Pseudogapping as pseudo-VP ellipsis

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May 20, 2015

Abstract

In this paper, we propose an analysis of pseudogapping in Hybrid Type-Logical Categorial Grammar (Hybrid TLCG; Kubota 2010; Kubota and Levine 2012). Pseudogapping poses a particularly challenging problem for previous analyses in both the transformational and nontransformational literature. We argue that the flexible syntax-semantics interface of Hybrid TLCG enables an analysis of pseudogapping that synthesizes the key insights of both transformational and nontransformational approaches, while at the same time overcoming the major difficulties of each type of approach.

Keywords: pseudogapping, VP ellipsis, anaphora, syntactic identity, Hybrid Type-Logical Categorial Grammar

1 Introduction

Pseudogapping is a somewhat odd instance of ellipsis in which a lexical verb under an auxiliary is deleted, leaving behind its own complement(s). There are clear family resemblances between pseudogapping on the one hand and Gapping and VP ellipsis on the other:

(1) Mary hasn't dated Bill, but she has ∅ Harry. (PSEUDOGAPPING)

(2) Smoke *bothers* Fred, and loud music, ∅ Fred's parents. (GAPPING)

(3) Smoke might have *bothered Fred*, but it didn't ∅. (VP ELLIPSIS)

In both pseudogapping and Gapping, the lexical verb is missing, leaving behind some (or all) of its complements as remnants, but in pseudogapping, an auxiliary in the ellipsed clause must be present (just like in VP ellipsis), whereas in Gapping no auxiliary is found. Gapping is moreover different from the other two in that it is restricted to coordination environments (cf. *I'll contact John if you will (Mary)* vs. **I'll contact John if you Mary*).

The proper analysis of pseudogapping has long been a problem in the literature (e.g. Kuno 1981; Jayaseelan 1990; Miller 1990; Hoeksema 2006; Lasnik 1999; Baltin 2000; Takahashi 2004; Gengel 2013; Miller 2014, to name just a few sources). The shared auxiliary requirement and distributional parallelisms of pseudogapping and VP ellipsis (where, unlike Gapping, they are not restricted to coordination environments) suggest a unitary analysis in which the latter is nothing but a limiting case of the former where all the verb's complements have been ellipsed. In transformational approaches (cf., e.g., Jayaseelan (1990)), this unification has been implemented by treating pseudogapping as VP ellipsis in which a remnant (*Harry* in (1)) has, in some way or other, been moved out of a subsequently deleted VP, thereby escaping ellipsis. The disagreements among previous proposals pertain to differences in (i) the kinds of movements proposed (A- vs. Ā-movement) and (ii) the direction of movement (leftward vs. rightward). However, as we document below, regardless of which choices are made, the various movement operations employed for this purpose by different authors are not only undermotivated but empirically problematic. The nontransformational literature, by contrast, has given relatively little attention to pseudo-

gapping, with Miller (1990) being virtually the only explicit proposal to date. In Miller's proposal, the meaning of the missing verb (such as *dated* in (1)) is simply recovered by an anaphoric mechanism. This approach is successful in providing a relatively simple mechanism for correlating the surface forms of pseudogapping sentences with their interpretations, but it has one major drawback: the complete dissociation between the syntactic and semantic licensing conditions for pseudogapping underlying Miller's analysis (which is common to many nontransformational analyses of ellipsis phenomena; see footnote 11 below) overgenerates in a way never expected in a transformational approach.

We argue in this paper that a synthesis of the transformation and nontransformational approaches to pseudogapping becomes possible in a version of categorial grammar (CG) called Hybrid Type-Logical Categorial Grammar (Hybrid TLCG; Kubota 2010, 2014, 2015; Kubota and Levine 2012). Hybrid TLCG is a contemporary variant of CG that recognizes both the familiar directional slashes (Lambek 1958) for handling word order and the more recent, non-directional mode of implication (or slash) from Oehrle (1994) (see also de Groote (2001), Muskens (2003), and Pollard (2013)) for handling scope-related phenomena. This new approach has proven successful in the analyses of several recalcitrant phenomena at the syntax-semantics interface, such as nonconstituent coordination (including Gapping) (Kubota 2015; Kubota and Levine 2015, 2014a) and the semantics of symmetrical predicates (*same*, *different*) (Kubota and Levine 2014c). The present paper shows that the 'hybrid' architecture of this framework once again yields an elegant analysis of a highly problematic empirical phenomenon, namely, pseudogapping. Our analysis characterizes the syntactic properties of the 'antecedent' of the pseudogapped verb in the preceding clause via the flexible notion of constituency with directional slashes and captures the anaphoric relation between the antecedent and the ellipsis clauses via order-insensitive inference with the non-directional slash. This essentially amounts to augmenting the interpretive analysis by Miller (1990) with the insights from transformational approaches that syntactic information is also relevant in the licensing of pseudogapping, resulting in a synthesis of the seemingly antithetical transformational and nontransformational approaches.

2 Data

In this section, we review the core data of pseudogapping. What emerges from this discussion is that there is an apparent impasse for both transformational and non-transformational approaches. On the one hand, a wide range of data argue against deriving the remnants of pseudogapping as 'evacuated remnants' of VP ellipsis. On the other hand, there are also data that suggest the existence of some purely syntactic dependency between the remnants and the 'elided' verb, posing problems for purely interpretive approaches.

2.1 Pseudogapping remnants

We first examine the number and kind of remnants that can appear in pseudogapping. The following sample, mostly taken from previous sources (Levin 1979; Jayaseelan 1990; Miller 1990; Kuno 1981; Gengel 2013), are by no means meant to be exhaustive, but gives a glimpse of the range of possibilities (we show the antecedent of the 'elided verb' in boldface and the remnant(s) in italics):[1]

(4) a. You can't **count** on a stranger, but you can ∅ *on a friend*.

b. John **spoke to** Mary more often than Peter did ∅ *Anne*.

c. John **gave** more caviar to Mary than he did ∅ *mush to Jane*.

d. Although I wouldn't **introduce** these people to Tom and Sally, I would ∅ *these people to each other*.

e. ROBIN will **bet** an entire fortune that the METS will win the pennant, and LESLIE will ∅ *that the* BRAVES *will win*.

f. I'd **bet** a friend more dollars that something unlikely was true than I would ∅ *an enemy Euros that the sun would rise tomorrow*.

g. Robin **gave** Terry more books than Leslie did ∅ *CDs*.

Note that what undergoes ellipsis is not necessarily a constituent in the standard sense:

[1] One interesting apparent exception to the availability of pseudogapping displayed in (4) is the behavior of the verb *promise*: **I promised John to send him the file more reluctantly than I did ∅ Bill (to edit it).* We have no account of why such examples are ill-formed.

(5) a. You can't **take the lining out of** that coat. You can ∅ *this one*.

b. You can't **pay more attention to** John than you do ∅ *Mary*!

c. The President **asked Congress to fund** the Contras more often than he did *the Salvadoran government*.

There are also data displaying apparently discontinuous ellipsis:

(6) a. I would give **more kudos to** Terry **for what he did** than I would ∅ Robin ∅.

b. I didn't **expect** your mother **to like the picture**, but I did ∅ you ∅.

An important aspect of pseudogapping is syntactic connectivity between the antecedent and pseudogapped clauses. For example, though *to Mary* and *for Mary* are both possible complements of *speak*, (7a) is ill-formed (similarly for the other examples):

(7) a. *John spoke to Mary more often than Peter did for Anne.

b. *John will accuse Bill of perjury more readily than he would Mary with forgery.

c. *John insisted that Mary be fired more frequently than he did that she had done something wrong.

(7c) is particularly interesting: *insist* has two different meanings ('demand' vs. 'believe firmly') depending on whether it takes a subjunctive or a finite complement, and the two meanings cannot be mixed in pseudogapping.

As in other domains of ellipsis, data like (7) are often taken to provide strong support for the presence of hidden syntactic structure in the ellipsis site. The ill-formedness of examples like the following is often cited as additional evidence for such analyses:

(8) *Klimt is admired by Abby more than anyone does Klee. (Merchant 2007, 170).

However, as noted by Tanaka (2011), there are well-formed instances of voice-mismatch pseudogapping such as the following, casting serious doubt on an argument for hidden syntactic structure based on data like (8):[2]

[2]Merchant's voice-mismatch data are exclusively of the sort illustrated in (8), in which what is being contrasted are the pairs Abby/Klimt and anyone/Klee. But Nakamura (2013a), following Kertz (2010, 2013),

(9) (?)MY problem will be investigated by Tom, but he won't YOURS.

A subtler type of tolerated mismatch is noted in Miller (2014), where the pseudogapped verb has a different valence from the token which appears in the antecedent clause:

(10) Ask Doll, who spoke as much about his schoolboy career ending as he did of the season in general. (Miller 2014, (15a))

The data above suggest a somewhat complex relationship between the morphosyntax of antecedent and pseudogapped clauses. While (7) makes it evident that some sort of syntactic category-matching condition is in force, the permissible voice-mismatch example in (9) and the tolerated subcategorization mismatch in (10) suggest a more complex relationship than simple 'deletion under structural identity'. Whatever one makes of these data, it should already be clear that syntactic form is far from the only factor determining the licensing conditions of pseudogapping.

A final set of important observations about pseudogapping comes from Miller's (2014) recent corpus study, where he notes a variety of cases in which pseudogapping displays insensitivity to island restrictions.

(11) a. According to current ideas, the frothiness of space **retards the arrival of** a burst's highest-energy photons more than it does ∅ the lowest-energy photons. [Complex NP Constraint]

b. ...they would **examine what** I **wore** as intensely as anything else—as they would ∅ any woman who met with them ∅ [*wh*-island]

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persuasively argues that the asymmetry between cases such as (8) and those involving the polarity of the auxiliary such as (9)—which Merchant does not take into account—reflects the manner in which the contrast relation imposed as a discourse coherence requirement on pseudogapping is satisfied. Specifically, when the (intended) contrast is between the subject in the antecedent clause and the corresponding demoted argument in the pseudogapped clauses, voice mismatch is barred, whereas if the contrast is established between the auxiliaries in different polarities in the antecedent and pseudogapped clauses, voice mismatch does not lead to unacceptability.

These examples pose serious challenges to treatments of pseudogapping that depend on movements of the remnant constituents out of VPs.

2.2 Pseudogapping and VP ellipsis

As we discuss in more detail in the next section, both the (majority of) transformational analyses and the nontransformational alternative by Miller (1990) take pseudogapping and VP ellipsis to be derived by the same mechanism (in the latter, VP ellipsis is simply a limiting case of pseudogapping where the auxiliary is associated with the subcategorization frame of an intransitive verb). Our own analysis proposed in Sect. 4 follows these proposals in this respect as well. But this identification has been questioned by certain authors, most notably, Hoeksema (2006). We now review the key arguments from Hoeksema, and evaluate to what extent they constitute evidence against a unified analysis of the syntax of VP ellipsis and pseudogapping (as opposed to pragmatic properties of the two phenomena). Our ultimate conclusion is that none of Hoeksema's arguments undermine the unified analysis. In the majority of cases, the divergence can be attributed to a difference in the discourse coherence conditions or processing-oriented factors in the two kinds of ellipsis.

In examining Hoeksema's (2006) arguments, one important *non*-syntactic difference between pseudogapping and VP ellipsis that should be kept in mind is that, as noted by Hoeksema himself, the two constructions are associated with very different types of pragmatic felicity conditions. In particular, pseudogapping must satisfy the Contrast relation, which is a particular form of Resemblance conditions in Kehler's (2002) classification of discourse relations.[3] The Contrast relation, typically expressed by the word *but* (*Mary took John to the movies, but Bill took Sue to a rock concert*), holds between two clauses having parallel structures in some sense but where at least one pair of corresponding arguments in the shared relation between the two clauses are different and in some sense opposed to each other.[4] The association of pseudogapping and the Contrast discourse relation seems

[3]Hoeksema (2006) speculates, correctly we believe, that this presumably explains the strong statistical association between pseudogapping and comparative constructions.

[4]The linkage between the Contrast relation and pseudogapping, but not VP deletion, is an unremarkable

to explain, for example, why there is often a polarity contrast in non-comparative pseudogapping (*You can't take the lining out of that coat. You* CAN ∅ *this one*).[5]

The first instance of alleged non-parallel between pseudogapping and VP ellipsis from Hoeksema is exemplified by the following contrast:

(12) a. Tornados petrify Harold more than I had assumed they do.

b. *Tornados petrify Harold more than I had assumed they do you.

The contrast in (12) shows that VP ellipsis can take place in an embedded position but pseudogapping cannot. According to Hoeksema, this argues for a non-unitary analysis of the two phenomena. However, mere distributional difference is hardly enough to argue against a uniform combinatoric analysis, since the surface distributional differences may simply arise from extragrammatical sources. Indeed, Hoeksema (2006, 339) himself attributes the contrast in (12) to the Contrast condition on pseudogapping. That is, in the grammatical, unembedded counterpart of (12b) (*Tornados petrify Harold more than they do you*), there is a simple contrast established between the degree of Harold's fear vs. the degree of the hearer's fear of tornados. But in (12b), what is contrasted is the degree of Harold's fear with the degree to which the speaker had imagined the hearer's fear.[6]

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outcome of the syntactic difference between these two ellipsis phenomena. Pseudogapping leaves remnants, whereas VP ellipsis doesn't. Thus, the syntactic form of pseudogapping is optimal for supporting the Contrast relation, with the remnant (which is usually focused) and its correlate in the antecedent clause being the contrasted elements; in the case of VP ellipsis (in which there is no remnant after the auxiliary), it would be much more difficult to establish a contrast relation between the two clauses.

[5]While there are distributional differences between comparative and noncomparative contexts that do not seem to involve Contrastiveness, these are also of a gradient kind rather than being absolute. For example, there seems to be an aversion to adjective remnants in coordination versions of pseudogapping (compare: **Rona looked annoyed, but she didn't frustrated* vs. *Rona looked more annoyed than she did frustrated*). But this does not appear to be a syntactic restriction, since adjectival remnants are actually allowed in at least some instances of noncomparative pseudogapping (cf. *I wouldn't call Rona hostile, but I* WOULD *stubborn*).

[6]The Contrast condition may also explain the dispreference for cataphora in pseudogapping. However, despite the general dispreference, good examples of cataphoric pseudogapping do exist (*As it did me, work rescued Willa Cather*; cf. Miller (2014)), suggesting that this is not a combinatoric constraint either.

Another divergence between VP ellipsis and pseudogapping from Hoeksema (2006) pertains to the classes of verbs that can respectively participate in the two constructions. The copula and the possessive verb *have* can occur in VP ellipsis, but not in pseudogapping:

(13) a. *The one they choose might be Gail, but it won't me.

b. The one they choose might be Gail, but it might not.

(14) A: Tim's preface has me in it!

B: *It does me, too.

B′: I am not surprised it does

Arguably, however, neither *be* nor the possessive *have* embody enough lexical content that there is any point to deleting it alone—the contentlessness of the verb would make the deletion more trouble in terms of processing burden than retaining the verb. Similar considerations are very likely responsible for the fact that psych perception verbs (*smell*, *taste*, *sound*, *look*, etc.) and raising verbs that take a stative complement (*seem*, *appear*, *turn out*) display similar behaviors, as reported by Levin (1979) (cf. footnote 5 above). This processing effect is very likely aggravated by the fact that the ill-formedness of (13) and (14) as well as examples involving raising verbs all seem due at least in part, and in some cases in large part, to the importance of marked contrast as part of the discourse felicity conditions on pseudogapping. There has to be some substantive relation in common between the two clauses in order to establish a Contrast relation. But the meanings of the verbs just displayed are arguably too abstract to support the level of contrast between the two clauses that pseudogapping requires. We take it that these two effects conspire to lower the level of acceptability of examples like (13) and (14) near ungrammaticality.

The final point of divergence we discuss here does not fall directly out of either the

Similarly, the preference for the same subject across clauses which Hoeksema (2006) alleges to be a property of pseudogapping is also only a tendency. Pseudogapping examples with different subjects do exist (*That thunderstorm bothered Millicent last night a lot more than your stereo did me, I can tell you that!*). Moreover, Miller's (2014) corpus study shows that, for that matter, a preference for the same subject exists for VP ellipsis as well, suggesting that the alleged difference between the two constructions isn't clear-cut at all.

coherence conditions or (semantic) processing-oriented considerations: infinitival *to* can support VP ellipsis, but not pseudogapping:

(15) a. I wrote his dissertation, but I didn't want to.

b. *I wrote his papers, but I didn't want to his dissertation.

(cf.: I can write you papers more easily than I can your dissertation.)

But note that, if the remnants are PPs, an infinitival pattern parallel to (15b) improves:

(16) a. I talked much more about Tom than I had wanted to about anybody else.

b. I wanted to put more books on the table than I wanted to on the desk.

The difference between (15b) and (16) is instructive. Before an NP remnant, there is a prominent stress on auxiliaries generally, just slightly less prominent than the stressed part of the NP. But in (16), which involve PPs rather than NPs as remnants, auxiliaries need not bear strong secondary stress (note that this is the case for ordinary auxiliaries as well: *I can put more books on the table than I can on the desk*). Unlike modal auxiliaries, but like the weak definite pronoun *it*, auxiliary *to* is extremely resistant to stress assignment, and cannot appear in environments in which stress assignment is obligatory.

To summarize, all distributional discrepancies between VP ellipsis and pseudogapping from Hoeksema (2006) receive satisfactory explanations in terms of extra-combinatoric factors that pertain to independently justified differences between the two phenomena.

3 Previous proposals

As noted above, in movement-based approaches, pseudogapping is typically analyzed as VP ellipsis after evacuation of the remnant via movement. There are two aspects to such proposals which need to be kept separate. One aspect is the characterization of pseudogapping (and ellipsis more generally) as an operation that makes reference to purely syntactic information. The second is the specific implementation of this syntactic dependency via structure-changing operations (i.e. movement+deletion).

The essential insight of movement-based approaches seems to largely lie in the first of these aspects. Movement-based approaches immediately explain the category-matching

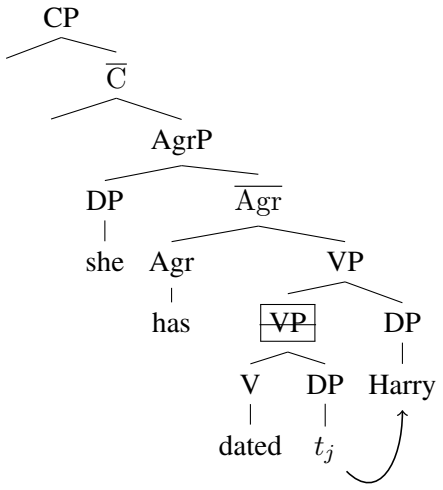
connectivity effect in pseudogapping, which can be accommodated only by an ad-hoc stipulation in the interpretive approaches. At the same time, as we discuss in detail below, previous transformational analyses are unsatisfactory in both empirical and conceptual grounds: the various movement operations utilized for the analysis of pseudogapping in the literature either lack independent motivation, or (when an independently motivated movement is retooled) does not match the actual distributional properties of pseudogapping. Moreover, movement-based approaches do not by themselves illuminate the question of why we might expect something like pseudogapping to be a possible type of ellipsis in English.

3.1 Pseudogapping as VP ellipsis: movement-based approaches

The transformational literature has essentially followed Kuno (1981), which took pseudogapping to be a case of VP ellipsis in which various constituents are moved out of the VP via adjunction operations, thus 'surviving' VP ellipsis. Jayaseelan (1990), adopting this general idea, analyzes (17) (= (1)) as in (18), via Heavy NP Shift (HNPS).

(17) Mary hasn't dated Bill, but she has ∅ Harry.

(18)



However, there are major empirical challenges for this approach. First, since HNPS cannot move the NP complement of a preposition, this analysis incorrectly rules out examples like the following (see also Lasnik (1999)):

(19) If you can't understand me, I will communicate with you like I would a dog.

(Miller (2014, 10), (10))

Second, Jayaseelan attributes the ill-formedness of (20) to the impossibility of multiple rightward movements in HNPS:

(20) *I didn't give a dime to Mary, but I did a nickel to Jane.

But this supposed prohibition is directly contradicted by data such as those in (21):[7]

(21) a. John gave more caviar to Mary than he did mush to Jane. (Kuno 1981, 145)

b. I would bet more dollars with Robin than I would Euros with Leslie.

An extreme example of this kind is provided by (4f), repeated here as (22).

(22) I'd bet a FRIEND more DOLLARS that something UNLIKELY was true than I would an ENEMY EUROS that the sun would RISE tomorrow.

On Jayaseelan's analysis, the input to the movement prior to VP ellipsis is the following:

(23) ...than I would [$_{\mathrm{VP}_0}$ bet an enemy Euros that the sun would rise tomorrow]

In order to evacuate VP_0 of all its nonhead daughters, leaving only *bet* in place to be deleted, movement must apply successively to each of the complements of the verb:

(24) ...than I would [$_{\mathrm{VP}_0}$ [$_{\mathrm{VP}_1}$ [$_{\mathrm{VP}_2}$ ~~[$_{\mathrm{VP}_3}$ bet t_1 t_2 t_3]~~ an enemy$_1$] Euros$_2$] [that the sun would rise tomorrow]$_3$]

But the rightward movements in (24) have serious empirical shortcomings. As we discuss below, when the verb is not elided, such rightward movements are ill-formed.

To see this, note first that neither of the two objects of *bet* is right-shiftable via HNPS:

(25) a. I bet Leslie a TON of money that Terry was alive.

b. *I bet Leslie that Terry was alive a TON of money.

[7]Given the fact that pseudogapping is most acceptable in comparatives and least so in ordinary coordination (Hoeksema 2006), the unacceptability of (20)—which is more complex than ordinary pseudogapping in involving more than one remnant—isn't particularly surprising.

(26) a. I would bet even the worst enemy I've ever met in my life (a lot of money) that Leslie is alive.

b. *I would bet (a lot of money) that Leslie is alive even the worst enemy I've ever had in my life.

The badness of (25b) or (26b) cannot be attributed to the NPs themselves since they are right-shiftable in the right syntactic environments, for example, *In the past, I'd transferred to Terry's account a* TON *of money*.

The pattern just observed severely jeopardizes an account of (22) via rightward movement. Such an account would first take the leftmost complement *an enemy* to heavy-shift to the right, followed by two further successive rightward movements targeting the remaining complements (below, ☠ marks an operation shown to be inadmissible in (25b) or (26b)):

(27) I would [$_{\mathrm{VP}}$ bet [an enemy] Euros [that the sun would rise tomorrow]] ⇒ ☠
I would [$_{\mathrm{VP}}$ bet t_1 Euros [that the sun would rise tomorrow]][an enemy]$_1$ ⇒ ☠
I would [[[$_{\mathrm{VP}}$ bet t_1 t_2 [that the sun would rise tomorrow]] [an enemy]$_1$] Euros$_2$] ⇒
I would [[[[$_{\mathrm{VP}}$ bet t_1 t_2 t_3] [an enemy]$_1$] Euros$_2$] [that the sun would rise tomorrow]$_3$]

In short, the necessary rightward movements are precisely the prohibited ones.

Finally, Jayaseelan argues that (28) supports the HNPS analysis since HNPS would not be able to apply to a weak definite pronoun such as *it*:

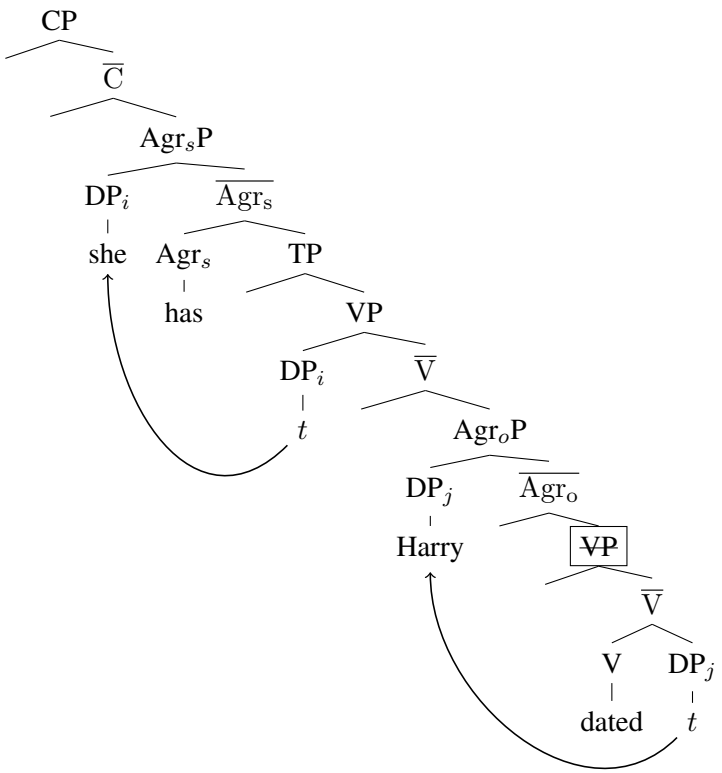
(28) Is she suing the hospital? – *Yes, she is it.

But this only shows that pseudogapping requires its remnant to carry stress. The stress requirement itself presumably follows from the required Contrast relation in pseudogapping along the lines discussed in the previous section (the association between pseudogapping and a contrastive discourse relation is noted by a number of authors, including Jayaseelan himself, as well as Hoeksema (2006), Tanaka (2011), Nakamura (2013b) and Miller (2014)). Note that replacing *it* with *that* (with a marked stress on it) improves (28).

Subsequent transformational analyses have added little to Jayaseelan's main ideas. The only differences consist in whether the movement is taken to be A or $\overline{\mathrm{A}}$ movement, and

rightward or leftward movement. For example, (29) illustrates Lasnik's (1999) alternative:

(29)



Here, Jayaseelan's rightward HNPS is replaced by a leftward A-movement of the remnant NP *Harry* to [Spec,Agr$_o$]. As noted in Takahashi (2004), while this treatment avoids the difficulties of an exclusively HNPS analysis, it creates a new problem. Examples such as (30) require a structure in which everything in the VP except *CDs* is deleted.

(30) Robin gave Terry more books than Leslie did CDs.

The complex interactions of Lasnik's assumptions about feature checking, derivational economy and binary branching yields the following structure:

(31) [$_{\mathrm{TP}}$ Leslie$_k$ did [$_{\mathrm{VP_1}}$ t_k [$_{\mathrm{AgrP}}$ Terry$_j$ [$_{\mathrm{VP_2}}$ t_j [$_{\mathrm{AgrP_3}}$ CDs$_i$ [$_{\mathrm{VP_3}}$ give t_i]]]]]].

To delete both *give* and *Terry*, it would be necessary to delete VP$_1$, which would also delete *CDs*. Suppose, then, that we were to instead assume a simpler initial structure for this sentence, where the verb directly precedes *Terry* and *CDs*, and then deleted the partially evacuated VP, as in (32):

(32) [$_{\mathrm{TP}}$ Leslie did [$_{\mathrm{AgrP}}$ CDs$_i$ [$_{\mathrm{VP}}$ ~~give Terry t_i~~]]

However, as noted by Takahashi, this derivation would also fail. The problem is that such a derivation requires a leftward A-movement of the indirect object *CDs* across the direct object—an operation which is blocked (except in British English) in non-ellipsed contexts:

(33) *CDs were given Terry (by Leslie).

Thus, as noted by Takahashi, there is no available derivation for (30) on the assumption that pseudogapping comprises exclusively leftward A-movement prior to VP deletion.[8]

Finally, Culicover and Jackendoff (2005, 294) note that Lasnik's analysis, if applied to data such as (34), would require the clausal remnant to be $\overline{\mathrm{A}}$-moved to the left.

(34) ROBIN will bet an entire fortune that the METS will win the pennant, and LESLIE will ~~bet an entire fortune~~ that the BRAVES will win.

But, as they note, cross-linguistic evidence from Dutch and German, where overt leftward object shift is standard, shows that clauses do not undergo such movement.

In place of Jayaseelan's (1990) exclusively rightward and Lasnik's (1999) exclusively leftward movement analyses, Takahashi (2004) proposes a mixed analysis where both Object Shift and rightward adjunction are available to partially evacuate VPs prior to deletion. It might seem at first that this 'eclectic' approach would overcome the problems just noted

[8]Minor variations on Lasnik's proposal are offered in Gengel (2013) and Boone (2014). Neither is satisfactory. On Gengel's analysis, examples such as (4c), *John gave more caviar to Mary than he did mush to Jane* force a $\overline{\mathrm{V}}$-deletion analysis, precisely the kind of deletion operation that Gengel herself objects to (Gengel 2013, 50), with the only alternative being to posit an extra ad hoc functional projection above VP. Boone (2014), on the other hand, proposes an analysis in terms of 'Exceptional Movement'—a kind of rightward adjunction which is allowed to occur counter-cyclically, 'tucking in' its movement target. Boone's analysis involves a principle called Interface Economy, which is both highly stipulative and empirically deficient. Interface Economy entails, for example, that Exceptional Movement must be local and confined within finite clauses, and that apparent movement out of finite clauses can only be instances of legal $\overline{\mathrm{A}}$-movement. This prediction is abundantly counterexemplified by the corpus data summarized in Miller (2014) (cf. (11)). Moreover, neither Gengel's nor Boone's approach offers a solution for data such as (22).

for Lasnik's analysis, as well as those noted earlier for Jayaseelan's. For example, (30) and (34) can be generated just as they would be under Jayaseelan's (1990) analysis, via a single application of HNPS. But in the case of (4c) and (21b), Takahashi's analysis would move the leftmost complement to the left via Object-shift, followed by rightward A-movement of the rightmost complement. In a sense, Takahashi's approach can be seen as the limiting case of the movement strategy: stretched under pressure from contraindications to both rightward and leftward strategies, the next (and the last) analytic alternative is to combine all approaches that have worked in particular cases. Unfortunately, however, a wider set of data reveal problems similar to those which undermine the previous accounts.

In (22), for example, there are three remnants. Takahashi's analysis would take the leftmost complement *an enemy* to Object-shift to the left, followed by either two rightward movements targeting each of the remaining complements, or a second movement to the left, applying to *Euros*, and a movement of the clausal complement to the right. But both of these possibilities are ruled out by Takahashi's own lines of separate argumentation against Jayaseelan's and Lasnik's analyses. In the former case, the same problem arises as in (27) above: leaving aside the legality of multiple HNPS, the first of the rightward movements must move the indirect object *Euros* over the clausal complement. But as discussed above, this is prohibited, as per (25). In the latter case, the first movement must move the indirect object over the direct object—again, an option precluded for Takahashi, since admitting such movement would incorrectly license the passivization of an indirect object in (33).

Given the discussions from the previous and the present sections, we have two kinds of evidence bearing on the movement hypothesis for pseudogapping: on the one hand, the general argument *for* movement in pseudogapping, largely predicated on the putative compliance with island constraints, are undercut by the evidence from Miller (2014) in Sect. 2.2, while the arguments just reviewed *against* each specific movement-based analysis make it difficult to see how such analyses can be maintained. But the problems do not end here. A third class of counterevidence comes from unwelcome consequences that follow from the assumption that a syntactic operation of VP ellipsis underlies pseudogapping.

For this third class of evidence, note first the ill-formedness of examples such as (35):

(35) *Bill can eat a four-course dinner faster than I can [[~~eat~~ a pizza] and [drink a beer]].

The badness of (35) cannot be attributed to heavy shift within the first of the two conjoined VPs, for (36) shows that such movement is completely acceptable.

(36) I can pass on to Bill all of the detailed instructions about getting to Chicago that you gave me yesterday and still make it back by 11 for the committee meeting.

But given this fact and given the lack of any ATB requirement on deletion itself, the HNPS+deletion analysis predicts that (35) should be unexceptionable. The marked unacceptability of such examples is then yet another major challenge to this kind of analysis. The problem here arises from the fact that VP ellipsis is involved in transformational analyses, rather than the direction or kind of movement prior to VP ellipsis, and hence persists in all subsequent variations on Jayaseelan's basic proposal.

The assumption that a syntactic operation of VP deletion underlies pseudogapping also leads to a striking incompatibility between the principal derivational analyses of pseudogapping and of Gapping in view of data such as (37) involving an interaction of the two:

(37) I can eat more pizza than John can ice cream or Mary tacos.

Consider the consequences of (37) for Johnson's (2000; 2009; 2014) low VP coordination/ATB verb movement analysis of Gapping. On the one hand, under a VP-evacuation/deletion analysis of pseudogapping, the first conjunct of the *than*-clause *John can ice cream* is an output of VP ellipsis, deleting a VP containing the verb and the trace of the remnant direct object. On the other hand, in order to get Gapping in the righthand conjunct, Johnson's analysis requires ATB movement of the verb *eat*. Suppose, following Johnson (2000, 2009), we assume a structure for (37) along the lines of (38):

(38) [$_{\mathrm{TP}}$ can [$_{\mathrm{VP}}$ John eat ice cream]] or [$_{\mathrm{VP}}$ Mary eat tacos]]]

If *eat* undergoes ATB movement from this structure, where have the two tokens of this verb in each conjunct in (38) gone in (37)? Suppose the ATB movement for Gapping applies

first. Then, *eat* is removed from the first conjunct, no longer deletable by VP ellipsis, and hence necessarily visible in the comparative clause at the end of the derivation, contrary to fact. The only other option would be to start with pseudogapping in the lefthand conjunct. Then, we obtain an intermediate structure in (39):

(39) can [$_{\mathrm{VP}}$ [$_{\mathrm{VP}}$ John $\varnothing$ ice cream]] or [$_{\mathrm{VP}}$ Mary [eat tacos]]]

Even allowing non-ATB movement from the VP, we still have nowhere to move *eat* to such that (37) is derived. Given these considerations, it seems fair to say that there is no straightforward analysis of the pseudogapping/Gapping interaction in (37) consistent with the standard assumptions about the two phenomena in movement-based approaches.[9]

Thus, previous movement-based analyses of pseudogapping are not only problematic as analyses of pseudogapping itself, but they also suffer from the implications of the fundamental premise: the assumption that the verb is elided by the syntactic operation of VP deletion leads to mispredictions in interaction with analyses of other syntactic phenomena.

3.2 The anaphoric-interpretive strategy

An alternative approach to ellipsis has emerged during the past three decades, whose central analytic precept is that ellipsis never involves covert structure (see, e.g., Sag et al. (1985), Miller (1990), Dalrymple et al. (1991), Culicover and Jackendoff (2005) among others). Such approaches typically invoke some kind of anaphoric process based on the semantics of the antecedent clause. We illustrate this strategy by reference to Miller (1990), which is the most explicit proposal of this sort to date for the analysis of pseudogapping.

The key idea of Miller's (1990) nonderivational analysis of pseudogapping, couched in GPSG, is that auxiliaries can appear as the head verb in the same set of PS rules that license

[9]Toosarvandani (2013) offers an alternative to Johnson's proposal which treats Gapping in the same way that Jayaseelan analyzes pseudogapping, as arising from partial VP evacuation plus movement, except that no auxiliary is present in TP. While this account does not encounter the severe difficulty that (37) poses for Johnson's approach, it has its own problems in that exactly the same issue noted above in connection with Jayaseelan's analysis vis-à-vis (22) arises in the context of Gapping (see Kubota and Levine (2014a, Sect. 2.2.1) for further discussion on this point and relevant data).

projections of lexical verbs. For example, in (1), reproduced here as (40), the auxiliary *has* is effectively treated as a transitive verb and directly combines with the remnant *Harry*.

(40) Mary hasn't dated Bill, but she has ∅ Harry.

Miller implements this strategy by assuming that auxiliaries can appear not only in subcategorization frames taking non-finite VP complements, but also in frames instantiating any subcategorization frame of a lexical verb in English. This means that the auxiliary *has* is specified in the lexicon to be compatible with the [SUBCAT 2] specification, which is associated with the following PS rule licensing lexically transitive verbs such as *drink*:

(41) VP $\rightarrow$ H[SUBCAT 2], NP

This rule licenses (40), and the meaning of the 'missing' verb is then supplied by anaphoric reference to some 'corresponding' verb in the preceding clause.[10]

Elegant though it may appear, this analysis has one serious source of overgeneration. The problem, in a nutshell, is that Miller's anaphora resolution procedure makes no reference to any syntactic information of the antecedent clause—in particular, to the selectional properties of the head verb, which must be matched by the auxiliary in the pseudogapped clause, as discussed above. This indeterminacy entails that if some complement in the pseudogapping clause has a denotation that corresponds to the denotation of a syntactically different complement in the antecedent clause, then it is in principle possible to obtain a coherent interpretation in Miller's analysis even though the verb in the antecedent clause cannot actually combine with the pseudogapping clause complement. Thus, (42), discussed earlier, is incorrectly predicted to be good.

(42) *John spoke to Mary more often than Peter did for Anne.

[10]In simple cases, the target of this anaphoric mechanism is a lexical verb, but more complex cases exist, such as (5c) from Sect. 2. In that example, the anaphoric process is supposed to solve the meaning of the missing 'verb' as $\lambda x[\mathbf{ask}(\mathbf{fund}(x))(\mathbf{Congress})]$, (effectively matching the meaning of the nonconstituent string in the antecedent clause *asked Congress to fund*), in a manner reminiscent of the Higher-Order Unification mechanism proposed for VP ellipsis in Dalrymple et al. (1991).

Here, the individual denotation **anne** is a possible interpretation for *for Anne* (cf. *Peter waited for Anne*, where the preposition *for* is standardly taken to be meaningless). But then, the meaning of the auxiliary *did* can be anaphorically resolved as the meaning of the verb *speak* in the antecedent clause (note that *to* in *spoke to Mary* is similarly meaningless), leading to the misprediction that (42) should be well-formed with the same interpretation as *John spoke to Mary more often than Peter did to Anne*.

Miller adds an extra filtering condition to his anaphora resolution procedure which in effect compares the verb in the antecedent clause with the form of the complement(s) in the pseudogapping clause, and requires the former to have the 'appropriate denotation' when used with the latter. Thus, for example, (42) is ruled out since 'NP1 *speak to* NP2' and 'NP1 *speak for* NP2' mean different things (NP2 is a participant in the act of speaking in the former but not in the latter). Thus, when appearing with *for* (as in the pseudogapping clause), the meaning of *speak* in the antecedent clause would not be the 'appropriate' one, and anaphora resolution therefore fails. But this constraint is a rather complex and indirect one. In order to determine the well-formedness of the target clause of ellipsis, the grammar needs to 'know' what would happen to the meaning of the antecedent clause predicate *if* it were to appear with a different subcategorization frame. Such a mechanism in effect amounts to a kind of 'transrepresentational constraint'—an analog of transderivational constraints within a monostratal setup—requiring appeal to a comparison between two (or conceivably more) syntactic representations. We take this outcome as an indication that the specific framework in which Miller implements his analysis is not the optimal one to embed the key analytic content of his proposal.[11]

[11]This general problem is by no means unique to Miller's proposal, but rather is common to interpretive approaches to ellipsis generally, arising in somewhat different forms in, e.g., Culicover and Jackendoff (2005). Like Miller, Culicover and Jackendoff provide a syntactic template for the pseudogapping clause but offer no direct way to align the syntactic form of the pseudogapped clause with that of the antecedent. Instead, they assume that the relevant selectional restriction (which is purely *syntactic*) is somehow retrieved from the lexicon on the basis of the *semantic* interpretation of the pseudogapping clause anaphorically recovered from the antecedent clause, via an 'Indirect Licensing' mechanism. Aside from the lack of formal details and

4 Pseudogapping as pseudo-VP ellipsis

In this section, we propose an analysis of pseudogapping in HYBRID TYPE-LOGICAL CATEGORIAL GRAMMAR (Hybrid TLCG; Kubota 2010, 2014, 2015; Kubota and Levine 2012, 2015), a variant of categorial grammar (CG) that has a flexible syntax-semantics interface. Our analysis aims to synthesize the key insights from both transformational and nontransformational approaches. Specifically, we follow Miller (1990) in taking pseudogapping to be licensed by an anaphoric mechanism, thereby escaping the various problems associated with previous transformational analyses. However, unlike Miller's purely interpretive approach, the specific way in which we unify the syntactic licensing mechanism of pseudogapping and VP ellipsis naturally predicts that pseudogapping is sensitive to certain syntactic information (specifically, the selectional restrictions that it imposes on its complements). This way, the analysis naturally incorporates the connectivity requirement on pseudogapping from transformational approaches as well.

The key analytic idea of our proposal is largely theory-independent and can be formulated in any syntactic theory that has an explicit syntax-semantics interface and which countenances a relatively flexible notion of syntactic constituency. We believe that one of the reasons that pseudogapping has turned out to be so problematic in both the transformational and nontransformational literature is that previous syntactic theories do not have these properties in a fully general manner. We choose to formulate our analysis in Hybrid TLCG, which turns out to satisfy these two requirements adequately. In particular, the flexible notion of syntactic constituency that it shares with many other variants of CG (such as Combinatory Categorial Grammar (CCG); Steedman 1996, 2000a,b, 2014) enables a straightforward characterization of the meaning/category pair of the 'elided' material, and

vagueness of the conceptual underpinnings, it is unclear from their account how one would handle examples such as (10) in which subcategorization mismatch does not lead to ungrammaticality.

Note also that Ginzburg and Sag's (2000) SAL-UTT feature (invoked in their analysis of sluicing and fragment answers and also employed in other recent work such as Chaves (2014)) works essentially along the same lines in that it builds strictly morphosyntactic specifications into supposedly purely discourse-based information (under CONTEXT) to capture morpho-syntactic connectivity by fiat within an interpretive analysis.

a novel mechanism of prosodic λ-binding (originally due to Oehrle (1994)) that enables a generalization of the notion of 'movement' from the transformational literature offers a simple characterization of the relevant anaphoric process.

4.1 Hybrid Type-Logical Categorial Grammar

This section presents a quick overview of Hybrid TLCG, pitched specifically to readers familiar with standard derivational approaches (for a more complete presentation discussing the logical underpinning of the theory in detail, see Kubota and Levine (2014b) and Kubota (2010, 2015)). We start with a simple categorial grammar equivalent to phrase structure grammar, and extend it first with a mechanism that models (and in fact generalizes) the notion of movement, and then extend it further by introducing flexible constituency.

4.1.1 The AB grammar

We start with a simple fragment of CG called the AB GRAMMAR, consisting of the two most basic rules, namely, the SLASH ELIMINATION rules for forward and backward slashes:

(43) a. FORWARD SLASH ELIMINATION

$$\frac{a;\ \mathcal{F};\ A/B \qquad b;\ \mathcal{G};\ B}{a \circ b;\ \mathcal{F}(\mathcal{G});\ A}\ /\mathrm{E}$$

b. BACKWARD SLASH ELIMINATION

$$\frac{b;\ \mathcal{G};\ B \qquad a;\ \mathcal{F};\ B\backslash A}{b \circ a;\ \mathcal{F}(\mathcal{G});\ A}\ \backslash\mathrm{E}$$

We write linguistic expressions as tuples $\langle \phi, \sigma, \kappa \rangle$ of phonological form ϕ, semantic translation σ, and syntactic category κ as in the above rules and in the following sample lexicon:[12]

(44) a. john; **j**; NP

b. mary; **m**; NP

c. walks; **walk**; NP\S

d. loves; **love**; (NP\S)/NP

Syntactic categories are defined recursively in the usual manner from the set of basic categories and the two connectives / and \ (to which the vertical slash $\restriction$ will later be added). The forward and backward slashes essentially encode subcategorization (or valence) infor-

[12] We adopt the Lambek-style notation of slashes, where what appears under the slash (i.e. B in A/B and $B\backslash A$) is always the argument. CCG adopts a different notation where $B\backslash A$ for us is written as $A\backslash B$.

mation together with the relative order between the functor and the argument: A/B ($B\backslash A$) is a functor that takes a B as an argument to its right (left) to become an A.

The PROOF (or DERIVATION—we use these two terms interchangeably, since a derivation is a proof in CG) in (45) illustrates how an analysis of a sentence goes. Here, a transitive verb, of category $(\mathrm{NP}\backslash\mathrm{S})/\mathrm{NP}$, is combined with its two arguments, one on the right (object) and one on the left (subject).

(45)
$$\dfrac{\mathsf{john};\ \mathbf{j};\ \mathrm{NP} \qquad \dfrac{\mathsf{loves};\ \mathbf{love};\ (\mathrm{NP}\backslash\mathrm{S})/\mathrm{NP} \quad \mathsf{mary};\ \mathbf{m};\ \mathrm{NP}}{\mathsf{loves} \circ \mathsf{mary};\ \mathbf{love}(\mathbf{m});\ \mathrm{NP}\backslash\mathrm{S}}\ /\mathrm{E}}{\mathsf{john} \circ \mathsf{loves} \circ \mathsf{mary};\ \mathbf{love}(\mathbf{m})(\mathbf{j});\ \mathrm{S}}\ \backslash\mathrm{E}$$

The Slash Elimination rules can roughly be thought of as subcategorization cancellation rules. Note that, by applying the rules in (43), the right surface word order is obtained in (45), paired with the right meaning. The prosodic effect of these rules is string concatenation: $/$ ($\backslash$) places the argument to the right (left) of the functor in the prosodic component. The semantic effect is function application in both cases.

4.1.2 ADDING THE VERTICAL SLASH TO THE AB GRAMMAR

Although variants of CG that distinguish word order via the forward and backward slashes (like the AB fragment above) have been the mainstream in CG research, the limitations of such systems in handling phenomena that are analyzed via movement in derivational approaches have been well-known (see Muskens 2003 for a good summary). There is a relatively recent strand of research in CG that addresses this issue head on and proposes to deal with word order in a radically different way—specifically, by enriching the prosodic component (roughly corresponding to PF in the minimalist literature) with the use of functional expressions employing the λ-calculus (Oehrle 1994; de Groote 2001; Muskens 2003; Mihaliček and Pollard 2012). We incorporate the key mechanism from this new approach into our AB fragment. As we show below, this small extension enables a straightforward modelling of the notion of movement within CG.[13]

[13] Actually more; prosodic λ-binding enables an analysis of Gapping that cannot be straightforwardly simulated in derivational approaches, accounting for its many puzzling properties (Kubota and Levine 2014a).

The new mechanism we incorporate into our system is an order-insensitive mode of implication $\restriction$ called the VERTICAL SLASH. We introduce two new rules involving this slash, the VERTICAL SLASH INTRODUCTION and ELIMINATION rules, formulated as follows (as with $/$, we write the argument to the right for $\restriction$; the harpoon is there as a visual aide indicating that the right category (A in $B \restriction A$) is the argument):

(46) a. VERTICAL SLASH INTRODUCTION

$$\dfrac{\begin{array}{c}\vdots\ \ \vdots\ [\varphi;\, x;\, A]^n\ \ \vdots\ \ \vdots \\ \vdots\ \ \vdots\ \ \ \ \vdots\ \ \vdots\ \ \ \ \vdots\ \ \vdots \\ b;\, \mathcal{F};\, B\end{array}}{\lambda\varphi.b;\, \lambda x.\mathcal{F};\, B \restriction A}\ \restriction\mathrm{I}^n$$

b. VERTICAL SLASH ELIMINATION

$$\dfrac{a;\, \mathcal{F};\, A \restriction B \qquad b;\, \mathcal{G};\, B}{a(b);\, \mathcal{F}(\mathcal{G});\, A}\ \restriction\mathrm{E}$$

The workings of these rules can be best illustrated with examples. We show in (47) the derivation for the sentence *John saw everyone yesterday*.

(47)

$$\textcircled{3}\rightarrow \dfrac{\lambda\sigma.\sigma(\mathsf{everyone});\ \mathbf{V_{person}};\, \mathrm{S}\restriction(\mathrm{S}\restriction\mathrm{NP}) \qquad \textcircled{2}\rightarrow \dfrac{\textcircled{1}\rightarrow \dfrac{\mathsf{john};\ \mathbf{j};\, \mathrm{NP} \qquad \dfrac{\dfrac{\mathsf{saw};\ \mathbf{saw};\, (\mathrm{NP}\backslash\mathrm{S})/\mathrm{NP} \qquad [\varphi;\ x;\, \mathrm{NP}]^1}{\mathsf{saw}\circ\varphi;\ \mathbf{saw}(x);\, \mathrm{NP}\backslash\mathrm{S}}\ /\mathrm{E} \qquad \dfrac{\mathsf{yesterday};\ \mathbf{yest};\, (\mathrm{NP}\backslash\mathrm{S})\backslash(\mathrm{NP}\backslash\mathrm{S})}{\mathsf{saw}\circ\varphi\circ\mathsf{yesterday};\ \mathbf{yest}(\mathbf{saw}(x));\, \mathrm{NP}\backslash\mathrm{S}}\ \backslash\mathrm{E}}{\mathsf{john}\circ\mathsf{saw}\circ\varphi\circ\mathsf{yesterday};\ \mathbf{yest}(\mathbf{saw}(x))(\mathbf{j});\, \mathrm{S}}\ \backslash\mathrm{E}}{\lambda\varphi.\mathsf{john}\circ\mathsf{saw}\circ\varphi\circ\mathsf{yesterday};\ \lambda x.\mathbf{yest}(\mathbf{saw}(x))(\mathbf{j});\, \mathrm{S}\restriction\mathrm{NP}}\ \restriction\mathrm{I}^1}{\lambda\sigma.[\sigma(\mathsf{everyone})](\lambda\varphi.\mathsf{john}\circ\mathsf{saw}\circ\varphi\circ\mathsf{yesterday});\ \mathbf{V_{person}}(\lambda x.\mathbf{yest}(\mathbf{saw}(x))(\mathbf{j}));\, \mathrm{S}}\ \restriction\mathrm{E}$$

$$\lambda\varphi.[\mathsf{john}\circ\mathsf{saw}\circ\varphi\circ\mathsf{yesterday}](\mathsf{everyone});\ \mathbf{V_{person}}(\lambda x.\mathbf{yest}(\mathbf{saw}(x))(\mathbf{j}));\, \mathrm{S}$$

$$\mathsf{john}\circ\mathsf{saw}\circ\mathsf{everyone}\circ\mathsf{yesterday};\ \mathbf{V_{person}}(\lambda x.\mathbf{yest}(\mathbf{saw}(x))(\mathbf{j}));\, \mathrm{S}$$

The main new ingredient here is a type of inference called HYPOTHETICAL REASONING. In ordinary kinds of logic (such as propositional logic), hypothetical reasoning is a type of proof in which one draws the conclusion $A \rightarrow B$ on the basis of a proof of B by *hypothetically* assuming A. What is going on in (47) is essentially the same type of proof. By hypothetically assuming an object NP (with prosody φ and semantics x; hypotheses are indicated by brackets) to the right of the verb, we first conclude the existence of a complete sentence (①). From this proof, we can conclude that what we really know is that the string *John saw __ yesterday* is a sentence *if* there is an NP in the gap position __, since the existence of the object NP was after all just a hypothesis (entertained only for the sake of making the inference go through). This step (②) is licensed by the Vertical

Slash Introduction rule (93a). We say that the Vertical Slash Introduction rule *withdraws* the hypothesis since the ultimate conclusion drawn no longer depends on the initial assumption that there is an NP in the object position. A hypothesis and the corresponding application of the Introduction rule are coindexed so that we can keep track of which hypothesis is withdrawn at which step in the proof (it is important not to confuse these indices with syntactic indices in derivational frameworks; unlike syntactic trees in the latter, proofs in CG are not linguistic representations). The vertical dots around the hypothesis in the rule in (93a) abbreviate an arbitrarily complex proof structure. Thus, (93a) simply says that a hypothesis posited at some previous step can be withdrawn by $\uparrow$I at any step in the derivation (this means that the combinatoric component of the grammar does not predict the so-called island effects; see footnote 14 for some discussion on this issue). The variable φ corresponding to the missing NP is bound by the λ-operator in the prosodic representation, and there is corresponding λ-binding in the semantic component. The syntactic category $\mathrm{S}\uparrow\mathrm{NP}$ indicates that the whole derived expression is a sentence missing an NP, but unlike $/$ and $\backslash$, $\uparrow$ does not indicate the position of the missing expression in the syntactic category.

The expression derived at step ②, whose phonology is a function from strings into strings (of type **st** $\rightarrow$ **st**; with **st** the type of strings), is then given as an argument to the quantifier, which itself has a functional phonology of a higher-order type (**st**$\rightarrow$**st**)$\rightarrow$**st**. This step (③) is licensed by the VERTICAL SLASH ELIMINATION rule (93b), which simply does function application in both the semantic and prosodic components. This has the effect of embedding the quantifier (which semantically scopes over the whole sentence) in the gap position in the prosodic representation. The dotted lines show β-reduction steps for the prosodic term obtained (we often omit these in the derivations below, directly writing the β-reduced terms), and should not be confused with the application of logical rules (i.e. Slash Elimination and Introduction) designated by solid lines; unlike the latter, purely from a formal perspective, these β-reduction steps are redundant. Semantically, the quantifier denotes a standard GQ meaning of type $(e \rightarrow t) \rightarrow t$. $\mathbf{\exists}_{\mathbf{person}}$ abbreviates the term $\lambda P.\exists x[\mathbf{person}(x) \wedge P(x)]$ (similarly for the universal quantifier $\mathbf{\forall}_{\mathbf{person}}$).

Scope ambiguity is then straightforward, and is essentially parallel to quantifying-in and QR. (48) shows the derivation for the reading $\forall > \exists$ for *Someone talked to everyone yesterday*:

(48)

$$\dfrac{\lambda\sigma.\sigma(\textsf{everyone});\ \mathbf{\forall_{person}};\ \mathrm{S}\uparrow(\mathrm{S}\uparrow\mathrm{NP}) \qquad \dfrac{\lambda\sigma.\sigma(\textsf{someone});\ \mathbf{\exists_{person}};\ \mathrm{S}\uparrow(\mathrm{S}\uparrow\mathrm{NP}) \qquad \dfrac{\dfrac{\dfrac{\begin{bmatrix}\varphi_2;\\ x_2;\\ \mathrm{NP}\end{bmatrix}^2 \quad \begin{array}{l}\textsf{talked} \circ \textsf{to};\\ \textbf{talked-to};\ (\mathrm{NP}\backslash\mathrm{S})/\mathrm{NP}\end{array} \quad \begin{bmatrix}\varphi_1;\\ x_1;\ \mathrm{NP}\end{bmatrix}^1}{\textsf{talked} \circ \textsf{to} \circ \varphi_1;\ \textbf{talked-to}(x_1);\ \mathrm{NP}\backslash\mathrm{S}}\,/\mathrm{E} \quad \textsf{yesterday};\ \textbf{yest};\ \mathrm{S}\backslash\mathrm{S}}{\varphi_2 \circ \textsf{talked} \circ \textsf{to} \circ \varphi_1;\ \textbf{talked-to}(x_1)(x_2);\ \mathrm{S}}\,\backslash\mathrm{E}}{\varphi_2 \circ \textsf{talked} \circ \textsf{to} \circ \varphi_1 \circ \textsf{yesterday};\ \textbf{yest}(\textbf{talked-to}(x_1)(x_2));\ \mathrm{S}}\,\backslash\mathrm{E}}{\lambda\varphi_2.\varphi_2 \circ \textsf{talked} \circ \textsf{to} \circ \varphi_1 \circ \textsf{yesterday};\ \lambda x_2.\textbf{yest}(\textbf{talked-to}(x_1)(x_2));\ \mathrm{S}\uparrow\mathrm{NP}}\uparrow\mathrm{I}^2}{\textsf{someone} \circ \textsf{talked} \circ \textsf{to} \circ \varphi_1 \circ \textsf{yesterday};\ \mathbf{\exists_{person}}(\lambda x_2.\textbf{yest}(\textbf{talked-to}(x_1)(x_2)));\ \mathrm{S}}\uparrow\mathrm{E}}{\lambda\varphi_1.\textsf{someone} \circ \textsf{talked} \circ \textsf{to} \circ \varphi_1 \circ \textsf{yesterday};\ \lambda x_1.\mathbf{\exists_{person}}(\lambda x_2.\textbf{yest}(\textbf{talked-to}(x_1)(x_2)));\ \mathrm{S}\uparrow\mathrm{NP}}\uparrow\mathrm{I}^1}{\textsf{someone} \circ \textsf{talked} \circ \textsf{to} \circ \textsf{everyone} \circ \textsf{yesterday};\ \mathbf{\forall_{person}}(\lambda x_1.\mathbf{\exists_{person}}(\lambda x_2.\textbf{yest}(\textbf{talked-to}(x_1)(x_2))));\ \mathrm{S}}\uparrow\mathrm{E}$$

The scopal relation between multiple quantifiers depends on the order of application of the hypothetical reasoning involving $\uparrow$ to introduce quantifiers. We get the inverse scope reading in this derivation since the subject quantifier is combined with the sentence first.

This logical reconceptualization of covert movement originally due to Oehrle (1994)—which can be extended straightforwardly to overt movement (see Muskens (2003) and Kubota and Levine (2014b))—captures the tight correlation between the semantic and prosodic effects of quantification transparently. Note in particular the way in which the scope-taking property of quantifiers is directly mediated by the logical properties of the quantifiers reflected in their syntactic categories, rather than by purpose-specific structure-changing operations as in quantifying-in and QR. This analysis of 'covert movement' has a number of empirical advantages as well. In particular, as demonstrated in the recent literature, this approach enables simple and formally explicit modelling of more complex types of scope-taking phenomena such as 'parasitic scope' (Barker 2007; Pollard and Smith 2012) and 'split scope' (Kubota and Levine 2014a; Pollard 2014).

4.1.3 HYPOTHETICAL REASONING FOR ALL SLASHES: HYBRID TYPE-LOGICAL CATEGORIAL GRAMMAR

At this point, we extend our fragment once more, this time by adding the Introduction rules for the forward and backward slashes. This gives us the full Hybrid TLCG, complete with both the Introduction and Elimination rules for all three slashes $/$, $\backslash$ and $\uparrow$. The main motivation for extending the system with the Introduction rules for the directional (i.e. forward and backward) slashes comes from the analysis of coordination, in particular, cases of NONCONSTITUENT COORDINATION, as we illustrate below.

The Slash Introduction rules for $/$ and $\backslash$ are formulated as follows:

(49) a. FORWARD SLASH INTRODUCTION

$$\dfrac{\begin{array}{ccccccc}\vdots & \vdots & \underline{[\varphi;\, x;\, A]^n} & \vdots & \vdots \\ \vdots & \vdots & \vdots & \vdots & \vdots \end{array}}{\dfrac{b \circ \varphi;\, \mathcal{F};\, B}{b;\, \lambda x.\mathcal{F};\, B/A}\,/\mathrm{I}^n}$$

b. BACKWARD SLASH INTRODUCTION

$$\dfrac{\begin{array}{ccccccc}\vdots & \vdots & \underline{[\varphi;\, x;\, A]^n} & \vdots & \vdots \\ \vdots & \vdots & \vdots & \vdots & \vdots \end{array}}{\dfrac{\varphi \circ b;\, \mathcal{F};\, B}{b;\, \lambda x.\mathcal{F};\, A\backslash B}\,\backslash\mathrm{I}^n}$$

The difference between the Introduction rule for the vertical slash and the Introduction rules for the directional slashes is that, in the /I and \I rules, the prosodic variable φ for the hypothesis (which is bound by the λ-operator in the $\uparrow$ rule) is simply thrown away in the output on the condition of its presence at the (either right or left) periphery of the phonology of the input. The position of the missing expression is instead recorded in the forward vs. backward slash distinction in the syntactic category.

With the Introduction rules for $/$ and $\backslash$, it becomes possible to reanalyze any substring of a sentence as a (derived) constituent. (51) shows how the string *John loves* in the Right-Node Raising (RNR) example in (50) is assigned the syntactic category S/NP.

(50) John loves, and Bill hates, Mary.

(51)

$$\textcircled{1}\rightarrow\dfrac{\mathsf{john};\, \mathbf{j};\, \mathrm{NP} \qquad \dfrac{[\varphi;\, x;\, \mathrm{NP}]^1 \quad \mathsf{loves};\, \mathbf{love};\, (\mathrm{NP}\backslash\mathrm{S})/\mathrm{NP}}{\mathsf{loves} \circ \varphi;\, \mathbf{love}(x);\, \mathrm{NP}\backslash\mathrm{S}}\,\backslash\mathrm{E}}{\textcircled{2}\rightarrow\dfrac{\mathsf{john} \circ \mathsf{loves} \circ \varphi;\, \mathbf{love}(x)(\mathbf{j});\, \mathrm{S}}{\mathsf{john} \circ \mathsf{loves};\, \lambda x.\mathbf{love}(x)(\mathbf{j});\, \mathrm{S}/\mathrm{NP}}\,/\mathrm{I}^1}\,/\mathrm{E}$$

Here, we see another instance of hypothetical reasoning, but one involving the forward

slash $/$ rather than the vertical slash $\restriction$. By hypothesizing a direct object NP, we first prove an S (①). Since the phonology of this hypothesis appears at the right periphery of this derived S, we can conclude that the whole expression is S/NP, that is, something that becomes a complete sentence *if* there is an NP to its right. The semantic effect of Slash Introduction is the same as with the vertical slash: the variable x corresponding to the hypothesis is bound by the λ-operator. Note that, in the notation of rules and derivations we adopt, the phonological term labelling, rather than the left-to-right order of the premises in the proof tree, is relevant for the applicability conditions of the $/\mathrm{I}$ and $\backslash\mathrm{I}$ rules (see also Morrill (1994), which was the first to recast the Lambek calculus in this format). This point should be clear from the proof in (51), where we have deliberately placed the hypothetical object NP to the *left* of the verb in the proof tree to underscore this point.

In the CG analysis of RNR (see, e.g., Morrill (1994); the original analytic insight goes back to Steedman (1985)), non-standard constituents like the one derived in (51) are directly coordinated as constituents and then combined with the RNR'ed expression ($\sqcap$ designates GENERALIZED CONJUNCTION (Partee and Rooth 1983), recursively defined as $P \sqcap Q \equiv \lambda x.P(x) \sqcap Q(x)$, with the base case $P_t \sqcap Q_t \equiv P \wedge Q$):

(52)

$$\dfrac{\dfrac{\dfrac{\vdots\ \ \vdots}{\mathsf{john} \circ \mathsf{loves};\ \lambda x.\mathbf{love}(x)(\mathbf{j}); \mathrm{S}/\mathrm{NP}} \quad \dfrac{\begin{array}{l}\mathsf{and};\\ \lambda\mathcal{W}\lambda\mathcal{V}.\mathcal{V} \sqcap \mathcal{W};\\ (X\backslash X)/X\end{array} \quad \dfrac{\vdots\ \ \vdots}{\begin{array}{l}\mathsf{bill} \circ \mathsf{hates};\\ \lambda x.\mathbf{hate}(x)(\mathbf{b}); \mathrm{S}/\mathrm{NP}\end{array}}\,/\mathrm{E}}{\begin{array}{l}\mathsf{and} \circ \mathsf{bill} \circ \mathsf{hates};\\ \lambda\mathcal{V}.\mathcal{V} \sqcap \lambda x.\mathbf{hate}(x)(\mathbf{b}); (\mathrm{S}/\mathrm{NP})\backslash(\mathrm{S}/\mathrm{NP})\end{array}}\,\backslash\mathrm{E}}{\mathsf{john} \circ \mathsf{loves} \circ \mathsf{and} \circ \mathsf{bill} \circ \mathsf{hates};\ \lambda x.\mathbf{love}(x)(\mathbf{j}) \sqcap \lambda x.\mathbf{hate}(x)(\mathbf{b}); \mathrm{S}/\mathrm{NP}} \quad \begin{array}{l}\mathsf{mary};\\ \mathbf{m}; \mathrm{NP}\end{array}}{\mathsf{john} \circ \mathsf{loves} \circ \mathsf{and} \circ \mathsf{bill} \circ \mathsf{hates} \circ \mathsf{mary};\ \mathbf{love}(\mathbf{m})(\mathbf{j}) \wedge \mathbf{hate}(\mathbf{m})(\mathbf{b}); \mathrm{S}}\,/\mathrm{E}$$

Note that this analysis assigns the right meaning to the whole sentence compositionally.

This analysis of nonconstituent coordination extends immediately to argument cluster coordination exemplified by data such as (53). See Morrill (1994) and Kubota and Levine (2014b, 2015) for details (also Dowty (1988) for the original proposal in CCG).

(53) John gave a book to Bill and a record to Chris.

This completes our exposition of Hybrid TLCG. To summarize the discussion up to

the point, hypothetical reasoning for the vertical slash roughly corresponds to the notion of movement,[14] whereas there is no direct analog within derivational approaches to hypothetical reasoning for the forward and backward slashes in the present framework. The latter is what introduces the flexible notion of constituency common to many variants of CG. The central characteristic of Hybrid TLCG is that these two types of inference smoothly interact with one another. Kubota (2015) and Kubota and Levine (2014a,c, 2015) show how this architecture of grammar enables simple analyses of a number of recalcitrant problems at the syntax-semantics interface such as Gapping and interactions between scopal operators (including quantifiers and symmetrical predicates) and nonconstituent coordination. In what follows, we show that this 'hybrid' architecture of the present framework also plays a crucial role in capturing the properties of pseudogapping: the flexible notion of constituency is essential in characterizing the 'nonstandard' syntactic constituents that serve as the antecedents of pseudogapping, and the order-insensitive mode of inference involving the vertical slash enables a simple formulation of the relevant anaphoric mechanism.

[14]There is, however, one important difference. Unlike traces in derivational approaches, hypotheses in hypothetical reasoning in our approach are not representational objects. Thus, the present setup precludes a possibility of encoding the so-called 'island effects'—either syntactic islands or scope islands—as combinatoric constraints in the grammar. We believe that this is as it should be, but do recognize that this is a controversial point. So far as syntactic islands are concerned, there is now considerable evidence in the literature that these constraints receive independent accounts via processing-oriented principles (Deane 1991; Kluender 1992, 1998; Kehler 2002; Hofmeister and Sag 2010). Whether semantic scope islands can be accounted for in terms of similar processing constraints is currently an open question. However, despite what appears to be the 'accepted wisdom' in the literature (cf., e.g., Ruys and Winter (2010)), syntactic and semantic islands display a large degree of divergence (see, e.g., Kubota and Levine (2015) for some discussion on this point), suggesting that the common assumption that they both should be accounted for in terms of the same type of combinatoric constraints is not as attractive as it may initially appear. We thus tentatively assume that the different patterns of island effects found in syntactic and semantic islands derive from the fact that syntactic and semantic processing pertain to different components of grammar and deal with somewhat different types of abstract representations of linguistic knowledge.

4.2 VP ellipsis

Since we take pseudogapping to be a special case of VP ellipsis, we start with an analysis of VP ellipsis. In CG, auxiliary verbs are standardly analyzed as having the syntactic category VP/VP (where VP is an abbreviation for $\mathrm{NP}\backslash\mathrm{S}$), as in the following lexical entry for *can*:

(54) $\mathsf{can}; \lambda Q\lambda x.\Diamond Q(x); \mathrm{VP}/\mathrm{VP}$

We take VP ellipsis to be licensed by an alternative sign for the auxiliary verb that does not subcategorize for a VP but instead anaphorically retrieves the relevant VP meaning in reference to the preceding discourse. For this purpose, we posit an empty operator that applies to the lexical sign of auxiliaries and saturates the VP argument slot of the latter. This 'VP ellipsis' operator is defined as in (55).

(55) **VP ellipsis operator, version 1**

$\lambda\varphi.\varphi; \lambda\mathscr{F}.\mathscr{F}(P); \mathrm{VP}\uparrow(\mathrm{VP}/\mathrm{VP})$

——where P is a free variable whose value is identified with the meaning of some linguistic sign in the preceding discourse with category VP

By applying (55) to (54), we obtain a derived auxiliary entry of category VP as in (56).

(56)
$$\dfrac{\begin{array}{ll}\lambda\varphi.\varphi; & \mathsf{can};\\ \lambda\mathscr{F}.\mathscr{F}(P); \mathrm{VP}\uparrow(\mathrm{VP}/\mathrm{VP}) & \lambda Q\lambda x.\Diamond Q(x); \mathrm{VP}/\mathrm{VP}\end{array}}{\mathsf{can}; \lambda x.\Diamond P(x); \mathrm{VP}}\uparrow\mathrm{E}$$

Then, a simple VP ellipsis example (57) can be derived as (58) (here and below, the syntactic category of the expression that serves as an antecedent of VP ellipsis is shadowed).

(57) John can sing. Bill can't.

(58)
$$\dfrac{\mathsf{john}; \mathbf{j}; \mathrm{NP} \qquad \dfrac{\mathsf{can}; \lambda P\lambda x.\Diamond P(x); \mathrm{VP}/\mathrm{VP} \qquad \mathsf{sing}; \mathbf{sing}; \mathrm{VP}}{\mathsf{can} \circ \mathsf{sing}; \lambda x.\Diamond\mathbf{sing}(x); \mathrm{VP}}/\mathrm{E}}{\mathsf{john} \circ \mathsf{can} \circ \mathsf{sing}; \Diamond\mathbf{sing}(\mathbf{j}); \mathrm{S}}\backslash\mathrm{E}$$

$$\dfrac{\mathsf{bill}; \mathbf{b}; \mathrm{NP} \qquad \dfrac{\begin{array}{ll}\lambda\varphi.\varphi; & \mathsf{can't};\\ \lambda\mathscr{F}.\mathscr{F}(\mathbf{sing}); & \lambda P\lambda x.\neg\Diamond P(x);\\ \mathrm{VP}\uparrow(\mathrm{VP}/\mathrm{VP}) & \mathrm{VP}/\mathrm{VP}\end{array}}{\mathsf{can't}; \lambda x.\neg\Diamond\mathbf{sing}(x); \mathrm{VP}}\uparrow\mathrm{E}}{\mathsf{bill} \circ \mathsf{can't}; \neg\Diamond\mathbf{sing}(\mathbf{b}); \mathrm{S}}\backslash\mathrm{E}$$

Importantly, since the operator directly applies to the auxiliary to modify its subcategorization property, and there is no phonologically empty verb involved, there is no phantom

VP constituent in the derivation of a VP ellipsis sentence. This plays an important role in ruling out the 'non-ATB pseudogapping' example in (**??**), as we discuss below.

At this point, some comments are in order as to our choice of an analysis involving an empty syntactic operator. There are at least three alternatives to this approach: (i) a binding-based analysis in which a hypothetical VP is bound by an antecedent VP via a syntactic mechanism of variable binding (Morrill et al. 2011; Barker 2013); (ii) an analysis that posits an empty VP (this would correspond most closely to a deletion-based analysis in derivational approaches); and (iii) one that posits an alternative auxiliary entry (identical to the output of our syntactic empty operator) in the lexicon (Jäger 2005).

We find these three alternatives less than optimal. The binding approach does not extend to intersentential anaphora easily; especially problematic are cases where VP ellipsis takes place across speakers. The present approach is superior to an empty VP approach in that it can capture the generalization straightforwardly that auxiliaries (including the 'infinitive marker' *to*) are the triggers of VP ellipsis (see also below for a potential worry for an empty VP approach in connection with the 'non-ATB' pseudogapping example (35)).[15] We believe that our approach is superior to a lexical approach along the lines of the third alternative in straightforwardly generalizing to the pseudogapping case (see below). It is not clear whether a purely lexical approach like Jäger's (2005) can offer a general characterization of the set of alternative entries for the auxiliary necessary to license pseudogapping.

Interactions between VP ellipsis and other phenomena such as the strict/sloppy ambiguity of pronouns and quantifier scope can be handled in essentially the same way as in

[15]Note in this connection that the definition of the operator in (55) actually involves a simplification in this respect, since, as it stands, it can combine with any VP/VP. We take it that there is an additional constraint on this empty operator that it can only combine with expressions that have the phonologies of auxiliaries (such as *do*, *should* and *will*). This constraint can be stated easily as a restriction on the phonology of the linguistic expression that this operator takes as an argument. An alternative formulation for the empty operator in (55) is possible by replacing the functional prosody of type $\mathbf{st} \rightarrow \mathbf{st}$ by an empty string and with syntactic category $\mathrm{VP}/(\mathrm{VP}/\mathrm{VP})$ without the use of the vertical slash. However, in this alternative, it is not clear how the restriction on the phonology of the argument of this empty operator can be encoded.

previous analyses of VP ellipsis in TLCG (Morrill and Merenciano 1996; Jäger 2005). (60) shows the sloppy reading of (59a) and (61) shows the *every* > *before* reading of (59b).

(59) a. John thinks he is a genius. Bill does, too.

b. John read every book before Bill did.

(60)

$$\dfrac{\dfrac{\mathsf{john};\ \mathbf{j};\ \mathrm{NP} \qquad \dfrac{\lambda\sigma.\sigma(\mathsf{he});\ \lambda R\lambda x.R(x)(x);\ \mathrm{VP}\uparrow(\mathrm{VP}\uparrow\mathrm{NP}) \qquad \dfrac{\dfrac{\mathsf{thinks};\ \mathbf{think};\ \mathrm{VP/S} \qquad \dfrac{[\varphi_1; x; \mathrm{NP}]^1 \quad \mathsf{is}\circ\mathsf{a}\circ\mathsf{genius};\ \mathbf{is\text{-}a\text{-}gens};\ \mathrm{VP}}{\varphi_1\circ\mathsf{is}\circ\mathsf{a}\circ\mathsf{genius};\ \mathbf{is\text{-}a\text{-}gens}(x);\ \mathrm{S}}\backslash\mathrm{E}}{\mathsf{thinks}\circ\varphi_1\circ\mathsf{is}\circ\mathsf{a}\circ\mathsf{genius};\ \mathbf{think}(\mathbf{is\text{-}a\text{-}gens}(x));\ \mathrm{VP}}/\mathrm{E}}{\lambda\varphi_1.\mathsf{thinks}\circ\varphi_1\circ\mathsf{is}\circ\mathsf{a}\circ\mathsf{genius};\ \lambda x.\mathbf{think}(\mathbf{is\text{-}a\text{-}gens}(x));\ \mathrm{VP}\uparrow\mathrm{NP}}\uparrow\mathrm{I}^1}{\mathsf{thinks}\circ\mathsf{he}\circ\mathsf{is}\circ\mathsf{a}\circ\mathsf{genius};\ \lambda x.\mathbf{think}(\mathbf{is\text{-}a\text{-}gens}(x))(x);\ \mathrm{VP}}\uparrow\mathrm{E}}{\mathsf{john}\circ\mathsf{thinks}\circ\mathsf{he}\circ\mathsf{is}\circ\mathsf{a}\circ\mathsf{genius};\ \mathbf{think}(\mathbf{is\text{-}a\text{-}gens}(\mathbf{j}))(\mathbf{j});\ \mathrm{S}}\backslash\mathrm{E}$$

$$\dfrac{\mathsf{bill};\ \mathbf{b};\ \mathrm{NP} \qquad \dfrac{\lambda\varphi.\varphi;\ \lambda\mathscr{F}.\mathscr{F}(\lambda x.\mathbf{think}(\mathbf{is\text{-}a\text{-}gens}(x))(x));\ \mathrm{VP}\uparrow(\mathrm{VP/VP}) \qquad \mathsf{does};\ \lambda P.P;\ \mathrm{VP/VP}}{\mathsf{does};\ \lambda x.\mathbf{think}(\mathbf{is\text{-}a\text{-}gens}(x))(x);\ \mathrm{VP}}\uparrow\mathrm{E}}{\mathsf{bill}\circ\mathsf{does};\ \mathbf{think}(\mathbf{is\text{-}a\text{-}gens}(\mathbf{b}))(\mathbf{b});\ \mathrm{S}}\backslash\mathrm{E}$$

We assume the so-called 'binding at VP' analysis of pronouns in (60) (cf. Bach and Partee 1980, 1984). In this analysis, after the binding of the pronoun to the subject NP, the right meaning (self-ascription of the property of being a genius) is assigned to the VP, which the VP ellipsis operator can then take as the antecedent.

(61)

$$\dfrac{\dfrac{\lambda\sigma.\sigma(\mathsf{every}\circ\mathsf{book});\ \mathbf{V_{book}};\ \mathrm{S}\uparrow(\mathrm{S}\uparrow\mathrm{NP}) \qquad \dfrac{\dfrac{\mathsf{john};\ \mathbf{j};\ \mathrm{NP} \qquad \dfrac{\mathsf{read};\ \mathbf{read};\ \mathrm{VP/NP} \quad \begin{bmatrix}\varphi_1;\\ x;\\ \mathrm{NP}\end{bmatrix}^1}{\mathsf{read}\circ\varphi;\ \mathbf{read}(x);\ \mathrm{VP}}/\mathrm{E}}{\mathsf{john}\circ\mathsf{read}\circ\varphi_1;\ \mathbf{read}(x)(\mathbf{j});\ \mathrm{S}}\backslash\mathrm{E} \qquad \dfrac{\mathsf{before};\ \lambda P\lambda Q.\ \mathbf{bef}(Q)(P);\ (\mathrm{S}\backslash\mathrm{S})/\mathrm{S} \qquad \dfrac{\mathsf{bill};\ \mathbf{b};\ \mathrm{NP} \qquad \dfrac{\lambda\varphi.\varphi;\ \lambda\mathscr{F}.\mathscr{F}(\mathbf{read}(x));\ \mathrm{VP}\uparrow(\mathrm{VP/VP}) \qquad \mathsf{did};\ \lambda P\lambda y.P(y);\ \mathrm{VP/VP}}{\mathsf{did};\ \lambda y.\mathbf{read}(x)(y);\ \mathrm{VP}}\uparrow\mathrm{E}}{\mathsf{bill}\circ\mathsf{did};\ \mathbf{read}(x)(\mathbf{b});\ \mathrm{S}}\backslash\mathrm{E}}{\mathsf{before}\circ\mathsf{bill}\circ\mathsf{did};\ \lambda Q.\mathbf{bef}(Q)(\mathbf{read}(x)(\mathbf{b}));\ \mathrm{S}\backslash\mathrm{S}}/\mathrm{E}}{\mathsf{john}\circ\mathsf{read}\circ\varphi_1\circ\mathsf{before}\circ\mathsf{bill}\circ\mathsf{did};\ \mathbf{bef}(\mathbf{read}(x)(\mathbf{j}))(\mathbf{read}(x)(\mathbf{b}));\ \mathrm{S}}\backslash\mathrm{E}}{\lambda\varphi_1.\mathsf{john}\circ\mathsf{read}\circ\varphi_1\circ\mathsf{before}\circ\mathsf{bill}\circ\mathsf{did};\ \lambda x.\mathbf{bef}(\mathbf{read}(x)(\mathbf{j}))(\mathbf{read}(x)(\mathbf{b}));\ \mathrm{S}\uparrow\mathrm{NP}}\uparrow\mathrm{I}^1}{\mathsf{john}\circ\mathsf{read}\circ\mathsf{every}\circ\mathsf{book}\circ\mathsf{before}\circ\mathsf{bill}\circ\mathsf{did};\ \mathbf{V_{book}}(\lambda x.\mathbf{bef}(\mathbf{read}(x)(\mathbf{j}))(\mathbf{read}(x)(\mathbf{b})));\ \mathrm{S}}\uparrow\mathrm{E}$$

In the quantifier-scope interaction case in (61), the VP ellipsis operator takes the VP in the antecedent clause containing a free variable x (to be later bound by the universal quantifier) as the antecedent. The quantifier scopes over the whole sentence after this anaphora

resolution takes place, and semantically binds the variable x in both the antecedent clause and the target clause of VP ellipsis.

4.3 Pseudogapping

We analyze pseudogapping in (62) via transitive verb ($\mathrm{TV} = (\mathrm{NP}\backslash\mathrm{S})/\mathrm{NP}$) ellipsis.[16]

(62) John should eat the banana. Bill should ~~eat~~ the apple.

In the present setup, this involves making only a very minimum extra assumption. In fact, the only thing we need to do is to make the VP ellipsis operator in (55) polymorphic. Polymorphism is a standard technique for generalizing the lexical definitions of semantic operators independently needed in the grammar, in the analysis of coordination and certain adverbial operators (cf. the 'cross-categorial' analysis of focus particles by Rooth (1985)).

There is moreover independent evidence that English allows for TV ellipsis. Jacobson (1992, 2008) argues that antecedent-contained deletion (ACD) is to be analyzed in terms of TV ellipsis rather than VP ellipsis. The idea is that in (63), what is missing after *had* is just the transitive verb *showed* instead of a full VP.[17]

[16] Jacobson (2014) independently arrives at the same conclusion, though her discussion of pseudogapping is very brief.

[17] Pseudogapping and ACD are sometimes thought to display different distributions. For example, Jacobson (1998) reports the following contrast (her (17)):

(i) a. John thought that Mary read everything that Bill (also) did (= think that Mary read).

b. *John thought that Mary read *Crime and Punishment* and Bill did *The Brothers Karamazov* (= think that Mary read).

But note that the configuration in (ib) improves considerably in an example like the following:

(ii) John would claim Bill is a SPY more confidently than I would a SABOTEUR.

We think that the unacceptability of (ib) is not due to a combinatoric constraint but rather derives from the requirement that the elided material corresponds to some 'coherent semantic unit' so as to support the Contrast relation between the two clauses. ACD is not so constrained presumably become the object is shared in the two clauses and hence the construction is not associated with the Contrast discourse relation.

Similarly, Lasnik (1999) reports contrasts like the following:

(63) John showed Bill every place that Harry already had.

We refer the reader to Jacobson's work for a detailed empirical justification and technical execution of this analysis of ACD (see also Jäger (2005) for a TLCG implementation of Jacobson's analysis), but one big advantage should be immediately obvious: in this analysis, the notorious problem of 'infinite regress' simply does not arise, since a VP containing a trace is not reconstructed in the ellipsis site to begin with.

Since pseudogapping is not restricted to transitive verbs but can involve ditransitive verbs, etc., we make the VP ellipsis operator polymorphic, employing Steedman's (2000b) \$-notation for polymorphic lexical entries.

(64) **VP ellipsis/pseudogapping operator, version 2**

$\lambda\varphi.\varphi;\ \lambda\mathscr{F}.\mathscr{F}(P);\ (\mathrm{VP}/\$)\uparrow((\mathrm{VP}/\$)/(\mathrm{VP}/\$))$

——where P is a free variable whose value is identified with the meaning of some linguistic sign in the preceding discourse with category $\mathrm{VP}/\$$

$\mathrm{VP}/\$$ is a metavariable notation for a set of categories where any number of arguments (of any category) are sought via / (VP, VP/NP, $\mathrm{VP}/\mathrm{NP}/\mathrm{PP}$, etc.). The three occurrences of $\mathrm{VP}/\$$ Are to be instantiated in the same way. The key idea behind this extension is that the ellipsis operator is generalized to apply to any syntactic category that the auxiliary itself can be derived in (as will become clear momentarily). Thus, thought the schema in (64) itself needs to be stipulated, it embodies a natural extension of the simpler version in (55).

The TV/TV (= $(\mathrm{VP}/\mathrm{VP})/(\mathrm{VP}/\mathrm{VP})$) entry of the auxiliary that this operator applies to in the analysis of (62) can be derivable from the lexically assigned VP/VP entry, and does not need to be posited separately. This is an instance of the Geach rule, which is a theorem in the Lambek calculus and TLCG (as long as the calculus is associative):

(iii) a. John stood near everyone Bill did.

b. *John stood near Bill and Mary should Susan.

arguing that pseudogapping is limited to direct objects but ACD is not. But here again, the alleged restriction of pseudogapping to direct objects is dubious at best. Miller (2014) reports several attested examples in which objects of prepositions undergo pseudogapping, such as (19) from Sect. 2.

(65)
$$\dfrac{\dfrac{\dfrac{\dfrac{\dfrac{\dfrac{}{\mathsf{should};\ \lambda P\lambda y.\Box P(y);\ \mathrm{VP/VP}}\qquad\dfrac{\dfrac{[\varphi_2;\ f;\ \mathrm{TV}]^2\quad[\varphi_3;\ x;\ \mathrm{NP}]^3}{\varphi_2\circ\varphi_3;\ \Box f(x);\ \mathrm{VP}}\ /\mathrm{E}}{\mathsf{should}\circ\varphi_2\circ\varphi_3;\ \lambda y.\Box f(x)(y);\ \mathrm{VP}}\ /\mathrm{E}}{\mathsf{should}\circ\varphi_2;\ \lambda x\lambda y.\Box f(x)(y);\ \mathrm{TV}}\ /\mathrm{I}^3}{\mathsf{should};\ \lambda f\lambda x\lambda y.\Box f(x)(y);\ \mathrm{TV/TV}}\ /\mathrm{I}^2$$

The analysis of a basic pseudogapping example like (62) is then straightforward:

(66)
$$\dfrac{\dfrac{\mathsf{john};\ \mathbf{j};\ \mathrm{NP}\qquad\dfrac{\mathsf{should};\ \lambda P\lambda x.\Box P(x);\ \mathrm{VP/VP}\qquad\dfrac{\mathsf{eat};\ \mathbf{eat};\ \mathrm{TV}\qquad\mathsf{the}\circ\mathsf{banana};\ \mathbf{the\text{-}b};\ \mathrm{NP}}{\mathsf{eat}\circ\mathsf{the}\circ\mathsf{banana};\ \mathbf{eat}(\mathbf{the\text{-}b});\ \mathrm{VP}}\ /\mathrm{E}}{\mathsf{should}\circ\mathsf{eat}\circ\mathsf{the}\circ\mathsf{banana};\ \lambda x.\Box\mathbf{eat}(\mathbf{the\text{-}b})(x);\ \mathrm{VP}}\ /\mathrm{E}}{\mathsf{john}\circ\mathsf{should}\circ\mathsf{eat}\circ\mathsf{the}\circ\mathsf{banana};\ \Box\mathbf{eat}(\mathbf{the\text{-}b})(\mathbf{j});\ \mathrm{S}}\ \backslash\mathrm{E}$$

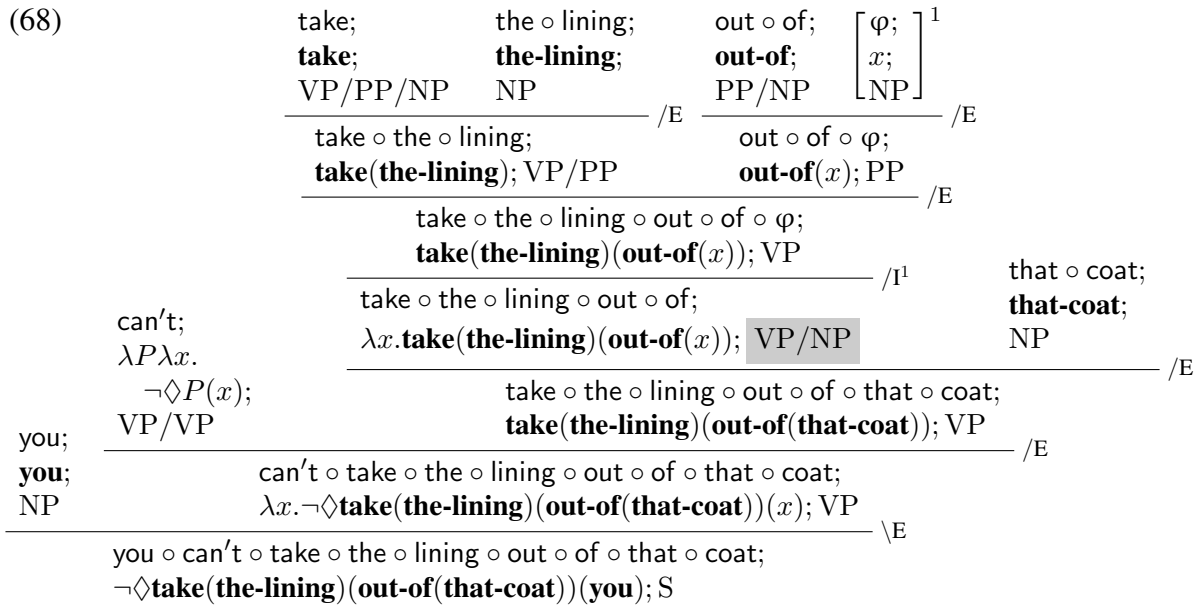
$$\dfrac{\dfrac{\mathsf{bill};\ \mathbf{b};\ \mathrm{NP}\qquad\dfrac{\lambda\varphi.\varphi;\ \lambda\mathscr{F}.\mathscr{F}(\mathbf{eat});\ \mathrm{TV}\restriction(\mathrm{TV/TV})\qquad\dfrac{\vdots\quad\vdots}{\mathsf{should};\ \lambda f\lambda x\lambda y.\Box f(x)(y);\ \mathrm{TV/TV}}}{\mathsf{should};\ \lambda x\lambda y.\Box\mathbf{eat}(x)(y);\ \mathrm{TV}}\ /\mathrm{E}\qquad\dfrac{\mathsf{the}\circ\mathsf{apple};\ \mathbf{the\text{-}a};\ \mathrm{NP}}{\mathsf{should}\circ\mathsf{the}\circ\mathsf{apple};\ \lambda y.\Box\mathbf{eat}(\mathbf{the\text{-}a})(y);\ \mathrm{VP}}\ /\mathrm{E}}{\mathsf{bill}\circ\mathsf{should}\circ\mathsf{the}\circ\mathsf{apple};\ \Box\mathbf{eat}(\mathbf{the\text{-}a})(\mathbf{b});\ \mathrm{S}}\ \backslash\mathrm{E}$$

Here, the auxiliary is in the derived $\mathrm{TV/TV}$ category. The VP ellipsis/pseudogapping operator in (64) takes this auxiliary category as an argument and saturates its TV argument by anaphorically referring to the transitive verb *eat* in the antecedent clause.

As discussed in Sect. 2.1, the 'deleted' material in pseudogapping does not necessarily correspond to a syntactic constituent in the traditional sense. The present approach straightforwardly handles such cases of 'nonconstituent' pseudogapping (like those in (5)), by treating the 'nonconstituent' strings in the preceding clause as syntactic constituents that can serve as antecedents in pseudogapping. We illustrate in (68) the derivation for (the antecedent clause of) (67) (= (5a)).

(67) You can't **take the lining out of** that coat. You can ∅ this one.

(68)



Via hypothetical reasoning involving directional slashes, the string *take the lining out of* is derived as a syntactic constituent of category VP/NP. This can then be identified as the antecedent of the relevant anaphoric process in the target clause. Examples like those in (5) are especially important in that they show the significance of the flexible notion of constituency available in CG in an empirical domain other than coordination.[18] Note that these nonconstituent pseudogapping examples pose significant problems for many previous transformational accounts since deriving these examples via movement+ellipsis entails positing various otherwise unmotivated movement operations.

As discussed in the previous section, pseudogapping with multiple remnants like the following are also highly problematic for movement-based approaches:

(69) a. I won't introduce these girls to my sister, but I will these boys to my brother.

b. I bet more money with Robin that the game would go into overtime than I did with Terry that the final score would be a tie.

[18] In a CG-based analysis, a similarly straightforward characterization is possible for the 'deleted' material in Gapping, too, in examples like the following (cf. Steedman 1990; Kubota and Levine 2014a):

(i) John **wants to try to begin to write** a novel, and Mary ∅ a play.

These examples are similarly problematic for movement-based approaches (see Kubota and Levine (2014a)).

Multiple remnant pseudogapping is straightforward in our approach. The key point is that the following $\mathrm{PDTV}/\mathrm{PDTV}$ (where PDTV = $\mathrm{VP}/\mathrm{PP}/\mathrm{NP}$) version of the auxiliary can be derived from the lexically specified VP/VP entry via Geach:

(70) will; $\lambda f \lambda x \lambda y \lambda z.f(x)(y)(z)$; $\mathrm{PDTV}/\mathrm{PDTV}$

Since the derivation is parallel to the one for the TV/TV entry above (hypothesizing a PDTV, NP and PP to the right of the auxiliary and withdrawing these hypotheses one by one after combining them with the auxiliary), we omit it here.

Since the VP ellipsis/pseudogapping operator is polymorphic, it can take this derived auxiliary verb as an argument and anaphorically saturate the missing PDTV argument position, in the same way as in the simpler examples above. Here, we show only the derivation for the target clause of pseudogapping. The VP ellipsis/pseudogapping operator makes reference to the ditransitive verb in the antecedent clause with category PDTV and semantics **introduce** (here we ignore the tense meaning of the auxiliary *will*).

(71)

$$\dfrac{\mathsf{i};\ \mathbf{i};\ \mathrm{NP} \qquad \dfrac{\dfrac{\dfrac{\lambda\varphi.\varphi;\ \lambda\mathscr{F}.\mathscr{F}(\lambda x\lambda y\lambda z.\ \mathbf{intro}(y)(x)(z));\ \mathrm{PDTV}\uparrow(\mathrm{PDTV}/\mathrm{PDTV}) \qquad \dfrac{\vdots}{\mathsf{will};\ \lambda f\lambda x\lambda y\lambda z.f(x)(y)(z);\ \mathrm{PDTV}/\mathrm{PDTV}}}{\mathsf{will};\ \lambda x\lambda y\lambda z.\mathbf{intro}(y)(x)(z);\ \mathrm{PDTV}}\uparrow\mathrm{E} \qquad \dfrac{\mathsf{these} \circ \mathsf{boys};\ \mathbf{these\text{-}boys};\ \mathrm{NP}}{\mathsf{will} \circ \mathsf{these} \circ \mathsf{boys};\ \lambda y\lambda z.\mathbf{intro}(y)(\mathbf{these\text{-}boys})(z);\ \mathrm{VP}/\mathrm{PP}}/\mathrm{E}}{\mathsf{will} \circ \mathsf{these} \circ \mathsf{boys} \circ \mathsf{to} \circ \mathsf{my} \circ \mathsf{brother};\ \lambda z.\mathbf{intro}(\mathbf{my\text{-}bro})(\mathbf{these\text{-}boys})(z);\ \mathrm{VP}}/\mathrm{E} \qquad \dfrac{\mathsf{to} \circ \mathsf{my} \circ \mathsf{brother};\ \mathbf{my\text{-}bro};\ \mathrm{PP}}{}}{\mathsf{i} \circ \mathsf{will} \circ \mathsf{these} \circ \mathsf{boys} \circ \mathsf{to} \circ \mathsf{my} \circ \mathsf{brother};\ \mathbf{intro}(\mathbf{my\text{-}bro})(\mathbf{these\text{-}boys})(\mathbf{i});\ \mathrm{S}}\backslash\mathrm{E}$$

The present analysis also correctly predicts the interactions between pseudogapping and strict/sloppy readings and quantifier scope in examples like the following:

(72) a. John showed his picture to Chris whereas Bill did to Robin.

b. John read every book to Mary before Bill did to Sue.

Since the derivations are completely parallel to the cases of VP ellipsis shown above in (60) and (61), we omit them here.

Since in CG the combinatorial properties of linguistic expressions (including those corresponding to non-traditional constituents) are represented explicitly in their syntactic

categories, our approach overcomes the major problem for previous nontransformational approaches as well. Recall from Sect. 3.2 that Miller's (1990) interpretive approach has difficulties in explaining the ungrammaticality of preposition mismatch examples like (73):

(73) *John spoke to Mary more often than Peter did for Anne.

Our approach rules out this type of example straightforwardly. In the antecedent clause, we have an instance of the verb *speak* that subcategorizes for a *to* PP (of syntactic category $\mathrm{VP}/\mathrm{PP}_{to}$). But in the target clause, we need to recover the meaning of *speak* associated with a different subcategorization frame $\mathrm{VP}/\mathrm{PP}_{for}$. Because of the syntactic category mismatch, the relevant anaphoric mechanism fails and hence (73) is correctly blocked.

Interestingly, the present proposal can also correctly capture cases of tolerated category mismatch, exemplified by data such as (74) (= (10)):[19]

(74) Ask Doll, who spoke as much about his schoolboy career ending as he did of the season in general.

Miller (2014) makes an important observation that (74) is licensed despite the preposition mismatch because of the closeness of the lexical meaning of the verb in the different subcategorization frames. This condition is not satisfied in the minimally different (73), resulting in the degraded status of the latter.

To see how the contrast in (73) vs. (74) can be accounted for in the present approach, note first that exactly the same contrast is found in unlike category coordination (UCC):

(75) a. Robin spoke about the War and of similar horrible events.

b. *John didn't speak to Mary or for Susan at the meeting.

This contrast motivates assigning the category $\mathrm{VP}/\mathrm{PP}_{of} \wedge \mathrm{VP}/\mathrm{PP}_{about}$ involving the 'meet' connective to the verb *speak*, following the general analysis of UCC by Morrill (1994) and

[19]Miller (2014) also discusses examples in which the preceding clause does not supply any plausible syntactic antecedent. We address these cases in the next section.

Bayer (1996) (see also Kubota and Levine (2013)).[20] In the lexical entry for *speak* in (76), the two (related yet distinct) meanings of *speak* associated with different subcategorization frames are represented separately in the form of a tuple.[21]

(76) $\mathsf{speak};\ \langle \textbf{speak-about}, \textbf{speak-of} \rangle;\ \mathrm{VP}/\mathrm{PP}_{\textit{about}} \wedge \mathrm{VP}/\mathrm{PP}_{\textit{of}}$

With this lexical assignment and the MEET ELIMINATION rules in (77) (where π_1 and π_2 are the standard projection functions such that $\pi_1(\langle \alpha, \beta \rangle) = \alpha$ and $\pi_2(\langle \alpha, \beta \rangle) = \beta$), the analysis for (75a) is straightforward as in (78).

(77) a. LEFT MEET ELIMINATION

$$\frac{\mathsf{a};\ \boldsymbol{\mathcal{F}};\ A \wedge B}{\mathsf{a};\ \pi_1(\boldsymbol{\mathcal{F}});\ A}\ \wedge\mathrm{E}_l$$

b. RIGHT MEET ELIMINATION

$$\frac{\mathsf{a};\ \boldsymbol{\mathcal{F}};\ A \wedge B}{\mathsf{a};\ \pi_2(\boldsymbol{\mathcal{F}});\ B}\ \wedge\mathrm{E}_r$$

(78)
$$\dfrac{\dfrac{\dfrac{[\varphi;\ F;\ \mathrm{VP}/\mathrm{PP}_{\textit{about}} \wedge \mathrm{VP}/\mathrm{PP}_{\textit{of}}]^1}{\varphi;\ \pi_1(F);\ \mathrm{VP}/\mathrm{PP}_{\textit{about}}}\ \wedge\mathrm{E}_l \quad \mathsf{about} \circ \mathsf{the} \circ \mathsf{war};\ \mathbf{w};\ \mathrm{PP}_{\textit{about}}}{\varphi \circ \mathsf{about} \circ \mathsf{the} \circ \mathsf{war};\ \pi_1(F)(\mathbf{w});\ \mathrm{VP}}\ /\mathrm{E}}{\mathsf{about} \circ \mathsf{the} \circ \mathsf{war};\ \lambda F.\pi_1(F)(\mathbf{w});\ (\mathrm{VP}/\mathrm{PP}_{\textit{about}} \wedge \mathrm{VP}/\mathrm{PP}_{\textit{of}})\backslash\mathrm{VP}}\ \backslash\mathrm{I}^1$$

$$\dfrac{\mathsf{robin};\ \mathbf{r};\ \mathrm{NP} \qquad \dfrac{\begin{array}{l}\mathsf{spoke};\\ \langle \textbf{spoke-about}, \textbf{spoke-of} \rangle;\\ \mathrm{VP}/\mathrm{PP}_{\textit{about}} \wedge \mathrm{VP}/\mathrm{PP}_{\textit{of}}\end{array} \quad \begin{array}{l}\vdots\\ \mathsf{about} \circ \mathsf{the} \circ \mathsf{war} \circ \mathsf{and} \circ \mathsf{of} \circ \mathsf{similar} \circ \mathsf{events};\\ \lambda F.\pi_1(F)(\mathbf{w}) \sqcap \lambda F.\pi_2(F)(\textbf{s-ev});\ (\mathrm{VP}/\mathrm{PP}_{\textit{about}} \wedge \mathrm{VP}/\mathrm{PP}_{\textit{of}})\backslash\mathrm{VP}\end{array}}{\begin{array}{l}\mathsf{spoke} \circ \mathsf{about} \circ \mathsf{the} \circ \mathsf{war} \circ \mathsf{and} \circ \mathsf{of} \circ \mathsf{similar} \circ \mathsf{events};\\ \textbf{spoke-about}(\mathbf{w}) \sqcap \textbf{spoke-of}(\textbf{s-ev});\ \mathrm{VP}\end{array}}\ \backslash\mathrm{E}}{\begin{array}{l}\mathsf{robin} \circ \mathsf{spoke} \circ \mathsf{about} \circ \mathsf{the} \circ \mathsf{war} \circ \mathsf{and} \circ \mathsf{of} \circ \mathsf{similar} \circ \mathsf{events};\\ \textbf{spoke-about}(\mathbf{w})(\mathbf{r}) \wedge \textbf{spoke-of}(\textbf{s-ev})(\mathbf{r});\ \mathrm{S}\end{array}}\ \backslash\mathrm{E}$$

The contrast between (75a) and (75b) then follows from the assumption that the verb *speak* subcategorizing for a *for* PP is simply listed as a separate entry in the lexicon. We

[20] We assume that $/$ and $\backslash$ associate more strongly than $\wedge$; thus, $\mathrm{VP}/\mathrm{PP}_{\textit{of}} \wedge \mathrm{VP}/\mathrm{PP}_{\textit{about}}$ is an abbreviation for $(\mathrm{VP}/\mathrm{PP}_{\textit{of}}) \wedge (\mathrm{VP}/\mathrm{PP}_{\textit{about}})$.

[21] This corresponds to the 'semantically potent' variant of meet in Bayer (1996). Bayer rejects this type of lexical entry by claiming that admitting them would incorrectly overgenerate violations of Zaenen and Karttunen's (1984) Anti-Pun Ordinance (**I can tuna and get a job*). We don't find this argument convincing. By assuming that lexical entries involving meet are restricted to ones in which the two meanings listed together in a single entry are related (as in (76) and (81)), and by ensuring that meet cannot be syntactically introduced, the Anti-Pun Ordinance can be maintained while still admitting semantically potent meet.

take it that the 'closeness' of meaning that Miller (2014) alludes to governs which subcategorization frames can be 'packaged' into a single lexical entry involving the meet connective for any given verb.

The parallel contrast between (73) and (74) in the pseudogapping case follows from the same assumption. The preposition-mismatch pseudogapping apparently violating connectivity is licensed in the present analysis without any extra machinery, except that the anaphoric retrieval mechanism is a bit more involved in this case. We assume that the VP ellipsis/pseudogapping operator can access either of the two category-meaning pairs stored in a linguistic sign involving the meet connective such as (76). With this assumption, the derivation for (74) is straightforward, as in (79).

(79)

$$\dfrac{\text{robin};\ \mathbf{r};\ \mathrm{NP} \qquad \dfrac{\text{has};\ \lambda P.P;\ \mathrm{VP/VP} \qquad \dfrac{\dfrac{\text{spoken};\ \langle\mathbf{speak\text{-}about}, \mathbf{speak\text{-}of}\rangle;\ \mathrm{VP/PP}_{about} \wedge \mathrm{VP/PP}_{of}}{\text{spoken};\ \mathbf{speak\text{-}about};\ \mathrm{VP/PP}_{about}}\wedge\mathrm{E}_l \qquad \dfrac{\text{about} \circ \text{the} \circ \text{war};\ \mathbf{w};\ \mathrm{PP}_{about}}{}}{\text{spoken} \circ \text{about} \circ \text{the} \circ \text{war};\ \mathbf{speak\text{-}about}(\mathbf{w});\ \mathrm{VP}}/\mathrm{E}}{\text{has} \circ \text{spoken} \circ \text{about} \circ \text{the} \circ \text{war};\ \mathbf{speak\text{-}about}(\mathbf{w});\ \mathrm{VP}}/\mathrm{E}}{\text{robin} \circ \text{has} \circ \text{spoken} \circ \text{about} \circ \text{the} \circ \text{war};\ \mathbf{speak\text{-}about}(\mathbf{w})(\mathbf{r});\ \mathrm{S}}\backslash\mathrm{E}$$

$$\dfrac{\dfrac{\text{leslie};\ \mathbf{l};\ \mathrm{NP} \qquad \dfrac{\dfrac{\lambda\varphi.\varphi;\ \lambda\mathscr{F}.\mathscr{F}(\mathbf{speak\text{-}of});\ (\mathrm{VP/PP}_{of})\restriction((\mathrm{VP/PP}_{of})/(\mathrm{VP/PP}_{of}))}{\vdots} \qquad \dfrac{\text{has};\ \lambda f\lambda x\lambda y.f(x)(y);\ (\mathrm{VP/PP}_{of})/(\mathrm{VP/PP}_{of})}{\vdots}\restriction\mathrm{E} \qquad \dfrac{\text{of} \circ \text{similar} \circ \text{events};\ \mathbf{s\text{-}ev};\ \mathrm{PP}_{of}}{}}{\text{has};\ \lambda x\lambda y.\mathbf{speak\text{-}of}(x)(y);\ \mathrm{VP/PP}_{of}} \qquad }{\text{has} \circ \text{of} \circ \text{similar} \circ \text{events};\ \lambda y.\mathbf{speak\text{-}of}(\mathbf{s\text{-}ev})(y);\ \mathrm{VP}}/\mathrm{E}}{\text{leslie} \circ \text{has} \circ \text{of} \circ \text{similar} \circ \text{events};\ \mathbf{speak\text{-}of}(\mathbf{s\text{-}ev})(y)(\mathbf{l});\ \mathrm{S}}\backslash\mathrm{E}$$

The ungrammaticality of (73) still follows, since the meaning of *speak* associated with the different lexical entry with syntactic category $\mathrm{VP/PP}_{for}$ cannot be anaphorically retrieved from an occurrence of the $\mathrm{VP/PP}_{of} \wedge \mathrm{VP/PP}_{about}$ entry in the antecedent.

Furthermore, the following related example noted by Miller (1990), in which a ditransitive verb instantiates different subcategorization frames (V NP NP vs. V NP PP) in the antecedent and the pseudogapping clauses, can be analyzed in essentially the same way (see ***[reference omitted for refereeing]*** for a complete derivation).

(80) I will give Mary my books if YOU will ∅ your records to Ann.

The key assumption is the following following lexical entry for the ditransitive verb *give* involving the meet connective (which again is motivated by the pattern in UCC, as discussed in ***[reference omitted for refereeing]***):

(81) give; $\langle \lambda x \lambda y \lambda z.\mathbf{give}(x)(y)(z), \lambda y \lambda x \lambda z.\mathbf{give}(x)(y)(z) \rangle$; $(\mathrm{VP}/\mathrm{PP}/\mathrm{NP}) \wedge (\mathrm{VP}/\mathrm{NP}/\mathrm{NP})$

We take voice-mismatch examples such as (82) (= (9)) to be licensed in a similar way.

(82) (?)MY problem will be investigated by Tom, but he won't YOURS.

Though the active/passive alternation is different from the argument structure alternation involving ditransitive verbs in that a morphological marking is involved (thus, the meet connective would be of no use here), there is an obvious similarity between examples like (80) and voice-mismatch examples involving the active form in the antecedent clause licensing a passive pseudogapped verb or vice versa. The key in both cases is lexical relatedness. Following the standard assumption in the nontransformational literature (cf. Bresnan (1982); Pollard and Sag (1994)), we take passivization to be a lexical operation. Since the argument structure and the morphological form are different, the passive form of a verb is listed in the lexicon as a distinct entry separate from the active form. However, they are related to each other via some explicit lexical operation (one standard way of formalizing this is in terms of lexical rules). It is then not unreasonable to assume that the pseudogapping operator can have access to the lexical entry of the passive form from the occurrence of the active form in the preceding clause and vice versa, due to this explicit relation between the lexical entries for the active and passive forms in the lexicon. Thus, the voice-mismatch examples like (82) do not pose problems for the present approach.

Before moving on to more complex examples involving discontinuity, we'd like to discuss how the two problematic cases (namely, 'non-ATB pseudogapping' and the interaction between pseudogapping and Gapping) identified at the end of Sect. 3.1 for transformational analyses in terms of syntactic VP deletion can be dealt with in the present approach.

Unlike movement-based approaches, the present approach does not posit any empty VP or verb in the analysis of VP ellipsis and pseudogapping. From this, it immediately follows that the 'non-ATB pseudogapping' example (83) (= (35)) is ungrammatical.

(83) *Bill can eat a four-course dinner faster than I can [[~~eat~~ a pizza] and [drink a beer]].

Specifically, the auxiliary *can* in the *than* clause cannot be the ordinary auxiliary taking an infinitival complement and the derived TV entry (produced by an application of the pseudogapping operator) at the same time. Thus, this example is correctly ruled out.

Second, the Gapping/pseudogapping interaction example in (37), reproduced in a slightly modified form in (84) (involving coordination rather than a comparative structure), is also straightforward in the present approach.

(84) I can eat ice cream and John can pizza or Mary tacos.

The only difference between this and simpler examples of Gapping like (85) is that the verb *eat* is missing from the first conjunct of Gapping conjunction due to pseudogapping in (84).

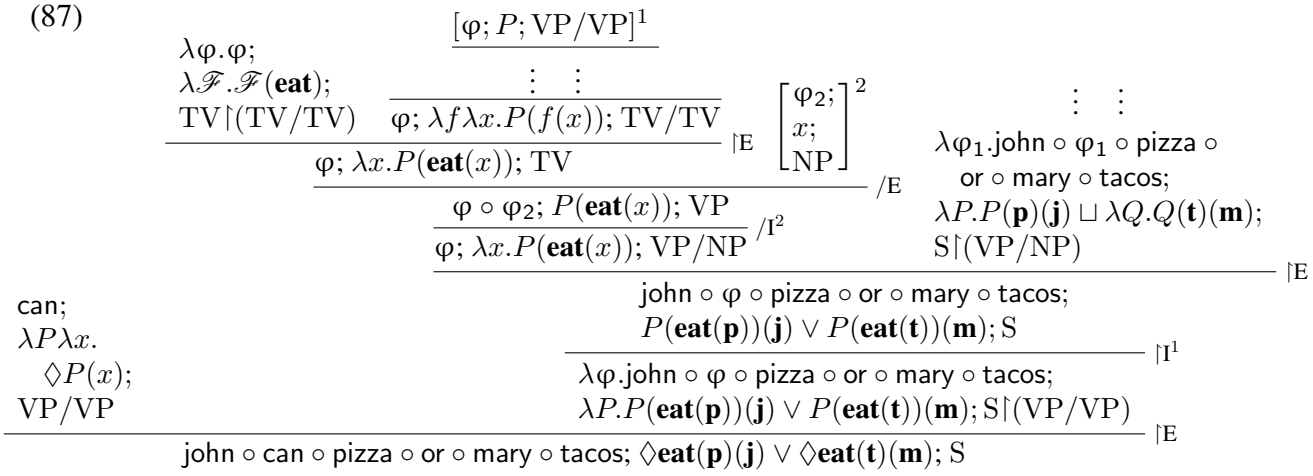
(85) John can eat pizza or Mary tacos.

Thus, the same proof for (85) works for (84) except for this extra complication. In Kubota and Levine's (2014a) analysis of Gapping, the following sign is derivable (see Appendix 2.2 in Kubota and Levine (2014a)):

(86) $\lambda\varphi_1.\mathsf{john} \circ \varphi_1 \circ \mathsf{pizza} \circ \mathsf{or} \circ \mathsf{mary} \circ \mathsf{tacos};\ \lambda P.P(\mathbf{p})(\mathbf{j}) \sqcup \lambda Q.Q(\mathbf{t})(\mathbf{m});\ \mathrm{S}\uparrow(\mathrm{VP}/\mathrm{NP})$

The rest of the derivation merely involves replacing the actual transitive verb *eat* with the pseudogapping operator supplying the meaning of this transitive verb for the auxiliary via anaphoric reference to the preceding clause:

(87)



4.4 Discontinuous pseudogapping

As discussed in the previous section, our approach extends smoothly to quite complex types of data such as multiple remnant pseudogapping (69), 'nonconstituent' pseudogapping (67), 'unlike category' pseudogapping (74) and (80), and an interaction between pseudogapping and Gapping (84) just shown, all of which are highly problematic for many previous approaches. However, as it stands, the present analysis does not yet cover cases of discontinuous pseudogapping exemplified by the following data:

(88) a. Although I didn't **give** Bill **the book**, I did ∅ Susan ∅.

b. She **found** her co-worker **attractive** but she didn't ∅ her husband ∅.

One possible approach would be to deal with discontinuity via the prosodic λ-binding mechanism already available in the grammar. For example, to license (88a) we could derive the following type $\mathrm{VP}\uparrow\mathrm{NP}$ expression and identify it as the antecedent for the VP ellipsis/pseudogapping operator in the target clause:

(89) $\lambda\varphi \circ \mathsf{give} \circ \varphi \circ \mathsf{the} \circ \mathsf{book};\ \lambda x.\mathbf{give}(x)(\mathbf{the\text{-}book});\ \mathrm{VP}\uparrow\mathrm{NP}$

This would suffice to license (88a) ((88b) could be derived analogously).

However, this approach seems too unconstrained. Note that λ-binding in the prosodic component in the present framework is a completely general mechanism, and once we admit discontinuous antecedents for pseudogapping like the one in (89), there is in principle

nothing that prevents licensing arbitrarily complex discontinuous pseudogapping via hypothetical reasoning for $\uparrow$. For example, this analysis overgenerates the following unacceptable pseudogapping example by assigning the same $\mathrm{VP}\uparrow\mathrm{NP}$ category to the discontinuous string *laughed when __ arrived*.

(90) *John **laughed when** Bill **arrived**, but he didn't ∅ Sue ∅.
intended: '...he didn't laugh when Sue arrived.'

Contrary to the prediction of this prosodic λ-binding approach, the distribution of well-formed instances of discontinuous pseudogapping is rather restricted (see Levin (1979) and Hoeksema (2006) for relevant examples). Specifically, in all examples reported in the literature that are unambiguous instances of pseudogapping in which the deleted material is discontinuous, the deleted discontinuous constituents correspond to what have traditionally been analyzed by the 'wrapping' operation in the CG literature.[22] Wrapping is a mechanism originally proposed by Bach (1979) and Dowty (1982) in the early literature of Montague Grammar for treating discontinuous strings (such as *make __ up*, *pull __ out* in verb-particle constructions) as combinatoric units. For example, in a wrapping-based analysis, the verb-adjective pair *found __ attractive* in (88b) is analyzed as an 'underlying' constituent, and it 'wraps' around the object NP *her co-worker* in the surface form of the sentence.

We sketch here an extension of the present analysis in which discontinuous pseudogapping like that in (88) can be treated by an interaction between pseudogapping and wrapping. In contemporary TLCG, wrapping is modelled by enriching the prosodic component of the theory (roughly corresponding to PF) via the notion of 'multi-modality' (Moortgat

[22]Levin (1979) provides several examples of (apparent) discontinuous pseudogapping. So far as we can tell, all of her examples belong to one of the following three classes: (i) antecedentless pseudogapping (similar to those discussed in Sect. 4.5); (ii) pseudogapping combined with an independent nominal ellipsis or adjunct ellipsis; (iii) wrapping-type pseudogapping. For example, her (36) on p. 77 *Does it [writing a check at a grocery store] usually take this long? – No, it never did me before* can be analyzed as an instance of (i), where what is missing after *did* is simply the verb (plus preposition) *happen to*. See Sect. 4.5 for antecedentless pseudogapping. We take an example such as (1) on p. 75 *We'll share it–like we do ∅ the pink [blouse]* as an instance of (ii), where the ellipsis of *blouse* after *pink* is nominal ellipsis independent of pseudogapping.

and Oehrle 1994; Dowty 1996a,b; Muskens 2007; Kubota 2010, 2014; Mihaliček 2012). The notion of 'modality' here pertains to different 'modes' of composition in the prosodic component governing various reordering and restructuring operations related to surface morpho-phonological constituency, and has nothing to do with the notion of modality in the semantics literature. Following Kubota (2010, 2014), we call this surface morpho-phonological component of grammar the 'prosodic algebra'.

For our purposes, it suffices to distinguish between two modes of composition in the prosodic algebra: the ordinary concatenation mode ($\circ$) and the infixation mode (which we notate as $\circ\!\!\bullet$). Prosodic terms are ordered in the prosodic algebra by the *deducibility* relations between terms (where $\varphi_1 \leq \varphi_2$ is to be read 'φ_2 is deducible from φ_1'). Specifically, to model wrapping, we posit the following rule:

(91) $(A \circ\!\!\bullet B) \circ C \leq (A \circ C) \circ B$

The intuition behind this is that when A and B are combined in the infixation mode, an expression C that combines with that unit at a later point in the derivation can be infixed in the middle by a surface morpho-phonological reordering operation. To refer to the deducibility relation in the prosodic algebra from the combinatoric component during the course of a derivation, we posit the following P(rosodic)-interface rule:

(92) P-interface rule

$$\frac{\varphi_0; \boldsymbol{\mathcal{F}}; A}{\varphi_1; \boldsymbol{\mathcal{F}}; A}\,\mathrm{PI}$$

——where $\varphi_0 \leq \varphi_1$ holds in the prosodic calculus

The syntactic rules of the calculus are also revised to take into account the sensitivity to modes of composition (for space reasons, we only reproduce the rules for $/$, but the rules for $\backslash$ are similarly revised; the rules for $\restriction$ remain the same as above):

(93) a. FORWARD SLASH INTRODUCTION

$$\frac{\begin{array}{c}\vdots\ \vdots\ \vdots\ [\varphi; x; A]^n\ \vdots\ \vdots\ \vdots \\ \vdots\ \vdots\ \vdots\quad\quad\vdots\ \vdots\quad\quad\vdots\ \vdots\ \vdots \\ b \circ_i \varphi; \boldsymbol{\mathcal{F}}; B\end{array}}{b; \lambda x.\boldsymbol{\mathcal{F}}; B/_i A}\,/_i\mathrm{I}^n$$

b. FORWARD SLASH ELIMINATION

$$\frac{a; \boldsymbol{\mathcal{F}}; A/_i B \quad b; \boldsymbol{\mathcal{G}}; B}{a \circ_i b; \boldsymbol{\mathcal{F}}(\boldsymbol{\mathcal{G}}); A}\,/_i\mathrm{E}$$

In these revised rules, the modes encoded in the slashes match those that are used to combine the phonologies of the functor expressions with those of their arguments.

With this small extension, a simple wrapping example can be analyzed as in (94).

(94)
$$\dfrac{\mathsf{mary};\ \mathbf{m};\ \mathrm{NP} \qquad \dfrac{\dfrac{\mathsf{found};\ \mathbf{find};\ \mathrm{VP/NP/.Adj} \quad \mathsf{attractive};\ \mathbf{attractive};\ \mathrm{Adj}}{\mathsf{found} \circ \mathbf{.}\ \mathsf{attractive};\ \mathbf{find}(\mathbf{attractive});\ \mathrm{VP/NP}}\ /.\mathrm{E} \qquad \mathsf{chris};\ \mathbf{c};\ \mathrm{NP}}{(\mathsf{find} \circ \mathbf{.}\ \mathsf{attractive}) \circ \mathsf{chris};\ \mathbf{find}(\mathbf{attractive})(\mathbf{c});\ \mathrm{VP}}\ /\mathrm{E}}{\mathsf{mary} \circ ((\mathsf{found} \circ \mathbf{.}\ \mathsf{attractive}) \circ \mathsf{chris});\ \mathbf{find}(\mathbf{attractive})(\mathbf{c})(\mathbf{m});\ \mathrm{S}}\ \backslash\mathrm{E}}{\mathsf{mary} \circ \mathsf{found} \circ \mathsf{chris} \circ \mathsf{attractive};\ \mathbf{find}(\mathbf{attractive})(\mathbf{c})(\mathbf{m});\ \mathrm{S}}\ \mathrm{PI}$$

The point here is that the (surface) discontinuous string *found* __ *attractive* behaves as a unit in the combinatoric component (motivation for this assumption comes from patterns of argument structure-sensitive phenomena such as passivization and binding; see, for example, Dowty (1982, 1996a)). The pseudogapping operator can then directly refer to the syntactic category and the semantics of this 'underlying constituent' to supply the relevant subcategorization frame and meaning of the missing TV to the auxiliary, in exactly the same way as in the simpler examples above. Thus, (88b) is licensed as follows:

(95)
$$\dfrac{\dfrac{\lambda\varphi.\varphi;\quad \lambda\mathscr{F}.\mathscr{F}(\mathbf{find}(\mathbf{attractive}));\quad \mathrm{TV}\uparrow(\mathrm{TV/TV}) \qquad \begin{array}{l}\vdots\ \ \vdots\\ \mathsf{didn't};\\ \lambda f\lambda x\lambda y.\neg f(x)(y);\ \mathrm{TV/TV}\end{array}}{\mathsf{didn't};\ \lambda x\lambda y.\neg\mathbf{find}(\mathbf{attractive})(x)(y);\ \mathrm{TV}}\ \uparrow\mathrm{E} \qquad \mathsf{robin};\ \mathbf{r};\ \mathrm{NP}}{\mathsf{didn't} \circ \mathsf{robin};\ \lambda y.\neg\mathbf{find}(\mathbf{attractive})(\mathbf{r})(y);\ \mathrm{VP}}\ /\mathrm{E}$$

The current formulation of the pseudogapping operator in (64) does not admit discontinuous constituents involving the vertical slash $\uparrow$ (such as $\mathrm{VP}\uparrow\mathrm{NP}$), since $\mathrm{VP}/\$$ ranges over categories involving directional slashes only. With this restriction, we predict that discontinuous pseudogapping is possible only when the deleted discontinuous string corresponds to an 'underlying' constituent in the combinatoric component involving wrapping. The data reported in the literature seems to conform to this prediction, and we thus tentatively conclude that a wrapping-based analysis of discontinuous pseudogapping is empirically more adequate than an alternative admitting derived discontinuous constituents freely with the vertical slash $\uparrow$.

4.5 A note on the nature of the syntactic identity condition

The analysis of VP ellipsis and pseudogapping given above is actually a bit too simplistic in assuming that there is always a syntactic antecedent that the ellipsis operator anaphorically refers to (see the side condition in (64)). This requirement is clearly too strong for VP ellipsis and arguably also for pseudogapping. As noted by Miller and Pullum (2013), if appropriate discourse conditions are satisfied, purely exophoric VP ellipsis is possible:

(96) a. Once in my room, I took the pills out. "Should I?" I asked myself. [COCA]

b. [Entering a construction site, A hands a helmet to B].
B: Do I have to?

While it is difficult, or perhaps impossible, to construct analogous purely exophoric cases of pseudogapping (presumably due to the requirement specific to pseudogapping that the remnant needs to be contrasted with some 'corresponding' item—establishing a Contrast relation involving 'parallel' elements seems difficult without an overt linguistic antecedent), Miller (2014) reports cases of pseudogapping in which there are no appropriate syntactic antecedents in the preceding clauses:

(97) a. They all called him Pa Tommy, just as they would any village elder in Sierra Leone.
= '. . . just as they would *call* any any village elder in S. L. *by his first name*'

b. Type in your PIN, just hit those buttons like you would a phone.
= '. . . like you would *use* a phone'

c. EPA urged the Corps "to work directly with the affected communities as well as seek professional assistance in this matter as they would any other environmental issue."
'. . . as they would *act with respect to* any other environmental issue'

Here, the pseudogapped clauses are interpreted along the lines of the paraphrases given, but there are no corresponding syntactic constituents in the preceding clauses that would match these paraphrases (or any other paraphrase that would work for these examples).

There are moreover cases involving 'split antecedents', both in VP ellipsis and pseudogapping, which are similarly problematic for syntactic approaches:

(98) a. Sally wants to sail around the world, and Barbara wants to fly to South America, and they will, if money is available. (VP ellipsis; Webber 1978)

b. John saw Mary and Peter heard Ann, but neither did me. (pseudogapping; Miller 1990)

While the examples above clearly show that the condition encoded in (64) (which requires the existence of a syntactic antecedent) is too strong, purely interpretive approaches such as Miller's (1990) would overgenerate radically, as Miller (2014) himself acknowledges. Miller (2014) alludes to the possibility of combining semantic/pragmatic conditions and processing constraints, but it is unclear how the preposition mismatch examples like (42) are ruled out on such an account without making reference to the *syntactic* subcategorization information associated with the different meanings of the verb.[23]

We think the right empirical pattern can be captured by relaxing the condition on the VP ellipsis/pseudogapping operator (reproduced in (99)) slightly, along the lines of (100):

(99) **VP ellipsis/pseudogapping operator, final version**

$\lambda\varphi.\varphi;\ \lambda\mathscr{F}.\mathscr{F}(P);\ (\mathrm{VP}/\$)\uparrow((\mathrm{VP}/\$)/(\mathrm{VP}/\$))$

——where P is a free variable whose value is resolved anaphorically

(100) Anaphora resolution condition on the VP ellipsis/pseudogapping operator:

(i) if there is a syntactic constituent with category $\mathrm{VP}/\$$ in the antecedent clause matching the syntactic category of the missing verb in the target clause, then the value of P is identified with the denotation of that constituent;

(ii) if there is no such syntactic constituent, then the value of P is anaphorically identified with some salient property in the discourse that is not inconsistent with the syntactic category $\mathrm{VP}/\$$

[23] We do not find it plausible to assume that semantic/pragmatic or processing constraints can make reference to such syntactic information, but if the assumption is that they somehow can, then it may be that Miller's (2014) suggestion and the relaxation of the syntactic antecedent condition we offer below are getting at similar analytic possibilities.

With these conditions, the preposition mismatch case in (42), repeated here as (101), is still correctly ruled out.

(101) *John spoke to Mary more often than Peter did for Anne.

The remnant PP_{for} in the target clause forces the syntactic category of the derived auxiliary to be $\mathrm{VP}/\mathrm{PP}_{for}$, but then, there is no matching syntactic antecedent in the preceding clause. Crucially, recovering the 'speak to' meaning of *speak* from the preceding clause via a purely anaphoric process (clause (ii)) is not an option either, since that meaning is associated with a distinct subcategorization frame $\mathrm{VP}/\mathrm{PP}_{to}$ and thus is inconsistent with the $\mathrm{VP}/\mathrm{PP}_{for}$ frame.

The revised condition in (100) is clearly in the same spirit as Miller's (1990) transrepresentational constraint in embodying the intuition that the ill-formedness of (101) is essentially due to the distinctness of meaning of the verb in the two different subcategorization frames. But note that (100) only makes reference to the category/meaning pairs in the lexicon (including cases of conjunctive lexical specification such as (76)) and thus avoids the 'transrepresentational' nature of Miller's original account. As we have noted in the previous section, Miller's account inevitably makes reference to two separate *syntactic* realizations of the lexically encoded information of the verb, a somewhat awkward type of constraint to posit in an allegedly strictly lexicalist theory such as G/HPSG.[24]

The 'antecedentless' examples in (97) and the 'split antecedent' examples in (98) are no longer problematic for the revised formulation of the anaphora resolution condition in (100). In these cases, there are no syntactic antecedents matching in category with the 'missing verbs'. However, unlike in the case of (101), the relevant relations appropriate as antecedents (such as 'call X by his first name' for (97a) and 'saw or heard' for (98b)) are salient in the preceding discourse, and there is moreover no interference from a lexically associated conflicting subcategorization frame. Thus, anaphora is resolved by a purely

[24]But to be fair, we believe that our own reformulated condition (100) is compatible with the general setup of HPSG. Thus, at least part of the complications of Miller's (1990) approach is due to the (now outdated) way in which subcategorization is handled (partly) via ID rules in GPSG.

semantic/pragmatic mechanism in these cases.

5 Conclusion

Pseudogapping has remained problematic for both transformational and nontransformational approaches because of what has recently been identified in a different domain of ellipsis as 'partial syntactic sensitivity' (Chung 2013; Barker 2013; Yoshida et al. to appear): with respect to subcategorization-related properties, the elided verb and the remnant exhibit morpho-syntactic matching, apparently motivating an analysis in terms of syntactic movement; in other respects, however, the movement operations that would be required in syntactic deletion-based analyses do not exhibit the expected distributional properties (for example, they don't exhibit typical island sensitivity), thus casting doubt on movement-based analyses. Interpretive (or semantic) approaches can account for the island insensitivity straightforwardly (and avoid various other problems for movement-based analyses), but on this type of approach, connectivity effects in subcategorization-related properties remain puzzling. In fact, Miller (1990)—the only extant proposal which explicitly attempts to capture syntactic connectivity in pseudogapping in an interpretive approach—invokes a quite complex set of constraints that are directly at odds with the spirit of the framework (GPSG) in which it is couched. Importantly, neither the transformational nor the nontransformational approach tells us *why* pseudogapping exhibits only partial syntactic sensitivity, and why it is that, among the various syntactic information encoded in the 'elided' material, what matters are the selectional requirements that the elided verb imposes on the remnant.

It is then interesting to see that, from the CG perspective, this partial syntactic sensitivity is exactly what is expected in an analysis that embodies the null hypothesis about pseudogapping. Pseudogapping involves anaphorically retrieving the meaning of the missing verb. In CG, there is a tight connection between the syntactic category of any linguistic expression and its semantic denotation (even in cases in which the linguistic expression in question does not correspond to a traditional constituent). Thus, it is naturally expected that the relevant anaphoric process is sensitive not just to the meaning of the antecedent

but also to its syntactic category that encodes the relevant subcategorization information. But this anaphora resolution process does not involve any movement operation, and, for this reason, the account is free from the problems for movement-based approaches (including island insensitivity). As we have argued in this paper, this CG perspective enables us to naturally synthesize the insights of both transformational and nontransformational approaches, paving a way toward a truly explanatory account of the phenomenon.[25] Of course, much more work needs to be done to determine whether this approach ultimately offers a viable account of ellipsis phenomena in general, but given its initial success in one of the most recalcitrant instances of ellipsis phenomena, we feel justified in our optimism about the prospects.

[25] See also Barker (2013) in this connection, who arrives at a very similar conclusion as ours in the analysis of another major and controversial type of ellipsis, namely, sluicing.

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