3

Reconstruction, Control, and Movement*

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3.1 Introduction

We currently suffer from an embarrassment of riches when confronting the proper analysis of *reconstruction effects*, the term given to phenomena in which a constituent is interpreted in a lower position than that in which it is pronounced. The copy theory of movement (Chomsky 1993, building on earlier work by Barss 1986 among others) provides a minimal syntactic approach to reconstruction effects: there is no operation of Reconstruction, but rather simply variation in which copy of a constituent is interpreted at LF. Complementing this is an approach to reconstruction effects based on higher-type traces, situated within Heim and Kratzer's (1998) approach to movement dependencies (e.g. Cresti 1995). On this approach, variation in the type of traces derives reconstruction effects without any Reconstruction operation, exploiting instead the power of the compositional semantic mechanism. Several other possibilities also exist: reconstruction effects could arise as a result of a lowering operation (May 1977), of PF-movement with no effect on LF (Sauerland and Elbourne 2002), of relativizing interpretation to chains rather than single positions (Barss 1986), or of a distinct reconstruction relation (Sternefeld 2000). All of these fit within modern syntactic theory (some more naturally than others), and most can be distinguished empirically (see, for example, Fox 1999 for arguments against an entirely semantic approach to scope reconstruction).

Most Minimalists have settled on some combination of the first four options, with questions remaining about the division of labour between them. Chomsky

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(1995:327) included examples of literal lowering alongside cases of interpretation of lower copies (see also Boeckx 2001*b*), while Lechner (1998, this volume) argues that a grammar must include both a mechanism of Syntactic Reconstruction (for example, lower copy interpretation) and a mechanism of Semantic Reconstruction (like Cresti's higher-type traces), an argument we will return to at length below.

This paper, in contrast, argues for a chain-based theory of reconstruction effects. The argument hinges on cases where reconstruction effects are found in the absence of movement relations. If we grant for now that such cases can be found, then the argument is straightforward. Analyses of reconstruction effects in terms of copy theory or higher-type traces tie reconstruction closely to movement, and so struggle to account for reconstruction without movement. As for the alternatives, a distinct reconstruction operation is clearly a last resort on grounds of parsimony, while lowering operations are severely constrained by the Proper Binding Condition (Fiengo 1974). No-one, to my knowledge, has suggested literal lowering as a general model of reconstruction effects, for this reason.

I will argue that cases of reconstruction without movement favour a chain-based analysis, based on a conception of 'chain' which is not limited to movement relations. Nothing forces chains to reflect movement relations alone (indeed, a system including chains determined exclusively by movement, alongside movement itself, is seen as unparsimonious, following Chomsky 1995 and Brody 1995), and more inclusive types of chain can be defined, as was common throughout the GB era. We will make extensive use of that flexibility here, by defining two distinct types of chain, both more expansive than the movement relation, and by tying different reconstruction effects to those more inclusive types of chain.

The two types of chain are necessary to capture the dissociations among reconstruction effects documented by Lechner (1998, this volume): scope reconstruction can be found without binding reconstruction, and *vice versa*. In the account we sketch below, each type of reconstruction effect is associated with a different type of chain, and the partial autonomy of the two types of chain derives the dissociations. Such dissociations are less clearly explicable on a theory which makes movement a precondition for all reconstruction effects.

An apparent empirical challenge to this approach comes from the *trapping effects* discussed by May (1977) and Fox (1999). Trapping effects arise where the position in which a constituent enters into binding relations determines the position in which it takes scope. Such an interaction suggests that scope reconstruction and binding reconstruction march in lockstep: one is found where the other is. This is in contrast to the dissociations that Lechner observes, which could be seen as *countertrapping effects*: in Lechner's examples, just because a constituent enters into scope relations from a given position, there is no

guarantee that it could also enter into binding relations from that position, or *vice versa*. The final task in this chapter, then, is to demonstrate that a chain-based approach to reconstruction can account for trapping effects, and can capture the balance between trapping and countertrapping.

In what follows, Section 3.2 demonstrates the existence of reconstruction across one nonmovement dependency, obligatory control. Section 3.3 compares reconstruction across obligatory control dependencies to the countertrapping effects observed by Lechner (1998) in A-scrambling and extraction from weak islands. Section 3.4 addresses the balance between trapping and countertrapping effects. Section 3.5 concludes.

3.2 Reconstruction Across Control Dependencies

Sentences such as (1), featuring obligatory complement control dependencies, can be scopally ambiguous.[1]

(1) Someone tried to read every book in the library. $(\forall > \exists, \exists > \forall)$

Historically, the ambiguity of such sentences has been a matter of contention (they were prominently claimed to be unambiguous in May 1977), but a consensus is emerging that the scope ambiguity is real and cannot be fully explained by reference to restructuring (Kennedy 1997, Johnson 2000, Hornstein 2001, Wurmbrand 2011).

Of course, once we decide that the ambiguity is real, we have to decide what to do about it. We could, like Kennedy (1997), postulate an operation of long-distance Quantifier Raising, allowing *every book in the library* to take matrix scope (2).

(2) [Every book in the library$_i$ [someone$_j$ [t_j tried to read t_i]]]

Alternatively, the scope ambiguity may be due to a reconstruction effect: *someone* takes scope in the embedded clause. We could provisionally represent this as in (3), employing ideas from Hornstein (1995, 1999, 2000, 2001). However, (3) represents control as movement and treats reconstruction effects as

[1] The arguments that obligatory control exhibits scope reconstruction were initially presented in Neeleman and Truswell (2006).

cases where different copies are interpreted from those that are pronounced. We will reject both of these claims below.

(3) [$_{TP}$ *Someone* [$_{vP}$ someone tried [$_{TP}$ someone to [$_{vP}$ **every book in the library** [$_{vP}$ **someone** read *every book in the library*]]]]]
(pronounced copies in *italics*, interpreted copies in **bold**).

This paper will argue that the scope ambiguity is a reconstruction effect. This, of course, leaves the question of the status of Kennedy's (1997) arguments, based on Antecedent-Contained Deletion, for a QR treatment, but that will have to wait for another time.

A major difference between QR and reconstruction is that the QR analysis predicts that the embedded quantifier *every book in the library* can take scope over everything in the matrix clause, while the reconstruction analysis is *selective*: it predicts that only *someone*, among the constituents of the matrix clause, can take scope under *every book in the library*. The evidence clearly favours the reconstruction analysis.

Firstly, an embedded quantifier cannot take scope over a matrix adverbial. (4a) is ambiguous, while (4b) is not.

(4) a. John frequently checks every calculation
($\forall >$ frequently, frequently $> \forall$).
b. John frequently tries to check every calculation
(frequently $> \forall, *\forall >$ frequently).

(4a) has a reading where all calculations are frequently checked, but not necessarily *en bloc*. (4b) lacks this reading. This is evidence against the QR analysis: if *every calculation* can take matrix scope, why can it not take scope over *frequently*?

As suggested by a reviewer, a natural way to attempt to capture these data on a QR approach would be to stipulate that QR of *every calculation* in (4b) can target a 'mid-size clausal' position (Johnson and Tomioka 1997) between *frequently* and the VP-internal trace position of *John*, but cannot target a position above *frequently*, as in (5b) (with irrelevant copies omitted). Meanwhile, in (4a), QR would be able to target a position above *frequently*, as in (5a).

(5) a. [John (every calculation) frequently (every calculation) [John checks every calculation]]
b. [John (*every calculation) frequently (every calculation) [John tries [PRO to check every calculation]]]

However, this analysis runs into conceptual and empirical difficulties. Conceptually, there is the question of why QR would cover a maximum of 1.5 clauses, or alternatively, why *frequently* acts as a barrier to QR in (5b), but apparently not in (5a). Empirically, problems arise when trying to order *frequently* with respect to 'mid-size clausal' elements across which QR is attested. Johnson and Tomioka (1997) show that *two thirds of the questions on the exam* can QR across negation in (6a), while (6b) shows that negation can precede (and so presumably c-command) *frequently*.

(6) a. Some student or other hasn't answered two thirds of the questions on the exam.
($some > \frac{2}{3} > \neg$)
b. John (frequently) doesn't (frequently) check every calculation.

If QR can cross negation (5a), and moreover Johnson and Tomioka's mid-size clausal position is above negation, which is in turn above one position where *frequently* occurs, the impossibility of long QR across *frequently* in (5b) is surprising. The most obvious conclusion, of course, is that long-distance QR out of control complements does not exist.

Complementary evidence against a QR approach to scope inversion in obligatory control constructions comes from transitive control constructions, with two matrix arguments. In such cases, only the controller can take scope under an embedded quantifier.[2] Given an object control predicate like *persuade*, an embedded quantifier can take scope over an object but not a subject.

(7) a. Mary persuaded someone [to read every book on the reading list]
($\exists > \forall, \%\forall > \exists$)
b. Someone persuaded Mary [to read every book on the reading list]
($\exists > \forall, *\forall > \exists$)

In contrast, given a subject control predicate like *promise*, the object cannot scope under the embedded quantifier.

(8) a. Someone promised Mary [to read every book on the reading list]
($\exists > \forall, \%\forall > \exists$)
b. Mary promised someone [to read every book on the reading list]
($\exists > \forall, *\forall > \exists$)

[2] Some individuals do not permit even this. To my knowledge, though, no-one is *more* permissive than this, once matters such as information structure are controlled for.

Finally, scope inversion in complement control constructions displays trapping effects: if a quantifier must bind a variable in the matrix clause, then it cannot take scope under an embedded quantifier, even if this would be otherwise possible.

(9) Someone promised himself [to read every book on the reading list]
($\exists > \forall, *\forall > \exists$)

All of these data are compatible with an analysis of scope inversion in complement control constructions as reconstruction effects: the controller is the only constituent of the matrix clause which interacts scopally with constituents of the embedded clause. The data call into question a QR-based analysis, though, as such an analysis does not predict such selective patterns of scope inversion. We conclude that complement control constructions display scope reconstruction effects: the controller can enter into scope relations as if it were in the embedded clause.[3]

A natural hypothesis would be that the controller can take scope in the embedded clause because of the dependency between the controller and PRO, the empty subject of the embedded clause. For example, we could adopt the Movement Theory of Control (Hornstein 1999, Boeckx, Hornstein and Nunes 2010), according to which obligatory control is a species of A-movement, distinguished by the fact that it targets a θ-position in the matrix clause, rather than a Case position (see (3) above). The possibility of scope inversion in sentences like (1) would then result from scope reconstruction across an A-movement dependency, plus whatever mechanism is responsible for local scope inversion (for Hornstein, a combination of *v*P-internal subjects and object shift, as in (3)).

However, there are grounds for scepticism concerning the Movement Theory of Control, as discussed in Culicover and Jackendoff (2001), Landau (2003, 2007), and elsewhere. Without going too far into the details of this ongoing debate, the major arguments centre around similarities and differences between the

[3] Winfried Lechner (p.c.) suggested a further potential argument that control complements are scope islands. If *every window* must scope under *forgot* in (i), it would provide further evidence that QR out of control complements is unavailable.

(i) John forgot to close every window.

My intuition broadly concurs with this prediction. However, here, as elsewhere, emphasis can lead to freer scope possibilities.

(ii) John forgot to close EVERY SINGLE WINDOW!
($forgot > \forall, \forall > forgot$)

Pending better understanding of this interaction, it is prudent not to read too much into (i).

grammatical dependencies underpinning A-movement and many obligatory control relations. A large number of differences between the properties of the two types of dependency have now been documented, militating against a reduction of obligatory control to A-movement.

Firstly, subject control predicates such as *promise* notoriously violate minimality constraints on controller choice. Under normal circumstances, PRO is controlled by the closest c-commanding argument: the matrix object if there is one, and the matrix subject if not.

(10) a. John_i wanted [PRO_i to blow up the bridge]
b. John_i persuaded Billy_j [$\text{PRO}_{j/*i}$ to blow up the bridge]

However, *promise* allows the subject to control PRO, despite the presence of an intervening object (11).

(11) John_i promised Billy_j [$\text{PRO}_{i/*j}$ to blow up the bridge]

Boeckx and Hornstein (2003) attempt to capitalize on this by pointing to the peripheral nature of subject control verbs in the grammar of English: they are acquired late, and informal surveys suggest that they are often not acquired at all. For Boeckx and Hornstein, then, the exceptional nonlocality of subject control dependencies is reflected in their late acquisition and omissibility from the grammar of English. However, an irreducible difference remains between locality of obligatory control and of regular A-movement: the locality constraints on A-movement are absolute, while those constraining obligatory control are a matter of markedness, and show some variability in controller choice (a phenomenon known as *control shift*).

This is most clearly seen, again, with verbs like *promise*. In (11), the subject controls PRO, while in (12), following Hust and Brame (1976), the object controls PRO.

(12) John_i promised Billy_j [$\text{PRO}_{\#i/j}$ to be allowed to blow up the bridge]

There are also cases, like (13), where the antecedent of an A-trace is not the closest c-commanding NP.

(13) a. Billy_i strikes me as t_i weird.
b. Billy_i seems to me t_i to be losing the plot.

However, these cases have very different properties from the variable control exhibited by *promise*. The experiencer argument of *strike* or *seem* is never a

landing site for A-movement. This might indicate that the experiencer does not enter into the calculation of locality in English A-movement dependencies. If so, an analysis can be maintained on which the antecedent of an A-trace is the closest c-commanding potential antecedent. However, such an analysis will not work for *promise*: (12) demonstrates that the object of *promise* is a potential antecedent of PRO, but that antecedent is nevertheless skipped in the subject control construction in (11).[4]

These considerations weigh against a movement-based analysis, building on Larson (1991), in which the object of *promise* is inaccessible as a landing site for some reason. Even if such an analysis were tenable for *promise* in the general case, it would fail to explain the discrepancy between raising (which always targets a unique designated landing site) and control (which exhibits variability in cases like (12)–(13)).

In contrast, thematically-based theories of controller choice (Jackendoff 1972, Farkas 1988, Sag and Pollard 1991, Jackendoff and Culicover 2003) predict that subject control exists, and predict which predicates exhibit this exceptional pattern. Such theories propose that the control properties of a predicate directly reflect its thematic properties: very roughly, the exceptional control behaviour of *promise* is related to the fact that if *X promises Y to V*, X is committed to bringing about an instance of V-ing, while if *X persuades Y to V*, it is Y who comes to have such a commitment. The controller is the person who is committed to the V-ing, and exceptional cases of object-control *promise* can be accommodated as instances of coercion. To the extent that there is no uniform syntactic representation of such commitments, the theory of control is also independent of particular syntactic structures, and the fact that such dependencies do not share the properties of A-movement dependencies is unsurprising.

Thematic theories of control are also corroborated if control properties, stated in thematic terms, remain invariant when a predicate appears in different syntactic configurations. Culicover and Jackendoff demonstrate such invariance in the nominalizations of control predicates. Nominalization preserves the control properties of these predicates, but the syntactic realization of the controller is more variable in a nominal construction, as in (14).

(14) a. The promise to Susan from John to take care of himself/*herself.

[4] These statements are all complicated by the consideration of dative intervention effects in A-movement. However, even here, there is an irreducible difference between control and movement: Beaven (2010) shows that dative intervention constrains A-movement to different extents in different languages, but there are no dative intervention effects in obligatory control in any language Beaven examined.

b. John gave Susan some sort of promise to take care of himself/*herself.
c. Susan got from John some sort of promise to take care of himself/*herself.
d. A: John made Susan a promise.
B: What was it?
A: I think it was to take care of himself/*herself
(all Culicover and Jackendoff 2001:506).
e. John's promise to Susan to take care of himself/*herself.
f. The promise from John to Susan to take care of himself/*herself.
g. The promise that Susan received on the part of John to take care of himself/*herself.

It is possible in principle that such variability belies an underlying syntactic uniformity on which the control relations depend — indeed, Boeckx *et al*. (2010) sketch such an account of data like these. However, to my knowledge, there is no current general theory relating such variability in the realization of thematic relations to a uniform underlying syntax. Examples like (14), together with the behaviour of *promise*, therefore stand as evidence in favour of theories of obligatory control as a thematic, and not narrowly syntactic, dependency: when the syntax varies and the thematic relations stay the same, control relations track the thematic relations rather than the configurational syntax.[5]

This picture is complicated somewhat by the fact that obligatory control into the complement of a control verb — examples such as (1) — show all the hallmarks of grammatical dependencies. Koster (1987) claimed that in every grammatical dependency, a unique, obligatory antecedent locally c-commands a dependent element. Following Hornstein (1999:73), we can see that complement control shows all these properties. (15a) shows that the controller is obligatory, (15b) that it must be local to PRO, (15c) that it must c-command PRO, and (15d) that there must be a unique controller.[6]

(15) a. *It was expected PRO to shave himself.

[5] Moreover, examples like those in (14) suggest that c-command is not a necessary condition on the relationship between controller and controllee, casting further doubt on the analysis of obligatory control as a species of grammatical dependency. This doubt is perhaps strengthened by examples such as *The promise to leave*, where the same person is the agent of *promise* and *leave*. However, the latter data, at least, are amenable to analysis in terms of a null subject of *promise*.

[6] Landau (2001) discusses *partial control* at length (*The director decided* PRO *to meet at 6*, with PRO interpreted as referring to the director and others). However, partial control does not invalidate the claim that the controller is unique, so much as refine our notion of what it means to be a unique controller.

b. *John thinks that it was expected PRO to shave himself.
c. *John's campaign expects PRO to shave himself.
d. *John$_i$ told Mary$_j$ PRO$_{i+j}$ to wash themselves/each other.

It seems, then, that the configuration of PRO and controller is regulated by a grammatical dependency in complement control constructions, but that this dependency is independent of the mechanisms underlying controller choice, which are also active in cases (particularly control in nominals) where there is no evidence of a grammatical dependency. Such a bipartite system is defended by Landau (2001), who proposes a series of Agree relations between heads in complement control constructions, partially independent of the lexicosemantic factors determining controller choice. Although we do not need to follow the specifics of his implementation, we must adopt this separation of the grammatical dependency from factors relating to controller choice.

This raises the question of whether scope reconstruction is contingent on this grammatical dependency, or the thematic control relation. The evidence points to the former. We have seen, for example, that obligatory control in nominals is not accompanied by a grammatical dependency. And unlike obligatory control in clauses, there is no long-distance scope inversion in such cases.

(16) a. Someone tried to read every book in the library ($\exists > \forall, \forall > \exists$).
b. Someone's attempt to read every book in the library
($\exists > \forall, *\forall > \exists$)

Likewise, there is no scope inversion in cases of nonobligatory control, where there is widespread agreement (e.g. Williams 1980) that there is no grammatical dependency.

(17) To read every book in the library would be nice for someone
($\exists > \forall, *\forall > \exists$)

The presence of scope reconstruction in obligatory control constructions is tied to the grammatical dependency, then, rather than the control relation.[7]

[7] If this is accurate, it undermines a reviewer's suggestion that scope reconstruction across obligatory control dependencies could be handled by a higher-type PRO, analogous to the higher-type traces of Cresti (1995). There are independent grounds for scepticism about this suggestion: a major difference between Cresti's cases and obligatory control constructions is that two distinct θ-roles are implicated in obligatory control, which significantly complicates the statement of a compositional semantics involving a higher-type

More remarkably, such scope reconstruction effects are not accompanied by binding reconstruction effects, as far as we can tell. Straightforward testing of the binding principles is marred by various confounds (for Condition A, it is impossible to tell whether a reflexive in the embedded clause is bound by the reconstructed controller or by PRO; configurations which would test reconstruction for Condition B are independently ruled out as surface violations of Condition C; and the failure of reconstruction for Condition C across a control dependency is unsurprising, given the demonstration in Fox 1999 that A-movement similarly fails to reconstruct for Condition C).

However, (18) shows an apparent failure of reconstruction for Principle A with a subordinate psych-predicate, relying on the familiar property of psych-predicates that the object can bind into the subject. (18a) shows binding of the reflexive in a raising construction, while (18b) shows that binding is not possible in the same configuration in a control construction.

(18) a. Stories about himself appear to have upset every senator.
b. *Stories about himself have managed to upset every senator.

Meanwhile, (19a) demonstrates the absence of reconstruction for variable binding in control constructions, in contrast with the raising example (19b). We will tentatively take this as evidence that control constructions do not reconstruct for binding.

(19) a. *Her$_i$ friends promised every girl$_i$ to meet her after school.
b. His$_i$ mother seems to every boy$_i$ to be wonderful.

Likewise, (20) demonstrates the absence of NPI-licensing under reconstruction, further evidence in the same direction if Progovac (1994) is right to relate NPI-licensing to binding.

(20) a. *[A doctor with any knowledge of acupuncture] wanted not to be ___ available.
b. [A doctor with any knowledge of acupuncture] seemed not to be ___ available.

Patterns like these are further evidence against reducing obligatory control to A-movement: the pattern of reconstruction effects is different in the two

PRO. Regardless of this, though, if there is a PRO in nominal, as well as verbal, obligatory control, then the availability of a higher-type PRO would make scope reconstruction equally available in either case, contrary to fact.

constructions. However, it also poses an analytical challenge in its own right: if we see some reconstruction effects here, why do we see so few? That is the topic of the next section.

3.3 Lechner's Double Dissociation

The occurrence in complement control constructions of scope reconstruction unaccompanied by binding reconstruction recalls seminal data from Lechner (1998, 2011*a*, this volume). Lechner showed that German *Mittelfeld* scrambling displays scope reconstruction effects, but not binding reconstruction; while the opposite holds of extraction from weak islands.

(21) demonstrates scope reconstruction without binding reconstruction. Scope in German typically reflects surface c-command, so it is natural to relate the ambiguity of (21) to the fact that the theme has scrambled over the goal: if the theme is interpreted in its surface position, it takes wide scope; if it is interpreted in the trace position (we will modify this below), it takes narrow scope.

(21) *weil sie* [*ein Bild von seinem*$_{*i}$ *Auftritt*]$_j$ *jedem Kandidaten*$_i$ t_j
since she a picture of his appearance every candidate
zeigte.
showed
'since she showed every candidate a picture of his appearance'
($\exists > \forall, \forall > \exists$, Lechner 1998:299)

However, despite the fact that the theme can take scope in the trace position, the pronoun *seinem* contained within the theme cannot be bound in that position, and must be interpreted as a free pronoun. (21) is therefore a second case of scope reconstruction without binding reconstruction.

In contrast, following Longobardi (1991), Lechner shows that extraction from *wh*-islands displays a full range of binding reconstruction effects. (22a) demonstrates reconstruction for Condition A (a reflexive pronoun can be bound from the trace position), as well as obligatory reconstruction for Condition B (a regular pronoun must be free in the trace position). (22b) demonstrates that reconstruction for Condition C is obligatory (*she* must be disjoint in reference from *Mary*), and (22c) shows that reconstruction for variable binding is possible.

(22) a. It is to herself$_i$/*her$_i$ that I don't know whether Mary$_i$ wrote.
(Lechner 1998:295)
b. *It is to Mary$_i$ that I don't know whether she$_i$ wrote.

c. It is to her$_i$ mother that I don't know whether every girl$_i$ wrote.

However, there is no scope reconstruction into weak islands. *How many*-questions can give rise to scope ambiguity: on the standard analysis, the two readings of (23) arise because *how many* contains two operators. The scope of one is fixed, as in standard analyses of operator movement (e.g. Chomsky 1993), while the other is free to reconstruct.

(23) How many books does Chris want to buy?
   a. For what n, there are n-many books $b_1, \ldots, b_n$, and for every $i, 1 \leq i \leq n$, Chris wants to buy b_i.
   b. For what n, Chris wants that [there are n-many books $b_1, \ldots, b_n$, and for every $i, 1 \leq i \leq n$, he buys b_i].

In principle, (24) should be ambiguous in the same way. However, only the reading corresponding to (24a) is available, with specific books in mind. As this is the reading where *many books* takes scope above *want*, and the reading where *many books* takes scope below *want* is unavailable, we conclude that scope reconstruction into *wh*-islands is not possible.

(24) How many books do you wonder whether Chris wants to buy? (many > want, *want > many)
   a. 'There are three books that I wonder whether Chris wants to buy: *Dubliners, Ulysses,* and *Finnegans Wake*.'
   b. *'I wonder whether Chris might be interested in buying three books, but I don't particularly care whether Chris might be interested in buying two books or four books.'

Combining these two findings gives a pair of examples in which the requirement that a *many*-phrase takes high scope (because there is no scope reconstruction into a weak island) bleeds the possibility of a pronoun being interpreted within the weak island, a variant on classical trapping effects.

(25) a. Every boy must see five pictures from the teacher's childhood before he can go home. The teacher must oversee this process, but hasn't paid attention, so he is now unsure who has seen which pictures.

   Question: How many pictures from his$_i$ childhood does the teacher$_i$ need to know whether every boy has seen?

b. Every boy must see five pictures from his own childhood before he can go home. The teacher must oversee this process, but hasn't paid attention, so he is now unsure who has seen which pictures.

Question: *How many pictures from his_i childhood does the teacher need to know whether every boy_i has seen?

Extraction from weak islands therefore shows the opposite pattern to *Mittelfeld* scrambling or complement control: binding reconstruction is possible, but scope reconstruction is not. Scope reconstruction and binding reconstruction are therefore doubly dissociable.

The next question is how to account for this. Lechner's approach is to make use of two different technologies for capturing reconstruction effects, and associate each type of effect with a different technology. Binding reconstruction would then be tied to copy-theoretic *Syntactic Reconstruction*, while scope reconstruction would be tied to the use of higher-type traces, as in Cresti (1995) (*Semantic Reconstruction*). The implication is that a theory of the distribution of the two types of reconstruction technology gives a theory of the distribution of the two types of reconstruction effect.

Lechner's approach is adequate in principle to capture the data he describes. However, both of Lechner's technologies crucially implicate a movement relation. The demonstration in Section 3.2 that reconstruction effects exist without movement dependencies therefore leads us to consider a different approach. In fact, I will suggest that neither of the constructions Lechner describes involves actual movement, but that both constructions, like complement control, bear similarities to movement relations.

We begin to investigate this possibility by comparing complement control and *Mittelfeld* scrambling. Both have the same reconstruction profile: they allow scope reconstruction, but not binding reconstruction. Moreover, in both cases, there are reasons to suspect that the grammatical dependency in question is not an instance of movement. For complement control, this has already been discussed above; for scrambling to the *Mittelfeld*, I refer the reader to Bayer and Kornfilt (1994), Neeleman (1994), Neeleman and Weerman (1999), and Fanselow (2001, 2003). All of these researchers propose that the relation between a predicate and a scrambled argument is direct, rather than mediated by a trace or copy. For Neeleman, and Neeleman and Weerman, for example, θ-roles are encoded as dependencies of a verb on its arguments, and those dependencies form a record of which argument bears which role. Instead of the movement approach, then, where the intended interpretation is recovered by virtue of a dependency between a scrambled argument and a trace in that argument's θ-position, Neeleman's system recovers largely equivalent

information by virtue of a dependency between a scrambled argument and a member of a θ-grid.[8]

Nevertheless, both control and scrambling relations share many properties with movement: all three dependencies require a unique, obligatory antecedent, which locally c-commands the dependent. Following Koster (1987), I take these to be the core properties of grammatical dependencies. For the remainder of this paper, I will assume that neither complement control nor scrambling to the *Mittelfeld* represent instances of movement, but that (like movement) they are instances of grammatical dependencies. This is partly for the independent reasons given in the references above, and partly because complement control and *Mittelfeld* scrambling do not show the same reconstruction effects as movement. Movement allows reconstruction for both scope and binding,[9] while

[8] Winfried Lechner (p.c.) suggests the following argument that scrambling configurations must be derived by movement. Pair-list readings of *wh*-questions only arise if a quantifier c-commands the *wh*-trace (May 1985, Aoun and Li 1993, Chierchia 1993, Beck 1996*b*).

(i) a. Which student did John give every book to *t*? (pair-list)
b. Which book did John give *t* to every student? (single pair)

The same facts occur in German, despite the fact that German, unlike English, allows scrambling (Lechner cites Pafel 1998 in this connection).

(ii) a. *Welches Buch hat Peter jedem Studenten empfohlen?*
Which book has Peter every.DAT student.DAT recommended
'Which book did Peter recommend to every student?" (pair-list)
b. *Welchem Studenten hat Peter jedes Buch empfohlen?*
Which student has Peter every.ACC book.ACC recommended
'Which book did Peter recommend to every student?' (single pair)

This is surprising if German scrambling allows internal arguments to freely permute; less so if the indirect object must always c-command the direct object or a trace thereof. However, an alternative interpretation of these facts is that A-scrambling bleeds A′-movement: A′-movement cannot apply to an A-scrambled constituent and disrupt the marked, scrambled order of internal arguments. Motivation for such a constraint can be found in the discussion of scrambling and information structure in Neeleman and van de Koot (2008), orthogonal to the question of whether A-scrambling leaves a trace. This evidence for scrambling as a movement relation therefore seems to me inconclusive.

[9] The claim is more controversial for A-movement. Following May (1977), some scope reconstruction effects clearly obtain, often analysed as instances of Quantifier Lowering (Chomsky 1993, 1995, Boeckx 2001*b*). Meanwhile, some potential Condition C violations fail to occur under reconstruction, which is sometimes taken to indicate an absence of binding reconstruction effects (Fox 1999), apparently contradicted by *prima facie* cases of reconstruction for Condition A (Takahashi and Hulsey 2009). The empirical picture is still somewhat unclear and inconsistent, but I will assume that A-movement can reconstruct for scope and binding, just like A′-movement, with apparent failures of binding reconstruction to be explained by independent factors, along the lines of the above references. If this

complement control and short scrambling only show scope reconstruction effects. If we were to analyse complement control and *Mittelfeld* scrambling as instances of movement, we would have to find some auxiliary explanation for the absence of binding reconstruction effects, and I, personally, don't see where to start.

We may then ask how movement is different from other grammatical dependencies. Given Koster's characterization of grammatical dependencies, as used repeatedly above, the major extra property of movement is that it relates positions which share a thematic role (to be understood, if necessary, in an extended sense that encompasses adjunct 'participant roles'). In contrast, the antecedent and dependent in a complement control relation bear different thematic roles, while the dependent in a base-generated scrambling relation is a predicate (a θ-role assigner), rather than an argument.

We can represent these distinctions, in the spirit (if not the letter) of proposals in Neeleman and van de Koot (2002), by thinking about the grammatical dependencies introduced by the elements in these constructions. A θ-role assigner is dependent on the θ-role assignee, whether that argument is a sister of the predicate (as in non-scrambling constructions) or asymmetrically c-commands it (as in scrambling constructions). A trace is dependent on an antecedent with which it shares a θ-role, while PRO is dependent on a controller which bears a distinct θ-role. We represent these three types of dependency as species of the general class of grammatical dependency, abbreviated as *Dep* in (26).[10]

(26) a. **Movement:** $[\mathrm{XP}_{\theta_i \mathrm{Dep}_{\#}} \ldots [t_{\theta_i \mathrm{Dep}} \ldots]]$
b. **Complement control:** $[\mathrm{NP}_{\theta_i \mathrm{Dep}_{\#}} \ldots [\mathrm{PRO}_{\theta_j \mathrm{Dep}} \ldots]]$
c. ***Mittelfeld* scrambling:** $[\mathrm{NP}_{\theta_i \mathrm{Dep}_{\#}} \ldots [\mathrm{V}_{\mathrm{Dep}} \ldots]]$

Movement, complement control, and scrambling to the *Mittelfeld* all involve a grammatical dependency, then. The distinguishing feature of movement dependencies is that the antecedent and dependent share a θ-role. In

turns out to be incorrect, alternative theories of A-movement can be envisaged which are compatible with the approach being developed here.

[10] In (26), simplifying aspects of Neeleman and van de Koot (2002) which are irrelevant to us, a constituent marked with *Dep* introduces a dependency, while a constituent marked with $Dep_{\#}$ satisfies that dependency. A constituent subscripted with $Dep_{\#}$ satisfies that dependency. Subscripted θ_i and θ_j are diacritics to identify which constituents share or do not share a θ-role.
This 'bottom-up' approach to dependencies, inherited from Neeleman and van de Koot as well as HPSG and other frameworks, is the reverse of the standard probe–goal Agree configuration. I leave it as an open question how much of the present approach could be translated into Agree-based terms.

complement control constructions, the antecedent and dependent have different θ-roles; in base-generated scrambling constructions, the dependent assigns a θ-role to the antecedent, but the dependent does not itself bear that θ-role. This then suggests a composite definition of movement relations.

(27) Movement $=_{df}$
   a. A grammatical dependency (obligatory, unique antecedent locally c-commanding a dependent), where;
   b. The antecedent and dependent share a θ-role.

The similarities in the scope reconstruction behaviour of movement, complement control, and *Mittelfeld* scrambling could then be related to the fact that all three are grammatical dependencies; the differences between them with respect to binding reconstruction can be related to the fact that movement is the only one of these three constructions where the antecedent and dependent share a θ-role. We arrive at the following hypothesis:

(28) a. **Scope reconstruction effects:** A constituent may take scope from the position of a constituent to which it is related by a grammatical dependency.
   b. **Binding reconstruction effects:** A constituent may (Condition A) or must (Condition B/C) enter into binding relations from the position of a constituent with which it shares a θ-role.[11]

This hypothesis would, of course, be strengthened if we could demonstrate a double dissociation: binding reconstruction effects are found without scope reconstruction precisely where multiple nodes share a single θ-role, but are not related by a grammatical dependency. This suggests an analysis of the second part of Lechner's double dissociation, namely extraction from weak islands.

Adapting ideas from Cinque (1990), we could hypothesize that successive-cyclic A′-movement cannot cross a weak island boundary, but that a null element within a weak island can be A′-bound by an operator outside the island.[12]

[11] The disjunctive 'may or must' reflects the demonstration in Lebeaux (2009) that Conditions B and C, unlike Condition A, are 'everywhere' conditions, which must be obeyed in every relevant position. It is straightforward to adjust this if it should turn out that Lebeaux's analysis is inaccurate, and that Fox (1999) was correct to locate all binding-theoretic effects at LF. I make no different predictions to anyone else in this respect.

[12] This is actually Cinque's analysis of strong islands, which (on his definition) can only be escaped by NP. Weak islands, such as the *wh*-islands described above, can be escaped by NP or PP. Adapting Cinque's ideas in this way therefore has consequences for locality theory, which I have not presently investigated.

According to such a hypothesis, all A′-dependencies crossing weak island boundaries are base-generated. As is well known, binding relations do not behave like grammatical dependencies: for example, the antecedent need not c-command the dependent.

(29) a. [[Every boy]$_i$'s mother] loves him$_i$.
b. I danced [with [every boy]$_i$] on his$_i$ birthday.

If extraction from a weak island is a base-generated binding relation, it is not a grammatical relation. On the hypothesis outlined in (28), we would then predict an absence of scope reconstruction. However, in a base-generated A′-binding configuration, the θ-criterion insists that *Wh* and *pro* share a θ-role, as *Wh* is never in a θ-position. Again according to (28), then, we expect that binding reconstruction will be displayed.

There is much scope for future research along these lines. Postulation of *pro* at the foot of an A′-chain has the effect of making extraction from weak islands look like an instance of null resumption, as mentioned by both reviewers. A recent strand of research has concentrated on interactions between island-sensitivity and reconstruction in a variety of resumptive constructions across languages (Aoun and Benmamoun 1998, Aoun, Choueiri and Hornstein 2001, Aoun and Li 2003, Guilliot and Malkawi 2006, 2007, 2011, Rouveret 2008). Typically (see in particular Rouveret 2008, and Guilliot and Malkawi 2011), differences among resumptive constructions in these respects are cashed out in terms of a typology of pronominal elements, itself derived from independent research into the syntax and semantics of pronominals, such as the distinction between e-type and bound readings (Evans 1980, Elbourne 2005).[13] A logical next step for this research would therefore be to situate these claims about reconstruction into weak islands, with respect to this typology of resumptive elements.[14]

[13] Similar questions arise concerning the syntax and semantics of copy-raising, in which two A-positions are related and the lower position is occupied by a pronoun. Fujii (2005) demonstrates limited binding reconstruction, without scope reconstruction, in copy-raising sentences. However, Asudeh and Toivonen (2009) demonstrate that even the full range of binding reconstruction effects is not attested (Asudeh and Toivonen 2009 is a pre-publication version of Asudeh and Toivonen 2012. The relevant discussion was omitted from the published version). Clearly, more research is needed to reconcile the two sets of facts.

[14] A further interesting piece of theoretical housekeeping for the future concerns the integration of this line of research with the claims of Takahashi and Hulsey (2009). Takahashi and Hulsey's combination of wholesale late merger and trace conversion has the effect of rendering many copies indistinguishable from pronouns. Given that the resumptive literature assumes that pronouns at the foot of chains are independently necessary, it

There are many competing analyses of extraction from weak islands, and I have no new evidence directly supporting the A′-bound *pro* analysis over any competitors. Equally, I cannot presently explain why particular reconstruction effects are tied to particular relations in the way I have suggested. However, I believe that the dissociation of scope reconstruction from binding reconstruction in this way has a good deal of promise. Lechner's double dissociation shows that reconstruction effects are not a monolithic class, although there is a clear tendency in GB and Minimalism to treat them as such. A major property of copy-theoretic approaches to reconstruction effects is that, all else being equal, they treat all reconstruction effects as being of a piece,[15] and this dissociation should cast doubt on that project. On the other hand, Lechner's own analysis of the double dissociation is still closely tied to movement dependencies, and the foregoing considerations should call this into question.

On the present approach, reconstruction effects are not limited to movement relations, and this appears to be accurate. However, movement does retain a privileged position in the taxonomy of reconstruction effects: movement is unique in that it is a grammatical dependency which relates positions which share a θ-role, as a matter of definition according to (27). According to (28), then, only movement should display both scope and binding reconstruction effects: there is 'more reconstruction' in movement dependencies than anywhere else. However, Lechner's double dissociation is also predicted, as a consequence of the independence of the two types of reconstruction.

3.4 Trapping and Countertrapping

The previous section sketched a theory which partially dissociates reconstruction effects from movement relations, in a way which is sufficiently flexible to account simultaneously for the attested dissociations between scope reconstruction and binding reconstruction, and for the presence of reconstruction effects in the absence of movement. We should now ask how to represent the relations which underpin reconstruction effects.

One option which can be immediately discarded is a single level of representation, like the LF of May (1977) and much subsequent work, in which

is natural to ask how much of Takahashi and Hulsey's analysis can be reformulated using pronouns instead of copies.

[15] Of course, all else is not always equal. Explanatory devices like partial reconstruction account for certain discrepancies between scope and binding reconstruction, but do not touch the patterns discussed here.

scope and binding relations are unambiguously represented by the position of a constituent. The reason is that a single position cannot represent two dissociable pieces of information: the fact that XP can take scope in a given position is no guarantee that it can also enter into binding relations from that position, and *vice versa*. If, for example, a controller in a complement control construction can take scope from the position of PRO, then we might represent that by having the controller in the position of PRO at LF, as we provisionally did in (3). However, given standard assumptions about the interpretation of LF, this would also predict that the controller enters into binding relations from the position of PRO, contrary to fact.

Disregarding this traditional conception of LF, there are two major possibilities: either different types of relation are represented at different levels, or they are represented at a single level, in such a way as to allow the representation of scope and binding more autonomy than in traditional LFs, for example by defining multiple types of chain over surface representations. Neither of these options suffers from the problem just described for traditional LFs, because in each case, the position in which a phrase takes scope does not automatically guarantee that a phrase can enter into binding relations from that position, or *vice versa*.

To choose between these two options, we must decide how independent scope reconstruction and binding reconstruction are from each other. To assign different phenomena to different levels of representation is an analytical move reflecting a hypothesis that the phenomena in question are encapsulated from each other. Representing them at the same level predicts that they will interact directly.

In fact, a demonstration that scope reconstruction and binding reconstruction interact substantially was given as early as May (1977), concerning *trapping effects* such as (30).

(30) a. Two people seem to be dancing with every senator
$(\exists 2 > \forall, \forall > \exists 2)$

b. Two people seem to themselves to be dancing with every senator
$(\exists 2 > \forall, *\forall > \exists 2)$

(30) shows that scope reconstruction interacts with binding: the fact that *Two people* enters into binding relations in the matrix clause in (30b) bleeds scope reconstruction into the embedded clause.

The existence of trapping effects suggests a representation of scope and binding at the same level: if we were to adopt the alternative, according to which scope relations are determined at level L_1 and binding relations are determined at a different level L_2, we would face the extra complexity of stating that the position of a constituent in L_1 constrains the position of the counterpart of that

constituent in L_2, and *vice versa*. The whole point of levels of representation is to avoid having to state such intricate global similarities as these.

We must represent scope and binding at the same level, then, but that level should not be LF in the traditional sense. As an alternative, I suggest a chain-based theory of reconstruction, as in Barss (1986), or Aoun and Li (1989). Such approaches have two main advantages, compared to approaches which treat reconstruction as the inverse of movement, whether as lowering or as interpretation of lower copies. Firstly, chain-based approaches need not be so closely tied to movement, depending on the definitions of 'chain' that we adopt. Secondly, the possibility exists of defining multiple types of chain, and relating different types of chain to different types of reconstruction effect. This gives us the power to account for Lechner's dissociations between reconstruction effects.

We define the following, maintaining the agnosticism about the precise formulation of the binding theory from footnote 11.

(31) a. X and Y are members of the same **scope chain** iff X and Y are related by a grammatical dependency.
b. X and Y are members of the same **binding chain** iff X and Y share a θ-role.

(32) a. X can take scope from the position of Y only if X and Y are members of the same scope chain.
b. (i) An anaphor or bound variable X can be bound from the position of Y only if X and Y are members of the same binding chain.
(ii) A pronoun or R-expression X must be locally free or free, respectively, in the position of Y if X and Y are members of the same binding chain.

This means that the syntactic representation fed to the semantic component encodes information about *potential* scope and binding relations, but this representation does not *unambiguously* represent information about these relations, in contrast to standard assumptions about copy-theoretic LFs after deletion of uninterpreted copies (see May 1985 for the original proposal that LF did not fully disambiguate scope and binding relations). However, no great problem arises from this: the information encoded in a representation like the one sketched here determines predicate–argument relations, as well as information on which elements may, or must not, be referentially dependent on which other elements, and which elements may be in the scope of which others.

Clearly, this is only an outline of a theory of reconstruction. Particular priorities for the future are a sharpening of the definition of *scope chain* in the light of the

patterns of fixed scope discovered by Aoun and Li (1989) in double object constructions; an investigation of 'Lebeaux effects,' or failures of Condition C reconstruction, within these terms; and an expansion to further apparent cases of reconstruction without movement, such as the pseudocleft connectivity discussed by Higgins (1973) among many others.

However, immediately, several analytical opportunities open up which are unavailable on other approaches. The system is designed to accommodate dissociations such as those described by Lechner, which are so puzzling on more standard approaches. Moreover, a promising treatment of movement as a composite relation emerges: movement dependencies are simply simultaneously scope chains and binding chains, or in other terms, grammatical dependencies which hold between elements which share a θ-role.

Finally, the chains we propose, unlike standard chains, arguably respect Chomsky's (1995) Inclusiveness principle, which states that syntactic properties of complex structures project from the lexicon. Chains normally violate this principle because they involve annotation of syntactic structures with lexicon-external diacritics. However, the present conception of scope chains and binding chains arguably escapes this problem, because the information about chain membership, on this view, must be recoverable from the syntactic structure in any case: we must know in any case which syntactic dependencies hold in that structure, and which constituents share which θ-role. Given that scope chains just are syntactic dependencies and binding chains just are shared θ-roles, information about scope and binding chains is already implicitly represented in the structure. The explicit labelling of these relations as chains is redundant, and carried out purely for expository clarity. There is no violation of Inclusiveness in the fundamentals of the analysis being developed.

We can now return to the significance of trapping effects. The core of trapping effects is that, if a constituent enters into binding relations in a given position, it also takes scope in that position, and *vice versa*. That core is independent of the relation of movement to reconstruction effects, and can be stated in the following way.

(33) **The Trapping Generalization**: Each constituent is interpreted in only one position.

However, we can now also state a further generalization concerning the distribution of Lechner's countertrapping effects, the dissociations discussed in Section 3.3, although (34) is strictly superfluous, being implicit in the foregoing.

(34) **The Countertrapping Generalization:** Individual types of reconstruction can sometimes target more positions than multiple cooccurring types of reconstruction.

The balance between these two generalizations is determined by the interaction of scope chains and binding chains. To illustrate, let us begin by considering (30). In (30), the story is essentially as in May (1977): the scope chain and binding chain of *two people* each consist of the surface position and the trace position, and the constituent can in principle be interpreted in either position. In the lower position, it can be interpreted with in the scope of *every senator*, so scope ambiguity is predicted, unless Principle A forces *two people* to bind a reflexive from its surface position, as in (30b). Because of the Trapping Generalization, if the binding theory forces interpretation of a constituent in a given position, that constituent must also take scope in that position.

Essentially the same is true in (35): the scope chain of *two people* contains the surface position and PRO. If *two people* may take scope from its surface position or the position of PRO, scope ambiguity arises, as in (35a). However, if it must bind a reflexive from its surface position, as in (35b), then it must also take scope from its surface position, and the scope ambiguity disappears.

(35) a. Two people want to dance with every senator.
$(\exists 2 > \forall, \forall > \exists 2)$

b. Two people have persuaded themselves to dance with every senator.
$(\exists 2 > \forall, *\forall > \exists 2)$

Where raising and complement control differ is in the nature of their binding chains: binding chains are determined by thematic relations. The trace of a raised constituent shares a θ-role, and so a binding chain, with its antecedent, while PRO and its antecedent have distinct θ-roles, and are therefore not members of the same binding chain.

This distinction is reflected in the possibility of being bound from the foot of the chain. The examples in (36), repeated from (18), demonstrate this. (36a) shows that a raised reflexive can be bound in its base position, while (36b) shows that a reflexive contained within a controller cannot be bound in the position of PRO. This is as expected if raising dependencies are binding chains but control dependencies are not.

(36) a. Stories about himself appear to have upset every senator.
b. *Stories about himself have managed to upset every senator.

Likewise, because a binding chain can cross a weak island but a scope chain cannot, a failure of scope reconstruction into a weak island can bleed binding possibilities within the weak island (see (25) above).

We see, then, that the Trapping Generalization, as formulated in (33) without reference to movement, is all that is necessary to capture trapping effects, but something like the distinction between scope chains and binding chains is required to capture the cases described by the Countertrapping Generalization: the Trapping Generalization forces scope chains and binding chains to interact to determine a single locus of interpretation for each element, but scope reconstruction is possible to positions that binding reconstruction cannot touch, and *vice versa*, because of the nonidentity of scope chains and binding chains.

It follows as a theorem from this approach to trapping and countertrapping that dissociations such as Lechner's will only be found in nonmovement constructions, because scope chains and binding chains always coincide in movement dependencies. This approach therefore rests on the correctness of theories of complement control, scrambling, and extraction from weak islands as base-generated. Only time will tell whether such theories are tenable, but the prize, if they can be made to work, is a theory of the distribution of trapping and countertrapping effects, an account of cases of reconstruction without movement, and a new reductionist approach to movement relations.

3.5 Conclusion

The major aim of this chapter has been to sketch a theory of reconstruction effects which takes dissociations between those effects seriously, while still allowing for intimate interactions between different types of reconstruction, such as trapping effects. Dissociating reconstruction effects involves relating each to a different type of relation (syntactic in one case, purely thematic in the other), while capturing the interactions involves representing those two types of relation at the same level. Finally, the consideration of two different types of relation makes it natural to consider movement relations as the cooccurrence of the syntactic and thematic relation.

This approach suggests several immediate avenues for exploration. Of course, there is much work to do in sharpening this analysis beyond the outline given here. Hand in hand with this comes the requirement that the general validity of the approach be demonstrated, by showing that it at least does not damage our current understanding of other patterns of scope and binding relations, and other types of reconstruction effect. Perhaps most intriguing, though, are the implications for the general theory of grammar. One major reason for the

adoption of the copy theory of movement in Chomsky (1993) and much subsequent work is that it allows for a natural treatment of reconstruction effects, building on work on 'layered traces' in Barss (1986) and elsewhere. However, there has been a degree of unanswered criticism of the copy theory (see Neeleman and van de Koot 2010 and references therein). Moreover, Neeleman and van de Koot have also demonstrated the invalidity of claims that copy theory is indispensible to the Minimalist analysis of movement dependencies, given the existence of alternative Minimalist approaches to movement, such as lexicalized traces. The present paper reinforces Neeleman and van de Koot's criticisms, by demonstrating that an approach such as the copy theory, which ties reconstruction effects to movement, fails to capture all instances of reconstruction effects. Both putative advantages of the copy theory are therefore called into question, while the criticisms of that theory remain unanswered. This paper therefore lends support to the programme of developing non-copy-theoretic forms of Minimalism (Brody 1995, Neeleman and van de Koot 2002).