Barss' generalization and the strict cycle at LF

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Abstract

Barss (1986) contains a generalization concerning reconstruction in remnant movement contexts. It states that a moved category α cannot reconstruct to its trace if α does not c-command the trace at the surface. This configuration arises in cases of remnant movement, where the remnant category is higher than the category whose extraction lead to the formation of the remnant. In the present paper, we argue that Barss' Generalization can be derived if reconstruction is lowering at LF and if LF is subject to strict cyclicity. The idea is that in order for reconstruction of the extracted category to apply, the remnant must reconstruct first. Due to the Strict Cycle Condition, however, reconstruction of the extracted category is impossible because the remnant category is part of a higher cycle. The lowering approach to reconstruction is compared to two previous accounts of Barss' Generalization. One bases reconstruction on the copy theory of movement, the other is built on the idea that reconstruction applies without there literally being a full category in the "base position" of the remnant.

1. Introduction

Syntactic movement may or may not have an influence on relative quantifier scope. In (1), we see an example that illustrates this point.

(1)   [$_\exists$ Some young lady] seems t$'_\exists$ to be likely t$_\exists$ to dance
with [$_\forall$ every senator].   ($\exists > \forall$; $\forall > \exists$)

The sentence in (1) can have a reading where the existential quantifier in *some young lady* has scope over the universal quantifier in *every senator*. This reading corresponds to the surface structure, where *some young lady* c-commands

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every senator. However, the inverse scope relation is possible as well. Assuming that the PP *with every senator* is the complement of *dance* (Larson 1988), two processes must apply in (1) in order to derive the inverse scope relation. First, *some young lady* must be interpreted in its base position. This process is commonly referred to as *reconstruction*. The second process that needs to apply is quantifier raising (QR) of *every senator* within the clause embedded by *likely*.[1] But how can *some young lady* be interpreted in its base position if it has moved into a higher position? That is, how exactly can reconstruction come about?

Basically, there are three different approaches to this phenomenon, which are abstractly depicted in (2) (see also Fox 1999 for an overview). One of the earliest approaches to reconstruction (see May 1977) involves lowering of the moved constituent α back to its base position, as in (2a). This applies covertly on an abstract syntactic representation called LF. This lowering approach has been superseded by the copy theory approach in (2b), which is nowadays the standard approach to reconstruction in the minimalist program (Chomsky 1995). It basically says that α has never really left its base position. Instead, it leaves behind a copy when it moves to its target position (Chomsky 1981: 89, Burzio 1986: 204, Chomsky 1995). This means that the surface structure can be interpreted directly by the semantics without invoking an additional LF representation. The semantics simply chooses either the lower or the higher copy for scope computation. Finally, (2c) shows an approach where the scope relations are not computed transparently but by application of purely semantic rules (Aoun and Li 1993, Frey 1993, Chierchia 1995, Cresti 1995, Rullmann 1995).

(2)   a.   *Covert Lowering*
              Syntax: $[\ \alpha \ldots \beta \ldots t_\alpha \ ] \Rightarrow$ LF: $[\ \_ \ldots \beta \ldots \alpha \ ]$

       b.   *Copy Theory of Movement*
              $[\ \alpha \ldots \beta \ldots \alpha \ ]$

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[1] We follow the traditional assumption that QR is clause bound (see May 1977). Therefore, overt movement of *some young lady* in (1) has the potential to change the scope relations as it raises the existential quantifier out of the minimal clause containing *every senator*.

c.   *Semantic Scope Computation*
In a configuration $[\alpha \ldots \beta \ldots t_\alpha]$, either α has scope over β or β has scope over α.

The aim of the present paper is to show that the lowering approach to reconstruction offers an elegant account of a case where reconstruction is blocked, which is known as *Barss' Generalization* (a term coined by Sauerland and Elbourne 2002), which is given in (3). An example of the configuration that (3) is concerned with is shown in (4).

(3)   *Generalization (Barss 1986: 517-542):*
Reconstruction of α to its trace t_α is blocked if α does not c-command t_α at S-structure.

(4) $[_{DegP}$ How likely $t_\exists$ to dance with $[_\forall$ every senator $]]$ does
$[_\exists$ some young lady $]$ seem to be t_{DegP}? $(\exists > \forall; {}^\star\forall > \exists)$

In (4), the quantified DP *some young lady* has moved out of its base position in the *likely*-clause. Afterwards, *how* moves across *some young lady* and pied-pipes the entire *likely*-phrase including the trace of *some young lady*. Thus, *some young lady* does not c-command its trace on the surface. In this configuration, reconstruction of *some young lady* is blocked and consequently it cannot take scope under *every senator*. Note that the inability of *some young lady* to reconstruct in (4) has nothing to do with *some young lady* being in an A-position. As shown in (1), it is in general possible to reconstruct from an A-position.

In what follows, we argue that Barss' Generalization can be derived under the assumption that reconstruction is syntactic lowering at LF and that lowering is subject to the Strict Cycle Condition (SCC, Chomsky 1973): After reconstruction of the *how*-phrase to its base position, reconstruction of *some young lady* cannot apply because this would exclusively affect a cyclic domain that is a proper subpart of the current cyclic domain of the tree. Thus, the analysis exhibits an interaction of syntactic operations which can be described as *counter-feeding*: Reconstruction of the *how*-phrase could feed reconstruction of *some young lady*, but, due to the SCC, it applies too late in order to do so.

The paper is structured as follows: In section 2, we present the lowering account of Barss' Generalization in more detail. In section 3, we introduce and discuss two alternative analyses by Sauerland and Elbourne (2002) and

Neeleman and van de Koot (2010) that are instances of the copy approach to reconstruction and the semantic computation approach, respectively. Section 4 concludes.

2.   The strict cycle at LF

The syntactic structure of the example in (4) is given, in more detail, in (5). *Some young lady* has moved to the subject position of *seem* and the *how*-phrase has moved to SpecC of the matrix clause.

(5)
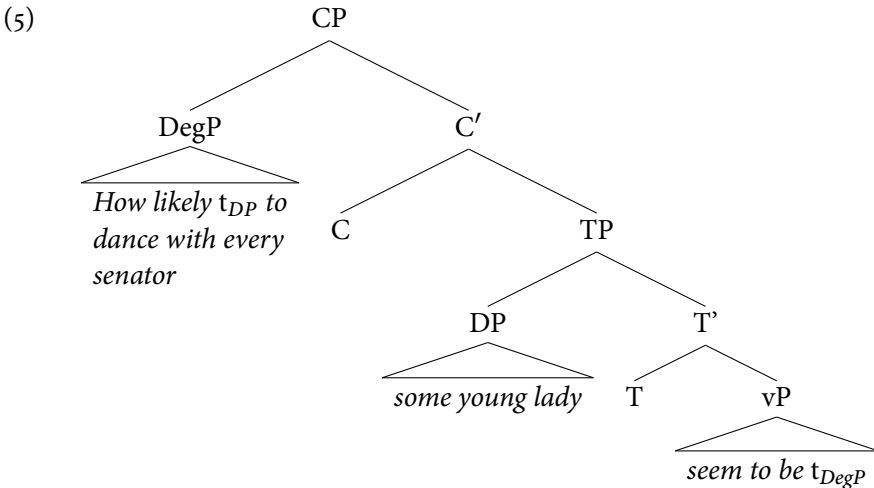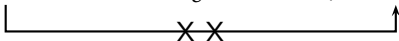
The relevant empirical observation about this structure, which goes back to Barss (1986), is that *every senator* cannot take scope over *some young lady*. Descriptively, this can be attributed to the impossiblity of reconstruction of *some young lady* into its base position. But how can this be derived? Barss (1986) assumes that reconstruction is an effect of traces being relevant for the computation of relative scope and that the LF associated with the impossible reading ∀ > ∃ would involve LF-movement of *some young lady* into the *how*-phrase. This, however, violates a constraint against sideward movement (cf. *Proper Binding Condition, PBC*, in Fiengo 1977; see den Besten and Webelhuth 1987 and Müller 1998 for criticism on the PBC).

   In the present article, we would like to propose a derivational alternative: Assume that reconstruction is syntactic lowering: Moved categories target traces with the same index. The term *trace* is to be understood in a very literal

sense, that is, a trace is not a copy of the moved constituent. Assume further that lowering applies at LF, which constitutes a syntactic level of its own.[2] Finally, assume that LF-derivations are subject to the Strict Cycle Condition in (6).

(6)   *Strict Cycle Condition* (Chomsky 1973)
        Within the current cyclic domain α, no operation may exclusively affect positions within another cyclic domain β that is dominated by α.

We assume here that every node in the tree is a cyclic domain in the sense of (6). The LF-derivation of the surface structure in (5) is given in (7). For reasons of simplicity we skip cycles that are irrelevant for the point we want to make here.

(7)   a. $[_\exists$ some young lady] seem to be t_{DegP}

        b. $[_{DegP}$ how likely $[_\forall$ every senator $]_3$ $t_\exists$ to dance with $t_\forall$]

        c. $[_{DegP}$ how likely $\forall_3$ $t_\exists$ to dance with $t_\forall$] $[_{TP}$ $\exists_1$ seem to be t_{DegP}]

        d. $[_{CP}$ $[_{TP}$ $\exists_1$ seem to be $[_{DegP}$ how likely $\forall_3$ $t_\exists$ to dance with $t_\forall$]]]
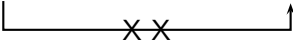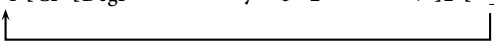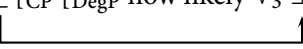
The LF-derivation proceeds in a cyclic and bottom-up fashion. (8a) enters the derivation in the TP-cycle. There, *some young lady* cannot be lowered because it does not c-command any coindexed trace. Next, in (7b) quantifier raising of *every senator* applies within the *how*-phrase, which occupies SpecC of the matrix clause and constitutes a cyclic domain of its own. Afterwards, in the matrix CP-cycle, the *how*-phrase reconstructs to its base position (7c). Once this point of the derivation is reached, the TP-cycle is finished and therefore *some young lady* cannot be lowered to its base position anymore (7d). Even though the trace of *some young lady* is now a possible target for reconstruction because the former is c-commanded by the latter, the SCC prevents this step

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[2] Thus, in so far as it is successful, the present analysis provides evidence against two standard assumptions of minimalism: Both the copy theory of movement (Chomsky 1981, 1995, Burzio 1986) and the single-cycle architecture (Groat and O'Neil 1996, Bobaljik 1995) are incompatible with the present account.

because it would exclusively affect a cyclic domain that is a proper subpart of the current cycle.

Thus, the derivation in (7) instantiates the rule interaction pattern of counter-feeding: The rule that could feed reconstruction of *some young lady*, namely reconstruction of the *how*-phrase, applies too late to actually feed reconstruction of *some young lady*. The consequence is that *some young lady* cannot be interpreted in the scope of *every senator*.

Note that there is one potential derivation that would allow reconstruction of *some young lady* into its base position within the *how*-phrase. The derivation is sketched in (8).

(8)   a.   [$_\exists$ some young lady] seem to be t$_{DegP}$

                ⌐̶̶̶×̶×̶̶̶̶̶¬

     b.   [$_{DegP}$ how likely [$_\forall$ every senator] t$_\exists$ to dance with t$_\forall$]

     c. $\exists_1$ [$_{CP}$ [$_{DegP}$ how likely $\forall_3$ t$_\exists$ to … t$_\forall$]$_2$ [t$'_\exists$ seem to be t$_{DegP}$]]

     d.   _ [$_{CP}$ [$_{DegP}$ how likely $\forall_3$ $\exists_1$ to … t$_\forall$]$_2$ [t$'_\exists$ seem to be t$_{DegP}$]]
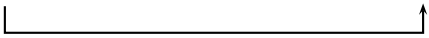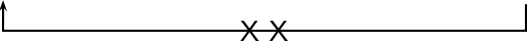
In contrast to (7), *some young lady* in (8c) raises across the *how*-phrase to an outer specifier of CP. From this position it can lower to the trace t$_\exists$ within the *how*-phrase. One way to exclude this derivation, is to assume that SpecC is not a proper target for quantifier raising (see May 1985, Cecchetto 2004, Potsdam 2013).

An independent argument for this assumption (which at the same time is an argument for strict cyclicity at LF) is based on instances of the Barss' configuration where the remnant is a VP that contains the trace of the raised subject. As observed in Huang (1993: 125) and Sauerland (1999: 590), such configurations also bear the typical footprint of Barss' configuration: frozen scope. Thus, while (9a) is ambiguous, (9b) is not.

(9)   a.   [$_\exists$ A guard] will [$_{VP}$ stand on [$_\forall$ every roof]].   ($\exists > \forall$; $\forall > \exists$)
     b.   [$_{VP}$ Stand on [$_\forall$ every roof]], [$_\exists$ a guard] will.   ($\exists > \forall$; *$\forall > \exists$)

Importantly, in contrast to (4) wide scope of the remnant-internal quantifier (*every roof*) in (9b) does not require reconstruction of the remnant-external

quantifier (*a guard*): Since the remnant is not a full clause (i.e. minimally a TP) but only a VP, it does not form an island for QR. Therefore, reconstruction of the remnant plus QR of *every roof* would, in principle, be sufficient to derive the unattested reading $^*\forall > \exists$. This LF-derivation (and the reading it induces) can be blocked under three assumptions. First, topicalization in English (as in (9b)) targets a functional projection above TP (arguably CP); second, the strict cycle holds at LF; and third, QR is restricted to the TP domain. Under these assumptions, the reading $^*\forall > \exists$ is excluded: Once the topicalized VP has been reconstructed from SpecC to its base position the quantifier *every roof* cannot QR to the TP-domain as this would violate the SCC. This is illustrated in (10).

(10)   a. $[_{VP}$ stand on $[_\forall$ every roof $]]$ $[_{TP}$ $[_\exists$ a guard $]$ will t_{VP} $]$

       b.   _ $[_{CP/TP}$ $[_\exists$ a guard $]$ will $[_{VP}$ stand on $[_\forall$ every roof $]$ $]]$

By assumption, however, QR also cannot target CP. As a consequence, a derivation that involves only reconstruction of the remnant plus QR of the quantifier from within the remnant across the quantifier outside the remnant is blocked, as desired. This lends support both to the claim that the strict cycle holds at LF and that QR must not target CP.

3.   Previous analyses

So far, we have explored one possibility as to how Barss' Generalization can be derived. This analysis involves the mechanism of lowering at LF. In the present section, we will discuss two previous approaches mentioned in section 1, namely the copy theory and the purely semantic scope computation.

   In Sauerland and Elbourne (2002) (see also Sauerland 1998, 1999), an analysis is presented that exploits the T-model of grammar (Chomsky and Lasnik 1977) and the idea that syntactic movement leaves a copy behind. Put simply, the idea why *some young lady* cannot reconstruct is that subject raising in (4) does not leave a copy behind.

   The account of Neeleman and van de Koot (2010) (see also van de Koot 2004) instantiates the semantic scope computation approach. To put it in a nutshell, Neeleman and van de Koot (2010) assume that the scope of a quanti-

fier can be computed at some position along its movement path (although this does not involve literal syntactic lowering of the quantifier itself). Crucially, narrowing of the scope of *some young lady* in (4) cannot proceed down to its trace because the path is interrupted by movement of the *how*-phrase.

3.1.   Sauerland and Elbourne (2002)

The analysis in Sauerland and Elbourne (2002) is based on the T-model of grammar (Chomsky and Lasnik 1977) shown in (11).

(11)   *T-model of Grammar*

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            Lexicon
               |
             Stem
               |
       _____|_____
      |                 |
     PF                LF
      |                 |
 PF-Interface    LF-Interface
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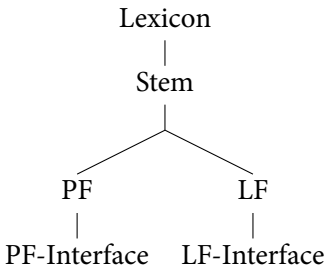
The main idea of this model is that the derivation proceeds on three different syntactic levels. It starts with *Narrow Syntax* (also called the *Stem*). Then, the derivation splits and proceeds within two separate branches, the syntactic levels of phonological and logical form (PF and LF). Importantly, operations that apply in the stem can feed LF and PF but operations applying at LF or PF can neither feed the stem nor each other. This order of operations is important for Sauerland and Elbourne's (2002) analysis.

Another assumption in Sauerland and Elbourne (2002) is that there are two properties that distinguish A-movement from Ā-movement. The first one concerns the way movement proceeds: Ā-movement leaves a copy behind, while A-movement does not. The second difference concerns the timing of operations: Ā-movement applies in the stem, while A-movement can apply in the stem or at PF.

Note that PF is assumed to be a genuine syntactic level, the only particularity about it being that it does not feed stem operations or LF (the latter rendering PF-movement semantically vacuous, thus effectively deriving reconstruction effects). As a consequence, PF-movement, just like any other movement

applying at a syntactic level, is assumed by Sauerland and Elbourne (2002) to target a c-commanding position.

Let us now see how these assumptions derive Barss' Generalization. The two potential readings of (4) (here repeated in (12)) have different derivations. Let us start with the reading $\exists > \forall$, the derivation of which is given in (13).

(12)   [$_{DegP}$ How likely t$_\exists$ to dance with [$_\forall$ every senator]] does
     [$_\exists$ some young lady] seem to be t$_{DegP}$?   ($\exists > \forall$;*$\forall > \exists$)

(13)   a.   seem to be [$_{DegP}$ how likely [$_\exists$ some young lady] to dance with
           [$_\forall$ every senator]]

    b. $\exists$ seem to be [$_{DegP}$ how likely _ to dance with $\forall$]
           $\uparrow$———————— STEM ————————$\rfloor$

    c.   [$_{DegP}$ how likely ... $\forall$] $\exists_1$ seem to be [how likely ... $\forall$]
                   $\uparrow$—————— STEM ——————$\rfloor$

(13a) shows the starting point with *some young lady* and the *how*-phrase in their respective base positions. In (13b), *some young lady* is A-moved. Here, A-movement applies in the stem and does not leave a copy behind. Afterwards, the *how*-phrase is Ā-moved. Ā-movement applies in the stem as well, but in contrast to A-movement of *some young lady*, it leaves a copy behind. The surface structure in (13c) thus represents a configuration where the existential quantifier *some* has scope over (the copy of) the universal quantifier *every*.

Next, we have a look at the impossible reading *$\forall > \exists$. There are at least three potential derivations, two of which are shown in (14) and (15).

(14)   a.   seem to be [$_{DegP}$ how likely [$_\exists$ some young lady] to dance with
           [$_\forall$ every senator]]

    b. $\exists$ seem to be [$_{DegP}$ how likely _ to dance with $\forall$]
           $\uparrow$———————— PF ————————$\rfloor$

    c.   _ $\exists$ seem to be [$_{DegP}$ how likely to dance with $\forall$]
           $\uparrow$————————✗✗————————$\rfloor$

(15)   a.   seem to be [$_{DegP}$ how likely [$_∃$ some young lady] to dance with
       [∀ every senator]]

   b.   [$_{DegP}$ how likely ∃ . . . ∀] . . . [$_{DegP}$ how likely ∃ . . . ∀]
       ⌊——————— STEM ———————⌋

   c.   [$_{DegP}$ how likely ∃ . . . ∀] . . . _ . . . [$_{DegP}$ how likely ∃ . . . ∀]
       ⌊——×—×——⌋

We start with the same structure in (14a) and (15a). The reading ∀ > ∃ can
only come about if *some young lady* is interpreted within the *how*-phrase be-
cause only then will QR of *every senator* have a chance to cross *some young
lady*, assuming that QR is clause bound. In order for this interpretation to
come about, A-movement of *some young lady* has to apply at PF. If movement
applied in the stem, it would feed LF, and thereby the semantics, and *some
young lady* would have to be interpreted in its target position outside the *how*-
phrase. In (14b), PF-movement has consequences for the subsequent appli-
cability of Ā-movement: Because PF-operations apply after operations in the
stem, Ā-movement of the *how*-phrase, being a stem operation, cannot apply
after PF-movement of *some young lady*. Thus, the step indicated in (14c) can
never apply and the reading ∀ > ∃ cannot be derived in this way.

   In the derivation (15), the operations can, in principle, apply in the order
indicated but stem movement of the *how*-phrase enforces that PF-movement
of *some young lady* must target a non-c-commanding position. This, however,
is impossible by assumption. The reading ∀ > ∃ cannot be derived by (15)
either.

   Finally, there is a third potential derivation that generates the unattested
reading. In this derivation, PF-movement of *some young lady* applies to the
lower copy of the Ā-moved *how*-phrase, as shown in (16).

(16)   [$_{DegP}$ how likely ∃ . . . ∀] ∃ . . . [$_{DegP}$ how likely _ . . . ∀]
       ⌊——————— PF ———————⌋

Sauerland (1999) suggests two reasons why such a derivation might be impos-
sible. Provided one of these, the reading ∀ > ∃ is, again, excluded. In section
3.2.4, we will briefly come back to this issue.

   To sum up, since all three derivations are blocked, and assuming that these
exhaust the possibilities, the reading ∀ > ∃ cannot be derived and Barss' Gen-
eralization is accounted for.

3.2.   Potential problems for Sauerland and Elbourne (2002)

3.2.1.   The A vs. Ā-distinction

As we have seen in the derivation above, the A vs. Ā-distinction is of crucial importance to Sauerland and Elbourne's (2002) account. This makes a prediction concerning cases of remnant movement where both the movement step that creates the remnant and the step that moves the remnant are of the same type: A or Ā, respectively. Namely, if the approach of Sauerland and Elbourne (2002) is on the right track, Barss' Generalization should not hold if a remnant category created by A-movement is A-moved itself or if both the extracted category and the remnant category are Ā-moved. If both categories are A-moved, A-movement can be delayed until PF which results in a reading that involves reconstruction. If both categories are Ā-moved, movement leaves a copy behind, which, again, allows a reconstructed reading. In contrast, the lowering account presented in section 2 does not distinguish between A-movement and Ā-movement for the purpose of reconstruction. Thus, it predicts that Barss' Generalization should also hold for derivations that involve two uniform movement types. The theories thus make different predictions for such derivations, which are therefore worth exploring.

There is the practical problem that relevant examples are difficult to construe for independent reasons. On the one hand, Ā-movement is not generally testable because it usually creates islands for movement (*wh*-islands, topic islands etc.). Thus, movement of the remnant category would have to cross an island induced by the category the extraction of which created the remnant. On the other hand, A-movement usually affects arguments with a certain grammatical function (e.g. subject raising or subject/object control). And construing Barss configuration with two applications of raising and/or control seems difficult. Despite all this, we would like to contend that the different predictions can indeed be used to distinguish between the approach of Sauerland and Elbourne (2002) and the lowering approach defended here.

Our first argument involves scrambling in German. To begin with, note that relative scope in German tends to be more surface true than in English. Therefore, Barss' Generalization may not be testable for German as easily by using scope reconstruction as it is for English. To avoid this complication, we will exploit the fact that Barss' Generalization holds for other empirical domains as well. In particular, it has been observed that idiomatic readings are

lost in Barss configuration (see Lasnik and Saito 1992: 141-142, Ackerman and Webelhuth 1993, Nunberg et al. 1994: 511-512). To our knowledge, the connection between this observation and Barss' Generalization has never been made. Here, we would like to argue that, abstractly, the same pattern underlies both phenomena.

Consider the examples in (17a,b).

(17)   a.   Einen Korb$_1$ hat ihr niemand t$_1$ gegeben.
            a   basket has her nobody   given
            'Nobody turned her down.'
       b.   [$_{VP}$ Gegeben t$_1$]$_2$ hat ihr niemand einen Korb$_1$ t$_2$.
               given   has her nobody a   basket
            #'Nobody turned her down.'

Underlyingly, both (17a) and (17b) contain the VP *jemandem einen Korb geben*, which bears the idiomatic reading "to turn someone down". (17a) illustrates that this VP belongs to the class of transparent VPs, which means that it can undergo a transformation, such as topicalization of the object *einen Korb* in (17a), without losing its idiomatic reading (see Müller 2000 and references therein for discussion).

In (17b), the object has scrambled out of the VP, the remnant of which is then topicalized. In this configuration, the idiomatic reading is not preserved, as indicated by the diacritic #. The parallel to Barss Generalization is obvious. It can be captured by the theory of Sauerland and Elbourne (2002) by assuming that the idiomatic reading in (17) requires reconstruction of the scrambled object *einen Korb* to its base position in the VP and, at the same time, that scrambling of *einen Korb* is A-movement. If scrambling were Ā-movement, then it would leave a copy, which in turn should bring about the idiomatic reading in (17b), contrary to fact.

Next consider the German idiom *X hat der Teufel geritten* "X must have had a devil in him", given in (18). Note that in this case the subject, *der Teufel* "the devil", is part of the idiom.

(18)   weil   den Koch   der Teufel   geritten hat
        because the cook$_{acc}$ the devil$_{nom}$ ridden   has
        'because the cook must have had a devil in him'

Again, extraction of the subject by movement (such as *wh*-movement in (19)) retains the idiomatic reading, i.e., the idiom is transparent:

(19)   Ich weiß nicht, [welcher Teufel]$_1$ den Koch t$_1$ geritten hat.
         I   know not   which   devil   the cook   ridden has
         'I don't know, what got into the cook.'

Now recall the above assumption that scrambling must be A-movement, which was crucial for Sauerland and Elbourne (2002) to be able to derive the lack of an idiomatic reading in (17b). Interestingly, the example in (20) does not preserve its underlying idiomatic reading.

(20)   dass [$_{VP}$ t$_1$ den Koch geritten]$_2$ der Teufel$_1$ t$_2$ hat
         that   the cook ridden   the devil   has
         #'that the cook must have had a devil in him'

In (20), the subject is raised out of the VP and then the remnant VP is scrambled (by assumption A-moved) across the subject.[3] Note that scrambling of a VP in German, and predicate scrambling in German in general, is marked (Stechow and Sternefeld 1988: 465-466, Haider 1993: 200). Accordingly, (20) is not fully well-formed. It is therefore important to stress that what is at stake here is not the relative markedness of (20) but the fact that it lacks the idiomatic reading available in (18) and (19). This is not predicted by the theory of Sauerland and Elbourne (2002). The reason is that scrambling, being A-movement, can apply at PF and that PF-movement leaves LF unaffected. Under these assumptions, the complete VP in (20) should be in its base position at LF.[4] Therefore, the idiomatic reading should be accessible, contrary to fact.

For the lowering approach defended in the present paper, the facts about

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[3] Arguably, the subject in (20) has undergone subject raising and not scrambling. Had it undergone scrambling, the example would violate the *Müller-Takano Generalization*:

(i)   *Generalization (Müller 1993, Takano 1994)*:
        A remnant XP cannot undergo Y-movement if the antecedent of the unbound trace has also undergone Y-movement.

See Müller (1998: 226) for relevant discussion of examples parallel to (20).

[4] Note that it does not matter whether movement of the subject is classified as A- or Ā-movement. If it is Ā-movement, it leaves a copy in base position and if it is A-movement, movement can be delayed until PF, again leaving the subject in base position for the semantic interpretation.

idioms do not pose a problem since the distinction between A- and Ā-movement is irrelevant. The lack of an idiomatic reading in (17b) and (20) can therefore be accounted for in exactly the same way as the lack of a particular scope reading in the standard examples of Barss' Generalization (see section 2 for details).

Our second argument that relates to the A vs. Ā dichotomy involves long topicalization and *wh*-islands in German. It has been observed that types of Ā-movement in German differ with respect to whether they induce operator islands for other types of Ā-movement or not. In particular, long-distance topicalization can apply out of an embedded question, that is, the *wh*-island constraint does not seem to hold for topicalization in German (see Fanselow 1987, Müller and Sternefeld 1993). This is illustrated in (21a). Furthermore, (21b) illustrates that long-distance topicalization of a remnant VP that was created by *wh*-movement of the object is also possible.[5]

(21) a. Radios$_1$ weiß ich nicht [wie man t$_1$ repariert].
          radios know I   not   how one   repairs
          'As for radios, I don't know how to repair them.'

     b. [$_{VP}$ t$_1$ Repariert]$_2$ weiß ich nicht [$_{CP}$ [$_{NP}$ welche Radios]$_1$ sie
              repaired   know I   not   which radios   she
          t$_2$ hat]
            has
          'I don't know which radios she has repaired.'

Crucially, if an idiom is affected by *wh*-extraction and subsequent long remnant topicalization, as shown in (22), the idiomatic reading is not preserved.

(22) [$_{VP}$ t$_1$ Den Koch geritten]$_2$ weiß ich nicht [$_{CP}$ [$_{NP}$ welcher Teufel]$_1$
          the cook ridden   know I   not   which devil
      t$_2$ hat].
        has
      #'I don't know what got into the cook.'

Again, (22) instantiates Barss' configuration, but this time its derivation involves two applications of Ā-movement: *wh*-movement of a subject and topicalization of a remnant VP containing the trace of the subject. The theory

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[5]Since the two instances of Ā-movement involved differ, the derivation does not violate the Müller-Takano Generalization on remnant movement, cf. footnote 3.

of Sauerland and Elbourne (2002) predicts that both *wh*-movement and VP-topicalization leave a copy in their base positions, which in turn should render the idiomatic reading possible, contrary to fact. And again, an approach based on syntactic lowering does not face this problem because it does not distinguish A and Ā-movement for the purpose of reconstruction in Barss' configuration. Thus, it accounts for the lack of the idiomatic reading in (22) in the same way as it does in the case of (17b) and (20) above.

3.2.2. Barss' configuration and extraposition

Another potential problem for the theory in Sauerland and Elbourne (2002) involves the contrast in (23a,b), which is due to Barss (1986: 531-532).

(23) a. [$_{DegP}$ How likely [$_{TP}$ t$_∃$ to address [$_∀$ every rally]]] is
          [$_∃$ someone] t$_{DegP}$?   ∃ > ∀; *∀ > ∃
      b. [$_{DegP}$ How likely t$_{TP}$] is [$_∃$ someone] t$_{DegP}$ [$_{TP}$ t$_∃$ to address
          [$_∀$ every rally]]?   ∃ > ∀; ∀ > ∃

The structure of (23a) is identical to the one of (4). The example in (23b) differs from (23a) in that the TP that contains the universal quantifier *every rally* and the trace of the existential quantifier *someone* is extraposed from the *how*-phrase. As we see in (23b), TP-extraposition goes hand in hand with scope ambiguity. Therefore, *someone* must be able to reconstruct in (23b). For Sauerland and Elbourne's (2002) approach, this means that raising of *someone* must be PF-movement. Assuming the Freezing Principle (see Ross 1967; Wexler and Culicover 1980: 143-144 call it the Raising Principle), which states that movement from a category that was moved at an earlier step is blocked, raising of *someone* must precede extraposition of the TP. It follows that TP-extraposition must be PF-movement, too. But then, Ā-movement of the *how*-phrase must be PF-movement as well because TP-extraposition feeds remnant movement of the *how*-phrase in (23). This, however, is not in line with Sauerland and Elbourne's (2002) assumption that all Ā-movement is narrow syntactic movement. It seems the only way (23b) can be derived by this theory at all is by assuming that raising in (23b) involves narrow syntactic A-movement. But then the theory also predicts, incorrectly, that (23b) should only allow for the non-reconstructed reading ∃ > ∀ (A-movement in the stem does not leave a copy behind).

In the lowering approach of section 2, the ambiguity can be accounted for as follows. Due to the Freezing Principle, the first movement in (23b) must be subject raising of *someone* out of the TP, followed by remnant extraposition of the TP. Note that extraposition must target a position above SpecT, due to the SCC. Assume that it minimally involves right-adjunction to TP. Finally, *wh*-movement of the remnant *how*-phrase to SpecC applies. The syntactic derivation of (23) is given in (24).

(24)   a.   is [how likely [$_{TP}$ [$_∃$ someone] to address [$_∀$ every rally]]]
       b.   [$_{TP}$ ∃ is [how likely [$_{TP}$ t$_∃$ to address ∀]]]
            └──── RAISING ────┘
       c.   [$_{TP}$ [$_{TP}$ ∃ is [how likely t$_{TP}$]] [$_{TP}$ t$_∃$ to address ∀]]
            └──── EXTRAP. ────┘
       d.   [$_{CP}$ [how likely t$_{TP}$] [$_{TP}$ ∃ is t$_{DegP}$] [$_{TP}$ t$_∃$ to address ∀]]
            └──── WH ────┘

The important steps of the LF-derivation are shown in (25). The main point is that in (25) the extraposed TP does not have to reconstruct to its base position. It is sufficient that QR adjoins *someone* to TP (25c). From this position, it c-commands the extraposed TP and can reconstruct into its base position (25d).

(25)   a.   [$_{TP}$ ∃ is t$_{DegP}$] [$_{TP}$ t$_∃$ to address ∀]
       b.   [$_{TP}$ ∃ is t$_{DegP}$] [$_{TP}$ ∀ [$_{TP}$ t$_∃$ to address t$_∀$]]
            └──── QR ────┘
       c.   [$_{TP}$ ∃ [$_{TP}$ t$'_∃$ is t$_{DegP}$] [$_{TP}$ ∀ t$_∃$ to address t$_∀$]]
            └ QR ┘
       d.   [$_{TP}$ _ [$_{TP}$ is t$_{DegP}$] [$_{TP}$ ∀ ∃ to address t$_∀$]]
            └──── LOWERING ────┘

In the final representation (25d), *every rally* takes scope over *someone*. If lowering in (25c) did not apply, the reading *someone > every rally* would be the result. This correctly derives the ambiguity of (23b).

3.2.3.   Head movement

A third potential problem for Sauerland and Elbourne (2002) concerns head movement. Consider the examples in (26).

(26)   a.   *Benjamin thought he would give the cloak to Lee, and [$_{VP}$ the cloak t$_V$ to Lee] he gave t$_{VP}$.

   b.   *[$_{VP}$ Vom Rauchen einen Katarrh t$_V$] bekam er nicht t$_{VP}$.
          by   smoking a   sinusitis   caught he not
          'He did not catch a sinusitis due to smoking.'

It has been argued (Haider 1990, 1993, Takano 2000, Sternefeld 2006) that examples such as (26a,b) are ungrammatical because a VP is topicalized, the head of which has been extracted. This corresponds to the generalization in (27), which we dub here the *Haider-Takano Generalization*.[6]

(27)   *Generalization (Haider 1990, Takano 2000)*:
        Phrases that have been beheaded by head movement are frozen in place.

The configuration in (26a,b) resembles Barss' configuration. The difference is that it deals with the possibility of head movement and not with the availability of scope. Under the lowering approach proposed here, (27) can be subsumed directly under Barss' Generalization if head movement requires reconstruction of the moved head at LF.

   Under the approach of Sauerland and Elbourne (2002), the Haider-Takano Generalization could also be subsumed under Barss' Generalization if head movement were a PF operation (see Chomsky 2001: 37-38). However, this assumption has been challenged in recent work, especially by Roberts (2010) (see also Matushansky 2006, Lechner 2007, Nevins 2011). A phenomenon that Roberts (2010) discusses intensively involves clitic movement in Romance languages, which he argues to be an instance of head movement (see also Baker 1988: 84-92, who discusses the similarity between *ne*-cliticization in Italian and noun incorporation). With this in mind, consider the examples in (28)

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[6] Fanselow (1991: 104; 1993: 66), analyzes examples parallel to (26b) as grammatical instances of topicalization of a beheaded phrase. Haider (1990: 103) and Sabel (1996) reject analog structures. An explanation for this variation might be that speakers of German that accept (26b) allow for exceptional topicalization of multiple constituents.

and (29) (taken from Couquaux 1982: 51, Burzio 1986: 214, fn. 25), which involve *en/ne*-cliticization in French and Italian, respectively.

(28)   a.   [Combien t_2]$_3$ en$_2$ connais-tu t_3?
             how.many   of.them know-you
          'How many of the girls do you know?'
       b.   [Quanti t_2]$_3$ ne$_2$ saranno invitati t_3?
             how.many   of.them will.be   invited
          'How many of them will be invited?'

If Roberts (2010) is correct, and clitic movement is head movement, then (28a,b) show that head movement can feed Ā-movement. This in turn means that, under the assumptions in Sauerland and Elbourne (2002), head movement must be narrow syntactic movement. But if it is, then the theory in Sauerland and Elbourne (2002) cannot account for the ungrammaticality of the examples in (26) in the same way as it accounts for Barss' Generalization. Thus, in this theory one either loses the parallelism between the ungrammaticality of (26) and the lack ambiguity in (4) or one has to assume that there are two different types of head movement, one at PF and one in narrow syntax. Both assumptions would, however, require independent evidence.[7]

3.2.4.   *Copy movement*

Sauerland (1999: 592) briefly discusses an example similar to (29) where a category is first A-moved and then Ā-moved.

(29)   [How many men]$_2$ t'_2 seemed to Kazuko t_2 to be downstairs?

In (29), the *wh*-phrase *how many men* first undergoes subject raising to matrix SpecT (an instance of A-movement). Afterwards, the *wh*-phrase is Ā-moved to matrix SpecC. The interesting fact about (29) is that it is ambiguous be-

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[7]One may wonder why (28a,b) are grammatical under present assumptions, provided that clitic movement is head movement and that head movement must reconstruct. After all, (28a,b) involve Barss' configuration and therefore reconstruction of the clitic into the previously reconstructed remnant category would be acyclic. However, note that while *en/ne* undergo head movement in the sense of Roberts (2010) qua being clitics, they are not the heads of the remnant categories in (28a,b) (i.e. not their predicates) but rather arguments therein. And as such, they need not undergo reconstruction (the underlying assumption being that it is predicates that must reconstruct at LF, see Barss 1986, Huang 1993).

tween the reading *many > seem* and the reconstructed reading *seem > many*. At first sight, this seems to be problematic, because similar to what is the case in Barss derivations, (29) involves A-movement that feeds Ā-movement. Thus, A-movement in (29) should apply in the stem, which in turn is incompatible with reconstruction.

To solve this problem, Sauerland (1999) proposes that the lower copy of the Ā-moved category in (29) can be PF-moved to the subject position in the matrix clause, thereby satisfying the trigger of subject raising.[8] In the LF-output of this derivation, (the lower copy of) *many* is still below *seem*. Crucially, if PF-movement out of a copy were also available in Barss configuration like (4), repeated in (30), then this would undermine the explanation for Barss' generalization given in Sauerland and Elbourne (2002).

(30)   [$_{DegP}$ How likely $t_{\exists}$ to dance with [$_{\forall}$ every senator]] does
       [$_{\exists}$ some young lady] seem to be t_{DegP}?

The reason is, of course, that A-movement of *some young lady* in (30) could then apply at PF after all, and, as a consequence, reconstruction of A-movement would lead to the unattested reading $\forall > \exists$. However, Sauerland (1999) proposes that such a derivation is banned for independent reasons. To this end, he offers two potential explanations that both refer to the fact that the difference between the derivation proposed for (29) and the unwanted derivation leading to scope inversion in Barss configuration differ in that the former involves PF-movement of a complete copy while the latter involves PF-movement *out of* a copy.

Sauerland's (1999) first proposal as to why PF-movement out of a copy is banned is that there may be a general requirement to the effect that two copies in an Ā-chain "must contain identical material". If this requirement is not to be ad-hoc, a rationale for it must be given. Since we are dealing with PF-movement here, the identity condition must hold at PF because, for principled reasons, PF-movement could never render two copies distinct for the purpose of LF. One might thus be tempted to think that the reason why the two copies should be identical is that copy deletion at PF can only apply between identical

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[8] Such PF-movement of a lower copy to an inner cycle as in (29) presupposes the existence of an additional PF-cycle, similar to the additional LF-cycle required by the present lowering approach. Thus, both Sauerland and Elbourne (2002) and the present approach are incompatible with a single-cycle architecture.

copies (Nunes 2004). To illustrate, in the derivation of (29) the *wh*-phrase *how many men* A-moves at PF to the matrix subject position to satisfy a feature of matrix T. This position is still in the c-command domain of the higher copy in SpecC. Since both copies are identical, deletion of the lower copy of *how many men* can apply. In the unwanted derivation of (30), however, A-movement of *some young lady* renders the two copies of the *how*-phrase non-identical. Therefore, deletion of the lower copy of the *how*-phrase fails. This explains why such a derivation cannot produce the string in (30). However, this rationale only shifts the need for an explanation because now the question arises as to why there is a problem if copy deletion does not apply in the above scenario. After all, the motivation for copy deletion put forward in Nunes (2004) is that it enables linearization of two copies. But if the two copies are not identical to begin with, linearization should be possible without copy deletion. In other words, under the assumption that PF-movement may render copies nonidentical and thereby leads to non-applicability of copy deletion the derivation sketched above generates the ungrammatical output (31).

(31)   *[$_{DegP}$ How likely t$_∃$ to dance with [$_∀$ every senator]] does [$_∃$ some young lady] seem to be [$_{DegP}$ how likely t$_∃$ to dance with [$_∀$ every senator]]?
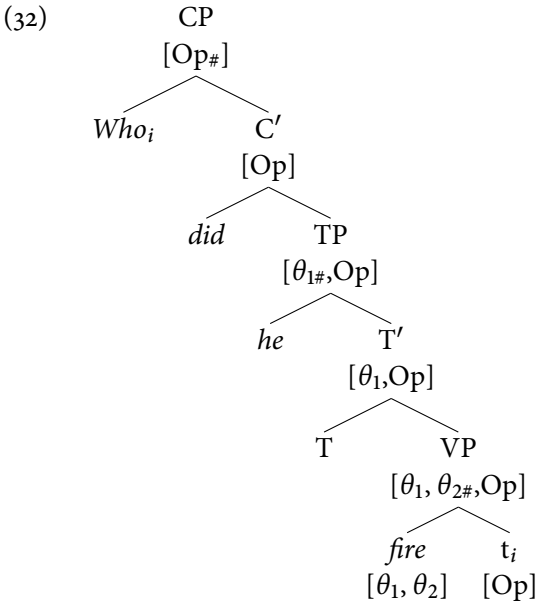
The second of Sauerland's (1999) proposals is that "phonological deletion of the bottom copy [. . .] must precede movement at PF". Apart from the fact that ordering the operations at PF in this way is ad-hoc, it suffers from the problem that it systematically leads to violations of the SCC at PF. Note that copy deletion of the lower copy at PF cannot apply before the current cyclic domain includes the higher copy. Otherwise, there would be no way for the derivation to determine whether deletion of the lower copy is in fact triggered by the presence of a higher copy. For the derivation of (30), this means that PF-movement targets a position (namely SpecT) that is properly included within the current cyclic domain (CP), and hence incurs a violation of the SCC. Of course, this result is unacceptable, given that PF is treated as a genuine syntactic level in Sauerland and Elbourne (2002) (see section 3.1), and should therefore obey the SCC. We conclude that while the second solution proposed by Sauerland (1999) for the problem posed by (31) is not tenable, the first at least requires an additional stipulation.

To sum up so far, we have seen that the proposal of Sauerland and El-bourne (2002) makes some incorrect predictions with respect to remnant scrambling, remnant movement involving two types of Ā-movement, and a variant of Barss' configuration that involves extraposition. In addition, it fails to account for the parallelism between Barss' Generalization and the Haider-Takano Generalization, and it requires an ad-hoc assumption to account for particular cases where reconstruction is possible although A-movement feeds Ā-movement. The approach in terms of syntactic lowering does not suffer from any of these problems.

3.3. Neeleman and van de Koot (2010)

Neeleman and van de Koot (2010) (see also van de Koot 2004) assume that relative scope is an interface phenomenon. As such, reconstruction for scope also applies at the interface. Additionally to interface reconstruction, they de-velop a mechanism of syntactic reconstruction. Crucially, none of the two reconstruction types is able to bring back the entire structure of a moved cate-gory to its trace. Syntactic reconstruction can only reconstruct certain syntac-tic features of a moved constituent while interface reconstruction only deals with scope. Thus, there is no real lowering in the sense of section 2, which undoes movement. Because of the lack of transparent reconstruction, the ac-count of Neeleman and van de Koot (2010) can be described as involving se-mantic scope computation (cf. (2c)).

Concretely, Neeleman and van de Koot (2010) work in a representational framework where movement is modeled as base generation plus a represen-tational dependency between target position and trace. More precisely, the antecedent and its trace are connected by local recursive percolation of "selec-tional requirements", a dependency similar to SLASH-feature percolation in GPSG or HPSG (Gazdar et al. 1985, Pollard and Sag 1994). Ā-dependencies are connected by percolating a feature [Op] while A-dependencies are due to percolation of a feature [θ]. The projection that dominates the antecedent bears a diacritic "#", which marks the end of the dependency. An example for movement in this theory is given in (32).

(32)

CP
[Op#]

Who$_i$ C′
                [Op]

       did   TP
                 [$\theta_{1\#}$,Op]

              he   T′
                      [θ_1,Op]

                    T   VP
                        [θ_1, $\theta_{2\#}$,Op]

                          fire   t$_i$
                        [θ_1, θ_2]   [Op]

(32) shows an Ā as well as an A-dependency. The verb *fire* selects two argu-
ments. Therefore, it has two θ-features [θ_1], which stands for the subject, and
[θ_2], which stands for the object. These two features are percolated to the VP-
projection. Since VP dominates the trace t_i, the object feature [θ_2] is satisfied
at this level. Thus, only the A-feature [θ_1] is percolated up to the TP-projection.
The TP dominates the subject *he* and [θ_1] is therefore satisfied at the TP-level.
Furthermore, the structure in (32) shows an Ā dependency. The trace t_i has
a selectional requirement [Op], which needs to be satisfied by the antecedent
who. The feature [Op] percolates up to the CP, which dominates *who* and can
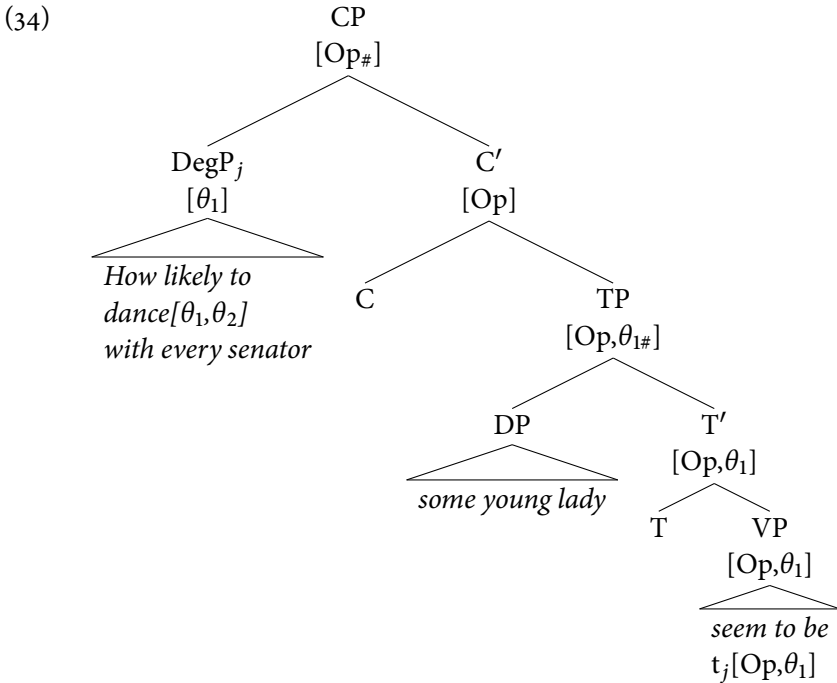satisfy [Op].

The definition of interface reconstruction for scope is built on this theory
of movement. The relevant principle is given in (33).

(33)   *Interface reconstruction*
        Let M be a member of the set of selectional requirements that encode
        movement and let α be the category that satisfies it.

        a.   The initial scopal domain of α is the node where M is satisfied.
        b.   The scopal domain of α can be narrowed from n_1 to n_2 if n_1 and
              n_2 contain M and n_1 immediately dominates n_2.

In a nutshell, the scope of a quantifier can be interpreted anywhere along its movement path without actually being in this position. There is, however, one condition under which this is not possible, namely if the movement path is not continuous. This is exactly what we find in Barss' configuration. Let us take a look at the structure of example (4) against the background of the assumptions in Neeleman and van de Koot (2010).

(34)

CP
[Op$_{\#}$]

DegP$_j$
[θ_1]

How likely to dance[θ_1,θ_2] with every senator

C′
[Op]

C

TP
[Op,$\theta_{1\#}$]

DP

some young lady

T′
[Op,θ_1]

T

VP
[Op,θ_1]

seem to be t$_j$[Op,θ_1]

Assume that in (34) *dance* has a selectional feature for both *some young lady* and *every senator* ([θ_1] and [θ_2]). The latter is satisfied within the *how-*DegP and not percolated up to the matrix CP. Furthermore, we have an Ā-dependency between the *how-*DegP and t, involving the feature [Op]. Due to this [Op]-dependency, the selectional feature [θ_1] of *dance* is also present on the trace t$_j$, which is connected to the *wh-*moved *how-*phrase by an [Op]-dependency. From there, it percolates to the TP. This is what Neeleman and van de Koot (2010) understand as *syntactic reconstruction*. In syntactic recon-

struction, certain syntactic features of a moved category are transmitted to its trace.[9]

With these assumptions in place, it is obvious why we cannot have interface reconstruction of *some young lady* into its base position in (34). The scope, or scopal domain in Neeleman & van de Koot's terms, of *some young lady* can be narrowed successively down to the trace t_j which bears the feature $[\theta_1]$. However, since t_j does not dominate any node that also bears $[\theta_1]$, the scope of *some young lady* cannot be lowered any further. Especially, it cannot be lowered into the *how*-phrase. This excludes the reading $\forall > \exists$. The reading $\exists > \forall$, on the other hand, can be derived by lowering the scope of the *how*-phrase to t_j along the [Op]-path.

3.4. Potential problems for Neeleman and van de Koot (2010)

3.4.1. *Remnant-external material*

One class of examples in particular poses a challenge for the analysis in Neeleman and van de Koot (2010). Consider the examples in (35a,b).
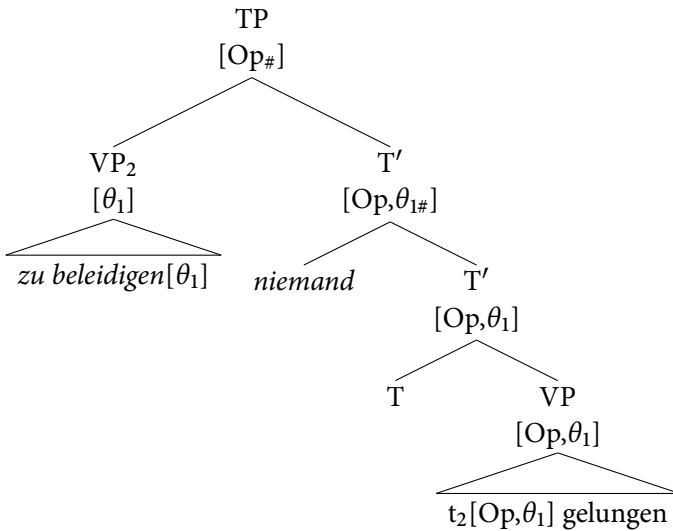
(35) a. dass ihr niemanden$_1$ [t_1 zu beleidigen]$_2$ gelungen ist
           that her no one   to insult   succeeded is
           'that she managed to insult no one'/ 'that she did not manage to
           insult anyone' $\neg\exists > succeed$; $succeed > \neg\exists$

      b. [t_1 Zu beleidigen]$_2$ ist ihr niemand$_1$ t_2 gelungen
              to insult   is her no one   succeeded
                                          $\neg\exists > succeed$; *$succeed > \neg\exists$

(35a) shows an example of subject raising of a (negative) existential quantifier out of a restructuring infinitive. In this configuration, reconstruction of the quantifier is possible, giving rise to scope ambiguity between the quantifier and the embedding verb *gelang*. In (35b), the remnant infinitive has been topicalized across the extracted quantifier, which results in configuration that is very similar (but not quite identical) to Barss' configuration. The interesting observation is that in this configuration, reconstruction of the quantifier is impossible (see Haider 2003: 101, Sternefeld 2006: 583). In particular, the embedding verb cannot take scope over the quantifier. Crucially, in this class of

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[9] See also Lechner (1998), Sternefeld (1997, 1998), Rullmann (1995) on the distinction between syntactic and semantic reconstruction.

examples the element that is supposed to have scope over the extracted category is external to the remnant. This is why (35b) causes a problem for the analysis in Neeleman and van de Koot (2010). As can be seen in the structure in (36), the scope of the raised subject quantifier can be narrowed down to t_2. (For simplicity, the indirect object and the V2-effect ignored in (36).) This is sufficiently low to rule in the ungrammatical readings in (35).

(36)

More generally, for any configuration of the form (37), Neeleman and van de Koot (2010) predict that Q_l should be able to take scope over Q_k, contrary to fact.

(37)

To rule out the non-attested reading in (35b), the theory in Neeleman and van de Koot (2010) could be modified by the assumption that scope reconstruction does not apply successively along the movement path but in one fell-swoop to the base position. This assumption, however, runs counter one of the main tenets of Neeleman and van de Koot's (2010) approach, namely that syntactic dependencies are strictly local.

The lowering approach proposed in section 2 derives the facts in (35) without further ado. Since LF-lowering of a moved category always targets its own traces, (35b) exhibits the same property as (7) in section 2: When reconstruction of the raised quantifier is supposed to happen, its trace is not yet part of the structure. After the infinitive has been reconstructed, lowering of the quantifier would violate the SCC.

3.4.2. *Barss' configuration and binding*

A second potential problem for Neeleman and van de Koot (2010) involves anaphor binding. Interestingly, in contrast to scope, reconstruction for anaphor binding does not seem to fall under Barss' Generalization. Consider the example in (38) (from Pesetsky 1995).

(38)   John promised to give books to them$_2$, and
        [$_{VP}$ give books to them$_2$ t$_{PP}$] he did t$_{VP}$ [$_{PP}$ at each other's$_2$ birthdays]

In (38) the anaphor *each other* can be bound by *them*, despite (38) involving Barss' configuration: The PP containing the anaphor has moved out of the VP, plausibly a case of extraposition, and the remnant VP has been topicalized across the PP. Note that Barss' Generalization is obeyed with respect to scope in cases where PP-extraposition feeds topicalization (Sauerland 1999: 591):[10]

(39)   a.   . . . and David gave every handout [$_{PP}$ to one of the students].
                                                                ($\exists > \forall; \forall > \exists$)
        b.   . . . and [$_{VP}$ give every handout t$_{PP}$]$_2$ David did t$_{VP}$
              [$_{PP}$ to one of the students].   ($\exists > \forall; *\forall > \exists$)

Now, Neeleman and van de Koot (2010) assume that anaphor binding without c-command comes about via syntactic reconstruction, which in their theory

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[10] As Sauerland (1999) notes, an account of the lack of scope inversion in (39b) in terms of his proposal presupposes that extraposition is an instance of A-movement.
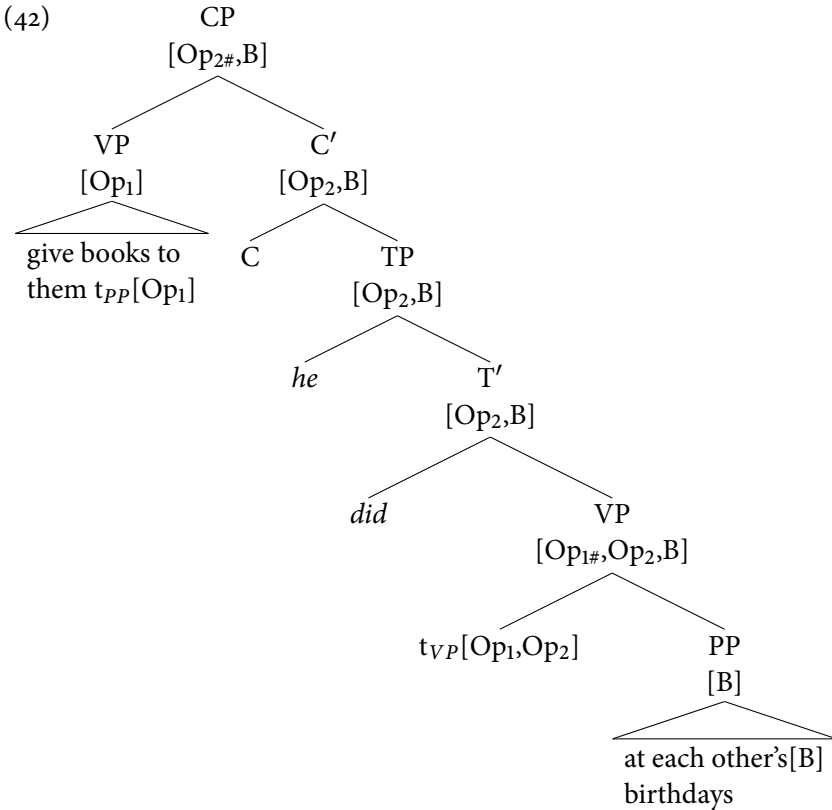
involves a syntactic feature that is passed along a movement path. For binding this means that a binding feature [B] is needed. Concretely, they assume that an anaphor carries a selectional requirement [B] that must be satisfied by a binder. (41) illustrates how this works for the example in (40) (Neeleman and van de Koot 2010: 340), where a category embedding an anaphor has moved across the binder and binding is possible nevertheless.

(40) [PP Aan zichself] had Jan   nooit t*PP* gedacht.
        on   self   had John never   thought
      'Of himself John never thought.'

(41)
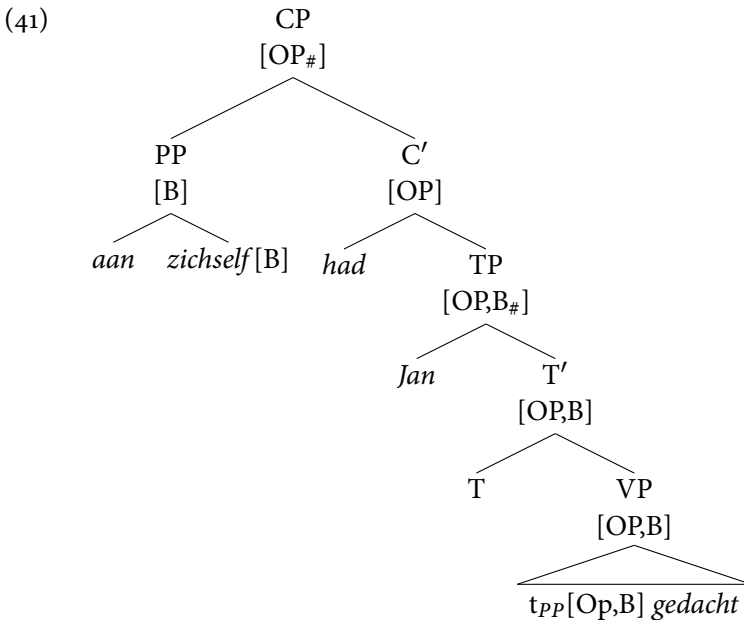
The antecedent PP and the trace t*PP* are connected via an [Op]-dependency. Therefore the binding feature [B], which percolates from the anapher to the PP, can be reconstructed into the trace. From there, it is percolated upwards until it encounters its binder *Jan*. Applying this mechanism to the example in (38) yields the following structure.
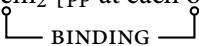
(42)

```
                        CP
                     [Op₂#,B]
            ┌───────────┴───────────┐
           VP                       C′
          [Op₁]                  [Op₂,B]
       ┌───┴───┐             ┌──────┴──────┐
   give books to            C              TP
   them t_PP[Op₁]                       [Op₂,B]
                                      ┌─────┴─────┐
                                     he           T′
                                               [Op₂,B]
                                            ┌─────┴─────┐
                                           did          VP
                                                   [Op₁#,Op₂,B]
                                                 ┌───────┴───────┐
                                            t_VP[Op₁,Op₂]        PP
                                                                 [B]
                                                            ┌─────┴─────┐
                                                        at each other's[B]
                                                           birthdays
```

As can be seen in (42), the binding feature [B] is not satisfied. The reason is that [B] is not percolated onto a category that immediately dominates the binder *them*. Thus, the analysis of Neeleman and van de Koot (2010) needs a modification to account for (38). One way to readjust the theory is to abolish the condition of *immediate domination* and replace it simply with *domination*. Then, the feature [B] in (42) would be satisified because the CP bearing [B] dominates the binder *them*. But since Neeleman and van de Koot (2010) do not distinguish movement from binding features, this modification would incorrectly rule in instances of sideward movement without limit.

It also would not help if the binder instead of the bindee bore the binding feature [B]. Then, satisfaction of [B] in (42) would proceed as follows: the binder *them* bears the feature [B] which is percolated up to the VP and reconstructed to t_{VP}. From there it percolates to the dominating VP-node. But at

this point, it cannot be satisfied because the VP does not immediately dominate the anaphor *each other*. This shows that the theory of Neeleman and van de Koot (2010) cannot be upheld, at least not in its present form. How exactly it should be modified in order to account for binding in (38) remains unclear.

To derive (38) in the lowering approach, one may assume that syntactic anaphor binding without c-command is not mediated by reconstruction. Rather, a derivational binding approach along the lines of Belletti and Rizzi (1988) and Lebeaux (1994, 2009) may be invoked. Put simply, the proposal is that once an anaphor is c-commanded by a potential antecedent, it gets syntactically bound and remains so throughout the rest of the derivation. This is enough to account for (38).[11]

(43) a. [$_{VP}$ give books to them$_2$ [$_{PP}$ at each other's$_2$ birthdays]]
          └── BINDING ──┘

      b. [$_{VP}$ give books to them$_2$ t$_{PP}$]   [$_{PP}$ at each other's$_2$ birthdays]
          └── EXTRAP. ──┘

      c. [$_{VP}$ give books to them$_2$ t$_{PP}$] he did t$_{VP}$ [$_{PP}$ at each other's$_2$ birthdays]
          └── TOPICALIZATION ──┘

There remains an open question here, namely how semantic binding of the anaphor in (38) is to be treated. Usually, it is assumed that semantic binding does not apply in narrow syntax but at LF. It might be possible to approach the problem by means of the theory of Jacobson (1999), which achieves semantic binding without c-command under certain conditions. We must leave the matter open here.

4. Conclusion

In this paper, we have argued that Barss' Generalization can be derived by means of an LF-derivation that obeys the Strict Cycle Condition. In a configuration where a remnant category α has moved above the extracted category

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[11]Note that the approach of Sauerland and Elbourne (2002) could, in principle, resort to the same mechanism. Thus, as long as anaphor binding can be derived without reconstruction at LF, the lowering approach and the copy approach make the same predictions.

β, β cannot reconstruct to its base position within α. The reason is that reconstruction is lowering and that lowering of β requires first lowering of α. But since lowering of α affects a higher cycle, subsequent lowering of β would violate the SCC.

We further discussed the approaches by Sauerland and Elbourne (2002) and Neeleman and van de Koot (2010), which also account for Barss' Generalization. We argued that both approaches face problems. The analysis by Sauerland and Elbourne (2002), which essentially builds on the distinction between A and Ā-movement cannot account for Barss' Generalization when the remnant category α and the extracted category β are both moved by the same movement type or when extraposition is involved. Furthermore, the account misses the similarity between the Haider-Takano Generalization and Barss' Generalization. Finally, cases where A-movement feeds Ā-movement but A-movement can reconstruct pose a problem.

The approach of Neeleman and van de Koot (2010) is challenged by examples where the category that cannot take scope over β is not contained within α. It also faces problems with anaphor binding in Barss' configurations. None of these problems arises in the approach presented in the present paper, which builds on literal syntactic lowering and strict cyclicity at LF.

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