Stripping and VP Ellipsis in Reduced Temporal Adverbs
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Abstract. The first goal of this article is to argue that phrasal temporal adverbial constructions like *Al left before Pat* are derived via ellipsis from an underlying clausal source. The second goal is to demonstrate and account for the restricted distribution and interpretation of these reduced phrasal temporal adverbial constructions relative to their clausal counterparts and to temporal adverbial constructions targeted by VP ellipsis. The proposed analysis provides evidence for an operator-variable parallelism condition on ellipsis and supports models for an identity condition on ellipsis that allow the identification of an antecedent within the phrase-structure representation of the utterance.

1.   Introduction

Temporal adverbial constructions (TACs) introduced by the connectives *before* and *after* come in both full clausal forms, as in (1a), and phrasal forms, as in (1b).

(1)   a.   Al left [before Pat left].
        b.   Al left [before Pat].

A question, which is familiar from the literature on comparative constructions (see Kennedy 1999 and Lechner 2004), concerns the status of the phrasal TAC in (1b). One possibility is that *before* and *after* can combine directly with either clausal complements or nominal complements. A less obvious possibility is that phrasal TACs are derived

from a clausal counterpart through a reduction mechanism such as ellipsis. In this scenario, the phrasal TAC in (1b) is more accurately represented as follows.

(2)   Al left [before Pat ~~left~~].

The goal of the first half of this article (sections 2 and 3) is to argue that at least some phrasal TACs in English are derived from a clausal source. The argument is partially in response to arguments presented in Penka & von Stechow 2011 against this approach to phrasal TACs. I show that several of Penka & von Stechow's arguments do not hold up to closer scrutiny and instead provide support for a reduction analysis. We will see that additional diagnostics also converge on the idea that phrasal TACs in English can have an underlying clausal source.

That phrasal TACs are reduced from a clausal source is gestured at by Geis 1970 and pursued by both Larson 1987 and Thompson 2005. However, I argue that these exact implementations suffer from technical shortcomings and fail to adequately account for the full range of facts regarding phrasal TACs. The facts to be presented lead us to an alternative reduction analysis for phrasal TACs that I refer to as *TAC stripping*:

(3) $[_{vP} [_{vP}$ Al left$]$ $[_{beforeP}$ before $[_{FocP}$ Pat$_1$ $\langle_{vP}$ ~~x_1~~ ~~left~~$\rangle]]]$.

Phrasal TACs on this account are low adjoined on the verbal spine and contain a truncated complement to the temporal connective, roughly an extended vP. Their internal syntax is likened to canonical stripping constructions as analyzed by Depiante 2000. A single remnant can be generated by $\overline{\text{A}}$ movement to a focus position outside the elided vP. This analysis is similar in spirit to Pancheva 2010's analysis of Slavic comparatives and Weir 2014b's analysis of *why* stripping.

The second half of this article (sections 4–6) demonstrates and accounts for a puzzle presented by the restricted distribution of reduced TACs relative to their full clausal counterparts, as well as to TACs that contain a VP-ellipsis site. The empirical generalization that underlies this puzzle is the following.

(4)   No Asymmetric Embedding
        A TAC-stripping site and its antecedent must be at the same level of embedding.

This generalization captures the fact that, while TACs can generally be adjoined to various positions on the verbal spine, phrasal TACs with a reduced clausal source cannot be adjoined to a predicate that does not resolve its interpretation. As will also be discussed, behavior similar to that described by (4) has been observed in gapping and other bare-argument ellipses (Hankamer 1979, Rooth 1992b, Lechner 2004, Johnson 2019). However, I argue that available accounts for these effects in other domains do not lend themselves to a treatment of TACs.

I present an account of the generalization in (4) that treats the restricted distribution of reduced clausal TACs as a symptom of the inability to satisfy a focus-based semantic identity condition on ellipsis that is stated over syntactic constituents (Rooth 1992a). In this way, ellipsis is found to be eliminative with respect to phrase-structure representations. Certain phrase-structure representations for TACs are blocked as a result of irreparable antecedent containment. In others, the syntax-semantics of TACs as temporal relative clauses, as motivated by Geis 1970 and Larson 1990, means that the TAC-stripping site will fail to find an appropriate antecedent that contains a parallel operator–variable dependency. Additional support for this focus-based approach will be provided by demonstrating the implausibility of alternative approaches: either likening reduced TACs to derived coordinations (e.g., Lechner 2004) or stating the identity condition on TAC stripping over a salient question meaning in the discourse (e.g., AnderBois 2011, Barros 2014, Weir 2014a).

This analysis is very much inspired by the one that Takahashi 2008 provides for underapplications of VP ellipsis in other environments, identified by Hardt & Romero 2004. However, I will argue that an account of the differing distributions of VP ellipsis and TAC stripping requires giving up the precise implementation in Takahashi 2008. I will argue that VP ellipsis targets a constituent that is smaller than what is possible for TAC stripping. The effect is that VP ellipsis is able to identify antecedents that are not available to TAC stripping. Thus, the differences between VP ellipsis and TAC stripping are also reduced to the ability to satisfy an identity condition on ellipsis.

In section 2 I first present the argument that at least some phrasal TACs are derived from a clausal source by way of ellipsis. In section 3 I present and motivate the basic syntax of the TAC-stripping operation that generates these reduced clausal TACs. In

section 4 I present the restricted distribution of reduced TACs relative to their clausal counterparts. In section 5 I present a slightly more articulated syntax for TACs and an account of the available data. In section 6 I demonstrate and account for the fact that TACs that have been targeted by VP ellipsis have a slightly wider distribution than those targeted by TAC stripping. I conclude the article in section 7.

2.   The Clausal Status of Phrasal TACs

Relative to clausal and phrasal comparative constructions, like those in (5), discussion about the relationship between the clausal and phrasal TACs in (6) is sparse.
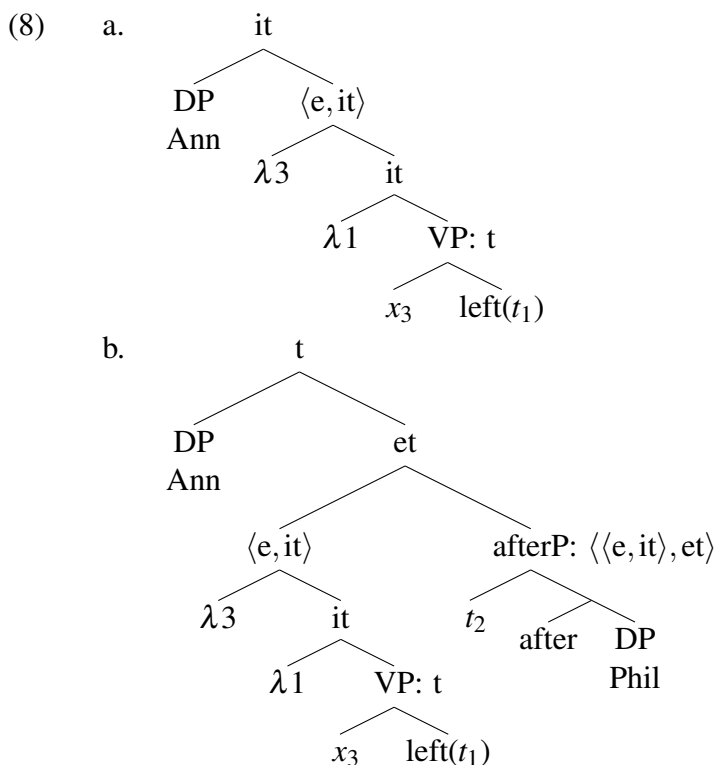
(5)   a.   Ann left later [than Phil left].
       b.   Ann left later [than Phil].

(6)   a.   Ann left [after Phil left].
       b.   Ann left [after Phil].

Nevertheless, the expected approaches are represented. One analysis asserts that the string in (6b) faithfully reflects the syntax. In this kind of "direct phrasal analysis," the temporal connective combines directly with a nominal complement. A straightforward implementation of this idea would assign phrasal TACs structures as follows.

(7)   Ann [$_{VP}$ left [$_{afterP}$ after [$_{DP}$ Phil]]].

The challenge for direct analyses is to assign this representation the appropriate interpretation wherein *Phil* is also construed to have left.

Penka & von Stechow 2011:sect. 5 presents a slightly more articulated syntax for phrasal TACs to do exactly this. Abstracting away from the precise details of the lexical semantics of the temporal connective, which they model on Heim 1985's treatment of comparatives, what Penka & von Stechow suggest is that the sentence in (7) is paired with an LF representation like in (8b), where entities are of type e, times are of type i, and propositions are of type t.

(8) a.

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                    it
          ┌─────────┴─────────┐
         DP                ⟨e, it⟩
         Ann          ┌───────┴───────┐
                     λ3               it
                            ┌─────────┴─────────┐
                           λ1                 VP: t
                                          ┌─────┴─────┐
                                         x₃       left(t₁)
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b.

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                         t
             ┌───────────┴───────────┐
            DP                       et
            Ann          ┌───────────┴───────────┐
                      ⟨e, it⟩              afterP: ⟨⟨e, it⟩, et⟩
                 ┌───────┴───────┐       ┌─────────┴─────────┐
                λ3              it       t₂            ┌──────┴──────┐
                       ┌─────────┴───┐           after          DP
                      λ1           VP: t                        Phil
                              ┌──────┴──────┐
                             x₃         left(t₁)
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This representation is generated, first, by an application of Quantifier Raising (QR) that moves the DP *Ann* out of the VP; see (8a). The phrasal adjunct is then counter-cyclically adjoined to the verbal spine in a position below the landing site of QR. The result, shown in (8b), is the adjunction of a TAC containing a temporal variable and the nominal element *Phil*. It is the semantics of the temporal connective that ensures the root-clause predicate is applied to the TAC-internal DP.

An alternative analysis, which holds that the phrasal TAC is reduced from a clausal source, is pursued by both Larson 1987 and Thompson 2005. We will consider the details of these "reduced clausal analyses" in section 3.2. For the time being, it is enough to note that the authors have representations like (9) in mind.

(9) Ann left [$_{afterP}$ after [Phil ~~left~~]].

The nominal element *Phil* in this representation is the remnant of an ellipsis operation that renders the rest of the embedded clause unspoken.

The substantive difference between these two families of analyses is the amount of linguistic material proposed to be inside the TAC. Direct analyses predict that a phrasal TAC will not show evidence of additional linguistic material beyond the nominal constituent—and possibly a temporal variable—inside the TAC. Reduced analyses predict that there will be evidence of clausal linguistic material inside the TAC that shares some identity with the material of the root clause.

Penka & von Stechow present a number of diagnostics for both English and German as evidence for the direct analysis of phrasal TACs. In the remainder of section 2 I will review the arguments that speak to the syntax of phrasal TACs in English.[1] Where we are able to make conclusions, I will argue that the data are consistent with or actually support the availability of a reduced analysis of phrasal TACs in English. I will also present some additional data sets that also point toward a clausal source for English phrasal TACs.

Before examining these arguments, however, it will be worthwhile to consider a prosodic property of phrasal TACs.

2.1.   Focus Sensitivity

Like other bare-argument ellipses, there is a general preference for placing the nominal constituent in a phrasal TAC in contrastive focus with a correlate in the root clause.[2] The pair of examples in (10) demonstrates the point with a pronominal remnant.

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[1] In addition to the arguments to be examined, Penka & von Stechow argue for a direct phrasal analysis on the basis of restrictions on the category and number of elements inside a phrasal TAC. Concerning the first of these, phrasal TACs, unlike other reduced clausal constructions, do not tolerate non-DP categories to the same extent. A relevant pair of examples is the following.

(i)   a.   Kate spoke to Nate earlier than/before Frank.
        b.   Kate spoke to Nate ?earlier than/*before to Frank.

At present, I am unable to provide a satisfactory account of this contrast, which is a-priori unexpected under a reduced clausal analysis. I hope that future research will be able to shed light on this puzzle. Regarding restrictions on the number of remnants, I will defer discussion of the relevant observation until section 3.2.3 and footnote 14, when we will have a more explicit picture of the proposed syntax of reduced clausal TACs.

[2] I will use *italics* to indicate the pitch accent associated with contrastive focus.

(10)　　a.　　Kim met *Sue* before *them*.

　　　　　b.　*Kim met *Sue* before 'em.

The strong pronominal *them* in (10a) serves as an acceptable remnant while the weak, unstressed *'em* in (10b) is highly degraded, if not ungrammatical.

　　Moreover, it was observed as early as Geis 1970 that phrasal TACs that modify a transitive predicate, like in (11)/(12), are ambiguous. Rooth 1992b notes further that the placement of focus in the root clause serves to disambiguate such configurations.

(11)　　*Kim* met Sue before *Tom*.
　　　　'Kim met Sue before Tom met Sue.'

(12)　　Kim met *Sue* before *Tom*.
　　　　'Kim met Sue before Kim met Tom.'

When the root-clause subject carries a pitch accent, as in (11), *Tom* is interpreted as the subject of another meeting event. A pitch accent on the root-clause object, as in (12), indicates that *Tom* should be interpreted as the object of another meeting event.

　　This does not rule out a direct analysis, but it is arguably expected under an analysis where *Tom* is the remnant of a clausal-ellipsis operation. Assuming Rooth's theory of focus interpretation, focus placement in the root clause presupposes that the focus semantic value of the root clause includes the ordinary semantic value of the embedded clause ($[\![\text{Emb}]\!]^{\text{o}} \in [\![\text{Root}]\!]^{\text{f}}$).

(13)　　a.　　$[_{\text{Root}}$ *Kim* met Sue$]$ before $[_{\text{Emb}}$ *Tom*$_1$ $\langle$~~met Sue~~$\rangle]$.
　　　　　　　$[\![\text{Emb}]\!]^{\text{o}} = \text{Tom met Sue} \in$
　　　　　　　$[\![\text{Root}]\!]^{\text{f}} = \{p : p = x \text{ met Sue} \mid x \in D_{\text{e}}\}$

　　　　　b.　　$[_{\text{Root}}$ Kim met *Sue*$]$ before $[_{\text{Emb}}$ $\langle$~~Kim met~~$\rangle$ *Tom*$_1]$.
　　　　　　　$[\![\text{Emb}]\!]^{\text{o}} = \text{Kim met Tom} \in$
　　　　　　　$[\![\text{Root}]\!]^{\text{f}} = \{p : p = \text{Kim met } x \mid x \in D_{\text{e}}\}$

When the root-clause subject has a pitch accent, there will be a presupposition that the embedded clause is a member of the set of focus alternatives derived from the root clause. As shown in (13), this requires interpreting *Tom* as the subject of the embedded

clause. A similar explanation can be provided for when *Tom* is interpreted as the object.

2.2. *Binding Connectivity*

Recall that direct and reduced analyses of phrasal TACs make different predictions with respect to the presence of unspoken linguistic material in the TAC. Building on Lechner 2004, we can probe for the existence of linguistic material in phrasal TACs by investigating the binding relationships of the remnant. If there is additional, unspoken linguistic material in the phrasal TAC, the remnant should be sensitive to the binding properties of that material.

Penka & von Stechow present the contrast in (14) as evidence that phrasal TACs involve directly combining the temporal connective with a DP. They point out that (14a) is acceptable on a subject interpretation of the remnant.

(14)   a.   ?Mary saw Peter$_1$'s sister [before him$_1$].
         b.   *Mary saw Peter$_1$'s sister [before he$_1$ saw Peter$_1$'s sister].

<div align="right">(Penka & von Stechow 2011:443, (35)–(36))</div>

The claim is that the lack of a disjoint-reference effect in (14a) indicates that the phrasal TAC does not have a clausal source. If it did, the Condition C violation found in (14b) would be expected.

There is a confound in this experiment that undermines the intended conclusion, however. A known property of ellipsis configurations is that they fail to display expected Condition C violations:

(15)   Mary saw Peter$_1$'s sister [before he$_1$ did ~~see Peter$_1$'s sister~~].

This is one effect of what Fiengo & May 1994 refer to as vehicle change.[3] Regardless of the exact source of vehicle-change effects, the lack of a Condition C violation in (14a) could equally signal the need for a direct analysis of this phrasal TAC or for a

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[3] An anonymous reviewer points out that they do not find the example in (14a) grammatical on the intended interpretation but that they do find (15) to be grammatical. One way to interpret this is that TAC stripping does not bleed Condition C effects for all speakers. Similarly conflicting results for comparative constructions are presented in Drummond & Shimoyama 2014.

reduced clausal analysis of it.[4]

If we are indeed observing vehicle-change effects in (14a), then we correctly expect to observe a disjoint-reference effect in minimally differing examples like (16a). A subject interpretation of the remnant induces a Condition B violation, as illustrated by the clausal version in (16b).

(16)   a.   *$Mary$ praised Peter$_1$ [before him_1].
        b.   *$Mary$ praised Peter$_1$ [before he_1 praised him$_1$].

These facts together support a reduction analysis of this phrasal TAC, which displays a characteristic property of ellipsis. A potential concern about the data in (16a) could be that it is actually the DP *Peter* in the root clause that is triggering the Condition B violation. This would undermine the conclusion that the phrasal TAC contains unspoken linguistic material. The example in (17) is provided to demonstrate that this is not the case.

(17)   Mary$_2$ praised Peter$_1$ [before he_1 praised her_2].

When the Condition B configuration in the TAC is resolved, the resulting string is grammatical. Thus, the root-clause object cannot be held responsible for the disjoint-reference effects in (16).

On a similar note, Penka & von Stechow also provide the paradigm in (18) in support of a direct analysis for phrasal TACs.

(18)   a.   *Mary saw him$_1$ [before Peter$_1$'s sister].
        b.   Mary saw him$_1$ [before Peter$_1$'s sister saw him$_1$].
        c.   Mary saw him$_1$ [before Peter$_1$'s sister did].

(Penka & von Stechow 2011:443–444, (40) and (41))

They point out that the ungrammaticality of (18a) is not expected under a reduction analysis of phrasal TACs. If the phrasal TAC had a reduced clausal structure, then it would pattern with the grammatical examples (18b) and (18c). Instead, the argument

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[4] There are several available proposals concerning the source of vehicle-change effects: Fiengo & May 1994, Merchant 2001, Drummond & Shimoyama 2014, and Hunter & Yoshida 2016.

goes, the ungrammaticality suggests that the phrasal TAC does not embed a clause, and this ultimately leads to a Condition C violation.

The example in (18a) is also not obviously consistent with a direct phrasal analysis of this TAC. For (18a) to induce a Condition C violation, the direct object of the root clause *him* would c-command *Peter's sister*. However, this would presumably also be true in (18b) and (18c), leading incorrectly to the expectation that these examples would also incur Condition C violations. Note that a similar point can be made about the examples below in (19) and (20a), where a direct object again fails to trigger a disjoint-reference effect associated with Condition C.

That being said, the judgment in (18a) is one that neither I nor several other English-speaking linguists who I have consulted share. To the extent that (18a) is relatively degraded, this is intuitively due to the ambiguity regarding the grammatical role of *Peter's sister*, which is necessarily resolved in (18b) and (18c). This effect tends to be alleviated by placing the root-clause pitch accent on *Mary*.[5]

Given the variability in the judgments regarding the paradigm in (18), we can also consider the following ditransitive structure.

(19)   Jane took him$_1$ to Sue [before Joe$_1$'s boss took him$_1$ to Sue].

(Adapted from Bhatt & Takahashi 2011)

The first thing to note about this example is that the pronominal direct object of the root-clause predicate does not trigger a disjoint-reference effect with *Joe* in the TAC. Knowing this, it is revealing to find that the subject–object ambiguity for a remnant, familiar from section 2.1, is missing in (20). Specifically, the remnant *Joe's boss* can receive a subject interpretation, but a disjoint-reference effect disrupts an indirect-object interpretation.

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[5] An anonymous reviewer points out that they do not find (18a) to be ungrammatical but that it is still marginal relative to the rest of the paradigm. However, they point out that, regardless of a pitch accent on *Mary*, this example is unambiguous for them, permitting only a subject interpretation. Another reviewer points out that the facts regarding the ability of the direct object to bind into adjuncts are not straightforward and become more complicated when one also considers bound-variable interpretations; see Valmala 2009 and Barker 2012. This all suggests that more systematic investigation of this paradigm will be necessary.

(20) a. *Jane* took him$_1$ to Sue [before Joe$_1$'s *boss* ⟨t̶o̶o̶k̶ ̶h̶i̶m̶$_1$ ̶t̶o̶ ̶S̶u̶e̶⟩].

　　　b. *Jane took him$_1$ to *Sue* [before ⟨J̶a̶n̶e̶ ̶t̶o̶o̶k̶ ̶h̶i̶m̶$_1$ ̶t̶o̶⟩ Joe$_1$'s *boss*].

The observation that a disjoint-reference effect is a function of the interpreted gram-
matical role of the remnant is exactly what is expected from the assertion that there
is additional linguistic material inside the phrasal TAC. An instance of *Joe's boss* is
c-commanded by an elided instance of the coreferential pronoun only when interpreted
as the indirect object in (20b).

　　Importantly, we see in (21) that an indirect-object interpretation for the remnant is
otherwise available.

(21) a. *Jane* took Joe$_1$ to Sue [before his$_1$ *boss* ⟨t̶o̶o̶k̶ ̶h̶i̶m̶$_1$ ̶t̶o̶ ̶S̶u̶e̶⟩].

　　　b. Jane took Joe$_1$ to *Sue* [before ⟨J̶a̶n̶e̶ ̶t̶o̶o̶k̶ ̶h̶i̶m̶$_1$ ̶t̶o̶⟩ his$_1$ *boss*].

By swapping the positions of the spoken pronoun and R expression, the relevant ambi-
guity emerges. Again, this is expected under a reduction analysis. The elided material
in the matrix clause no longer induces a Condition C violation under either the subject
or indirect-object interpretation of the remnant *his boss*.

2.3. Quantifier Phrases

Penka & von Stechow also investigate (pp. 444–445) the behavior of quantificational
DPs in phrasal TACs. They argue that a quantificational DP would be expected to
interact freely with quantificational elements in the root clause if a phrasal TAC had
a direct syntax. This would not be possible given a reduced clausal source seeing as
"quantifier scope is generally clause bounded." A relevant test sentence is the following.

(22)　　A secretary cried after each executive.

　　　a. $\exists > \forall$: 'There is some secretary x such that, for each executive y, x cried
　　　　　after y cried.'

　　　b. $\forall > \exists$: 'For each executive y, there is some secretary x such that x cried
　　　　　after y cried.'

(Adapted from Penka & von Stechow 2011:445, (44))

As indicated, this example permits both surface-scope and inverse-scope interpretations of the quantificational DPs *a secretary* and *each executive*.

This experiment also suffers from a confound, which is acknowledged by Penka & von Stechow and calls into question any conclusions regarding the status of a phrasal TAC. The example in (23) illustrates the observation—which Penka & von Stechow credit to Artstein 2005—that quantificational DPs embedded in clausal TACs also seem to interact with quantifiers in the matrix clause.

(23)   A secretary cried after each executive resigned.

    a. $\exists > \forall$: 'There is some secretary x such that, for each executive y, x cried after y resigned.'

    b. $\forall > \exists$: 'For each executive y, there is some secretary x such that x cried after y resigned.'

(Penka & von Stechow 2011:445, (44))

Given the lack of contrast between the data points above, the behavior of quantifiers inside phrasal and clausal TACs does not obviously help us choose between the two analyses.[6]

A more telling diagnostic can be found in the behavior of quantificational DPs in the root clause. Consider the difference in the available interpretations for the following string.

(24)   Dale read a book after May.

    a.   Specific: 'Dale read a certain book after May read the same book.'

    b.   Nonspecific: 'Dale read a book after May read a different book.'

On the specific interpretation, it is possible to interpret the TAC to mean that May read the same book that Dale read. On the nonspecific interpretation, May read a different book than the book that Dale read. This contrast can be explained, first, by asserting that the phrasal TAC in (24) in fact has an underlying clausal source that has been reduced by ellipsis. This makes it possible to model the ambiguity by proposing different material

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[6]See Kusumoto 2008 for an analysis of (23) that employs exceptional QR out of the embedded clause.

in the ellipsis site:

(25)   Dale read a book . . .

      a.   Specific: . . . [$_{\text{afterP}}$ after [May ⟨read it⟩]].
      b.   Nonspecific: . . . [$_{\text{afterP}}$ after [May ⟨read a book⟩]].

The specific interpretation arises as part of the vehicle-change family of effects discussed in Fiengo & May 1994. More concretely, we can propose that the ellipsis site contains an E-type pronoun that can be counted as equivalent, with respect to the identity condition on ellipsis, to the existentially quantified *a book* in the root clause (Elliot, Nicolae & Sudo 2014; cf. Barker 2012). The nonspecific interpretation arises when there is an independent instance of *a book* present in the ellipsis site. This is not a result that is obviously expected from the direct phrasal analysis of such TACs. Under that analysis, there is a single instance of a predicate *read a book* that is applied both to the matrix subject and the TAC-internal DP. Thus, only the specific interpretation is expected.

A reduction analysis of (24) also leads us to expect that the relevant ambiguity will not be observed with other connectives that do not involve clausal ellipsis. It is not immediately clear that this prediction is borne out. The following sentence contains a comitative *with* PP, which has no plausible clausal counterpart, but the sentence is compatible with either a scenario in which Dale and Mary read a single book or a scenario in which they each read a different book.[7]

(26)   Dale read a book with May (*read {it/a book}).

There is evidence suggesting that this is a false positive. Whatever the source of the vagueness in (26) is, it is arguably not a result of ellipsis.

The evidence is drawn from the missing-antecedent effects introduced by Grinder & Postal 1971 and employed by Hankamer & Sag 1976. The observation is that existential quantifiers under negation fail to introduce an antecedent for pronouns. This is demonstrated

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[7] An anonymous reviewer points out that they do not get the nonspecific interpretation of (26). To the extent that this is a general intuition about this sentence, it supports the argument that nonellipsis constructions lack the syntactic content to produce the nonspecific interpretation in (25).

by the inability of *it* to refer to *a camel* in (27). The fact that *it* finds an antecedent given the ellipsis construction in (28) is taken by Hankamer & Sag to support the presence of linguistic material in an ellipsis site. The reasoning is that *it* is provided an antecedent by an instance of *a camel* in the ellipsis site.

(27)   *Ivan has never ridden a camel and it stank horribly.
   it = a camel that Ivan has ridden

           (Adapted from Hankamer & Sag 1976:404, (25))

(28)   I've never ridden a camel but Ivan has ⟨ridden a camel⟩ and it stank horribly.
   it = a camel that Ivan has ridden

           (Adapted from Hankamer & Sag 1976:403, (23b))

In light of these data, consider the following minimal pair of examples. The intended antecedent for *it* is missing from the surface structure in (29), which contains a phrasal TAC. Nevertheless, the specific interpretation is possible. In contrast, *it* fails to find the intended antecedent in the comitative *with* PP in (30).

(29)   Dale didn't write an abstract [after May ⟨wrote an abstract⟩] because it was so good.
   it = the abstract that May wrote

(30)   *Dale didn't write an abstract [with May] because it was so good.
   it = the abstract that May wrote

A straightforward way to understand this contrast is through the claim that, as indicated, the phrasal TAC contains elided linguistic material that provides the missing antecedent. Because the *with* PP in (30) is not derived from a clausal source, the antecedent for *it* is missing. The result is the observed ungrammaticality.

2.4. *Island Effects*

In addition to the claim that phrasal TACs can be generated by an application of ellipsis, the analysis sketched in section 1 asserted that the remnant undergoes an instance of A̅ movement out of the elided constituent. To the extent that the DP contained in a

phrasal TAC were sensitive to island conditions, both claims would find support (as observed by, e.g., Merchant 2004).

Among the relevant island conditions are the Complex-NP Constraint and the Left-Branch Condition, both catalogued in Ross 1967. The examples in (31) and (32) show respectively that phrasal TACs are sensitive to the Complex-NP Constraint and to the Left-Branch Condition.

(31)   a.   They hired someone who knows a *Balkan* language
           before they hired [$_{DP}$ someone [$_{CP}$ who knows a *Slavic* language]].
      b.   They hired someone who knows a *Balkan* language
           before [$_{DP}$ someone [$_{CP}$ who knows a *Slavic* language]]$_1$ ⟨~~they hired x_T~~⟩.
      c.   *They hired someone who knows a *Balkan* language
           before a *Slavic* language$_1$ ⟨~~they hired [$_{DP}$ someone [$_{CP}$ who knows x_1]]~~⟩.

(32)   a.   Abby$_2$ read *Fran*'s book after she$_2$ read [$_{DP}$ *Greg*'s book].
      b.   Abby$_2$ read *Fran*'s book after [$_{DP}$ *Greg*'s book] ⟨~~she$_2$ read x_T~~⟩.
      c.   *Abby$_2$ read *Fran*'s book after *Greg*$_1$ ⟨~~she$_2$ read [$_{DP}$ x_1's book]~~⟩.

The (a) variants of these examples provide the full clausal version of the TAC. The (b) variants present phrasal TACs with nominal elements that contain the island environment. Note that in both cases the contrastively focused element can grammatically appear inside the island environment. The (c) variants demonstrate that the contrastively focused element cannot on its own act as the nominal of a phrasal TAC on the intended interpretation.

These paradigms suggest that the nominal element in a phrasal TAC is somehow sensitive to island environments. This is expected under a reduction analysis with the additional assumption that the remnant is $\overline{\text{A}}$ extracted from the ellipsis site.

2.5. *Section Summary and Discussion*

The data presented in this section collectively support the claim that phrasal TACs can be derived via ellipsis from a clausal source. The results from the previous subsection suggest, moreover, that the remnant is extracted from the elided constituent. Note that

the claim here is only that phrasal TACs *can* be reduced from a clausal source by ellipsis, not that they all must be. There are examples, such as the ones in (33) and (34), that are amenable to a direct phrasal analysis, like the one in Penka & von Stechow 2011. To the extent that such examples have a clausal counterpart, the content of the TAC and the root clause do not fit any definition of identity that would be expected to permit ellipsis.

(33)   Paul left before dinner (began).

(34)   Kim left after the movie (ended).

The picture that is emerging from this study, therefore, is that English has both direct phrasal TACs and clausal TACs, the latter being able to surface in a form reduced through the instance of ellipsis to be investigated in sections 3 to 5.

This is a conclusion also reached by Larson 1987:261 as well as Thompson 2005:76–77, and it is reasonable to call it an unsurprising conclusion (notwithstanding Geis 1970's uniformly reduced relative clause analysis and Penka & von Stechow 2011's uniformly phrasal analysis). First, it makes phrasal TACs a counterpart to *like*Ps as analyzed by Yoshida 2013 and to comparative constructions as analyzed by Lechner 2004; more on this in section 3.2.3. Additionally, other languages seem to overtly betray this property of TACs. Larson notes (260, fn. 20) that full and reduced clausal TACs in Spanish are distinguished from their direct phrasal counterparts by the presence of the complementizer *que* 'that'. The same is true of Catalan. Direct phrasal TACs like in (35), which do not have a plausible clausal source, embed complements that are necessarily introduced by *de* 'of' and that cannot contain *que*. Full clausal complements of temporal connectives, on the other hand, are necessarily introduced by *que*, as shown in (36).[8]

(35)   En Ricard va   marxar [després de (*que) la   conferència].
        the Ricard AUX.PRS.3SG leave   after   of   that the lecture
        'Ricard left after the lecture.'

---

[8] Nonstandard dialects of Catalan permit *de que* 'of that' in both full clausal TACs and reduced clausal TACs (Ricard Viñas de Puig, p.c.).

(36)   En Ricard va   marxar [després (%de) *(que) l' Elena marxés].
       the Ricard AUX.PRS.3SG leave   after   of   that the Elena leaves
       'Ricard left after Elena left.'

Much as with the construction we have investigated in the preceding parts of section 2, a reduced version of (36) is possible:

(37)   En Ricard va   marxar [després (%de) *(que) l' Elena ⟨marxés⟩].
       the Ricard AUX.PRS.3SG leave   after   of   that the Elena leaves
       'Ricard left after Elena.'

Of particular interest is that the complementizer *que* is again obligatory. This is a fact that can be understood if (37) is treated not as a direct phrasal TAC but as a phrasal TAC that has been reduced from a clausal source.

The claim made in this section is also not that all languages have a reduction mechanism for clausal TACs. As an anonymous reviewer points out, there is compelling evidence suggesting that, while German has both phrasal and clausal TACs, the latter do not have reduced forms. Like Catalan, German also distinguishes lexically between phrasal and clausal TACs, but it does so by way of the choice of temporal connective (Penka & von Stechow 2011:440–441). Direct phrasal TACs, like (38), are introduced by the temporal connectives *vor* 'before' and *nach* 'after', which assign dative case. Clausal TACs, like in (39), are introduced by the temporal connectives *bevor* 'before' and *nachdem* 'after'.

(38)   Peter trank den   Whiskey [vor/nach   dem   Abendessen].
       Peter drank the.ACC whiskey before/after the.DAT dinner
       'Peter drank the whiskey before/after dinner.'

                                    (Adapted from Penka & von Stechow 2011:440, (24c))

(39)   Peter trank den   Whiskey [bevor/nachdem er das Bier getrunken hatte].
       Peter drank the.ACC whiskey before/after   he the beer drunk   had
       'Peter drank the whiskey before/after he had drunk the beer.'

                                    (Adapted from Penka & von Stechow 2011:440, (24a))

The anonymous reviewer also presents the contrast in (40). Like other embedded

finite clauses, finite clausal TACs appear postverbally in non-V2 environments; (40a) illustrates this. As (40b) shows, there is no reduced version of this TAC comparable to those in English and Catalan.

(40)   a.   weil   sie das   Haus verließ, [bevor ich es   verlassen hatte]
                because she the.ACC house left   before I   it.ACC left   had
                'because she left home before I left it'

        b.   *weil   sie das   Haus verließ, [bevor mir/ich]
                because she the.ACC house left   before me.DAT/I
                Intended: 'because she left home before me'

Interestingly, there is a phrasal treatment available for (40), which is provided by the reviewer in the form of (41). In this example, the TAC appears with the temporal connective *vor* 'before' and a dative DP. Moreover, the TAC patterns with PPs in that it appears in a preverbal position.

(41)   weil   sie das   Haus [vor   mir]   verließ
          because she the.ACC house before me.DAT left
          'because she left home before me'

Collectively, these data suggest that German does not have reduced clausal TACs. Instead, candidates for this treatment pattern with PPs with respect to word order and with other direct phrasal TACs with respect to the choice of temporal connective and the case properties of the TAC-internal DP.

    These observations reveal a rich vein of future research. For those languages that show evidence for a clause-reduction strategy for TACs, like Catalan and English, we should ask what properties they share. For languages that do not have a clause-reduction strategy for TACs, like German, we should ask what contributes to setting this group of languages apart from the other. In the remainder of this article, however, I focus on providing an account of reduced clausal TACs in English and the fact that, as we will see, their distribution is restricted relative to other TACs.
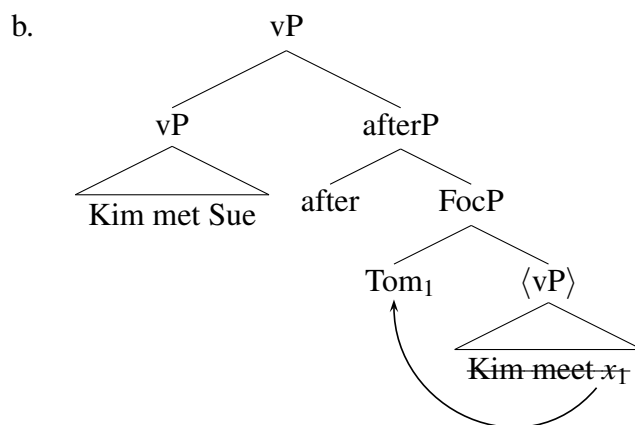
3.   TAC Stripping

Assuming that we have correctly diagnosed at least some phrasal TACs as having a clausal source that is reduced by ellipsis, we turn to providing a syntactic analysis for them. I will first present and motivate the basic internal and external syntax of phrasal TACs targeted by ellipsis. I will refer to this particular application of ellipsis as TAC stripping. I will then present several previous and alternative analyses along with the challenges they face.

3.1.   *Low-Adjoined Small Clauses*

The basis for the analysis to be proposed here comes from the treatment of canonical stripping provided by Depiante 2000. The basic picture, which I am referring to as TAC stripping, is sketched in the following partial representation.

(42)   a.   Kim met Sue after Tom.

   b.

TAC stripping involves $\overline{\text{A}}$ movement of the remnant to a Focus Phrase (FocP) outside of the elided constituent.[9]

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[9] TAC stripping, as presented, employs movement to the left edge of the reduced clausal TAC. This is at odds with Hooper & Thompson 1973's claims about what is possible in clausal TACs. Future research will hopefully reconcile these facts by appealing to the truncation account being provided. While unreduced clausal complements to temporal connectives lack a sufficiently articulated left periphery, as argued by Sawada & Larson 2004 and Haegeman 2006, the hypothesis is that small-clause complements contain the relevant structure to allow this movement.

An anonymous reviewer inquires about the exact nature of and motivation for the position that this movement targets. One possibility is that it is the position employed in instances of heavy-NP shift like

The evidence to be presented suggests that the constituent being deleted is an extended projection of the predicate, which I will identify as vP. This vP is part of a truncated complement of a necessarily low-adjoined temporal connective.

3.1.1.   Small-Clause Analysis

The reduced size of the elided constituent makes this analysis very similar to Pancheva 2010's treatment of Slavic comparatives and to Weir 2014b's treatment of *why* stripping in English. The following examples are intended to demonstrate that the temporal connectives *before* and *after* are capable of embedding verbal small clauses that can be quite small.

(43)   You should cook the dumplings [before eating them].

(44)   The dumplings were eaten [after being cooked].

The embedded main verb in (43) and the passive-voice morpheme in (44) appear in their gerundive form in the absence of the progressive auxiliary *be*. This suggests an absence from these examples of the tense, modal, or aspectual structure that is normally taken to appear above the vP in finite clauses. The reasoning is that the gerundive morphology in these examples is the default morphology that results from the absence

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the following.

(i)   Kim bought x_1 for her friends — some coffee$_1$.

A portion of the literature on heavy-NP shift has converged on the idea that it targets a low position at the edge of the predicate and results in focus effects for the displaced constituent (see Overfelt 2015).

   What is relevant for the purposes of the analysis is that constituents with focus properties can appear at the periphery of the vP. A word is in order, however, regarding the particular type of focus being explored. The peripheral constituent in heavy-NP shift is usually thought to show presentational-focus properties, providing the answer to a question (Rochemont & Culicover 1990). The analysis presented in this article hypothesizes that the remnant of TAC stripping is interpreted with "contrastive" focus. Moreover, I will provide evidence in section 4.3 that the content of a TAC cannot provide the answer to a question, suggesting it is not presentationally focused. This discrepancy in how focus is interpreted could be made to follow from the idea that the interpretation of focus is a function of the anaphoricity of focus marking. Roughly in the terms of Roth 1992b, it could be that, when focus marking cannot be anaphoric to a question, focus cannot be interpreted as presentational and, in the cases at hand, will be contrastive. Fully exploring and developing this idea is outside the scope of this article, however, and must be left for future research.

of I^0. As (45) shows, I^0 does not seem to license gerundive morphology, at least outside of nominalizations (see Abney 1987).

(45)   *Sue leaving.

The impossibility of modals in these constructions, as shown by (46), also indicates that I^0 and its associated categories are missing from the clausal gerunds that can be embedded in TACs.[10]

(46)   a.   *Sue left [before Kim might leaving].
        b.   *Sue left [before Kim mighting leave].

Next, a portion of the research on gapping has suggested that gapping constructions at least *can* involve low coordination in the phrase marker, making the conjuncts relatively small constituents. It has been argued, Lin 2002 and Johnson 2009 being representative cases, that it is VPs or vPs that are coordinated. These analyses have been motivated in part by observations from Oehrle 1987 and Siegel 1987 that sentential negation and modals either need not or cannot be interpreted in the gapped constituent.

We can observe similar behavior with phrasal TACs. Looking at the scope of modals first, consider the following example.

(47)   Stan can leave after Phil.

        a.   = 'Stan can leave at a time t that is after a time t' that Phil leaves at.'
        b. $\neq$ 'Stan can leave at a time t that is after a time t' that Phil can leave at.'

This example has an interpretation whereby Stan is able to leave after whatever time it is that Phil actually leaves at. That is, the sentence is true in a context where Phil is not allowed to stay on his own, so Stan is required to stay until after Phil leaves. Missing from the sentence is the interpretation expected to arise if it were possible to interpret the ellipsis site with an instance of *can*, as in (47b). The unreduced clausal TAC in (48) does have this interpretation.

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[10] This is not to say that aspect cannot be projected in the clausal gerunds embedded by *before* and *after*. This is clearly possible: *Sue left after having eaten*. The point to grasp here is that these temporal connectives are capable of embedding very small clausal complements.

(48)   Stan can leave after Phil can leave.

This interpretation is expected to be missing from (47) given the assertion that the deleted constituent in a phrasal TAC is not large enough to host modal auxiliaries, like in (46).

Similar effects arise with sentential negation. The TAC-stripping site in (49) resists an interpretation that would signal the presence of negation in the ellipsis site.

(49)   Pam didn't leave after Beth.

      a.   = 'Pam left, but it's not the case that she did so after Beth left.'

      b.   ≠ 'Pam left, but it's not the case that she did so after Beth didn't leave.'

This sentence is true in a context where Pam left but this did not happen after the time at which Beth left. Among the interpretations that are missing for the string in (49) is one that describes a situation in which Pam left and in which, it is asserted, this did not happen after an event in which Beth stayed; Pam in fact left before Beth didn't leave. In other words, it is not possible to interpret negation inside the phrasal TAC. Note that the absence of this interpretation from a phrasal TAC does not reflect an absence of this interpretation generally. The unreduced clausal TAC in (50) is intended to provide this interpretation, though it is admittedly an odd way of expressing it.

(50)   Pam didn't leave after Beth didn't leave.

The inability to interpret negation in the ellipsis site of a phrasal TAC is consistent with the claim that the elided constituent is no larger than a vP plus a focus projection to catch the remnant.

3.1.2.   Low Adjunction

The interaction of sentential negation and phrasal TACs also provides evidence that TAC stripping only targets TACs that are adjoined to the verbal spine in a relatively low position. In order to appreciate this, let us first observe that clausal TACs can be interpreted at various positions on the verbal spine within a single clause. This is evidenced by the scopal ambiguity of *after* phrases with respect to sentential negation:

(51)   Pam didn't leave after Beth left.

    a.   *after*P > ¬: 'After Beth left, it's not the case that Pam left.'

    b.   ¬ > *after*P: 'Pam left, but it's not the case that she did so after Beth left.'

The high-scope interpretation of the TAC in (51a) is compatible with a context where, after Beth's departure, Pam decided not to leave and instead stayed. When the TAC is interpreted within the scope of negation, as in (51b), the sentence can be uttered in a context where Pam left but where this in fact occurred before Beth left.[11]

    It is interesting, in light of this general ambiguity, to find that a phrasal variant of the example above only has the low-scope interpretation for the TAC:

(52)   Pam didn't leave after Beth.

    a. **after*P > ¬: 'After Beth left, it's not the case that Pam left.'

    b.   ¬ > *after*P: 'Pam left, but it's not the case that she did so after Beth left.'

This sentence is only true in a context where Pam left but did so before Beth left (52b). It lacks the interpretation, available for (51), wherein it was following Beth's departure that Pam stayed (52a). The fact that the high-scope interpretation is not available

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[11] It is a curious property of *before*Ps that they do not display the same type of ambiguity with respect to sentential negation that we find with *after*Ps:

(i)   Pam didn't leave before Beth left.
    a. **before*P > ¬: 'Before Beth left, it's not the case that Pam left.'
    b.   ¬ > *before*P: 'Pam left, but it's not the case that she did so before Beth left.'

The precise nature of this asymmetry between *before*Ps and *after*Ps is likely to be orthogonal to the discussion at hand. On the other hand, it makes it crucial that the experiments with negation that are being run in the present subsection use *after*Ps.

    It may be worth noting that the QR-based treatment of TACs adopted in section 5.1 plus some naïve lexical entries like those in (ii) for the temporal connectives (Anscombe 1964; cf. Beaver & Condoravdi 2003) may help us understand the asymmetry.

(ii)   a. $[\![\text{before}]\!] = \lambda P \lambda Q. \forall t [P(t) \rightarrow \exists t'[Q(t') \wedge t' < t]]$
        b. $[\![\text{after}]\!] = \lambda P \lambda Q. \exists t [P(t) \wedge \exists t'[Q(t') \wedge t' > t]]$

The resistance to scoping over sentential negation that *before*Ps show could be understood as an instantiation of the dispreference that universally quantified expressions have for scoping over sentential negation (e.g., Beghelli & Stowell 1997, Mayr & Spector 2010).

suggests that reduced clausal TACs must be interpreted relatively low on the verbal spine.

It is also telling to consider again, briefly, direct phrasal TACs like the following.

(53)   Kim didn't leave after dinner.

   a.   *after*P $>$ ¬: 'After dinner time, Kim didn't leave.'

   b.   ¬ $>$ *after*P: 'Kim left, but it's not the case that she did so after dinner time.'

This example presents an interesting contrast with the reduced clausal TAC above. Direct phrasal TACs are ambiguous with respect to sentential negation in the same way observed for full clausal TACs. This can be taken as further evidence that not all phrasal TACs are made equally. It also implicates the reduction mechanism in the restricted distribution of reduced clausal TACs.[12]

3.2.   *Alternative Reduction Analyses*

The analysis presented in section 3.1 holds that phrasal TACs involve $\overline{\text{A}}$ movement of a remnant out of the elided small-clause complement to a low-adjoined temporal connective. This is not the first analysis to propose that phrasal TACs are derived from a clausal source via ellipsis. I will look here at some alternatives made available in the literature, with a focus on some issues they encounter and how the present proposal avoids them.[13]

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[12] This analysis leaves several questions unanswered, and available space precludes engaging with those questions here. I would direct the reader to Overfelt 2018:sect. 2.3 for supplemental discussion.

[13] An anonymous reviewer points out that the data and analysis presented in section 3.1 have a number of similarities with what can be found in Yoshida 2013. Yoshida presents pairs of examples like those in (i), arguing that phrasal *like*Ps are reduced from a clausal source.

(i)   a.   Michael must not dance like Fiona.
   b.   Michael must not dance like Fiona danced.

This argument involves, in part, the observation that it is possible to interpret modals and negation in a phrasal *like*P but only when that *like*P can be interpreted higher on the verbal spine than those projections, namely at TP. This leads to an analysis of phrasal *like*Ps that involves movement of the remnant out of an elided TP. Yoshida claims that this TP can be elided under satisfaction of Merchant 2001's e-GIVENness by a TP or—provided it avoids antecedent containment—a VP.

3.2.1. Larson 1987

Larson 1987 suggests that reduced TACs represented by the string in (54a) arise from a derivation that circumvents an antecedent-contained-deletion configuration.

(54) a. John [$_{\bar{\text{I}}}$ arrived [O_1 before Max $\langle_{\bar{\text{I}}} e \rangle$]].

b. [O_1 before Max $\langle_{\bar{\text{I}}} e \rangle$]$_1$ [John [$_{\bar{\text{I}}}$ arrived t_1]]
 ⌞------------------- QR -------------------⌝

c. [O_1 before Max $\langle_{\bar{\text{I}}}$ arrived $t_1 \rangle$]$_1$ [John [$_{\bar{\text{I}}}$ arrived t_1]]
 ⌞------- LF copying -------⌝

(Adapted from Larson 1987:(47), 262)

The TAC is generated with an $\bar{\text{I}}$ constituent containing an empty category, as in (54a). Resolving the identity of the empty category requires the application of QR shown in (54b). This places the TAC in a position outside of its containing $\bar{\text{I}}$. In this position, the ellipsis site can be resolved through LF copying of the root $\bar{\text{I}}$ constituent into the TAC; see (54c). The idea, though not stated explicitly in Larson 1987, seems to be that the copied instance of the trace of the TAC comes to be bound by a covert operator O_1 within the TAC (see section 5.1).

The reader will find that the analysis that is ultimately presented in section 5 is quite similar to what is shown in (54). However, there are several reasons not to adopt this exact implementation. The first issue to observe with this analysis is that the ellipsis-resolution process targets an $\bar{\text{I}}$ node, a nonphrasal constituent. This runs counter to what seems to be the modern consensus that ellipsis deals in phrasal constituents. The analysis of TAC stripping that was proposed in section 3.1, on the other hand, asserts ellipsis of a phrasal constituent.

Second, the analysis presented in (54) proposes both that the elided constituent con-

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Choosing between the analysis in Yoshida 2013 and the analysis being presented, both for phrasal *like*Ps and phrasal TACs, must be left for a future occasion. However, it is worth keeping in mind that among the primary motivations for Yoshida's analysis, alongside the assumption that phrasal *like*Ps can only contain TPs, are the observations that phrasal *like*Ps can be interpreted at various positions on the verbal spine and that it is possible to interpret modals and negation in the deletion site. Section 3.1 argued that none of these are properties of reduced clausal TACs.

tains I^0 and that the reduced TAC is interpreted at the level of IP, equivalently referred to as S in Larson 1987. These proposals are at odds with the data available in the previous section. Recall that we were led to the conclusion that, in the case of TAC stripping, it is a constituent that is smaller than IP that is deleted. We were also led to conclude that a TAC targeted by TAC stripping is interpreted relatively low on the verbal spine, certainly lower than IP. These are observations that the analysis proposed in section 3.1 is designed to deliver.

3.2.2.   Thompson 2005

Thompson 2005 proposes an analysis of reduced TACs that avoids the issues of QR and traces. Ellipsis resolution involves LF copying, but the TAC is base generated as a TP adjunct:

(55)   a.   John left before Bill *e*.

   b.
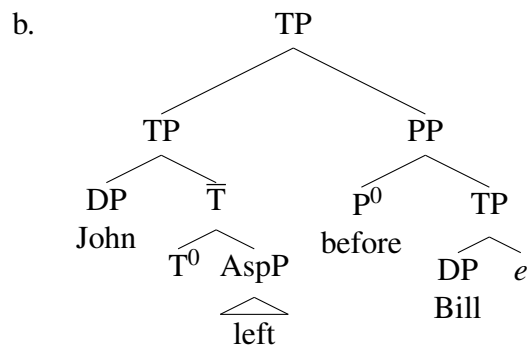
(Adapted from Thompson 2005:77, (45))

Thompson suggests that the ellipsis site is resolved by "copying (the lower segment of) TP into the ellipsis site" (p. 77). Copying the lower segment of the TP generates the following representation.

(56)   John left [PP before [TP Bill [TP John left]]].

It is not clear that this would be a legitimate representation. Seeing as it leaves *Bill* uninterpreted as an argument in the embedded clause, it would not obviously generate the intended interpretation, which is that John left and this happened before Bill left. It

seems that on this analysis it must be asserted instead that the root $\overline{\overline{\text{T}}}$ must be copied into the ellipsis site. Like Larson 1987, this analysis must assume ellipsis of a nonphrasal constituent and, for this reason, should be dispreferred to the analysis of TAC stripping being presented. We can add that this analysis also fails to reflect our findings regarding the size of the reduced TAC and its point of interpretation.

Another significant issue for both the analysis in Thompson 2005 and the analysis in Larson 1987 comes from the observation in section 2.1 that the remnant of a reduced TAC may be ambiguous given a transitive predicate. This ambiguity is not expected if truncated TACs are derived only by ellipsis of an $\overline{\text{I}}$ constituent as proposed by Larson or a $\overline{\overline{\text{T}}}$ constituent as required for Thompson. No material other than what appears in the grammatical subject position or higher would be expected to survive ellipsis. However, this is an expected property in the analysis of phrasal TACs presented in section 3.1. The interpreted grammatical role of the remnant is a consequence of its base-generated position within the elided clausal material.

Finally, the analysis in (55) admittedly presents a simpler derivation for reduced TACs than Larson 1987 and what will be presented in section 5.1. We will find, however, that there is significant explanatory power in asserting that TACs do undergo QR and leave behind traces.

3.2.3.   Conjunction Reduction

The analysis presented in Larson 1987 is motivated in part by the idea that it is possible to think of TACs as counterparts to comparatives like *earlier* and *later*. This basic intuition can in fact be traced as far back as Geis 1970:chap. 4, which noted a number of syntactic and interpretive similarities between these constructions. An alternative implementation of this idea could build from Lechner 2004, which argues that phrasal comparatives have a clausal source and are derived-coordination configurations:

(57)

```
                    IP
               ／        ＼
          DP₁              vP
          John        ／   |   ＼
                   vP     than    vP
                ／   ＼          ／   ＼
              t₁      VP       DP      VP
                    ／  ＼     Bill    ／ ＼
                  left earlier      left △
```
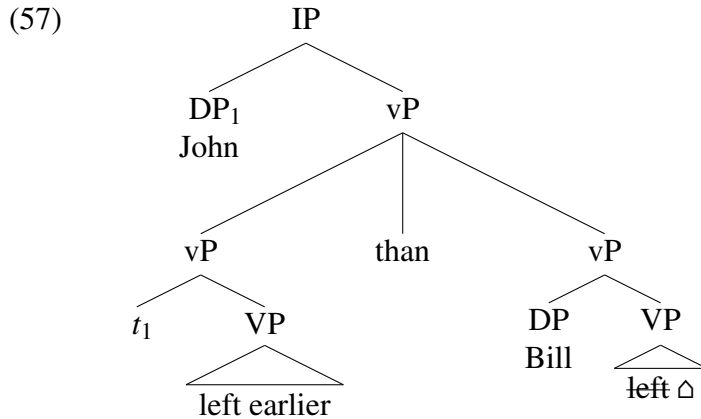
The argumentation that Lechner provides for this derived-conjunction analysis is based on the conclusion that comparative constructions can be targeted by across-the-board movement, gapping, stripping (as a form of gapping), and right-node raising. The reasoning is that these reduction processes only target conjunctions; therefore, comparative constructions at least can be conjunctions at a point in the derivation when these mechanisms apply.

A similar approach to reduced clausal TACs would reject the claim that they involve subordination. Instead, they would similarly be treated as (derived) coordinations that are possibly reduced via gapping, right-node raising, or across-the-board movement. As we will see presently, there are considerations that speak against this approach. TACs cannot be targeted by the full range of reduction mechanisms available to comparatives, they fail to display properties expected of coordinations, and the temporal connectives *before* and *after* show noncharacteristic properties of comparatives.

Concerning the reduction mechanisms, it has been argued that across-the-board movement and right-node raising do not exclusively appear in coordination configurations (see, for instance, Munn 1992, Postal 1993, 1994 on parasitic gaps). On the other hand, gapping has relatively uncontroversially been assumed to be impossible outside coordinations (Jackendoff 1971, Hankamer 1979). Therefore, the availability of gapping seems to be the strongest argument for a coordination treatment of comparatives and potentially for TACs. However, as pointed out by Lobeck 1995 and Penka & von Stechow 2011, only a single remnant is possible within the TAC. Con-

sider the following.

(58) a. Kim read the article and Sam ~~read~~ the book.

   b. Kim read the article earlier than Sam ~~read~~ the book.

   c. *Kim read the article before Sam ~~read~~ the book.

This paradigm can be taken to teach us two things. The first is that TACs do not tolerate gapping (58c), unlike coordinations and comparatives. This is consistent with the claim that these phrasal TACs are derived from a clausal source given that they are subordination configurations (cf. Penka & von Stechow 2011:441). Second, following Lechner 2004's reasoning, the failure of gapping to target TACs can be interpreted as evidence that TACs should not be treated on a par with either coordination or comparative configurations.

  Additional facts speak against equating TACs and coordinations, including their differing ability to appear clause initially in the following.

(59) a. *And he read the magazine, Tim read the book.

   b. After he read the magazine, Tim read the book.

To the extent that reduced clausal TACs require treatment as coordinations, the expectation is that they, too, should resist appearing clause initially. Instead, we find that reduced clausal TACs can appear clause initially. This is shown in (60), which suggests that they are not (derived) coordinations.

(60) After the magazine, Tim read the book.

Moreover, if reduced clausal TACs required treatment as coordination, we would expect that it would not be possible to extract from only the first conjunct. Assuming that the moved element does not come to bind a variable in the second conjunct, the result demonstrated by the full clausal examples in (61) would be a violation of the Coordinate-Structure Constraint (Ross 1967, Ruys 1992).

(61) a. *I know what$_1$ Kim read x_1 and she read the magazine.

   b. I know what$_1$ Kim read x_1 after she read the magazine.

This expectation is not borne out. The sentence in (62) shows that reduced clausal TACs behave like subordination structures with respect to extraction.

(62)   I know what$_1$ Kim read x_1 after the magazine.

Despite their actual and intuitive similarities, there is also reason to think that *before* and *after* are not counterparts to the comparatives *earlier* and *later*. For example, a seemingly ubiquitous property of comparatives is their ability to license negative-polarity items (NPIs), like *anyone* in (63). However, it has been known at least since Geis 1970 that, while *before* licenses NPIs, *after* does not. The contrast is shown in (64) for both full clausal and reduced clausal variants.

(63)   a.   Meg left later than anyone else (left).
        b.   Bob ate earlier than anyone else (ate).

(64)   a.   *Meg left after anyone else (left).
        b.   Bob ate before anyone else (ate).

To this we can add the asymmetry between *after* and *before* in the scope they can bear relative to sentential negation. Section 3.1.2 demonstrated that clausal *after*Ps may be interpreted either above or below sentential negation. It was observed in footnote 11, however, that clausal *before*Ps strongly resist being interpreted above sentential negation. Comparatives, on the other hand, are generally thought to be scopally inert with respect to negation (e.g., Heim 2000).

Finally, Geis observes (pp. 143–146) what he refers to as the Verb-Verb Constraint, which describes the dispreference for mismatched verbs in the comparative and root clauses of sentences like the following.

(65)   a. ??Joe left later than he ate.
        b. ??Joe left earlier than he ate.

No account is provided for this constraint. However, my intuition and that of several linguists and nonlinguists is that (65) can be improved by placing a pitch accent on the verbs. This may be taken to suggest that (65) is a case of comparative subdeletion.

Regardless, the relevant observation is that no such oddity arises in the corresponding TACs:

(66)   a.   Joe left after he ate.

        b.   Joe left before he ate.

The verb of the root clause and TAC can mismatch without any particular prosodic licensing.

In sum, both full and reduced clausal TACs display properties indicating that they are syntactically distinct from more usual instances of comparatives and coordinations. These conclusions will guide the remainder of the article as we attempt to account for the distribution of reduced clausal TACs under the analysis of TAC stripping presented in this section.[14]

4.   The Eliminative Puzzle of TAC Stripping

In this section we turn to constraints on the distribution of reduced clausal TACs. As we will see, their distribution can be described by the constraint in (4), repeated here.

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[14] We are now in a position to comment on the remaining argument from Penka & von Stechow 2011 for a direct analysis of phrasal TACs in English. Penka & von Stechow point out that phrasal TACs cannot contain more than one constituent in addition to the temporal connective:

(i)   *Mary drank the beer after Peter ~~drank~~ the whiskey.

(Adapted from Penka & von Stechow 2011:441, (27a))

The argument they present is that this contrasts with phrasal comparatives, which do allow multiple remnants or, in other terms, permit gapping (Lobeck 1995, Lechner 2004). On the reduction account of phrasal TACs being proposed here, this should follow from whatever disallows gapping in subordination structures (section 3.2.3). To the extent that pseudogapping would be suspected to generate additional remnants (e.g., Takahashi 2004, Gengel 2013), we can understand why it fails to do so in reduced TACs. Object shift could be assumed to be too local to escape the ellipsis operation. Assuming that the remnant of TAC stripping is generated by heavy-NP shift, a second remnant will also be ruled out by whatever is responsible for the constraint against multiple heavy-NP shift:

(ii)   a.   Kim gave her friends x_1 this morning — some coffee$_1$.

        b.   *Kim gave y_2 x_1 this morning — her friends$_2$ some coffee$_1$.

(67)   No Asymmetric Embedding

A TAC-stripping site and its antecedent must be at the same level of embedding.

This constraint encompasses the idea that, given the analysis of TAC stripping, the interpretation of a reduced clausal TAC cannot be resolved to any other predicate than the one it modifies. The next two subsections will establish this empirical generalization. The third subsection acknowledges the resemblance this constraint shares with observations made in the literature regarding gapping and various bare-argument ellipses; I will argue that available approaches for those constructions are not suited for TACs, given their resistance to being treated as coordinations and to being anaphoric to implicit question meanings.

4.1.   *The Distribution of Clausal Temporal Adverbs*

As is commonly thought to be the case for other adjuncts, utterance-final clausal TACs may be ambiguous with respect to their point of adjunction on the clausal spine in multiclausal constructions. The string in (68) provides a relevant example.

(68)   Kim heard that Sue left after Joe left.

On one bracketing of the string in (68), the TAC *after Joe left* is a constituent of the embedded clause. This constituency generates an interpretation whereby the TAC modifies the event of Joe leaving. This is shown in (69). I will refer to this as the *embedded interpretation*.

(69)   Embedded interpretation

Kim heard [$_{CP}$ that Sue left after Joe left].
'Kim heard that, after Joe left, Sue left.'

On an alternative bracketing, the TAC is a constituent of the embedding clause. The interpretation is one where the TAC modifies the event of Kim hearing about the fact regarding Sue, as shown by (70). I will refer to this as the *matrix interpretation*.

(70)   Matrix interpretation

Kim heard [$_{CP}$ that Sue left] after Joe left.

'After Joe left, Kim heard that Sue left.'

That these interpretations indeed correspond to the proposed bracketings is supported by basic constituency diagnostics. Replacing the embedded clause with a proform would presumably remove the structure that hosts the clausal TAC, and the embedded interpretation should become unavailable. This expectation is realized in the following example.

(71)   Kim heard it after Joe left.

a.   ≠ 'Kim heard that, after Joe left, Sue left.'

b.   = 'After Joe left, Kim heard that Sue left.'

A structural account of the observed ambiguity also predicts a correlation between the TAC's interpretation and bound-variable interpretations of pronouns inside the TAC. The matrix reading of the TAC should not permit a variable in the TAC to be bound by the embedded subject, on account of its being interpreted outside the scope of the embedded subject. The example in (72) is provided to show that this prediction is borne out.

(72)   Kim heard that no one$_1$ left after his$_1$ boss left.

a.   = 'Kim heard that, for no person x, after x's boss left, x left.'

b.   ≠ 'After x's boss left, Kim heard that, for no person x, x left.'

We are also led on this account to the expectation that either reading will be available if it is the matrix subject that binds a pronoun in the TAC. The example in (73) is provided to show that this prediction is borne out.

(73)   No one$_1$ heard that Kim left after his$_1$ boss left.

a.   = 'For no person x, x heard that, after x's boss left, Kim left.'

b.   = 'For no person x, after x's boss left, x heard that Kim left.'

These observations support what is likely to be the unsurprising conclusion that the height of adjunction of a TAC determines its modification relationship.

4.2.   *The Distribution of Reduced Temporal Adverbs*

We have already seen, in section 3.1.2, one way in which the distribution of reduced clausal TACs differs from their full clausal counterparts. We will see here that the divergence of the two distributions goes further.

The previous subsection considered strings like in (74a), observing that the clausal TAC is ambiguous with respect to its point of adjunction on the verbal spine. The string in (74b) differs minimally in that it contains a reduced clausal TAC.

(74)   a.   Kim heard that Sue left after Joe left.

   b.   Kim heard that Sue left after Joe.

The string in (74b) is not ambiguous in the same way as its counterpart in (74a). On the one hand, the reduced clausal TAC can be paired with the embedded interpretation, which we expect to arise from the bracketing in (75) along with the application of TAC stripping that is illustrated.[15]

(75)   Kim heard [$_{CP}$ that Sue left after Joe $\langle_{vP}$ ~~left~~$\rangle$].
   = 'Kim heard that, after Joe left, Sue left.'

Missing from this string, on the other hand, is the matrix-level interpretation that is illustrated in the following.[16]

(76)   *Kim heard [$_{CP}$ that Sue left] after Joe $\langle_{vP}$ ~~left~~$\rangle$.
   $\neq$ 'After Joe left, Kim heard that Sue left.'

This is not to say that a reduced clausal TAC must adjoin to an embedded position or

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[15] Here and in the following sections I will represent the ellipsis site in TAC stripping constructions with the finite form of the predicate, contra the claims made in section 3.1.1. This is purely to ease the comparison of these examples with their nonreduced counterparts.

[16] A familiarity with Wurmbrand 2017 might lead one to wonder if the presence of the complementizer *that* is to blame for the grammaticality patterns documented in this subsection. In all cases to be investigated, the presence or absence of *that* does not affect grammaticality.

that TAC stripping cannot target an embedded TAC. As shown in (77), matrix-level modification of a reduced clausal TAC is possible when the meaning of the TAC-stripping site is resolved to the matrix predicate.

(77)   Kim heard [$_{CP}$ that Sue left] after Joe ⟨$_{vP}$ ~~heard that Sue left~~⟩.
        = 'After Joe heard that Sue left, Kim heard that Sue left.'

The contrast between the examples in (76) and (77) is rather telling. It seems to suggest that a matrix-adjoined adjoined TAC can be targeted for TAC stripping but that the TAC-stripping site is necessarily resolved to the clause that it modifies. It is possible to provide a similar description of the contrast between (75) and the following example.

(78)   *Kim heard [$_{CP}$ that Sue left after Joe ⟨$_{vP}$ ~~heard that Sue left~~⟩].
        ≠'Kim heard that, after Joe heard that Sue left, Sue left.'

The intended interpretation of this string, which is unavailable, is one in which the TAC modifies the embedded predicate but the TAC-stripping site is resolved to the matrix predicate.

That this is the correct description of the facts is corroborated by the following example.

(79)   Kim heard [$_{CP}$ that Sue left after Joe heard that Sue left].
        = 'Kim heard that, after Joe heard that Sue left, Sue left.'

This string provides the clausal variant of the example in (78) and is grammatical on the intended interpretation. This suggests that it is not the bracketing itself that results in the ungrammaticality observed in (78). Instead, it is the phrasal TAC—and presumably the particular application of TAC stripping—that is disallowed under this bracketing.

4.3.   *Section Summary and Discussion*

The discussion in the previous two subsections is summarized by table 1, which shows the available interpretation of a TAC-stripping site as a function of the point of adjunction of the reduced TAC. A way to understand these facts, which is represented by the No Asymmetric Embedding condition, is that a TAC-stripping site in a reduced TAC is

Adjunction	Antecedent	TAC stripping
Matrix	Matrix	✓ (77)
Matrix	Embedded	* (76)
Embedded	Matrix	* (78)
Embedded	Embedded	✓ (75)

Table 1: Source of antecedent for TAC stripping as a function of adjunction site

necessarily resolved to the vP that it directly modifies.

This behavior is reminiscent in certain ways of effects observed for gapping and stripping.[17] Johnson 2009 proposes that an inability to embed the antecedent of gapping is a property one would expect if gapping involved coordination of vPs and across-the-board extraction of VPs, a proposal given slightly more substance in Johnson 2019. In a response to Johnson 2009, Toosarvandani 2016 proposes that a requirement for conjoined vPs to have parallel focus structures is the source of gapping's apparent inability to identify an embedded antecedent.

Setting the precise details of these proposals aside, neither of them is suited to be applied to constraints on TACs. Recall from section 3.2.3 that reduced clausal TACs are not amenable to treatment as coordination structures. Thus, any constraint on conjoined vPs, as in Toosarvandani 2016, will not be applicable. These observations, if correct, also preclude an analysis of phrasal TACs that employs VP extraction, across-the-board or otherwise, as in Johnson 2009. Postal 1993 catalogs a significant amount of evidence that across-the-board extraction is not possible in subordination structures and, moreover, that only nominal constituents can license parasitic gaps in such structures.

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[17] It is possibly tempting to analogize the data investigated in this section to the familiar constraints against embedding a gapping or stripping site under another predicate (Hankamer 1979, Lobeck 1995, Johnson 2019), which have been counterexemplified by Weir 2014a and Wurmbrand 2017. Space precludes providing a full discussion of such examples, but the reader might confirm that examples like (i) are at least consistent with the analysis in section 5.3. (See Overfelt 2018:fn. 6 for additional comments.)

(i)   *Kim left [after Sue made [Joe ⟨$_{vP}$ ~~leave~~⟩]].

   a.   ≠ 'After a time t such that at t Sue made Joe leave, Kim left.'
   b.   ≠ 'After a time t such that Sue made Joe leave at t, Kim left.'

In the puzzle being presented in this article we are interested in the impossibility of embedding a phrasal TAC inside the predicate that resolves its meaning.

An alternative idea entertained by Johnson 2019 is to make these constraints follow from models of the identity and recoverability conditions on ellipsis that require antecedence by a possibly implicit question meaning in the discourse; such models can be found in AnderBois 2011 and Barros 2014 for sluicing and in Weir 2014a for fragment answers, which arguably are a species of bare-argument ellipsis (cf. Progovac 2013). Again, details aside, there is reason to disprefer this type of account for TAC stripping. Speaking, for concreteness, in terms of the *question under discussion* (QUD; Büring 2003, Roberts 2012), diagnostics presented in Tonhauser 2012 suggest that the content of TACs is not-at-issue with respect to the QUD.[18]

For example, Tonhauser 2012:sect. 3.2 proposes that QUD-not-at-issue content cannot solely address the QUD. In (80), the QUD is proffered explicitly. Under standard theories of question–answer congruence (e.g., Rooth 1992a, Roberts 2012), a felicitous answer would have the form of a proposition in $\{p : p = x \text{ left} \mid x \in D_e\}$. A proposition of the appropriate shape is provided by B in the content of the TAC, but B's utterance fails to felicitously provide this as an answer. In comparison, when an appropriate answer appears in the root clause, as is the case in the response from B′, the utterance provides a felicitous answer, modulo Quantity and Relevance implicatures perhaps.

(80)   A: Who left?

      B: #Tom started reading before Sue left.

      B′:   ?Sue left before Tom started reading.

In a related diagnostic, Tonhauser 2012:sect. 3.3 proposes that QUD-not-at-issue content cannot determine the relevant set of alternatives for the QUD. The polar question in (81) cannot be interpreted as a request for answers of the form {*Sue left*, *Sue*

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[18] It is worth noting that the claim is not that the TAC as a whole cannot be QUD-at-issue content, nor is it that the TAC cannot be part of some larger QUD-at-issue content. That these are possibilities is reflected by the fact that a clausal or phrasal TAC is one way to provide an answer to a question:

(i)   A: When did Matt leave?

      B: Matt left before Phil (left).

      B′:   Matt left before dinner.

The suggestion, again, is that the content embedded inside the TAC is QUD-not-at-issue.

didn't leave}. This is evidenced by the infelicity of providing a positive answer with the corresponding positive alternative, as done by B. The response from B′ shows that the content of the root clause, on the other hand, can felicitously provide the form of the alternatives for the question.

(81)   A: Did Tom start reading before Sue left?
        B: #Yes, she left.
        B′: ?Yes, he started reading.

These differences between the content of a TAC and the content of the root clause suggest that the content of a TAC has a different status in the discourse. Specifically, the content of a TAC is QUD-not-at-issue content.[19] Thus, it is not clear that defining identity and recoverability conditions on TAC stripping that require anaphoricity to a salient question meaning is a desirable way of modeling ellipsis here. This in turn casts doubt on the ability of such a condition to derive the No Asymmetric Embedding condition. Therefore, the following section will turn to providing an alternative analysis of these observations.

5.   Ellipsis Bleeds Phrase-Structure Representations
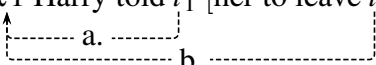
The analysis presented in this section attempts to attribute the No Asymmetric Embedding condition (67) to the ability to satisfy an identity requirement on ellipsis. This account builds on what is found in Takahashi 2008. However, as we will come to see, the accounts generate different predictions which ultimately favor the approach presented here. I will start by making more explicit the proposed treatment of TACs. I will then introduce the identity condition on ellipsis to be adopted and demonstrate its use in vanilla instances of TAC stripping. The remainder of this section shows how these assumptions correctly rule out those instances of TAC stripping that violate the No Asymmetric Embedding condition.

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[19] In accord with the discussion in Simons et al. 2010 this could be seen as another way of saying that the content of a TAC is "softly" presupposed (e.g., Abrusán 2016). This is a claim that can be traced back to Hooper & Thompson 1973, which cites Keenan 1971 for the same observation. See Overfelt 2020a for additional discussion of the role of QUD-at-issueness in licensing ellipsis.

5.1.   TACs and the Identity Condition on Ellipsis

The analysis to follow capitalizes on a more articulated treatment of TACs proposed by Geis 1970. Geis observed that certain TACs, including those introduced by *before* and *after*, are potentially ambiguous with respect to the events they order. The example in (82), for instance, might order Joan's 'leaving' time before Harry's 'telling' time (82a) or before the 'leaving' time that Harry provided (82b).

(82)   Joan left [$_{\text{beforeP}}$ before λ1 Harry told t_1 [her to leave t_1]].

        a.   'Joan left before t such that at t Harry told her to leave.'

        b.   'Joan left before t such that Harry told her to leave at t.'

(Geis 1970:127, (42))

I will refer to this as the Geis ambiguity. For Geis, who was building on similar suggestions found in Ross 1964, this ambiguity revealed that TACs are effectively relative clauses for unexpressed nominal constituents. We will take a similar path and model this ambiguity by asserting the presence of a null-operator chain within the TAC, as in Larson 1990. This operator is base generated local to the predicate it modifies, moves to the edge of the clause embedded in the TAC, and leaves behind a variable (t_n). This is sketched in (82) for each interpretation.

Among the reasons to think that these examples are derived via movement is the sensitivity of the Geis ambiguity to the presence of island boundaries, as Geis pointed out. The example in (83) is similar to (82) but separates the temporal connective *before* from the predicate *leave* with a complex-NP boundary.

(83)   Joan left [$_{\text{beforeP}}$ before $\lambda 1$ Harry told t_1 her of [his desire [for her to leave t_1]]].

       a.   = 'Kim left before t such that at t Harry told her of his desire for her to leave.'

       b. $\neq$ 'Kim left before t such that Harry told her of his desire for her to leave at t.'

<div align="right">(Geis 1970:129, (55))</div>

While the sentence in (83) has an interpretation where Joan left before the time at which Harry expressed his desire, it lacks an interpretation where Joan left before the time for her to leave that Harry desired. In other words, the embedded interpretation is missing. This can be understood as an effect of a Complex-NP Constraint violation induced by movement of the postulated operator.

Regarding the base position of the temporal operator, Takahashi 2008 asserts that it is low enough on the verbal spine to be contained in the constituent targeted by VP ellipsis:[20]

(84)   Sue left [$_{\text{afterP}}$ after $\lambda 1$ Joe did ⟨leave t_1⟩].

Without saying more it is not clear that ellipsis should be possible in this example. It seems to be a condition on ellipsis that variables in the ellipsis and antecedent sites must be bound from parallel positions or, in the case that both are free, otherwise coreferent ((NP) Parallelism; Sag 1976, Heim 1997, Fox 2000, Thoms 2015, though see Roelofsen 2010). However, the elided constituent in the representation in (84) contains a bound variable that has no correlate in any available antecedent.[21] To address this

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[20] It is this assertion that we will take issue with in section 6, arguing that the base position of the temporal operator is inside the constituent targeted by TAC stripping but is outside the smaller constituent targeted by VP ellipsis.

[21] An anonymous reviewer rightly points out that the phenomenon of sprouting, notably discussed in Chung, Ladusaw & McCloskey 1995, might equally lead one to suspect that ellipsis should be possible in (84). For recent discussions of how to reconcile sprouting with a condition like Parallelism see Thoms 2015, Barros & Kotek 2019, and Overfelt to appear.

issue, Takahashi adopts the proposal, made independently by Larson 1987 and also Fox & Nissenbaum 2003, that TACs themselves undergo QR within their root clause:

(85) $[_{afterP}$ after $\lambda 1$ Joe did $\langle$leave $t_T\rangle]$ $\lambda 2$ Sue [left t_2]

The effect, shown in (85), is the introduction of a parallel temporal variable in the antecedent.

Incorporating these pieces into our account of phrasal TACs gives the representation in (86). The TAC undergoes an instance of covert movement that targets some functional projection (FP) outside the root vP. In accordance with the data presented in section 3.1.2, we can assume that this is still a relatively low position on the verbal spine.

(86)
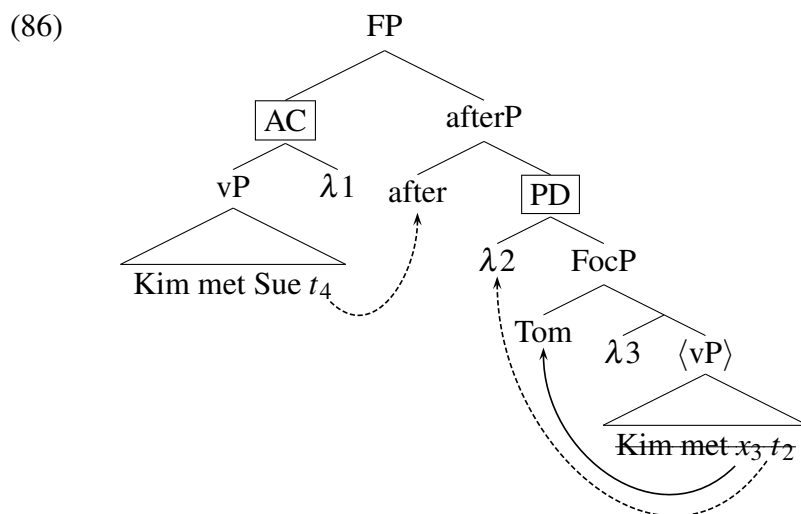
To understand how ellipsis is permitted in this representation we will adopt the focus-based semantic-identity condition in (87). This is a slightly modified version of what can be found in Rooth 1992a and Takahashi & Fox 2005.

(87)   Ellipsis of some XP is permitted only if:

    a.   there is a parallelism domain (PD) that contains XP,

    b.   there is an antecedent constituent (AC), and

    c. $[\![AC]\!]^o \subseteq [\![PD]\!]^f$ for any variable-assignment function g.

In prose, (87) says that a constituent (XP) may be elided on the condition that it is contained within some constituent (PD) whose focus semantic value, given any assignment function g, includes as a subset the ordinary semantic value of some antecedent constituent (AC). As per the discussion in 4.3, we are assuming that the AC for TAC stripping must be found in the overt syntax because the content of TACs cannot obviously be anaphoric to implicit question meanings. The focus semantic value of a constituent is the set of alternatives that are derived by replacing focus-marked elements—which, in a reduced clausal TAC, include the remnant—with their type-matching alternatives.

In (88) we can see how to apply the identity condition in (87) to the example in (86).

(88)   a. $[\![AC]\!]^o = \lambda t . \text{Kim met Sue at } t$

    b. $[\![PD]\!]^f = \{p : p = \lambda t . \text{Kim met } x \text{ at } t \mid x \in D_e\}$

    c. $[\![AC]\!]^o \subseteq [\![PD]\!]^f$ for any g. Ellipsis is permitted.

Given the presence of bound variables in the elided $\langle vP \rangle$, it will be necessary to define the PD as the node directly dominating the binder $\lambda 2$, which contains the binders for both elided variables. Only this will guarantee that an AC can be identified that, under any variable-assignment function, will have an ordinary semantic value that is a subset of the computed alternative set of the PD. The constituent that contains the binder $\lambda 1$ for the trace of the TAC provides an appropriate AC. Therefore, with respect to the identity condition on ellipsis, ellipsis of $\langle vP \rangle$ is permitted and a TAC-stripping configuration emerges.

5.2.   *Antecedent-Contained TAC Stripping*

We are now prepared to turn to the analysis of the No Asymmetric Embedding condition stated in (67) and visualized in table 1. Let us start, in this subsection, by considering

the interpretations available to reduced TACs that are adjoined to embedded clauses.

As per the No Asymmetric Embedding condition, the interpretation of the embedded reduced TAC in (89) cannot be resolved to the matrix predicate.

(89)   a.   *Kim heard [$_{CP}$ that Sue left after Joe $\langle_{vP}$ ~~heard that Sue left~~$\rangle$].

b.
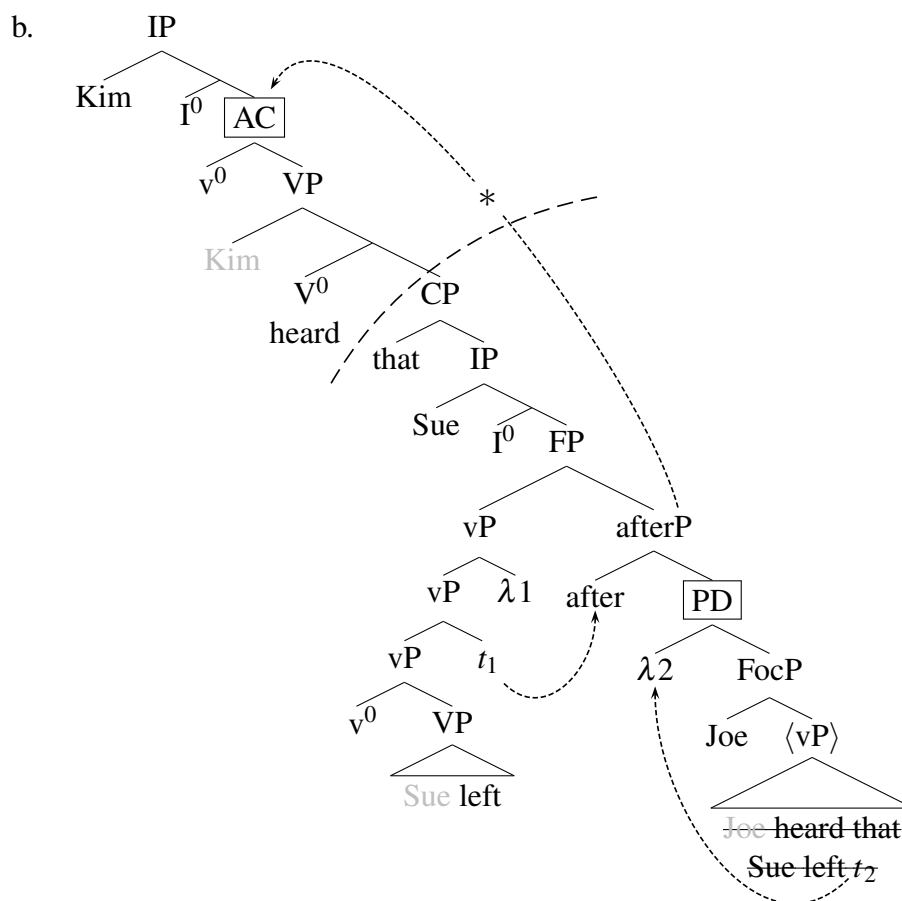
Given the ellipsis-based analysis of phrasal TACs that is motivated in sections 2 and 3, the ungrammaticality of this example can be understood straightforwardly as an instance of irreparable antecedent containment that precludes the possibility of ellipsis. The general finite-clause boundedness of QR means the phrasal TAC in (89) will be trapped in the embedded clause and unable to escape the attempted antecedent. As (90) shows, the calculation of identity is expected to fail.

(90)   a. $[\![AC]\!]^o = $ Kim heard that Sue left at t after Joe heard that Sue left at t'

   b. $[\![PD]\!]^f = \{p : p = \lambda t \, . \, x \text{ heard that Sue left at } t \mid x \in D_e\}$

   c. $[\![AC]\!]^o \nsubseteq [\![PD]\!]^f$ for any g. Ellipsis is not permitted.

The intended AC does not have an ordinary semantic value that is included in the focus semantic value of the PD. Thus, it is because the attempted application of ellipsis fails that a TAC with this content cannot be adjoined to this position.

   The available interpretation for the string in (89) (with the bracketing shown) is one in which the ellipsis site is resolved to the embedded predicate. The relevant example is provided again in (91) along with a partial representation that includes just the embedded clause.

(91)   a.   Kim heard [$_{CP}$ that Sue left after Joe $\langle_{vP} \text{left}\rangle$].

   b.
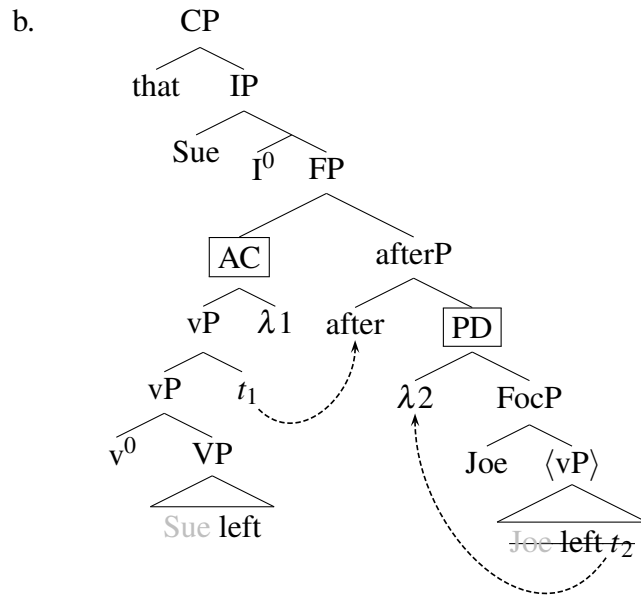
The present analysis predicts the contrast on account of the fact that it is possible to identify an AC in this representation that does not contain the PD containing the elided constituent. The calculation of the identity for the purpose of ellipsis is as follows.

(92) a. $\llbracket AC \rrbracket^o = \lambda t \,.\, \text{Sue left at } t$

  b. $\llbracket PD \rrbracket^f = \{p : p = \lambda t \,.\, x \text{ left at } t \mid x \in D_e\}$

  c. $\llbracket AC \rrbracket^o \subseteq \llbracket PD \rrbracket^f$ for any g. Ellipsis is permitted.

As in section 5.1, the PD will be required to contain the binder for the temporal-operator variable inside the TAC. Unlike what we saw for (89), an acceptable AC can be identified that is included in the set of focus alternatives that can be derived from the PD. Consequently, ellipsis is permitted.

5.3. Nonparallel Variable Binding

We turn now to the interpretations available to phrasal TACs that are adjoined to the matrix clause. In (93) is the proposed representation for the attempt to modify the matrix vP with a phrasal TAC and resolve the ellipsis site to an embedded vP.

(93) a. *Kim heard [$_{CP}$ that Sue had left] after Joe $\langle_{vP}$ ~~left~~$\rangle$.

  b.
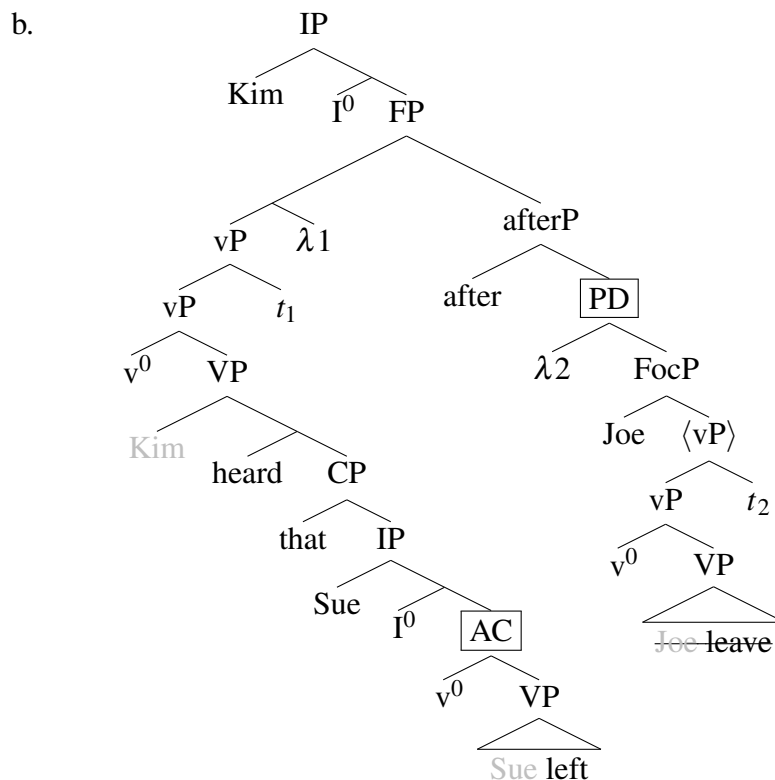
The ungrammaticality of (93) is not obviously expected. It could not, on any theory of ellipsis licensing, be attributed to antecedent containment of the ellipsis site or of a constituent containing the ellipsis. As noted in section 4.3, several analyses have attempted to tie similar effects in other domains to something besides the ability to permit ellipsis. I propose that, in the case of reduced clausal TACs, the ungrammaticality being observed represents a failure to satisfy the identity condition on ellipsis. What does the work here—much as in Takahashi 2008—is the temporal operator–variable relationship that we have seen is present in the TAC. Because the TAC serves to modify the matrix predicate, it will be generated in a position adjoined to a projection of the matrix predicate. The relevant effect is that there will be no parallel temporal operator–variable relationship in the complement clause from which the AC is pulled.

It is the absence of this operator–variable chain that disrupts the calculation of identity. The necessary PD for licensing ellipsis will be the same as we just saw in (91). An antecedent must be found for a constituent that contains the binder for the trace of the temporal operator. Because of the absence of a parallel operator–variable relationship in the complement clause, however, there is no appropriate AC in the representation provided in (93). As shown in (94), the nearest possible AC that can be identified is not a member of the set of focus alternatives derived from the PD for the elided constituent.[22]

(94)   a. $[\![AC]\!]^o$ = Sue left
       b. $[\![PD]\!]^f = \{p : p = \lambda t \,. x \text{ leave at } t \mid x \in D_e\}$
       c. $[\![AC]\!]^o \nsubseteq [\![PD]\!]^f$ for any g. Ellipsis is not permitted.

As with (89), a TAC with this particular content cannot be adjoined to this position on the verbal spine because the attempted application of ellipsis fails.

Again, the linear string under consideration here (with the bracketing shown) is not unavailable. As per No Asymmetric Embedding, the available interpretation is one in

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[22]Even assuming that VPs, or their extended projections, always contain a temporal variable, there would still not be a parallel temporal variable–operator relationship in (93) for the calculation of identity with the necessary PD. See section 6 for further discussion.

which the ellipsis site is resolved to the matrix predicate:

(95)   a.   Kim heard [$_{CP}$ that Sue left] after Joe ⟨$_{vP}$ ~~heard that Sue left~~⟩.

b.
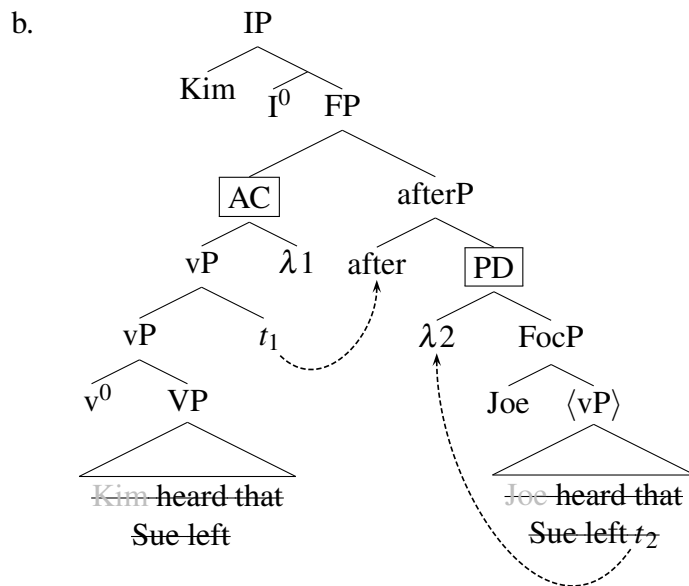
The PD for which an appropriate AC must be found must still contain the binder for the elided temporal variable. However, the focus alternatives derived from this constituent, given the shape of the elided content, will now include the ordinary semantic value of the AC that is indicated in (95). As shown in (96), it is determined that ellipsis is permitted on the intended interpretation.

(96)   a. $[\![AC]\!]^{o} = \lambda t$. Kim heard at t that Sue left
       b. $[\![PD]\!]^{f} = \{p : p = \lambda t . x$ heard at t that Sue left $\mid x \in D_{e}\}$
       c. $[\![AC]\!]^{o} \subseteq [\![PD]\!]^{f}$ for any g. Ellipsis is permitted.

At this point we can appreciate a specific prediction that this analysis makes with respect to the effect of TAC stripping on the Geis ambiguity. The requirement for parallel operator–variable binding that the identity condition in (87) enforces leads us to expect that TAC stripping will also have an eliminative effect on the point of adjunction for the temporal operator inside the TAC and, therefore, on its possible interpretations. More plainly, this analysis predicts that the temporal operator cannot be generated as

a modifier of the embedded 'leaving' event within the TAC in (95). As shown in (97), the resulting nonparallel binding chains in the PD and AC are expected to disrupt the adopted identity condition.

(97) a. $[\![AC]\!]^o = \lambda t \,.\, \text{Kim heard at } t \text{ that Sue left}$

b. $[\![PD]\!]^f = \{p : p = \lambda t \,.\, x \text{ heard that Sue left at } t \mid x \in D_e\}$

c. $[\![AC]\!]^o \not\subseteq [\![PD]\!]^f$ for any g. Ellipsis is not permitted.

This prediction is borne out. To see this, let us first convince ourselves that we observe the Geis ambiguity in the kind of TAC under consideration. This is demonstrated in the slightly simplified example in (98), wherein Sue's 'leaving' time is ordered after either the time at which Joe heard something or the time of Sue's leaving that Joe heard about.

(98) Sue left [$_{\text{afterP}}$ after $\lambda 1$ Joe heard t_1 [$_{\text{CP}}$ that she left t_1]].

a. = 'Sue left after t such that Joe heard at t that she left.'

b. = 'Sue left after t such that Joe heard that she left at t.'

Consider again the example in (95), which is given here with the relevant interpretations.

(99) Kim heard [$_{\text{CP}}$ that Sue left]

[$_{\text{afterP}}$ after $\lambda 1$ Joe ⟨$_{\text{vP}}$ heard t_1 [$_{\text{CP}}$ that she left t_1]⟩].

a. = 'Kim heard at t that Sue left and t is after t' such that Joe heard at t' that Sue left.'

b. ≠ 'Kim heard at t that Sue left and t is after t' such that Joe heard that Sue left at t'.'

As indicated, the embedded interpretation for the temporal operator in the reduced TAC in (99) is unavailable, as expected. The sentence cannot express a meaning in which there is some time at which Sue left that Joe heard about, and this 'leaving' time follows a time at which Kim heard about Sue's leaving. This supports the proposed analysis

of TAC stripping as an instance of ellipsis. It also provides further support for the treatment of the No Asymmetric Embedding condition as a symptom of impermissible ellipsis caused by nonparallel temporal-operator chains.

6. The VP-Ellipsis Puzzle

Having taken an ellipsis approach to accounting for the restricted distribution of reduced TACs, we turn now to a second, yet still familiar puzzle. As has been observed previously, VP ellipsis is not subject to the No Asymmetric Embedding condition. This distinguishes it from gapping and stripping, and now from the TAC-stripping operation that has been identified in phrasal TACs. It is also not obviously a result that is expected from the analysis presented in the preceding sections or the analysis of TACs presented in Takahashi 2008. After establishing this extended paradigm, I will argue that the data reflect the fact that VP ellipsis targets a smaller constituent for ellipsis than does TAC stripping.

6.1. The Extended Paradigm

Let us consider first the interpretations available to a VP-ellipsis site inside of a TAC that is adjoined to an embedded clause:

(100)   *Kim heard [CP that Sue left after Joe did ⟨hear that Sue left⟩].
        'Kim heard that, after Joe heard that Sue left, Sue left.'

(101)   Kim heard [CP that Sue left after Joe did ⟨leave⟩].
        'Kim heard that, after Joe left, Sue left.'

As (100) shows, this configuration does not allow the VP-ellipsis site to be resolved to the matrix predicate. It is possible, on the other hand, for the VP-ellipsis site to be resolved to the embedded predicate, as in (101). This pattern mirrors what we saw in section 4 for TAC stripping and is not necessarily a surprising finding. The structure and interpretation in (100) are expected to be unavailable as another instance of irreparable antecedent containment. If, on the other hand, an antecedent is pulled from the embedded predicate, as in (101), it should be possible to avoid antecedent containment and satisfy the identity condition on ellipsis.

Adjunction	Antecedent	TAC stripping	VP ellipsis
Matrix	Matrix	✓ (77)	✓ (102)
Matrix	Embedded	* (76)	✓ (103)
Embedded	Matrix	* (78)	* (100)
Embedded	Embedded	✓ (75)	✓ (101)

Table 2: Source of antecedent for TAC stripping and VP ellipsis as a function of adjunction

The puzzle arises from the observation that a TAC adjoined to the matrix clause allows a wider range of interpretations for a VP-ellipsis site than we observed for a TAC-stripping site. The relevant data points are the following.

(102)   Kim heard [CP that Sue left] after Joe did ⟨hear that Sue left⟩.
        'After Joe heard that Sue left, Kim heard that Sue left.'

(103)   Kim heard [CP that Sue left] after Joe did ⟨leave⟩.
        'After Joe left, Kim heard that Sue left.'

In (102) we see that the VP-ellipsis site in this configuration can be resolved to the matrix predicate, which we also saw is possible in the context of TAC stripping. It is the grammaticality of examples like (103) that distinguish VP ellipsis from TAC stripping. In this example, the VP-ellipsis site is contained in a TAC adjoined to the matrix clause and is resolved to the embedded predicate. The state of affairs is summarized in table 2.

As pointed out above, the similarities between TAC stripping and VP ellipsis in embedded environments are expected and understood under an ellipsis-based account of these phenomena. What is unexpected is the ability of a VP-ellipsis site in a matrix-modifying TAC to find an embedded antecedent (103). Recall that section 5.3 blocked this possibility in the context of TAC stripping by asserting that the presence of a temporal-operator chain in the TAC, which is not paralleled by a similar relationship in the embedded clause, precludes the identification of an appropriate AC. The same should be true in the context of VP ellipsis if, as suggested by Takahashi 2008, VP

ellipsis also targets a constituent that contains the trace of the temporal operator in the TAC.

I will argue in what follows that we should no longer maintain the idea that the VP-ellipsis site contains the trace of the temporal-operator variable. The effect we will see is that, in the context of VP ellipsis, it is possible to search for a smaller AC, which the embedded clause is able to provide.

6.2. VP Ellipsis versus TAC Stripping

The asymmetry just identified can be made to follow, I argue, from the assertion that VP ellipsis is ellipsis of a smaller constituent than what is elided in TAC stripping. The basic idea finds support from a few additional asymmetries between the two ellipsis operations.

The first is relatively familiar from the recent literature regarding the size of VP ellipsis relative to other instances of ellipsis (e.g., Merchant 2013). The voice feature that is interpreted in a VP-ellipsis site can differ, under certain circumstances, from the voice feature that is present in the antecedent constituent. Representative examples are the following

(104)   a.   ?The photos must be found before the police do $\langle_{\text{VP}}$ ~~find them~~$\rangle$.

       b.   ?The camera can still be used after the photographer does $\langle_{\text{VP}}$ ~~use it~~$\rangle$.

In the minimally differing examples that involve TAC stripping in (105), the same kind of mismatch is not tolerated to the same degree.

(105)   a.   *The photos must be found before the police$_1$ $\langle_{\text{vP}}$ ~~x_1 find them~~$\rangle$.

       b.   *The camera can still be used after the photographer$_1$ $\langle_{\text{vP}}$ ~~x_1 uses it~~$\rangle$.

The contrast can be taken to indicate a difference in the size of the elided constituent. As Merchant 2013 suggests, VP ellipsis elides a constituent below the head responsible for the voice properties of a predicate. Thus, the voice features in the root-clause predicate and the TAC are not subject to any kind of identity constraint and can vary in the way shown above. TAC stripping, on the other hand, we can assert is ellipsis of a constituent that does contain the relevant voice head. Therefore, the TAC-stripping site must find

an antecedent with an identical value for voice.

An anonymous reviewer provides an argument in a similar spirit that is based on discussion from Sailor 2014:sect. 1.4.2. The relevant observation, provided in (106), is that VP ellipsis inside of a TAC permits a strict interpretation when provided a reflexive antecedent VP.[23]

(106)   Lea will slap herself before Jane will.

     a.   Sloppy: 'Lea will slap herself before Jane will slap herself.'

     b.   Strict: 'Lea will slap herself before Jane will slap Lea.'

For Sailor, who builds upon work in Ahn 2011, this can be seen as a product of the size of the constituent targeted by VP ellipsis. Asserting that reflexivity is encoded on a low functional head, namely the same head that encodes voice, Sailor argues that it is because VP ellipsis in (106) targets a constituent below this head that a mismatch in reflexivity is possible. This mismatch gives rise to the strict interpretation. To the extent that TAC stripping is deletion of a constituent larger than that targeted by VP ellipsis and includes the head that encodes voice/reflexivity, TAC stripping should disallow analogous strict interpretations. The reviewer provides the example in (107) to show this prediction borne out.

(107)   Mary slapped herself before Sue.

     a.   Sloppy: 'Mary slapped herself before Sue slapped herself.'

     b. *Strict: 'Mary slapped herself before Sue slapped Mary.'

Finally, note that when both the antecedent and ellipsis site are in the passive voice, as in (108), the passive auxiliary can escape VP ellipsis.

(108)   a.   The photos must be found

                  before the documents$_1$ must (be) $\langle_{\text{VP}}$ ~~found x_{T}~~$\rangle$.

     b.   The trash should be emptied

                  after the recycling$_1$ should (be) $\langle_{\text{VP}}$ ~~emptied x_{T}~~$\rangle$.
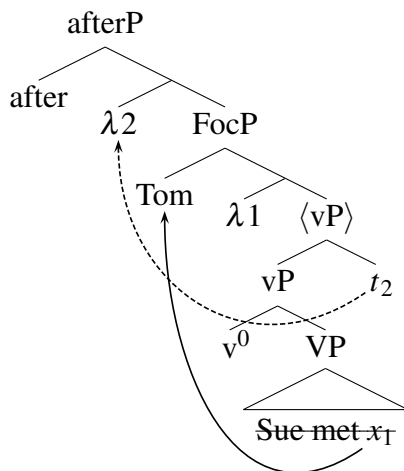
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[23] This notably contrasts with VP ellipsis in coordinations, which does not so readily permit sloppy interpretations, as shown in Hestvik 1995. See Sailor 2014 for a discussion of the full paradigm.

This can be taken to reveal that VP ellipsis may in fact target various different kinds of constituents, including one that does not contain the passive auxiliary (e.g., Sailor 2014). However, we do not find the same kind of variability with TAC stripping. The examples in (109) show that it is not possible for the passive auxiliary to escape a TAC-stripping site.
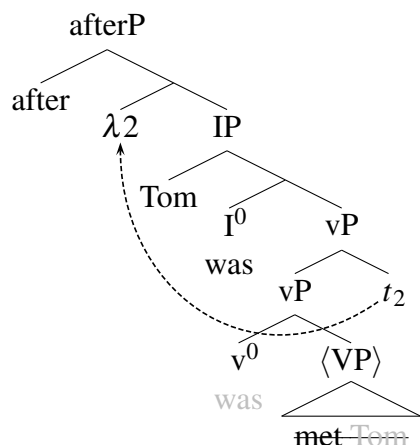
(109)   a.   The photos must be found before the documents (*being) $\langle_{vP}$ ~~found x_T~~$\rangle$.
         b.   The recycling should be emptied

before the trash$_1$ (*being) $\langle_{vP}$ ~~emptied x_T~~$\rangle$.

The contrasts above can be understood by modeling VP ellipsis and TAC stripping as ellipsis operations that target different-sized constituents, as shown in (110) and (111).

(110)   TAC stripping

(111)   VP ellipsis

```
                    afterP
              _____|_____
           after                     |
                   _____|_____
                  λ2                  IP
                  ⋮         _____|_____
                  ⋮      Tom                    |
                  ⋮              _____|_____
                  ⋮             I⁰                      vP
                  ⋮            was          _____|_____
                  ⋮                       vP                       t₂
                  ⋮                 _____|_____
                  ⋮                v⁰           ⟨VP⟩
                  ⋮               was      _____|_____
                  ⋮                       met  Tom
```

TAC stripping is intended to be ellipsis of the argument structure of the predicate, the functional structure that introduces voice/reflexivity, the trace of the temporal operator, and possibly other aspectual projections below I^0. Following Merchant 2013 and Sailor 2014, VP ellipsis inside a TAC is ellipsis of the argument structure of the predicate, possibly to the exclusion of the functional structure that introduces voice/reflexivity but necessarily to the exclusion of the trace of the temporal operator.[24]

6.3.   *The Puzzle Solved*

Most relevant for the puzzle at hand is the assertion that VP ellipsis is ellipsis of a constituent that does not contain the trace of the temporal operator. Given our identity condition on ellipsis in (87), excluding the trace of the temporal operator in the VP-ellipsis site makes it possible to search for a smaller AC than is necessary for TAC stripping. This is because, in the case of VP ellipsis, there will be no bound variables in the ellipsis site.

To see this, consider the representation for the case of a matrix-adjoined TAC with a VP-ellipsis site resolved to the matrix predicate. This is provided in (112) and should be contrasted with (93).

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[24] Providing an analysis of the difference between TAC stripping and VP ellipsis that is consistent with all of the properties of VP ellipsis identified by Sailor 2014 is beyond the scope of this article. However, as an anonymous reviewer notes, it is crucial to the analysis in the next subsection that even the largest instantiation of VP ellipsis that is possible in TACs does not include the trace of the temporal operator.

(112)　a.　Kim heard [$_{CP}$ that Sue [$_{VP}$ left]] after Joe did ⟨$_{VP}$ ~~leave~~⟩.

b.
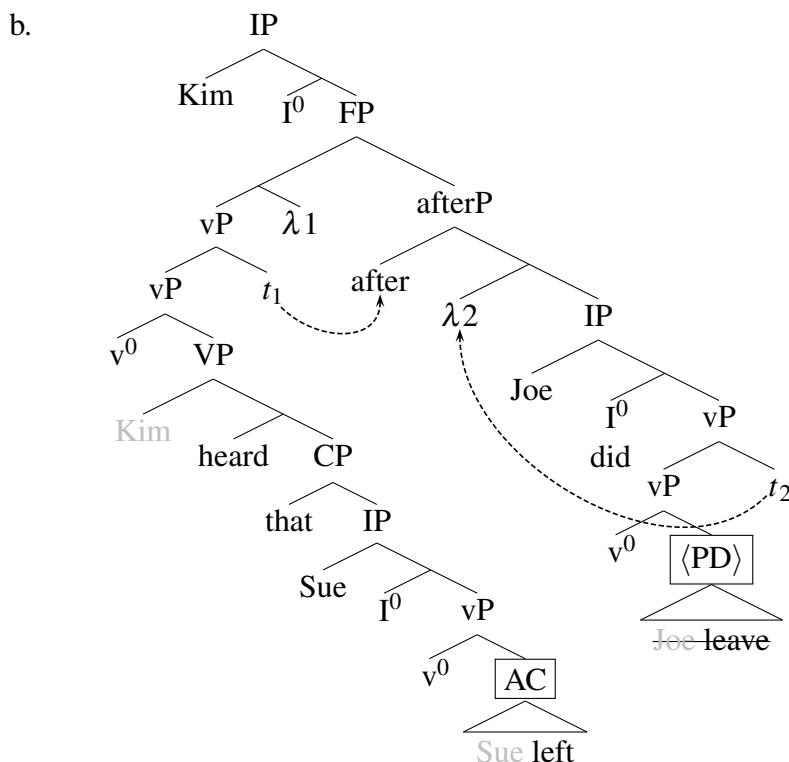
As argued in section 6.2, VP ellipsis is ellipsis of a constituent smaller than the constituent that contains the trace of the temporal operator. The absence of any bound variables in the ellipsis site means that it will not be necessary to identify a PD any larger than the deleted constituent. Because the deleted constituent does not have to find an AC with a trace of a temporal operator, the embedded VP now provides a suitable antecedent. As shown in (113), the result is that ellipsis is permitted in this representation and the sentence is grammatical.[25]

(113)　a.　$[\![AC]\!]^o$ = Sue left

　　　b.　$[\![PD]\!]^f = \{p : p = x \text{ left} \mid x \in D_e\}$

　　　c.　$[\![AC]\!]^o \subseteq [\![PD]\!]^f$ for any g. Ellipsis is permitted.

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[25] This requires that neither A movement nor X^0 movement introduce variables that require extending the PD (Messick & Thoms 2016, Overfelt 2020b; cf. Hartman 2011).

In sum, the wider distribution of VP ellipsis relative to TAC stripping can be understood as a function of the ability to satisfy the identity condition on ellipsis given the additional claim that both phenomena involve ellipsis but target different-sized constituents.[26]

7. Conclusion

This article has argued that phrasal TACs can be derived by an ellipsis operation that targets the truncated complement in a low-adjoined *before*P or *after*P; the elided constituent is larger than what is targeted in instances of VP ellipsis but smaller than the elided constituent in genuine stripping. I referred to this constituent as vP. The single remnant in a reduced TAC was argued to be generated by $\overline{\text{A}}$ movement to a focus position outside the elided constituent, as Depiante 2000 proposes for canonical stripping.

We also adopted an articulated syntax–semantics mapping that involved covert movement of and within the TAC (Geis 1970, Larson 1987, Takahashi 2008). These pieces together provided a way to account for the observation that TACs targeted with TAC stripping have a more constrained distribution than either their full clausal counterparts or TACs containing VP ellipsis. Put simply, trying to identify an antecedent that is a constituent other than the vP that the reduced clausal TAC directly modifies will necessarily fail. This is the result of creating an irreparable antecedent-containment configuration (section 5.2) or requesting an antecedent that lacks a binding relationship parallel to the temporal operator–variable relationship in the ellipsis site (section 5.3). The differing distribution of TAC stripping and VP ellipsis was argued to be an effect of VP ellipsis eliding a smaller constituent that does not include the TAC's temporal operator–variable relationship. This makes it possible, in the case of VP ellipsis but not in TAC stripping, for a constituent that also lacks this relationship to serve as a

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[26] One should wonder why VP ellipsis—be it big VP ellipsis or the small VP ellipsis that, according to Sailor 2014, is preferred—is not a possible way to derive a reduced TAC such as (93). If a smaller constituent that did not contain the trace of the temporal operator were elided, the problem of nonparallel binding would not arise. Two possibilities come to mind for why this is not possible: (i) the relevant head that licenses ellipsis of VP, namely I^0, is not present as a result of truncation, or (ii) the focus movement involved in TAC stripping induces a MAXELIDE-type effect that forces ellipsis of the larger vP (e.g., Merchant 2008, Griffiths 2019, Stockwell 2020). Choosing between these options must be left for future research.

sufficiently identical antecedent (section 6).[27]

What we have been led to with respect to the constraints on ellipsis is that the identity condition is stated semantically over variable syntactic domains, as per Rooth 1992a. Recall that this was motivated in part by the observation in section 4.3 that TACs are not-at-issue with respect to the QUD and, thus, may not obviously be anteceded by the QUD. Moreover, the identity condition on ellipsis that was adopted made it possible to identify different syntactic constituents as the antecedent for different ellipses. This is how VP ellipsis and TAC stripping were distinguished in a way that captured their differing distributions. In other words, the approach taken makes it possible to understand how these two types of ellipsis are differentially eliminative with respect to the phrase-structure representations containing TACs.

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[27] It should be pointed out that, in taking this approach, we have lost the ability to account for the ungrammaticality of examples like (i), from Hardt & Romero 2004, which formed part of the empirical domain for Takahashi 2008.

(i)   Agnes [$_{VP_1}$ arrived after John [$_{VP_2}$ ate t]], but Bill didn't $\Delta_{1/*2}$.

(Hardt & Romero 2004:384, (34))

For Takahashi, the ungrammaticality of interpreting the TAC-internal VP_2 in the ellipsis site is the result of nonparallel variable binding. There can be no parallel temporal operator-variable relationship in the second conjunct and this precludes satisfcation of the identity condition on ellipsis. Examples like (ii) suggest that an alternative to Takahashi 2008 may be required anyhow.

(ii)   *Agnes arrived [after $\lambda 1$ *John* [$_{VP}$ ate t_1]], but I don't know [when$_2$ *Sue* did $\langle_{VP}$ ate $t_2\rangle$]].

Despite the presence of arguably parallel temporal operator–variable relationships, the TAC-internal VP continues to fail as (part of) an antecedent for ellipsis.

It must be left to future research to extend the analysis proposed here in such a way as to help us understand such cases. Alternatively, one might follow the lead of Hardt & Romero and pursue a discourse-accessibility condition that makes (i) and (ii) an issue of the recoverability of potential antecedents.

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