011, 2013):

(6) *Condition on Extraction from Copies (CEC)*
Extraction out of movement copies is local.

Applied to (5), the CEC eliminates the reconstructed *de re* reading by blocking LF representation (7), in which the s-variable of the lower subject is bound across *seem*:

(7) $\underline{\lambda s_0}$ [seemed-in-s_0 [to *the boys*$_2$ [λs_1 [*each others*$_2$'s height-in-$\underline{s_0}$] to exceed-in-$\overline{s_1}$ their height-in-s_0]]]

In what follows, I will focus on the second axiom, spelled out in (8) as a restriction on the type of a subset of the logical, permutation invariant vocabulary:[4]

(8) *Extensional Traces and Antecedents (ETA)*
The denotation of quantificational DPs and their traces do not include situation variables.

The ETA postulates that ⟨et,t⟩ is a possible type for generalized quantifiers and that traces can be mapped into individual or ⟨et,t⟩-type variables, but that ⟨⟨e,st⟩,st⟩ and ⟨s,⟨et,t⟩⟩, for instance, are beyond the boundaries of the expressivity of natural language. Limiting the prohibition in (8) to permutation invariant expressions is motivated by two factors. First, it exempts non-quantificational, property denoting indefinites (⟨e,st⟩-type), sanctioning their occurrence in the object position of intensional transitive verbs like *seek*. Second, the qualification ensures that the ETA does not conflict with movement of predicates or clauses, which are standardly given denotations that include s-arguments (⟨e,st⟩ or ⟨s,et⟩ and ⟨s,t⟩, respectively).[5]

Returning to the case at hand, one immediate prediction of the ETA is that it forces SemR invariably to result in narrow scope *de re* interpretations (Heim & von Fintel 2005, Lechner 2009). This is so because according to (8), higher type traces lack an argument slot for situations, with the result that s-variables have to be bound in a movement copy – instead of a higher type trace – at LF. For instance,

4 Keshet (2010) advances a similar proposal: "Avoid reference to times/worlds in the lexical definitions, if possible". The assumption that generalized quantifiers are extensional is orthodox (Peters & Westerståhl 2006).

5 Whether predicates and clauses reconstruct in syntax or semantics is immaterial for present purposes. See Takano (1995), Lechner (1998) and Moulton (2013a) for discussion.

the silent situation pronoun in the schematic derivation (9) can be bound by the superordinate λ_0, as in (9)a, but not by the lower λ_1 subsequent to SemR ((9)b). Consequently, the restrictor of a DP which has moved across an intensional operator and is restored into its pre-movement position by SemR is to be interpreted *de re* with respect to this operator:

(9) a. LF:
$[\lambda_0 \ldots \quad [[_{DP} \ldots s_{0/*}s_1 \ldots]_2 \ldots [\mathit{seem}\ [\lambda_1 \ldots T_{2,\langle et,t\rangle} \ldots \quad]]]]$
b. After SemR:
$[\lambda_0 \ldots \quad [\ldots \quad [\mathit{seem}\ [\lambda_1 \ldots [_{DP} \ldots s_{0/*}s_1 \ldots]_2]]]]$
(*de dicto/de re*)

The sample derivation (9) makes explicit relevant details of the derivation for the narrow scope *de re* reading by SemR. (R_{seem} is the accessibility relation which collects for each situation s the set of situations compatible with the evidence available to the speaker in s.)

(10) a. A friend seemed to be sick.
b. $[\lambda_0\ [_{TP2}\ [\text{a friend-}s_0]\ [\lambda_2\ [_{VP}\ \text{seem}\ [_{\langle s,t\rangle}\ \lambda_3\ [_{TP}\ T_{2,\langle et,t\rangle}$
$[_{\langle e,t\rangle}\ \lambda_1\ [_{vP,t}\ t_1\ \text{to be sick-}s_3]]]]]]]]$
c. $[\![TP_2]\!] = \lambda_2.\forall s[R_{seem}(s_0)(s) \rightarrow T_2(\lambda_1.\text{sick}(s)(t_1))$
$(\lambda Q.\ \exists x[\text{friend}(\underline{s_0})(x) \wedge Q(x)])$
$= \forall s[R_{seem}(s_0)(s) \rightarrow \lambda Q.\ \exists x[\text{friend}(\underline{s_0})(x) \wedge Q(x)]\ (\lambda_1.\text{sick}(s)(t_1))]$
$= \forall s[R_{seem}(s_0)(s) \rightarrow \exists x[\text{friend}(\underline{s_0})(x) \wedge \lambda_1.\text{sick}(s)(t_1)(x)]]$
$= \forall s[R_{seem}(s_0)(s) \rightarrow \exists x[\text{friend}(\underline{s_0})(x) \wedge \text{sick}(s)(x)]]$

Another direct consequence entailed by (8) is that since SemR restores quantifier scope but does not affect referential opacity, narrow scope *de dicto* readings must be derived by syntactic reconstruction and Copy Theory. But as (6) requires movement out of copies to proceed locally, binding reconstruction never produces *de re* readings. Thus, the combination of the locality principle (6) and the ETA in (8) has the effect of establishing a close link between referential opacity, expressed in terms of s-variables binding, and the syntactic domain of Binding Theory. Reconstruction by SemR always results in *de re* interpretations, and syntactic reconstruction systematically produces *de dicto* readings, deriving what has become known as the *Scope Trapping* generalization (Romero 1998, Fox 1999, among others). Providing an explanation for this link is crucial as it eliminates a potential source of overgeneration and thereby a serious challenge for any theory that incorporates SemR. Note that the combination of (6) and (8) still admits dissociations like (1), in which extensional quantifier scope is decoupled from syntactic reconstruction.

Intensional contexts also afford a second, new insight apart from exposing (parts of) the Scope Trapping phenomenon. Sharvit (1998) observed that in amount interrogatives, binding scope correlates with referential opacity. If the fronted degree predicate *n-many* in (11) is construed with narrow scope, the availability of a coreferential link between *Anton* and *he* is contingent upon the relative clause *who hate Anton* being interpreted transparently, i.e. *de re*, with respect to *hope*.

(11) How [[many students] who hate *Anton*$_1$]$_2$ did *he*$_1$ hope [t_2/T_2 will buy him$_1$ a beer]? (**de dicto*/*de re*)

a. * *Narrow scope 'n-many', restrictor de dicto:* "For which number n and for all of Anton's bouletic alternatives s_1 in s_0: there are n-many students who hate Anton <u>in s_1</u> that will buy him a beer in s_1."

b. *Narrow scope 'n-many', restrictor de re:* "For what number n, and for all of Anton's bouletic alternatives s_1 in s_0: there are n-many students who hate Anton <u>in s_0</u> that will buy him a beer in s_1."

The hybrid theory of reconstruction captures this correlation by assuming a higher type trace below the pronoun and the intensional predicate, which generates a transparent *de re* reading without triggering a disjoint reference effect. Thus, (11) demonstrates that the effects of SemR are visible in intensional contexts, as well as in extensional constructions ((1)a).

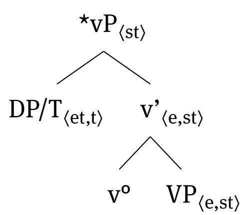
Recapitulating briefly, it was seen that there are good reasons for adopting two different mechanisms for scope diminishment: SemR and Copy Theory. In order to contain overgeneration, two mechanisms were introduced guaranteeing that (i) reconstructed opaque, *de dicto* readings for moved DPs are always the product of reconstruction in syntax, and that (ii) situation variables in lower movement copies are locally bound. Together, these two conditions result in a theory of Trapping Effects as they ensure that dissociations between scope and binding emerge only in contexts where a narrow scope quantificational DP is construed transparently, *de re*, while Binding Theory is evaluated in a higher copy.

The next section explores further consequences of the ban on intensional traces, proceeding from there to the presentation of a calculus which derives the differences between scope rigid and flexible scope languages.

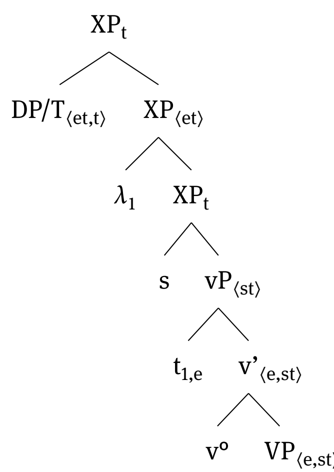
3 Subject reconstruction

Combining the ETA (8), which bans traces and quantificational DPs from bearing s-arguments, with a routine semantics for one-place predicates, on which VPs denote relations between individuals and eventualities (⟨e,st⟩)[6], imposes an empirically non-trivial restriction on the logical type of *in-situ* subjects. Concretely, these two assumptions ensure that only individual denoting subjects, that is individual DPs or traces/copies of such, are compositionally interpretable in their thematic position (SpecvP). If, on the other hand, SpecvP is occupied by a higher type trace (⟨et,t⟩) or (the copy of) a generalized quantifier, as in (12)a, a type mismatch ensues. Finally, intensional versions (⟨⟨e,⟨st⟩⟩,t⟩), which would in principle be type-compatible in SpecvP, are blocked by (8). The only strategy for integrating low, quantificational subjects into the semantic computation consists in supplying the vP-denotation with a situation variable first, as in (12)b, in order to create a suitable landing site for short subject movement.

(12) a. *Subject* in-situ *(type mismatch)*



b. *Subject interpreted* ex-situ



The system above ensures that quantificational subjects are never interpreted *in-situ*, regardless whether they undergo total reconstruction in syntax or in semantics. A similar requirement, prohibiting DPs from reconstructing into their Θ-position, was postulated on independent grounds in Johnson & Tomioka (1998). There, the condition had to remain an axiom unrelated to other properties of the system, though.

A first desirable empirical consequence of the ban on quantificational *in-situ* subjects comes from its ability to contribute to a better understanding of the phenomenon of scope rigidity. In scope rigid languages, inverse object scope is contingent upon overt inversion (see (1), Frey 1993, Aoun & Li 1993, i.a.). Now,

6 If the external argument is introduced by an applicative v°, then the minimal node comprising v° and VP is of type ⟨e,st⟩. Nothing bears on the choice, as far as I can see.

if subjects are always interpreted in a derived position ((13)a), and if it can be ensured that object QR indiscriminately lands *below* the subject, as in (13)b, it can be deduced that canonical word order configurations only yield surface scope. A condition which guarantees the locality of object QR in the sense intended above will be introduced momentarily. (Abstraction operators and irrelevant details will be omitted from now on.)

(13) *Scope rigid languages, non-inverted orders*

a. $[_{XP}\ \mathit{QP}_{Subject}\ \ [_{XP,\,t}\ \mathrm{s}\ [_{vP,\,\langle st\rangle}\ \mathit{t}_{Subject}\ [_{VP,\,\langle e,st\rangle} \ldots \mathrm{QP}_{\mathrm{Object}} \ldots]]]]$

b. $[_{XP}\ \mathrm{QP}_{\mathrm{Subject}}\ [_{XP}\ \mathit{QP}_{Object}\ [_{XP,\,t}\ \mathrm{s}\ [_{vP,\,\langle st\rangle}\ \mathrm{t}_{\mathrm{Subject}}\ [_{VP,\,\langle e,st\rangle} \ldots \mathit{t}_{Object} \ldots]]]]]$

(Subject > Object)

Crucially, the prohibition on total subject reconstruction is an integral component of the analysis of scope rigidity outlined above and thereby provides additional motivation for the ETA.

Next, consider the alternative derivation (14), which is based on the (admittedly somewhat implausible) assumption that VPs denote individual predicates instead of properties. On this view, spelled out in (14)a, subject quantifiers, as well as their copies and their higher type traces, can directly combine with VP-denotations (*DP* symbolizes a movement copy, i.e. the result of total subject reconstruction). As a consequence, it is possible to assign quantificational objects wide scope even if they surface to the right of the subject. In (14)b, this is obtained by subject reconstruction in syntax or semantics in conjunction with short object QR:

(14) *Scope rigid languages, non-inverted orders (incorrect analysis)*

a. $[\mathrm{QP}_{\mathrm{Subject}}\ \ [_{vP,\,t}\ \mathit{DP/T}_{Subject}\ [_{VP,\,\langle et\rangle} \ldots \mathrm{QP}_{\mathrm{Object}} \ldots]]]$

b. $[\mathrm{QP}_{\mathrm{Subject}}\ [_{vP}\ \mathit{QP}_{Object}\ [_{vP,\,t}\ \mathrm{DP/T}_{\mathrm{Subject}}\ [_{VP,\,\langle et\rangle} \ldots \mathit{t}_{Object} \ldots]]]]$

(Object > Subject)

Thus, alternative systems which do not include the ETA or object language situation arguments in modeling VPs generate the false prediction that in scope rigid languages, scope inversion can also be obtained in absence of changes in overt word order.

As mentioned above, the analysis of scope rigidity has a second part to it, which limits the scope of object QR in German (see (13)b). What is essential is that this component is flexible enough to admit non-local, scope feeding object QR for English, but not for German. I suggest that the relevant typological asymmetry separating scope flexible from scope rigid languages is anchored to an independent factor which has been productively used in explaining cross-linguistic variation in other domains: the timing of displacement operations. While there are languages which move all *wh*-phrases in overt syntax (Bulgarian), others do not overtly mark the interpretive position of some *wh*-phrases (English, German) or even all of them

(Chinese). Following this strategy, it is proposed that the factor discriminating between English and German consists in a single criterion that restricts all movement operations in German to the overt component (in the spirit of Diesing 1992), but tolerates post-syntactic dislocation in English. English accordingly has the option of delaying QR to LF, while in German, all overt and covert displacement proceeds overtly by what has come to be known as *Overt Covert Movement* (OCM; Bobaljik 1995, Groat & O'Neil 1996, Pesetsky 2000, on OCM and scope see also Bobaljik & Wurmbrand 2012). In order to be able to define a deterministic procedure for multiple applications of QR, I will moreover adopt the standard pair of axioms in (15) for non-feature driven movement. Overt movement will be taken to subsume audible, overt displacement as well as OCM.

(15) a. Extension Condition (Chomsky 1995):
All overt movement extends the tree.

b. The Strict Cycle:
Movement proceeds bottom up, affecting lower nodes first.

Implementing the assumptions above, consider the derivation of scope rigidity for a transitive German clause like (1)b first. Representation (16)a depicts the point at which the two quantificational arguments still reside *in-situ*, where they cannot combine with their sister nodes due to type mismatch. Further up in the tree, an s-variable has been merged, generating a suitable landing site (XP) for OCM of the two argument QPs. Given that both the subject and the object need to undergo type-driven QR, a decision must be made about the order and scope of movement. The Strict Cycle (15)b determines that the lower node (the object) raises first, while the Extension Condition (15)b ensures that it attaches to the root node (XP), resulting in (16)b.[7] Next, the subject moves, again abiding by the Extension Condition, yielding (16)c. This subtree for the first time locates both quantifiers in type-compatible, interpretable positions. (Scope positions are typographically marked by double underline.) Moreover, since neither the subject nor the object can bind a higher type trace in, nor fully reconstruct into their respective base positions, the calculus predicts that canonical word orders always translate into surface scope orders.

(16) *Scope rigid languages, non-inverted orders*

a. $[_{XP,\,t}\ s\ [_{vP,\,\langle st\rangle}\ QP_{Sub}\ [_{VP,\,\langle e,st\rangle} \dots QP_{Obj} \dots]]]$

b. $[_{XP}\mathit{QP}_{Obj}\ [_{XP,\,t}\ s\ [_{vP,\,\langle st\rangle}\ QP_{Sub}\ [_{VP,\,\langle e,st\rangle} \dots\ t_{Obj} \dots]]]]$

c. $[_{XP}\ \underline{\underline{\mathit{QP}}}_{Sub}\ [_{XP}\ \underline{\underline{QP}}_{Obj}\ [_{XP,\,t}\ s\ [_{vP,\,\langle st\rangle}\ t_{Sub}\ [_{VP,\,\langle e,st\rangle} \dots\ t_{Obj} \dots]]]]]$

(Subject > Object)

7 As will be seen in section 4, OCM of the object in (16)b does not affect a full DPs, but just the determiner, the restrictor is merged in a higher position.

In a step not represented separately, the subject is attracted to SpecTP. Finally, (16)d/e illustrate the emergence of an additional scope option by overt subject-object inversion, either by scrambling or some other overt dislocation operation. Once the object has been overtly shifted across the subject in SpecTP into a TP-adjoined position, it can either bind individual traces ((16)d) or reconstruct below the subject into XP in syntax or by SemR ((16)e), resulting in the signature ambiguity characteristic of inverted contexts in scope rigid languages:

(16) *Scope rigid languages, inverted orders*

d. $[_{TP}\ \underline{\underline{QP}}_{Obj}\ [_{TP}\ \underline{\underline{QP}}_{Sub}\ [_{XP}\ t_{Sub}\ [_{XP}\ t_{Obj}\ [_{XP,\,t}\ s\ [_{vP,\,\langle st\rangle}\ t_{Subj}\ [_{VP,\,\langle e,st\rangle} \ldots t_{Obj} \ldots]]]]]]]$ (Object > Subject)

e. $[_{TP}\ QP_{Obj}\ [_{TP}\ \underline{\underline{QP}}_{Sub}\ [_{XP}\ t_{Sub}\ [_{XP}\ \underline{\underline{DP/T}}_{Obj}\ [_{XP,\,t}\ s\ [_{vP,\,\langle st\rangle}\ t_{Sub}\ [_{VP,\,\langle e,st\rangle} \ldots t_{Obj} \ldots]]]]]]]$ (Subject > Object)

The relations depicted in (16) generalize to double object constructions and short object-over-object scrambling in these contexts. In canonical structures with two non-inverted quantificational objects, (15) dictates that both internal arguments land in an order preserving manner in specifiers of XP, resulting in surface word order. Further displacement of the lower indirect object (IO) across the higher, direct one (DO), as in (17), feeds ambiguity (intermediate subject traces suppressed). The relations are for all means and purposes identical to those between the subject and the object in (16)d/e.[8]

(17) *Scope rigid languages, double object constructions, inverted orders*

$[_{XP}\ \underline{\underline{QP}}_{DO}\ [_{XP}\ \underline{\underline{\mathit{IO}}}\ [_{XP}\ t/\underline{\underline{T}}_{DO}\ [_{XP,\,t}\ s\ [_{vP,\,\langle st\rangle}\ t_{Subject}\ [_{VP,\,\langle e,st\rangle} \ldots [t_{IO} \ldots [t_{DO} \ldots]]]]]]]]$ (DO > IO / IO > DO)

English differs from German in that QR is delayed to LF. This has the important consequence that the principles regulating the scope options for canonical word orders do not only sanction order preserving movements. Specifically, in English, subjects are attracted to a higher position in overt syntax and quantifiers move at LF. This entails that subject raising may – unlike in German – precede object QR, essentially canceling the effects of the Strict Cycle condition ((15)b). Moreover, suppose that quantificational subjects pass, just like in German, through an intermediate position (XP) on their way to TP. This step is either driven by a syntactic locality metric favoring short movement paths, or the need to render trees compositionally interpretable as soon as possible ((18)b). Since the Extension Condition

8 The question why DO cannot syntactically reconstruct below IO will be addressed in section 4.

((15)a) does not impose any requirement on the landing site of LF-movement, nothing prevents then the object from QRing across the intermediate subject copy (XP), legitimizing the passage from (18)b to the two possible representations (18)c and (18)d. In the surface scope parse (18)c, the subject is interpreted in TP from where it binds an individual variable in XP. By contrast, (18)d translates into inverse scope, because the subject reconstructs, either by SemR or by Copy Theory.

(18) *Scope flexible languages, non-inverted orders*

a. $[_{XP,\, t}\ s\ [_{vP,\, \langle s,t\rangle}\ QP_{Sub}\ [_{VP,\, \langle e,st\rangle}\ \dots\ QP_{Obj}\dots]]]$

b. $[_{XP}\ QP_{Sub}\ [_{XP,\, t}\ s\ [_{vP,\, \langle s,t\rangle}\ t_{Sub}\ [_{VP,\, \langle e,st\rangle}\ \dots\ QP_{Obj}\dots]]]]$

c. $[_{TP}\ \underline{\underline{QP}}_{Sub}\ [_{XP}\ \underline{\underline{QP}}_{Obj}\ [_{XP}\ t_{Sub}\ [_{XP,\, t}\ s\ [_{vP,\, \langle s,t\rangle}\ t_{Sub}\ [_{VP,\, \langle e,st\rangle}\ \dots\ t_{Obj}\dots]]]]]]$ (Subject > Object)

d. $[_{TP} QP_{Sub}\ [_{XP}\ \underline{\underline{QP}}_{Obj}\ [_{XP}\ \underline{\underline{DP/T}}_{Sub}\ [_{XP,\, t}\ s\ [_{vP,\, \langle s,t\rangle}\ t_{Sub}\ [_{VP,\, \langle e,st\rangle}\ \dots\ t_{Obj}\dots]]]]]]$ (Object > Subject)

In sum, the present analysis locates the difference between scope rigidity and scope flexibility in the timing of object QR. If the object QRs in overt syntax, by OCM, it moves prior to the subject (Strict Cycle; (15)b). Given the Extension Condition (15)a, the subject therefore needs to land above the lowest interpretable object position. By contrast, languages which admit post-syntactic object QR such as English also generate LF-representations in which the object is higher than the subject. In section 4, it will be seen how the scope algorithm can be integrated into the analysis of (anti-)reconstruction phenomena. Before doing so, I will briefly expand on another favorable corollary of the ban on intensional traces (ETA, (8)), though.

The additional benefit comes in shape of a new perspective on a long standing puzzle regarding the interpretation of small clause subjects. Small clause subjects can – with a notable exception I will return to below – only be construed transparently with respect to the small clause selecting predicate (Stowell 1991, Williams 1983). To illustrate, while the indefinite subject of (19)a can be used to identify an individual, regardless of whether it meets the description of being a doctor, this reading is absent from (19)b. As a result, only (19)a is felicitous when followed by the context (20), which explicitly revokes the credentials of the antecedent DP, forcing a *de re* construal (context based on an allegedly true story)

(19) *Small clauses, no wide scope for subject*

a. A doctor in the audience seemed to be nervous. (*de dicto*/*de re*)

b. A doctor in the audience seemed nervous. (**de dicto*/*de re*)

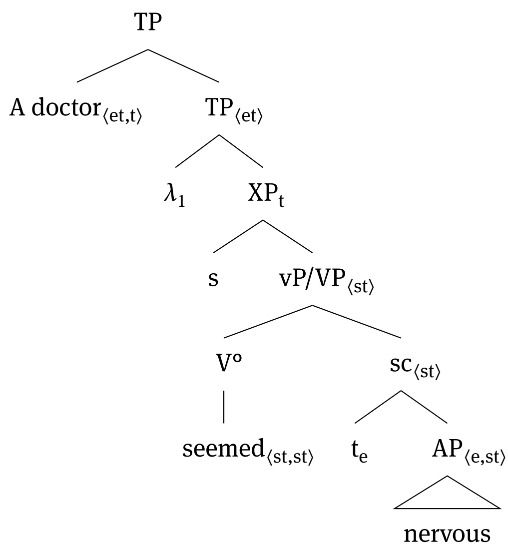
(20) It is obvious why. He was the imposter Dr. Moos, who performed plastic surgery using kitchen utensils in his kitchen in Dubai.

According to a widely held view, also to be adopted here, small clauses are ‘small’ in that they comprise of a predicate but exclude higher functional structure. Since s-variables which turn predicates into suitable landing sites for generalized quantifiers are part of the functional skeleton (they are hosted outside vP), it follows that small clauses lack the position designated for reconstructed quantificational subjects (XP). (19)b can therefore be parsed into the tree (21)a, which encodes the logical syntax underlying a *de re* proposition, whereas the *de dicto* representation (21)b is barred by the prohibition on intensional traces (ETA).

Thus, the ETA in (8) provides a natural, minimally invasive analysis for the prohibition on scope reconstruction into small clauses.

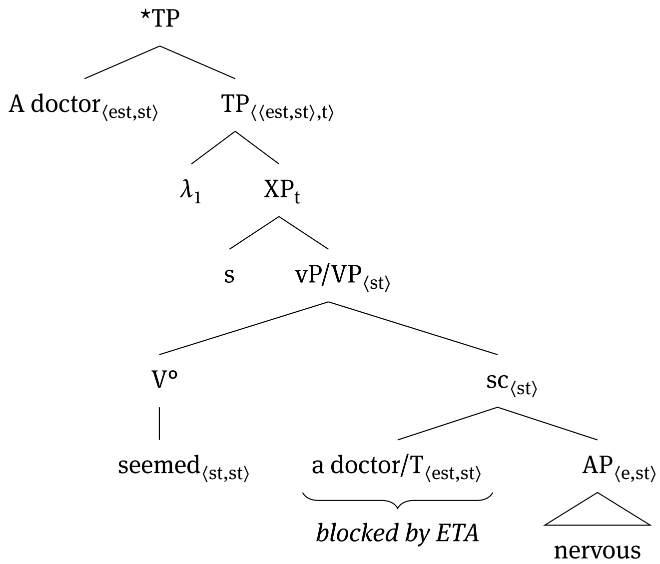
Moulton (2013b) noticed that the wide scope requirement for small clause subjects is revoked in contexts in which the subject serves as the argument of an intensional predicate. In contrast to what was seen above, (22)a also supports the narrow scope *de dicto* interpretation (22)b, which does not commit the speaker to having a particular fridge in mind. For (22)a to come out as true, fridges can also vary across situations.[9] (R_{nec} is an accessibility relation that returns for each situation s those situations that are compatible with what is necessary in s.)

(21) a. *Small clause subject* de re



9 (22)a is also not falsified by scenarios in which the speaker misidentifies some non-fridge entity as a ‘fridge’, providing further confirmation for the *de dicto* character of the descriptive content.

(21) b. *Small clause subject* de dicto



(22) a. A new fridge seems necessary. (*seem* > ∃ / ∃ > *seem*)

b. $\lambda s. \forall s' \, \forall s'' \, [R_{seem}(s)(s') \wedge R_{nec}(s')(s'') \rightarrow \exists x \, [new\_fridge(x)(s'')]$

Moulton proposes that (22) is instructive about the lexical properties of intensional predicates. If *necessary* is assigned the denotation in (23), it can directly combine with a property type argument which is existentially closed off either by the lexical meaning of *necessary* or, alternatively, a higher operator (Moulton 2013b: (17)):[10]

(23) $[\![\text{necessary}]\!] = \lambda P_{\langle e,st \rangle} . \lambda s. \forall s' [R_{nec}(s)(s') \rightarrow \exists x \, [P(x)(s')]]$
(Moulton 2013b: (9))

As far as I can see, the availability of exceptional narrow scope in (22) is directly compatible with the present system. Notably, the ETA only blocks situation variables in the denotation of permutation invariant expressions of the logical vocabulary, among them generalized quantifiers.

10 It is not clear how the account can be generalized to other subjects admitting *de dicto* readings (*two fridges*, *exactly seven fridges*,....). Speculatively, different quantifiers could be associated with different types of existential closure operators ($\exists_2$, $\exists_{!7}$, ...) which would have to be made to agree with their morphological exponents (*two*, *exactly seven*, ...) by a syntactic feature sharing mechanism.

Property type expressions are not permutation invariant and are accordingly not affected by the ETA (see fn. 4). Thus, the system is flexible enough to provide a suitable vehicle for scope diminishment from the matrix clause into the small clause in (22). The two analyses therefore naturally complement each other. While the ETA excludes maximally narrow scope for subjects, it also admits exceptional narrow scope in the environments identified by Moulton.[11]

In the next and final section, I will turn to the relation between ETA and other syntactic principles responsible for regulating the binding scope options of displaced DPs.

4 Anti-reconstruction, reconstruction and scope

The discussion up to this point has been restricted to environments in which an entire dislocated DP is interpreted in a lower chain link, resulting in radical reconstruction either in syntax (Copy Theory) or semantics (SemR). But not all lower occurrences of moved DPs postulated by Copy Theory enter into the computation of licit binding and coreference patterns. The central class of these *anti-reconstruction* phenomena relevant for present purposes is exemplified by Principle C obviation in A-movement environments (Lebeaux 1990):

(24) Every picture of *John*$_2$ seems to *him*$_2$ to be great.

An explicit theory of anti-reconstruction is presented in Takahashi (2006: chapter 3) and Takahashi & Hulsey (2009) who propose that a disjoint reference effect is absent from (24) because the name has actually never been part of the embedded clause. Rather, the subject starts out as a bare determiner (*every*) and raises into the higher subject position ((25)a), where it is combined with its restrictor *picture of John* ((25)b) by *Whole Sale Late Merge* (WLM).[12] Since the name *John* is merged above the point at which the coreferential pronoun is introduced, the WLM analysis derives the anti-reconstruction effect. (The position of restrictor insertion is marked by underline.)

11 A question which will have to await another occasion is to which extent binding scope and referential opacity coincide in property type DPs.

12 The lower copy of *every* is turned into an expression semantically equivalent to a variable by Trace Conversion ((i); Fox 2002, Sauerland 1998, 2004). Applying (i) to (25)b yields (ii). See discussion below and Fox (2003), i.a. for further elaboration.

(i) *Trace Conversion*: (Det)(Pred)$_n$ ⇝ the ([(Pred) λx.x = n]) (where ‘n’ is the index)

(ii) [Every picture of *John*$_2$]$_1$ seems to *him*$_2$ [[the λx.x = 2] to be great]

(25) a. Every$_1$ seems to him$_2$ [~~every~~$_1$ to be great]. (Move *every*)
b. [Every picture of *John*$_2$]$_1$ seems to *him*$_2$ [~~every~~$_1$ to be great]. (WLM of restrictor)

Unlike A-movement, Ā-movement obligatorily reconstructs for Principle C (Lebeaux 1990):

(26) *Which picture of *John*$_2$ does *he*$_2$ [$_{VP}$ like best t].

This contrast falls out from the additional requirement articulated in (27) that countercyclic WLM of restrictors has to apply before the minimally containing DP is assigned Case.

(27) *Case Constraint on WLM* (adopted from Takahashi 2006)
A restrictor argument R can be merged with a determiner D only if R is within the c-command domain of its Case-assigning head.

In essence, (27) defines an upper bound on WLM. Provided that objects receive Case from v°, (27) dictates that the object restrictor in (26) is merged VP-internally, prior to movement. Accordingly, condition (27) is satisfied if (26) is assembled as in (28), with the restrictor NP being added below v° ((28)a), such that low attachment of the restrictor accounts for the disjoint reference effect:

(28) a. [$_{vP}$ v°$_{[ACC]}$ [$_{VP}$ like best which picture of *John*$_2$]]
b. * [Which picture of *John*$_2$ does *he*$_2$ [$_{vP}$ v°$_{[ACC]}$ [$_{VP}$ like best ~~which picture of *John*$_2$~~]]]

Conversely, (27) blocks the alternative derivation (29), which abides by Principle C because the restrictor has been counter-cyclically merged outside the c-command domain of the case assigning head v°$_{[ACC]}$:

(29) *[Which picture of *John*$_2$ does [$_{TP}$ *he*$_2$ [$_{vP}$ v°$_{[ACC]}$ [$_{VP}$ like best ~~which~~]]]]

Thus, the WLM analysis offers a natural explanation for the fact that Principle C does not treat A and Ā-movement alike.[13]

In what follows, I will extend Takahashi's WLM account to short (i.e. object-over-object) and medium (object-over-subject) scrambling in German. As it will turn out, the intricacies of these contexts do not fit the reconstruction typology established by A- and Ā-movement in English since the reconstruction options of

13 The availability of WLM does not affect the conclusions drawn on the basis of the scope-binding dissociation in (11). In (11), the case position of the moved object is below the pronoun to be construed coreferentially with *Anton*.

scrambled word orders are less permissive than those of displacement in English. I will therefore propose a minor modification of the licensing conditions on lexical insertion which, while leaving the basic insights of Takahashi (2006) intact, imposes an additional requirement on the lower bound of WLM in inverted contexts. The resulting system will be seen to account for the full range of scope and binding reconstruction.

Scrambling in German displays complex reconstruction properties. On the one hand, pronominal variables inside scrambled DPs can be bound by subjects to their right, both in transitive contexts (30)c and double object constructions ((31)d). On the other hand, (31)c documents that short scrambling of an accusative object across a dative cannot be undone for the computation of binding relations (Frey 1993, Haider 1993):

(30) *Medium scrambling, reconstruction for variable binding*

a. weil $jeder_2$ [$seinen_2$ Vater] liebt
since everone $father_{ACC}$ loves
"since everyone loves his father" (base order)

b. * weil [$sein_2$ Vater] $jeden_2$ liebt
since his father $everone_{ACC}$ loves
"since his father loves everyone" (base order, WCO violation)

c. weil [$seinen_2$ $Vater]_1$ $jeder_2$ t_1 liebt
since his $father_{ACC}$ everyone loves
"since everyone loves his father" (medium object scrambling)

(31) *Short scrambling, no reconstruction for variable binding*

a. weil wir $jedem_2$ [$seinen_2$ Vater] zeigten
since we $everyone_{DAT}$ his $father_{ACC}$ showed
"since we showed everyone his father" (base order)

b. * weil wir [$seinem_2$ Vater] $jeden_2$ zeigten
since we his $father_{DAT}$ $everyone_{ACC}$ showed
"since we showed his father everyone" (base order, WCO violation)

c. * weil wir [$seinen_2$ $Vater]_1$ $jedem_2$ t_1 zeigten
since we his $father_{ACC}$ $everyone_{DAT}$ showed
"since we showed everyone his father"
(short DO scrambling, WCO violation)

d. weil uns [$seinen_2$ $Vater]_1$ $jeder_2$ t_1 zeigen wollte
since us_{DAT} his $father_{ACC}$ everyone show wanted
"since everyone wanted to show us his father"
(medium scrambling of DO)

This suggests that there is a lower bound for the position in which c-command sensitive properties of direct object (such as variable binding) are evaluated. More specifically, this lower bound is set by the left edge of the indirect object.

It is not possible to test the effects of scrambling on Principle C, because in the relevant contexts, schematized in (32), a full DP containing a name would have to precede a coreferential pronoun, and such constellations are barred for independent, prosodic reasons.

(32) *[[$_{DP}$ ... *name*$_2$ ...]$_1$ ....[*pronoun*$_2$ ... [... t_1 ...]]] (where DP_1 is scrambled)

The generality of the phenomenon is corroborated by the behavior of names inside topicalized constituents, though. While names embedded within fronted accusatives do not reconstruct below pronouns they have crossed over ((33)b), suspending a Principle C violation, the pair in (34) demonstrates that movement across a subject pronoun preserves the original coreference relations (Frey 1993). These paradigms confirm the generalization that the binding scope of (material inside) direct objects is evaluated below the subject but above the indirect object position:

(33) *Topicalization of DO, no reconstruction below IO*

a. * Ich brauchte *ihm*$_2$ [diesen alten Freund von *Peter*$_2$] nicht
I needed him$_{DAT}$ this old friend of Peter$_{ACC}$ not
vorzustellen. (base order)
to introduce

b. [Diesen alten Freund von *Peter*$_2$]$_1$ brauchte ich *ihm*$_2$ t_1 nicht
this old friend of Peter$_{ACC}$ needed I him$_{DAT}$ not
vorzustellen. (topicalization of DO)
to introduce
"I didn't need to introduce him this old friend of Peter's."

(34) *Topicalization of DO, reconstruction below subject*

a. * *Er*$_2$ brauchte uns [diesen alten Freund von *Peter*$_2$] nicht
he needed us$_{DAT}$ this old friend of Peter$_{ACC}$ not
vorzustellen. (base order)
introduce

b. * [Diesen alten Freund von *Peter*$_2$]$_1$ brauchte *er*$_2$ t_1 uns nicht
this old friend of Peter$_{ACC}$ needed he us$_{DAT}$ not
vorstellen. (topicalization of DO)
introduce
"He did not need to introduce to us this old friend of Peter's."

Finally, the behavior of A/Ā-movement under reconstruction in German parallels that of English (for data, discussion and references see also Salzmann 2006).

Combining the findings above, it can be concluded that DO reconstruction targets a node in the tree which is located directly below TP, the surface position of the subject. (35) makes visible how this condition translates into the WLM framework: the lower bound for the insertion of direct object restrictors is α, where α is immediately contained within TP.

(35) $[[_{DO}$ D° <u>restrictor</u>] ... $[_{TP}$ subject $[_{\alpha}$ $[_{DO}$ D° <u>restrictor</u>] ...
[IO ... $[_{VP}$ $[_{DO}$ D° *<u>restrictor</u>]]]]]]

Evidently, the pattern (35) poses a challenge for the WLM analysis, which only sets an upper bound for restrictor insertion, because objects are assigned case *in-situ* and nothing should therefore block objects from already being fully assembled within the VP. The task accordingly consists in defining an algorithm which preserves the results of Takahashi (2006) for A/Ā-movement, while at the same time ensuring that fronted direct objects acquire their restrictors only once they have passed over the indirect object.

A solution presents itself in form of a slight change in the licensing conditions on the first-merge position of restrictors. Suppose that WLM is not subject to Case but the requirement that the NP-complement resides within the c-command domain of an abstract head with agreeing Φ-features (henceforth 'Φ-head'). Variants of such Φ-heads are well-established in the literature. Kratzer (2009), for one, postulates a verbal functional head – a variety of v° – that serves as the link between nominal and verbal Φ-features. In a different domain, Φ-heads above v° have been used in the analysis of co-occurrence restrictions on dative and accusative arguments that fall under the Person Case Constraint (Anagnostopoulou 2003). Following this tradition of encoding Φ-feature relations in designated positions of the tree, I suggest that Φ-heads are also implicated in the licensing of WLM.

As for the details, it will be assumed that Φ is identical to α in (35), located inbetween TP and the landing site of short scrambling, which will, without ontological commitment, be referred to as ScrP.[14] Together with the deliberations of section 3, which revealed that the lowest interpretable position for quantificational arguments is XP, i.e. the point at which the s-variable is added, this yields the clausal structure in (36). While short srambling targets ScrP, medium srambling adjoins to TP:

(36) $[_{TP}$ ... $[_{\Phi P}$ ... $[_{ScrP}$ ... $[_{XP,\, t}$... s-variable $[_{vP,\, \langle st\rangle}$ ... $[_{VP}$ ...]]]]]]

14 In other languages, this position has been suggested to host clitics (*Clitic Voice* in Sportiche 1995). A related idea (Agr∀P) has been explored in Richards (1997: 92).

Furthermore, I propose (37) as the updated condition on WLM of nominal restrictors:

(37) Φ-*Constraint on Restrictor Insertion*
A restrictor argument R can be merged with a determiner D at stage S of a derivation only if R is within the c-command domain of a Φ-head at S.

The revised version differs from Takahashi's original (27) in two respects. First, (37) makes restrictor insertion contingent upon an (agreeing) higher head bearing Φ-features, instead of Case features. Second, for reasons to be explicated below, I will adhere to a strictly derivational model of the grammar, according to which restrictors can be inserted only if their licensing Φ-heads are already included in the representation. This view departs from Takahashi's (2006: 125f) valuation based feature system in which it is possible to merge restrictors at an early stage of the derivation and defer licensing to a point at which a suitable feature has been introduced.

Turning to the analysis, consider first regular, non-inverted transitive clauses, relevant parts of which are schematically exposed in (38). (37) demands that restrictors are inserted only in the presence of a c-commanding agreeing Φ-head. Given that such Φ-heads are generated VP-externally, the object starts out as a bare determiner ((38)a). In the next relevant step ((38)b), the Φ-head bearing agreeing object features is added, which in turn makes it possible to insert the restrictor in (38)c:

(38) *Restrictor insertion, canonical word order*
a. $[_{VP}$ ... $[_{DO}$ D° ...]]
b. $[_{\Phi P}$ $\Phi_{[F]}$ ... $[_{VP}$ ... $[_{DO}$ D° ...]]]
c. $[_{\Phi P}$ $\Phi_{[F]}$ ... $[_{VP}$ ... $[_{DO}$ D° $\underline{\text{restrictor}}_{[F]}$ ...]]]

Note on the side that restrictor insertion in (38)c 'reaches' into the tree to a certain extent, in that the restrictor is merged below the root node. But since such a stipulation is the very defining characteristic of counter-cyclic merge, it is independently required by any theory that espouses WLM or late merge of adjuncts (*Which picture near John*$_2$ *did he*$_2$ *like*), and is therefore innocuous (on structural limits to late merge see Nissenbaum 2000).

In scrambled environments, the object undergoes an additional movement step to ScrP, which by assumption resides below ΦP. Since restrictors can only be merged if their licensing heads are already present, short scrambling in (39)b again solely affects the determiner. Once Φ is inserted in (39)c, D° is combined with its restrictor, resulting in (39)d:

(39) *Restrictor insertion, short scrambling*

a.			$[_{VP}$ IO … $[_{DO}$ D° …]]
b.		$[_{ScrP}\ [_{DO}$ D°]	$[_{VP}$ IO … $[_{DO}$ D° …]]]
c.	$[_{\Phi P}\ \Phi_{[F]}$ …	$[_{ScrP}\ [_{DO}$ D°]	$[_{VP}$ IO … $[_{DO}$ D° …]]]]
d.	$[_{\Phi P}\ \Phi_{[F]}$ …	$[_{ScrP}\ [_{DO}$ D° $\underline{\text{restrictor}}_{[F]}$]	$[_{VP}$ IO … $[_{DO}$ D° …]]]]

Thus, the lowest node containing a full object copy is located right below ΦP, deriving the descriptive generalization (35). A contending derivation, in which restrictor insertion precedes movement is blocked by the Extension Condition, since scrambling would fail to target the root node. This view aligns well with an emerging consensus in derivational models according to which counter-cyclicity is a phenomenon which is characteristic of external merge, but which is not found with (overt) movement.

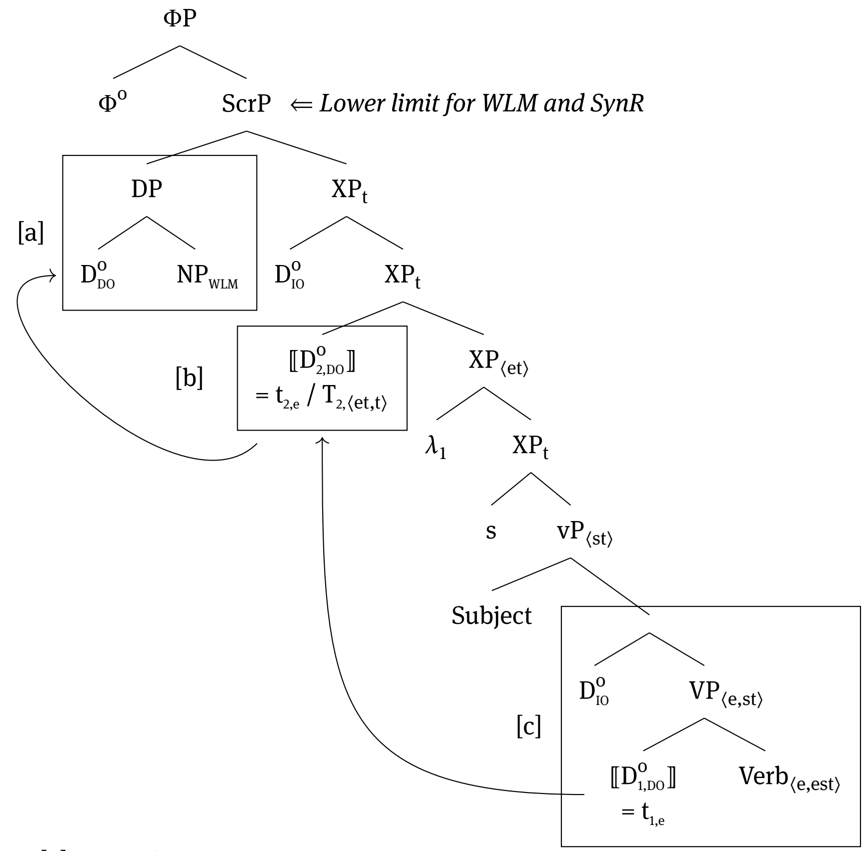
Applying the system outlined above to the empirical findings of section 3 finally provides an explanation of the reconstructive options for constellations in which a quantificational direct object has scrambled over an indirect object quantifier. Relevant details are represented by the tree in (40).

In the lowest section of (40), the direct object starts out as a determiner and moves to XP, the first position in which generalized quantifiers are interpretable. Next, movement to ScrP shifts the DO to the left of the indirect object. Scrambling optionally strands a higher type trace in XP, sanctioning scope reconstruction by SemR. Crucially, the revised WLM condition (37) ensures that the DO-restrictor is joined with its determiner no lower than in ScrP. From this, it follows that while the DO may be assigned narrow scope with respect to the indirect object by SemR, its descriptive content is not accessible below ScrP. Short scrambling leads, as desired, to scope ambiguity, but fails to reconstruct for the evaluation of binding relations. Thus, the calculus successfully derives the central generalizations about the interpretive options of short scrambling.

Two aspects of the theory deserve further attention. First, it was assumed that bare determiner movement in (40) optionally results in binding of generalized quantifier type traces.[15] While a rule for translating determiners into second order property variables, formulated in (41)a, is not part of the standard inventory for rendering movement copies interpretable, it can be seen as a member of the same family of operations as Trace Conversion ((41)b; Fox 1999). Such an extension is also not without precedent in the literature. For instance, Takahashi (2011) employs an ⟨et,e⟩-version of Trace Conversion (see (41)c) in implementing a choice function analysis of Weak Crossover (Ruys 2000, Sauerland 2004).

15 I disagree here with Takahashi (2006: 88), who pursues the idea that determiners are always translated as individual variables; see (41)c for discussion.

(40) *Reconstructive options for moved QPs*



[a] WLM of restrictor ⇒ SynR or SemR
[b] No restrictor ⇒ SemR, but no SynR
[c] D^{o}_{IO} and D^{o}_{DO} translate into individual variables

(41) *Trace Conversion (generalized)*

a. $Det_n \rightsquigarrow$ the $(\lambda\wp_{\langle et,t\rangle}[\wp = \lambda Q_{\langle et\rangle}[Q = \lambda x[x = n]]])$
$\equiv T_n$, where $T \in D_{\langle et,t\rangle}$ (Generalized Quantifier version)

b. $[(Det)\ (Pred)]_n \rightsquigarrow$ the $([(Pred)\ \lambda x[x = n]])$ (Standard e-type version)

c. Det Pred $\rightsquigarrow f_{ch} \in D_{\langle et,e\rangle}$ (Pred) (Choice function version)

On the present conception, the translation for copies is not rigidly determined by a stipulative device, but may yield a number of different values, depending on the local context.[16] The quantificational determiner *some* can then be converted into an individual variable, a variable of type ⟨et,t⟩ or – if the copy includes an overt restrictor argument[17] – a choice function:

(42) a. [some boy]$_3$ ⇝ the (boy and $\lambda x[x = n]$)
b. some$_3$ ⇝ the $(\lambda\wp_{\langle et,t\rangle}[\wp = \lambda Q_{\langle et\rangle}[Q = \lambda x[x = 3]]]) \equiv T_{3,\ \langle et,t\rangle}$
c. some$_3$ (boy) ⇝ $f_{ch} \in D_{\langle et,e\rangle}$ (boy)

In this way, a natural liberalization of the system which renders syntactic copies interpretable at the syntax-semantics interface also makes it possible to use bare quantificational determiners as targets for scope reconstruction by SemR.

A second point in need of clarification concerns the technical implementation of the syntactic licensing condition on restrictor insertion. Above, it was assumed that NP-restrictors are merged counter-cyclically once a licensing Φ-head has been inserted into the tree. As will be explicated below, this view generates different predictions from the ones projected by the Case based system advanced in Takahashi (2006).

Observe to begin with that the Case criterion for WLM in (27) does not make restrictor insertion contingent upon *actual* Case assignment, but merely requires the restrictor to reside within the c-command domain of a *potentially* Case assigning head. Such a proviso is essential, because otherwise, it would not be possible to merge the restrictor *pictures of each other* in (43) within the embedded infinitival TP1 ((43)a), whose T°-head lacks nominative Case features:

(43) *Raising, subject reconstruction*
a. [$_{TP1}$ T1° these pictures of *each other*$_2$ to be boring]]]
b. [$_{TP2}$ These pictures of *each other*$_2$ [T2°$_{[NOM]}$ seem to the *children*$_2$
[$_{TP1}$ T1° ~~these pictures of *each other*~~$_2$ to be boring]]]

This signals that the Case criterion (27) is either evaluated globally or that the link between Case assignment and WLM is indirect. Takahashi (2006: 125) avoids both complications by assuming that restrictors bear an unvalued, uninterpretable Case feature which is licensed under Agree by a c-commanding higher Case head. The restrictor of (43) can therefore be inserted early, in the lower clause ((44)a) and Case-licensed later on, once the DP has moved into the higher clause ((44)b).[18]

16 'the' in (41) is a type flexible maximalization operator.

17 This requirement is essential for capturing WCO effects. See Takahashi (2011) for details.

18 If raising subjects are driven into their surface position by Case, the [NOM]-feature has to be valued under specifier head agreement, and not by c-command. This introduces a second

(44) a. [T2°$_{[NOM]}$ seem to the *children*$_2$
[$_{TP1}$ [these pictures of *each other*$_2$]$_{[NOM]}$ ...]]
b. [$_{TP2}$ [these pictures of *each other*$_2$]$_{[NOM]}$
[T2°$_{[NOM]}$ seem to the *children*$_2$ [$_{TP1}$ ...]]]

The above solution is not compatible with the analysis advanced here, though, at least not in its present incarnation. If restrictor insertion is modeled in terms of features, and if features can be legitimized retroactively at a later point in the derivation, it should be possible to merge a complete copy of the object VP-internally ((45)a) and subsequently move that DP to its scrambled surface position (ScrP in (45)b), followed by valuation of the restrictor feature upon insertion of the Φ-head ((45)c):

(45) *Short scrambling, reconstruction (derivation overgenerates)*
a. [$_{VP}$ IO ... [$_{DO}$ [D° restrictor$_{[F]}$] ...]]
b. [$_{ScrP}$ [D° restrictor$_{[F]}$] [$_{VP}$ IO ... [$_{DO}$ [D° restrictor$_{[F]}$] ...]]]
c. [$_{\Phi P}$ $\Phi_{[F]}$ [$_{ScrP}$ [D° restrictor$_{[F]}$] [$_{VP}$ IO ... [$_{DO}$ [D° restrictor$_{[F]}$] ...]]]]

However, it is evident that such an algorithm fails to derive obligatory late restrictor insertion in German, because it would legitimize direct object restrictors – to be converted into interpretable expressions by standard Trace Conversion – below indirect objects. If (45) were admitted, short scrambling should, contrary to fact, reconstruct for the purposes of Binding Theory. One way to avoid this shortcoming consists in stipulating that the relevant set of Φ-features needs to be valued immediately upon insertion. Without further pursuing this idea, note in passing that a related condition has, for similar reasons, been pursued in Takahashi & Hulsey (2009: fn. 12).[19]

But anchoring late insertion to Case features also comes at the cost of losing an important correlation between feature valuation and structural relations. While the Case-based criterion on WLM (27) states a *non-local* relation, which in raising contexts like (43) obtains between an embedded subject restrictor and a higher,

structural condition for Agree relations, possibly an undesirable redundancy. Alternatively, the subject could be assumed to check Case in vP-adjoined position, and move to its final destination to eliminate a EPP-feature.

19 Takahashi and Hulsey note that the prepositional complement of (i) must be merged cyclically in order to induce a disjoint reference effect. They suggest that this falls out from a requirement that Case heads need to value their features immediately upon insertion.

(i) * [In which corner of John$_2$'s room] was he$_2$ sitting?

Transposed to the present context, the condition would have to impose a similar condition on the (Φ-)features of the restrictor, instead of the Φ-head.

superordinate T°-head, Case assignment or Case valuation is usually taken to be *local*. Raising subjects are, after all, not valued for Case by lower non-finite T°-heads. Hence, (27) obfuscates the nature of the dependency of WLM on Case. By contrast, linking restrictor insertion to Φ-features, as suggested here, makes it possible to model the relations entirely locally, at least if it can be shown that the locality conditions which define Φ-relations are sufficiently similar to those attested with Case.

That Φ-features indeed pattern with Case features in being subject to a local licensing requirement can be seen in languages, among them Greek and Rumanian, in which raising subjects agree with infinitival embedded predicates in Φ-features. On a prominent interpretation, (46) indicates that raising subjects enter into local, cyclic Φ-relations with the embedded infinitive before being attracted by the higher finite T° (Alexiadou & Anagnostopoulou 1999):

(46) Ta pedia archizun na pezoun. (Raising, Greek)
the children start$_{[3pl]}$ C° play$_{[3pl]}$
"The children start to play."

This result dovetails with the local account of restrictor licensing in terms of Φ-feature (37), but is not compatible with the Case-based solution (27).

On the present conception, the fact that the insertion point for restrictors of raising subjects is variable (anti-reconstruction effect by WLM in (25)b vs. reconstruction in (43)b, both repeated below) can then be traced back to the natural assumption that each non-finite clause contains an agreeing Φ-head for subjects, which can, but does not have to, trigger restrictor insertion:

(25)b [Every picture of *John*$_2$]$_1$ seems to *him*$_2$ [~~every~~$_1$ to be great].

(43)b [$_{TP2}$ These pictures of *each other*$_2$ [T2°$_{[NOM]}$ seem to the *children*$_2$
[$_{TP1}$ T1° ~~these pictures of *each other*~~$_2$ to be boring]]]

Furthermore, since the Φ-constraint (37) introduces the requirement to be c-commanded by a Φ-head existentially ("if [the restrictor] is within the c-command domain of *a* Φ-head […]"), a restrictor can be merged in any position inside the c-command domain of a Φ-head. Provided that subject Φ-features are hosted by T° (but see below), these nodes include the thematic base SpecvP, as well as all intermediate landing sites below matrix T°, among them adjunct positions to vP and XP:

(47) [$_{TP}$ [D° restrictor]$_{[NOM, \Phi]}$ T°$_{[NOM, \Phi]}$ … [$_{vP}$ [$_{Subject}$ D° {restrictor}]
[$_{VP}$ seem [$_{TP}$ T°$_{[\Phi]}$ … [$_{vP}$ [$_{Subject}$ D° {restrictor}]…]]]]]

Hence, the Φ-variant of Takahashi's WLM analysis equally guarantees the flexibility of restrictor insertion with A-movement.

Finally, the hypothesis that Φ-features are responsible for restrictor insertion has a further consequence for the analysis of anti-reconstruction effects with Ā-movement, which happens to align well with independent, recent ideas about where Φ-relations are encoded in the tree. The starting point of these concluding remarks comes from the observation that at first sight, the system appears to overgenerate in one particular context. Notably, it admits the derivation for German object Ā-movement schematized in (48), which mimics the scrambling derivation (39), the only, immaterial, difference being that in (48), the object stops in an outer specifier of vP on its way to SpecCP, instead of ScrP. As can be seen from representation (48)b, the restrictor of the Ā-moved object has been merged *above* the thematic position of the subject:

(48) *Ā-movement, reconstruction (derivation overgenerates)*
a. $[_{\Phi P}$ $\Phi_{[F]}$... $[_{vP}$ D° $[_{vP}$ Subject $[_{VP}$ ... $[_{DO}$ D° ...]]]]
b. $[_{\Phi P}$ $\Phi_{[F]}$... $[_{vP}$ [D° <u>restrictor</u>$_{[F]}$] $[_{vP}$ Subject $[_{VP}$ ... $[_{DO}$ D° ...]]]]

But such a derivation wrongly leads one to expect that *wh*-movement has the option of making disjoint reference effect disappear if the subject is an individual term that can undergo full reconstruction into SpecvP. This prediction is incorrect, the German equivalent of **Which picture of John*$_2$ *does he*$_2$ *like* behaves just like its English counterpart.[20]

The problem turns out to be only apparent, though, once the details of how subject restrictors are licensed are taken into consideration.[21] In particular, subject related Φ-features are commonly held to be located above object Φ-heads, that is either in T° or, as recently suggested in Chomsky (2008), even as high as in C° (see also Pesetsky & Torrego 2001). Adopting for expository reasons the latter assumption, it follows that subject restrictors are never merged in their thematic base, but are fully assembled only once the subject has reached SpecTP. Consequently, subjects cannot reconstruct below TP, and late merge of object restrictors as in (48) has never a discernable effect on the binding and coreference relations between terms inside subjects and objects. This modification does not affect scope

20 The same problem does not arise for English, where object Φ-features are arguably not introduced in a high Φ-head, as in German, but in v°. Hence, object restrictors are always merged below SpecvP in English. This language specific difference can furthermore be related to the parametric difference between free word order languages like German and Icelandic on the one hand, which possess a more articulated functional field, and English on the other hand, where all functional heads are collapsed in a single positions (cf. Bobaljik & Thráinsson's (1998) *Split Infl Parameter*).

21 I assume with Takahashi & Hulsey (2009) that pronouns and names are hidden definite descriptions. Hence, subject pronouns start out as definite determiners and acquire their assignment dependent component only once the restrictor is merged.

reconstruction, because scope relations can of course still be reversed by SemR into XP (see derivation (18)). In sum, the analysis delivers correct results also for the reconstructive properties of subjects.

5 Conclusion

This paper addressed two questions pertaining to the study of reconstruction phenomena. Is it necessary to admit additional mechanisms for reconstruction apart from those provided by the Copy Theory? And if so, is it possible to contain overgeneration which is well-known to arise from these mechanisms? Both questions were answered in the positive. More concretely, the additional requirements that reconstruction needs to satisfy were seen to fall into two groups: a syntactic locality condition on binding into copies (which was not further pursued at the present occasion) and a condition on the logical type of quantificational DPs and their traces, repeated in (49)a.

(49) a. ETA: Traces and quantificational DPs are extensional
b. In German, all movement operations apply in the overt component. English admits post-syntactic dislocation at LF.
c. (Counter-cyclic) Insertion of restrictors is regulated by Φ-features, instead of Case.

Together with two additional components, listed in the (49)b and (49)c, the proposal offered a unified and natural explanation for five sets of data: (i) the scope rigidity of German; (ii) the scope flexibility of English; (iii) the absence of scope reconstruction into small clauses; (iv) the absence of syntactic reconstruction into short scrambling chains; (v) the availability of scope reconstruction in short scrambling chains. To my knowledge, this is the first algorithmic account of these phenomena to date which makes explicit the relations between syntactic representations and their transparent logical forms.

The present contribution can also be seen as an attempt at supporting a broader claim about the division of labor between syntax and semantics. Concretely, I believe that a theory which makes use of the mechanisms provided by a properly constrained syntactic system in tandem with semantic mechanisms is better equipped to provide an adequate description of the multifarious properties of reconstruction phenomena than a theory which relegates these explanation to a single component, either syntax or semantics.

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