What is in a trace? Accounting for reconstruction patterns in parasitic gaps

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Abstract

This paper argues that the internal structure of movement gaps is the result of a natural tension between representational economy and interpretability. That is, the lexico-syntactic form of an unpronounced gap consists of the minimal constituent formed by elements contained in the filler that yields a convergent representation. The proposal is shown to handle a number of (anti)reconstruction phenomena. Particularly, the system allows to account for the puzzling behaviour of parasitic gaps, as they have been observed to display both reconstruction and anti-reconstruction effects in different contexts. The solution may be considered an extension of classic proposals according to which parasitic gaps are a sort of pronoun.

Keywords— parasitic gaps, reconstruction, economy, interpretability, chains

1 Introduction

Parasitic gap constructions involve configurations in which a gap within an opaque domain for extraction is licensed by a legitimate movement dependency in the sentence. For instance, extraction cannot take place from within adjuncts (1a); however, a gap inside an adjunct ends up being acceptable if there is a filler-gap dependency in the matrix structure (1b), i.e., the gap PG in the adjunct is "parasitic" on the gap in the main clause.

(1)   a.   * [$_{DP}$ Which paper]^i did Elaine review the book [$_{ADJUNCT}$ without reading t^i]?
       b.   [$_{DP}$ Which paper]^i did Elaine review t^i [$_{ADJUNCT}$ without reading PG^i]?

An immediate question that this phenomenon raises is whether parasitic gaps and true gaps are the same kind of syntactic object. According to copy theory (Chomsky 1995, Nunes 1995, 2004), standard movement gaps are silent copies of the filler. Therefore, if parasitic gaps were elements of this type, they should be identical to the filler in the main structure (e.g., Nunes 2001, 2004). This prediction has proven to be problematic, as parasitic gaps tend to obviate reconstruction effects. In (2), for example, the parasitic gap PG does not seem to be identical to the wh-phrase *which picture of Jerry* as this would produce a Condition C violation with respect to the pronoun *he*.

(2)   [$_{\text{DP}^i}$ Which picture of Jerry$_j$] did Elaine destroy t^i [$_{\text{ADJUNCT}}$ after he$_j$ saw PG^i]

A similar argument can be drawn from reconstruction patterns for Condition A. As (3a) shows, the reflexive anaphor *himself* can be interpreted in the position of the movement gap to get its reference. However, an unacceptable outcome is obtained if the anaphor *herself* in (3b) needs to be interpreted in the parasitic gap position.

(3)   a.   [$_{\text{DP}^i}$ Which picture of himself$_j$] did Cosmo$_j$ destroy t^i [$_{\text{ADJUNCT}}$ after Elaine saw PG^i]

        b.   * [$_{\text{DP}^i}$ Which picture of herself$_j$] did Cosmo destroy t^i [$_{\text{ADJUNCT}}$ after Elaine$_j$ saw PG^j]

Cinque (1990) proposed analysing parasitic gaps as a sort of null pronominal that forms a *chain* with a constituent in a c-commanding A'-position.[1] While this hypothesis allows to account for the data in (2) and (3), it does not suit well with standard assumptions on chain formation under copy theory. In this framework, constituents forming a chain are assumed to be *non-distinct*, which in most implementations is taken to mean they are *identical*. Therefore, forming chains containing distinct types of element is not immediately granted.

However, a further and more serious problem for an account of parasitic gaps in terms of null pronouns is the fact that they do exhibit reconstruction effects in certain cases. As noticed by Williams (1990: 271), parasitic gaps corresponding to *whose*-phrases feed Condition C. This is shown in (4), where the pronoun *he* cannot be interpreted coreferentially with *whose*, as a copy of the wh-possessor seems to be within the parasitic gap position.

(4)   * [$_{\text{DP}^i}$ Whose$_j$ mother] did we warn t^i [$_{\text{ADJUNCT}}$ before he$_j$ arrested PG^i]?

The patterns discussed so far suggest that, depending on yet unknown factors, parasitic gaps may be either pronouns or copies of their filler. This paper argues that this behaviour follows straightforwardly from a system in which the internal structure of movement gaps is calculated by appealing to representational economy principles applying over anaphoric constituents. That is, there are conditions in which a gap will exhibit the full lexico-syntactic content of its filler, but in other cases it will simply consist of a pronominal element. As an important characteristic, this system does not appeal to copying procedures to account for filler-gap isomorphism: it is contended that such a relation is enforced by interpretability requirements.

The structure of the paper is as follows. Section 2 introduces the system that will be employed to account for reconstruction and anti-reconstruction patterns in parasitic gaps; a brief presentation of its functioning with respect to standard gaps is also included. In section 3, an analysis of the puzzling data introduced in this introduction is offered. Finally, section 4 concludes the article.

2   The system

The analyses to be advanced in this paper rely on many non-canonical assumptions on the functioning of movement dependencies. This section introduces some of them, and attempts to offer an exemplification of their interaction. However, many potential shortcomings will be ignored for the moment, as the consequences of the proposal go far beyond the realm of parasitic gaps and reconstruction effects.[2]

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[1]Similar analyses have been advanced by Chomsky (1982), Engdahl (1985), Postal (1993), among others.

[2]In particular, the proposal as presented here lacks explicitness regarding the functioning of those mechanisms that are taken to apply during the syntactic derivation, i.e., Agree and Merge. A main reason

2.1 Assumptions on chain recognition

As mentioned in the introduction, standard copy theory does not provide the means to account for chains containing both full phrases and pronouns. In order to allow this possibility, the algorithm of chain recognition developed in Muñoz Pérez (2017, 2018) will be adopted.

This mechanism is originally aimed to solve the *copies vs. repetitions* problem within copy theory.[3] As an illustration of this issue, consider the passive sentence in (5a) as analysed in (5b). The phrase marker in (5b) contains two occurrences of the DP *Cosmo*. For this kind of representation to capture the displacement property of human language, the interpretative components must be assumed to be capable of recognizing that both occurrences of *Cosmo* are non-distinct, i.e., they are "one and the same thing" for the purposes of many grammatical processes (e.g., pronunciation, θ-assignment).

(5) a. Cosmo was arrested.
     b. [$_{\text{TP}}$ Cosmo [$_{\text{T'}}$ was [$_{\text{VP}}$ arrested Cosmo]]]

There are situations in which repetitions of a certain constituent are not supposed to form movement dependencies. That is, whatever definition of non-distinctiveness applies to the occurrences of *Cosmo* in (5b), it should be fine-grained enough to distinguish the unrelated repetitions of this constituent in sentences as (6).

(6) Cosmo$_{\text{i}}$ arrested Cosmo$_{\text{j}}$.

The definition of non-distinctiveness offered by Muñoz Pérez (2017, 2018) is based on the type of reasoning that allows to distinguish, for instance, the pronouns *she* and *her* in English. While both pronouns have basically the same grammatical features (cf. (7)), their Case values are different: *she* carries a nominative NOM value for its κ-feature, and *her* has an accusative ACC value. As this opposition allows to discern between *she* and *her* in general terms, it is just a safe assumption that non-distinctiveness also makes use of this kind of contrast.

(7)
$$she_{\text{NOM}} = \left\{ \begin{array}{c} \langle \kappa, \text{NOM} \rangle \\ \langle \text{Gender}, \text{FEM} \rangle \\ \langle \text{Number}, \text{SG} \rangle \\ \langle \text{Person}, 3 \rangle \\ \langle \text{Category}, \text{D} \rangle \\ ... \end{array} \right\} \neq \left\{ \begin{array}{c} \langle \kappa, \text{ACC} \rangle \\ \langle \text{Gender}, \text{FEM} \rangle \\ \langle \text{Number}, \text{SG} \rangle \\ \langle \text{Person}, 3 \rangle \\ \langle \text{Category}, \text{D} \rangle \\ ... \end{array} \right\} = her_{\text{ACC}}$$

In this case, a distinction is made by appealing to values that are assigned during the syntactic computation, i.e., Case. However, non-distinctiveness should also be considered with respect to elements that do not enter directly in licensing relations and, therefore, do not receive new values.[4] For example, the first externally merged occurrence of the pronouns in (7) should look like the set in (8), which lacks a value for its κ-feature.

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to remain silent about these is that the very logic of some of the principles to be advanced below seems to require top-down derivations (e.g., Phillips 2003, Chesi 2015, Georgi & Salzmann 2016, den Dikken 2018), i.e., if the structure of gaps depends on the structure of fillers, then the latter must be generated before. Of course, this implies an even greater deviation from the standard minimalist framework. A proper justification of all these changes is far beyond the scope of the article.

[3]See Collins & Groat (2018) for recent discussion of this issue.

[4]The implicit hypothesis here is that Agree only values the features of a single matching constituent, not the ones in all its occurrences. As for the interpretability of valued/unvalued features, it should be assumed that an unvalued feature $\langle \text{F}, \emptyset \rangle$ on a constituent α is tolerable at the interfaces if α pertains to a chain CH containing an element α' with a valued version of that same feature. This is different

(8)
$$she/her_{\text{CASELESS}} = \left\{ \begin{array}{c} \langle \kappa, \emptyset \rangle \\ \langle \text{Gender}, \text{FEM} \rangle \\ \langle \text{Number}, \text{SG} \rangle \\ \langle \text{Person}, 3 \rangle \\ \langle \text{Category}, \text{D} \rangle \\ ... \end{array} \right\}$$

Should this object be considered non-distinct from *she* and *her* in (7)? There are good reasons to believe it should, as it is able to form chains with both of these pronouns, as shown in the following examples.[5]

(9)   a.   She$_{\text{NOM}}$ was arrested ~~she/her~~$_{\text{CASELESS}}$.
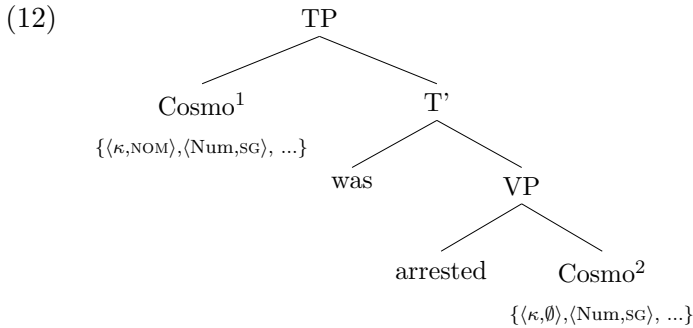   b.   Cosmo believes her$_{\text{ACC}}$ to have ~~she/her~~$_{\text{CASELESS}}$ won.

In sum, the pronouns in (7) can be said to be different syntactic objects because of the opposing values in their Case features, while the examples in (9) show that the lack of a certain value on a constituent is not a factor that makes it distinct from another element. These two traits of the non-distinctiveness relation are straightforwardly captured under the following definition.

(10)   Non-Distinctiveness (Muñoz Pérez 2018: 5)
       A constituent β is non-distinct from a constituent α if for every feature-value of β there is an identical feature-value in α.

This definition allows to posit a representational algorithm of chain recognition.

(11)   Two constituents α and β are part of the same chain if:
       a. α c-commands β,
       b. β is non-distinct from α,
       c. there is no δ between α and β such as β is non-distinct from δ, or δ is non-distinct from α.

Consider once again the sentence in (5a), this time represented as a tree in (12). In this representation, there are (at least) two occurrences of the same DP: *Cosmo²* occupies a θ-position and lacks a Case value; while *Cosmo¹* agrees with T and receives nominative Case.[6]

(12)
```
                    TP
              ┌──────┴──────┐
          Cosmo¹           T'
   {⟨κ,NOM⟩,⟨Num,SG⟩, ...}  ┌───┴───┐
                          was      VP
                               ┌────┴────┐
                           arrested   Cosmo²
                                  {⟨κ,∅⟩,⟨Num,SG⟩, ...}
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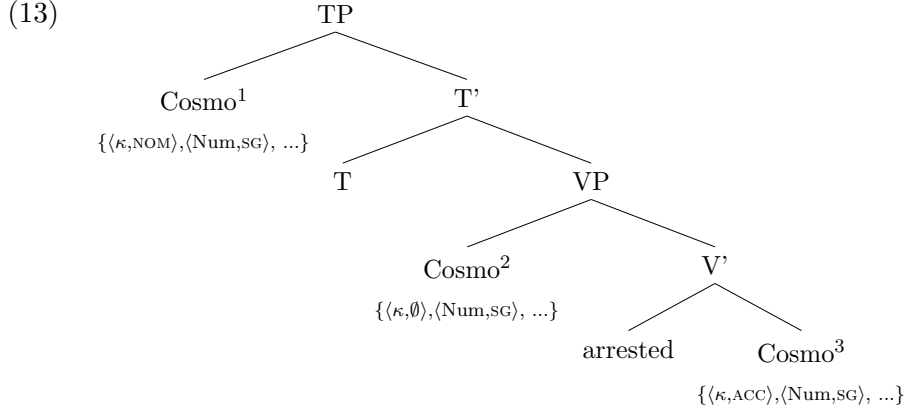
from Chomsky's (1995: 381) side assumption that "the features of a chain are considered a unit: if one is affected by an operation, all are", but both approaches seem to be extensionally equivalent. In fact, the version implicitly adopted here seems to be preferable, as Chomsky's version presupposes that chains are narrow syntactic constructs over which Agree/feature-checking can take place.

   [5]Strikethrough words represent unpronounced constituents.
   [6]Numerical indexes on constituents are for expository purposes only.

As $Cosmo^1$ c-commands $Cosmo^2$ (11a), the feature-values of $Cosmo^2$ are contained in those of $Cosmo^1$ (11b), and there are no potential interveners between $Cosmo^1$ and $Cosmo^2$ (11c), both DPs must be interpreted as a single chain CH = {Cosmo^1,Cosmo^2}. Notice that no transformational operation is assumed to relate both chain-members; they are base-generated constituents that are identified as pertaining to the same chain in virtue of the algorithm in (11).

Take again the example in (6), represented now as a tree in (13). There are (at least) three occurrences of the DP *Cosmo* in this representation: $Cosmo^3$ is in the internal argument position of the verb and receives an accusative value for its κ-feature; $Cosmo^2$ occupies the external argument position; and $Cosmo^1$ is in the Spec,T position and receives nominative Case.

(13)

$$
\begin{array}{l}
\text{TP} \\
\quad \diagup \diagdown \\
\text{Cosmo}^1 \qquad \text{T'} \\
\{\langle\kappa,\text{NOM}\rangle,\langle\text{Num},\text{SG}\rangle, ...\} \\
\qquad\qquad \text{T} \qquad \text{VP} \\
\qquad\qquad\qquad \text{Cosmo}^2 \qquad \text{V'} \\
\qquad\qquad\qquad \{\langle\kappa,\emptyset\rangle,\langle\text{Num},\text{SG}\rangle, ...\} \\
\qquad\qquad\qquad\qquad \text{arrested} \quad \text{Cosmo}^3 \\
\qquad\qquad\qquad\qquad\qquad \{\langle\kappa,\text{ACC}\rangle,\langle\text{Num},\text{SG}\rangle, ...\}
\end{array}
$$

In this representation, $Cosmo^1$ and $Cosmo^2$ are taken to be part of the same chain in virtue of the same calculation than in (12). The relevant different between both examples lies in $Cosmo^3$: while it is c-commanded by $Cosmo^2$, these elements cannot pertain to the same chain as the feature-values of $Cosmo^3$ are not included in those of $Cosmo^2$, i.e., $Cosmo^3$ has an accusative ACC value that is not present in $Cosmo^2$. Therefore, the occurrences of *Cosmo* must form two different chains CH$_1$ = {Cosmo^1,Cosmo^2} and CH$_2$ = {Cosmo^3}.

This system has two important characteristics that will be exploited along the rest of the paper. First, it allows forming chains without appealing to copying procedures, e.g., the *Copy* operation in Nunes (2004, 2011);[7] this trait will be exploited to analyse anti-reconstruction phenomena as cases of gaps being underlying pronominal elements.

Second, the definition of non-distinctiveness in (10) and the algorithm of chain recognition in (11) do not posit any restrictions on the lexico-syntactic form of unpronounced constituents. Therefore, the internal structure of a gap should be calculated by resorting to principles that are not specific to chains or movement dependencies. These are introduced in the next section.

2.2   Non-redundancy and interpretability

This paper maintains the hypothesis that the internal structure of gaps is constrained by representational economy principles ranging over anaphoric constituents. Such an approach is based

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[7]Furthermore, this characteristic could potentially lead to dispense entirely with the Copy operation. As authors as Rizzi (1986b) and Brody (1995) have pointed out, a theory that incorporates both movement operations and chain formation algorithms is redundant, as both theoretical constructs express the same type of syntactic relation. Following this logic, given that (i) movement is taken to be *Copy+Merge* (Nunes 2004), and (ii) Merge is a conceptually necessary operation, it follows that Copy should be abandoned. Notice that the preference for chain formation algorithms relies partially in their capability to deal with anti-reconstruction, as discussed throughout this article.

on Schlenker's (2005) treatment of Condition C. According to him, the unacceptability of (14a) is due to a "redundant" use of the nominal restrictor *neighbour* within DP^2. This NP introduces no new information with respect to the restrictor in the antecedent DP^1. Therefore, representational economy dictates that a smaller definite description, i.e., a pronoun, should be preferred to occupy the DP^2 position (14b).

(14)   a.   * $[_{DP^1}$ The $[_{NP}$ neighbour$]]_i$ said that $[_{DP^2}$ the $[_{NP}$ neighbour$]]_i$ was arrested.

          b. $[_{DP^1}$ The $[_{NP}$ neighbour$]]_i$ said that $[_{DP^2}$ he$]_i$ was arrested.

This proposal can be adapted to account for the distribution of NP restrictors within movement gaps. Unlike Schlenker's *Minimize Restrictors!*, the economy principle to be adopted here (i) is sensitive to c-command, and (ii) applies to any type of DP, not only definite descriptions.

(15)   Given a DP^1 that c-commands an anaphorically dependent DP^2, the restrictor in DP^2 must be as little redundant as possible with respect to the restrictor in DP^1.

While this definition seems to be aimed to account for the pair in (14), it can also be exploited to predict the internal structure of the gap DP^2 in a sentence like (16).

(16) $[_{TP}$ $[_{DP^1}$ The $[_{NP}$ crazy $[_{NP}$ neighbour$]]]$ $[_{T'}$ was $[_{VP}$ arrested $\cancel{DP^2}]]]$

The economy principle in (15) states that the lexico-syntactic structure of the unpronounced chain-member DP^2 must avoid containing elements that are already present within the antecedent DP^1. This introduces a competition between determiner phrases "of different size" that may function as the gap DP^2. A first type of candidate to occupy this position is a DP that contains the full NP restrictor together with its adjunct modifiers (17a); as these elements are also part of the structure of the filler, this DP is highly redundant in the sense of (15). The next option involves a DP that does not contain any adjuncts, but the NP restrictor alone (17b); while this choice is more economical than the previous one, the NP part of the constituent is still redundant. A third alternative to occupy the DP^2 position is a DP that lacks altogether an NP, but has a set of ϕ-features as restrictor, i.e., it is a pronoun (17c); in this case, redundancy with respect to the filler is reduced to features only. A final potential choice consists on a bare determiner D with no NP restrictor at all (17d); this element is taken to be a placeholder that avoids redundancy altogether.

(17)   a. Noun phrase + optional modifiers
          $[_{DP}$ the $[_{NP}$ crazy$_{\langle e,t \rangle}$ $[_{NP}$ neighbour$_{\langle e,t \rangle}]]]$

          b. Noun phrase
          $[_{DP}$ the $[_{NP}$ neighbour$_{\langle e,t \rangle}]]$

          c. Pronominal (φ-features as restrictor)
          $[_{DP}$ he$_\phi]$

          d. Bare D (no restrictor)
          $[_{DP}$ the$]$

While the bare determiner in (17d) is the most economical pick for DP^2 in (16), there are additional factors that must be taken into consideration at computing the internal structure of a gap. In particular, there are cases in which a certain gap must contain a minimal structure in order to generate an interpretable representation. This is to say that the lexico-syntactic content of a gap is the product of a natural tension between representational economy and interpretability conditions.

Consider as an illustration of this idea the abstract representation in (18), in which the gap DP^2 occupies the Spec,T position, and must Agree with T to value its ϕ-features.

(18) $[_{XP}$ DP^1 ... $[_{TP}$ $\overline{DP^2}$ $[_{T'}$ $T_{\langle\phi,\emptyset\rangle}$ ... $]]]$

In principle, the most economical type of DP competing to occupy this position is a bare determiner D with no restrictor at all, as the one exemplified in (17d). However, these elements lack ϕ-features, so they are not able to satisfy the uninterpretable features on T.[8] Therefore, the optimal pick to function as the gap DP^2 must be a pronoun, a D-element that carries ϕ-features as restrictor as in (17c). This example shows that independently motivated interpretability requirements interact with representational economy to define the internal structure of gaps.

Back to the representation in (16), there seems to be no particular interpretability condition constraining the form of the gap DP^2: this element is not required to value the features of the T head, as these are satisfied through agreement with the filler DP^1; moreover, there are no semantic requirements over traces of A-movement other than being placeholders for θ-assignment. Thus, DP^2 must simply consist on a bare determiner D.

(19)   Competing alternatives for DP^2 in (16)
       $[_{DP}$ the $]$ > $[_{DP}$ he$]$ > $[_{DP}$ the neighbour$]$ > $[_{DP}$ the crazy neighbour$]$
       THIS ONE!

Before moving to reconstruction phenomena, there is an additional assumption that must be made explicit. As discussed, the algorithm of chain recognition in (11) does not require copying procedures to identify movement dependencies; instead, base-generated constituents are identified as pertaining to a given chain due to their feature-values. The problem with this is that nothing excludes forming a chain $CH = \{DP^1, DP^2\}$ in which DP^1 and DP^2 contain different lexical items.

(20)   * $[_{TP}$ $[_{DP1}$ The crazy neighbour$]$ $[_{T'}$ was $[_{VP}$ arrested $[_{DP2}$ $\overline{\text{the great golfer}}]]]]$

This unwanted prediction becomes particularly problematic for the economy principle in (15), as the "minimizing" effect attested in (17) obtains only if the constituents forming the gap DP^2 are supposed to be the same than those displayed in the filler DP^1; otherwise, redundancy can be avoided simply by appealing to distinct lexical items, as it happens in (20). Therefore, the theoretical proposal in this section requires a constraint according to which the material that may be interpreted within a movement gap depends on the content of its filler.

A simple way of deriving this result is by appealing to conditions on recoverability of deletion (e.g., Katz & Postal 1964, Chomsky 1965, 1981). For instance, it could be argued that a representation like (20) violates the recoverability conditions as the information encoded in the silent gap DP^2 cannot be recovered from the overt parts of the sentence.[9] While offering a descriptively adequate definition of Recoverability is beyond the scope of the article, the following working definition will be adopted in what follows.

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[8]The assumption here is that the ϕ-features that determiners exhibit in certain languages are interpretable within the NP. Therefore, determiners lacking NPs must also lack ϕ-features.

[9]At defining parasitic gaps as null pronominals, Cinque (1990) faces a similar problem. In order to comply with the identification requirements of null pronouns (Rizzi 1986a), Cinque proposes that the ϕ-features of a parasitic gap are recovered from the constituent that moves in the matrix structure. This intuition is immediately captured in the definition of Recoverability in (21), i.e., the ϕ-features to be interpreted in the gap are those available in the filler.

(21) Recoverability[10]
A movement gap can only contain lexico-syntactic information that is available on a preceding filler.

This condition allows to rule-out representations like (20), at the time that constrains the form of the determiner phrases that compete for a certain gap position.

2.3 Accounting for some (anti)reconstruction effects

The system advanced so far allows to account for the distribution of reconstruction effects in a very elegant way. To begin with, consider the sentence in (22); notice that if DP^2 was a copy of DP^1, (22) would be incorrectly ruled-out due to a Condition C violation.

(22) [$_{DP^1}$ The claim that Cosmo$_i$ was asleep] seems to him$_i$ to be ~~DP^2~~ correct.

According to the assumptions in this paper, there are three DPs "of different size" competing to occupy the DP^2 position, i.e., a bare determiner D, a pronoun, and a full occurrence of the filler.[11] From these elements, the "smallest" constituent yielding an interpretable representation must be selected to function as the gap DP^2. Since there are no particular semantic conditions on traces of A-movement other than being placeholders for θ-assignment, the most economical pick is the bare determiner D.

(23) Alternatives for DP^2 in (22)
$\underbrace{[_{DP} \text{ the }]}_{\text{THIS ONE}!} > [_{DP} \text{ it}_\phi] > [_{DP} \text{ the claim that Cosmo was asleep}]$

The resulting phrase marker is the one sketched in (24), which includes the features of each member of the chain CH = {DP^1,DP^2}. Roughly the same representation has been independently advanced for this kind of anti-reconstruction effect by Takahashi & Hulsey (2009) under very different assumptions.

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[10]While the definition of Recoverability in (21) is taken to be a primitive, it could also be derived from the *Full Interpretation Principle*.

(i) Full Interpretation (Chomsky 1986: 98)
Every element of PF and LF must receive an appropriate interpretation. None can simply be disregarded. At the level of PF, each phonetic element must be licensed by some physical interpretation.

The example in (20) violates Full Interpretation as the lexical items within DP^2 are selected from the lexicon but do not receive phonological representation. The effect of this principle for chain theory is that the material forming an unpronounced constituent is restricted to what appears in an overt antecedent, just as stated in (21).

[11]In this case, there are no adjuncts to the NP in the filler DP^1. Therefore, Recoverability in (21) dictates that elements containing this type of constituent should not compete for the position DP^2.

(24)
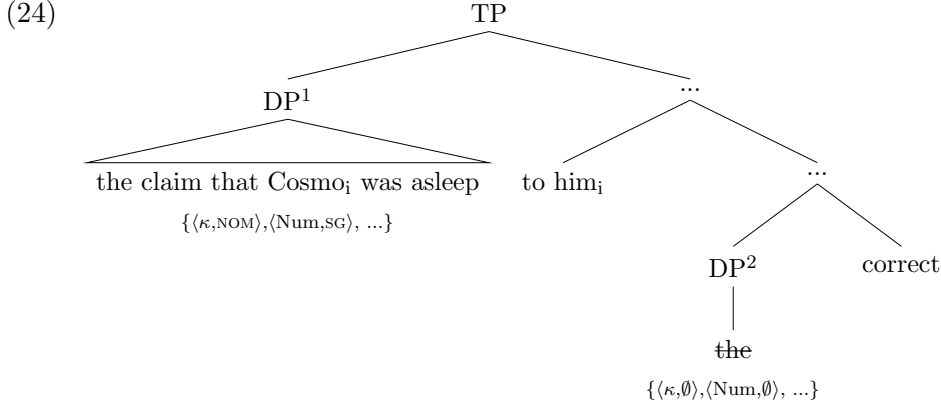
Consider now the example in (25). This sentence is bad if *George* and *he* corefer, so it must be the case that there is an occurrence of the NP *picture of George* within DP^2 producing a Condition C violation, as shown in (25).

(25)   * [$_{DP^1}$ Which picture of George$_i$] did he$_i$ see [$_{DP^2}$ ~~which picture of George$_i$~~]?

According to this representation, DP^2 introduces an NP restrictor that is redundant with respect to DP^1, in apparent contradiction to what is expected from the economy principle in (15). While at first sight this may look problematic, cases like this one are expected under the assumptions advanced so far, as the type of redundancy attested in (25) is enforced by interpretability conditions on A'-chains.

A number of authors working within copy theory have advanced the idea that gaps of A'-movement must function as anaphoric definite descriptions bound by their filler (e.g., Sauerland 1998, Fox 2002, 2003, Elbourne 2005). This hypothesis implies that in order to interpret a chain CH = {DP^1,DP^2} as a proper operator-variable dependency, (i) both chain-members must have restrictors denoting matching predicates, and (ii) the determiner heading DP^2 must be interpreted as a definite determiner. For instance, the LF representation of a sentence like (26a) must look like (26b).

(26)   a.   [$_{DP^1}$ Which book] did Elaine read ~~DP^2~~?
       b.   *For what x, x a book, Elaine read* [$_{DP^2}$ *the book x*]

These assumptions allow to account for the internal structure of the gap DP^2 in (25). As the filler DP^1 and the gap DP^2 must have matching restrictors, DP^2 is required to contain the NP *picture of George.* Therefore, more economical picks for this position (i.e., a bare interrogative determiner and a wh-pronoun) must be disregarded, as shown in (27). In short, this election shows that interpretability requirements on A'-chains override the non-redundancy principle in (15).

(27)   Alternatives for DP^2 in (25)
      $\underbrace{[_{DP} \text{ which}]}_{*} > \underbrace{[_{DP} \text{ what}_\varphi]}_{*} > \underbrace{[_{DP} \text{ which picture of George}]}_{\text{THIS ONE!}}$

In the particular case of the sentence in (25), this choice leads to a Condition C violation with respect to the pronoun *he.* The outcome LF representation is sketched in (28).

(28)   * *For what x, x a picture of George$_i$, he$_i$ saw* [$_{DP^2}$ *the picture x of George$_i$*]
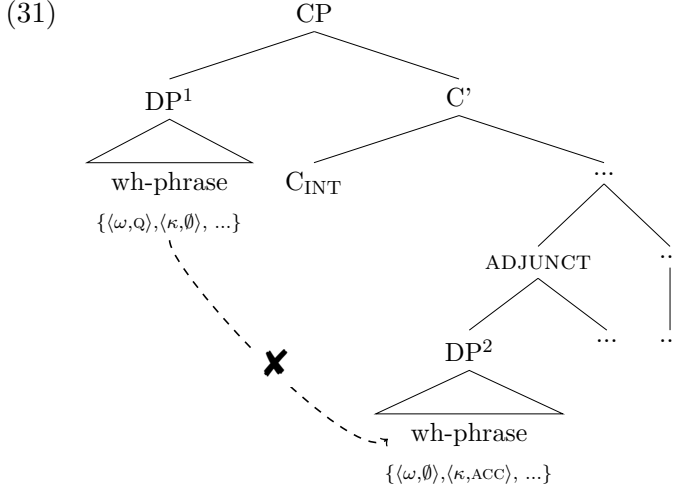
As for the feature-values that allow to form chains in these cases, some qualifications are necessary. Licensing of left-peripheral phrases is taken to function in fairly traditional terms: these constituents are assumed to carry an activity feature for A'-dependencies, call it an ω-*feature*, that gets satisfied through direct Merge with the relevant type of complementizer, e.g., DP^1 in (25) receives a Q value for its ω-feature by being introduced in the specifier position of an interrogative complementizer C_{INT}, as shown in (29).

(29)
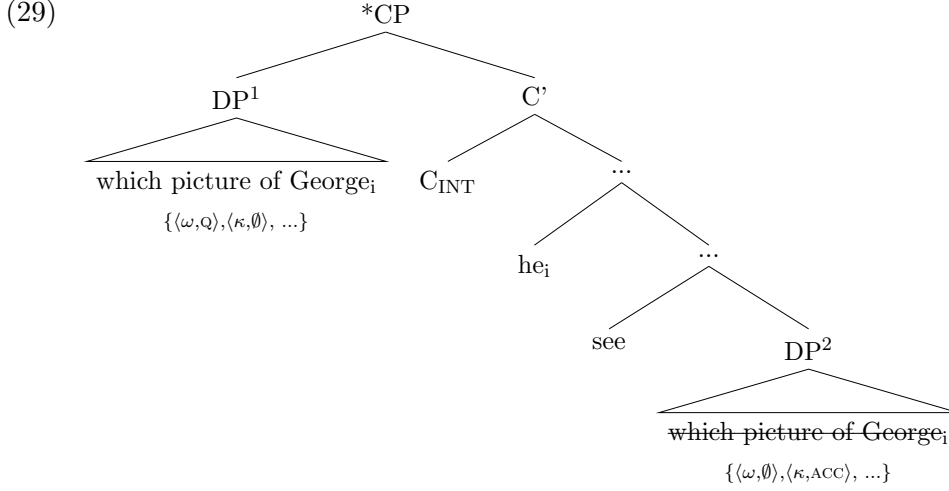
In this representation, however, the κ-feature in DP^1 remains unsatisfied. By hypothesis, valuation is taken to occur through Agree with DP^2, as in (30). The resulting feature-values allow to form the chain $CH = \{DP^1, DP^2\}$ according to the algorithm in (11).
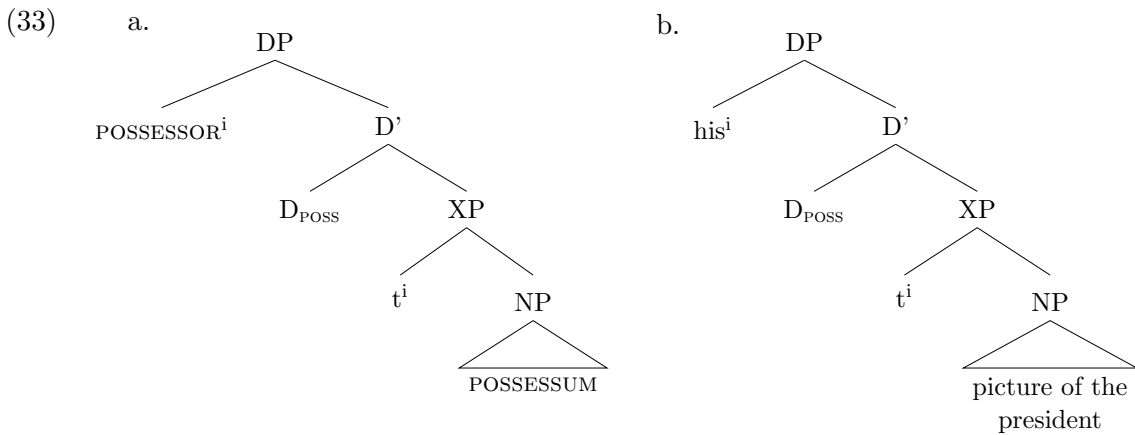
(30)
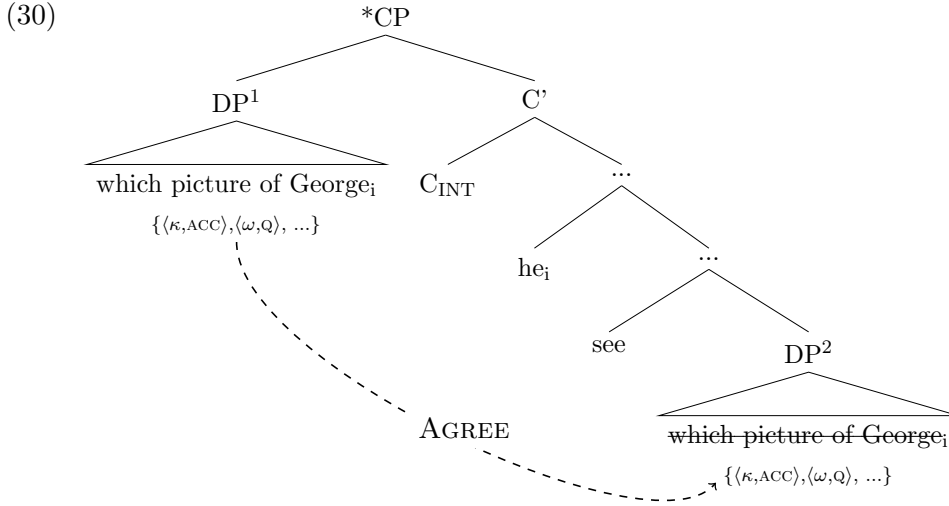
This trait permits to account for certain restrictions on syntactic movement that would be otherwise unexpected under a base-generation approach. The island status of adjuncts, for example, can be derived from it: since Agree cannot take place through the boundaries of an adjunct, it follows that a wh-phrase DP^1 merged in the left-periphery will not be able to satisfy its κ-feature with a DP^2 within an adjunct, so no chain $CH = \{DP^1, DP^2\}$ will be formed in this scenario.

(31)

CP

DP^1 — C'

wh-phrase — C$_{\text{INT}}$

$\{\langle\omega,\text{Q}\rangle,\langle\kappa,\emptyset\rangle, ...\}$

...

ADJUNCT — ...

DP^2 — ... ...

✘

wh-phrase

$\{\langle\omega,\emptyset\rangle,\langle\kappa,\text{ACC}\rangle, ...\}$

To finish the exemplification, consider the interpretation of the gaps in (32):[12] first, the NP *picture of the president* does not seem to be part of the gap DP^3, as this would otherwise lead to a Condition C violation with respect to the pronoun *him*; second, the possessive pronoun *his* needs to be interpreted within DP^2 to be bound by the quantifier *every man*.

(32) [$_{\text{DP}^1}$ His$_i$ picture of the president$_k$] seemed to every man$_i$ ~~DP^2~~ to be seen by him$_k$ ~~DP^3~~ to be a real intrusion.

In particular, reconstructing *his* within DP^2 seems to require the presence of the full DP *his picture of the president*, as most analyses of prenominal possessives take *possessor* and *possessum* to be generated together within the complement of a null determiner (e.g., Szabolcsi 1994, Radford 2000, Alexiadou et al. 2007). A rather agnostic version of this analysis is as follows: possessor and possessum form a constituent XP that is selected by a particular type of determiner, call it D$_{\text{POSS}}$; this head attracts the possessor to its specifier position and assigns it genitive Case. As discussed by Alexiadou et al. (2007), among others, this derivation makes prenominal possessives similar to preverbal subjects.

(33) a.

DP

POSSESSOR^i — D'

D$_{\text{POSS}}$ — XP

t^i — NP

POSSESSUM

b.

DP

his^i — D'

D$_{\text{POSS}}$ — XP

t^i — NP

picture of the president

An immediate outcome of positing a type of determiner head with these properties is that no pronoun is expected to pertain to this class. That is, if D$_{\text{POSS}}$ is an element that expresses the relation between possessor and possessum as sketched in (33), then it follows that there is no version of it that stands by its own, without selecting a lexical complement. Therefore, when

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[12]This example is taken from Lebeaux (2009: 47).

evaluating the constituents that compete for the position DP^3 in (32), there will be no pronoun as a potential alternative; the only candidates are a bare determiner D$_{\text{POSS}}$ and a full phrase headed by D$_{\text{POSS}}$. As there are no particular conditions on DP^3, the former option is preferred.

(34) Alternatives for DP^3 in (32)
$\underbrace{[_{\text{DP}} \text{ D}_{\text{POSS}}]}_{\textsc{this one}!} > [_{\text{DP}} \text{ his picture of the president }]$

The same candidates are available for the position DP^2, with an important difference: picking the full DP would allow to license a bound reading of the pronoun *his* and the quantifier *every man*. Just as Schlenker (2005) points out with respect to his *Minimize Restrictors!*, violations of the economy principle in (15) are permitted if they introduce semantic effects that are not possible with more economical representations. Therefore, selecting a redundant occurrence of *his picture of the president* for DP^2 is allowed in case this reading is looked for.

(35) Alternatives for DP^2 in (32)
$\underbrace{[_{\text{DP}} \text{ D}_{\text{POSS}}]}_{\textsc{ok}} > \underbrace{[_{\text{DP}} \text{ his picture of the president }]}_{\textsc{allows binding } his}$

The resulting representation is sketched in (36). As the tree shows, this analysis predicts that DP^3 does not produce a Condition C violation, and that *his* gets a bound reading.

(36)
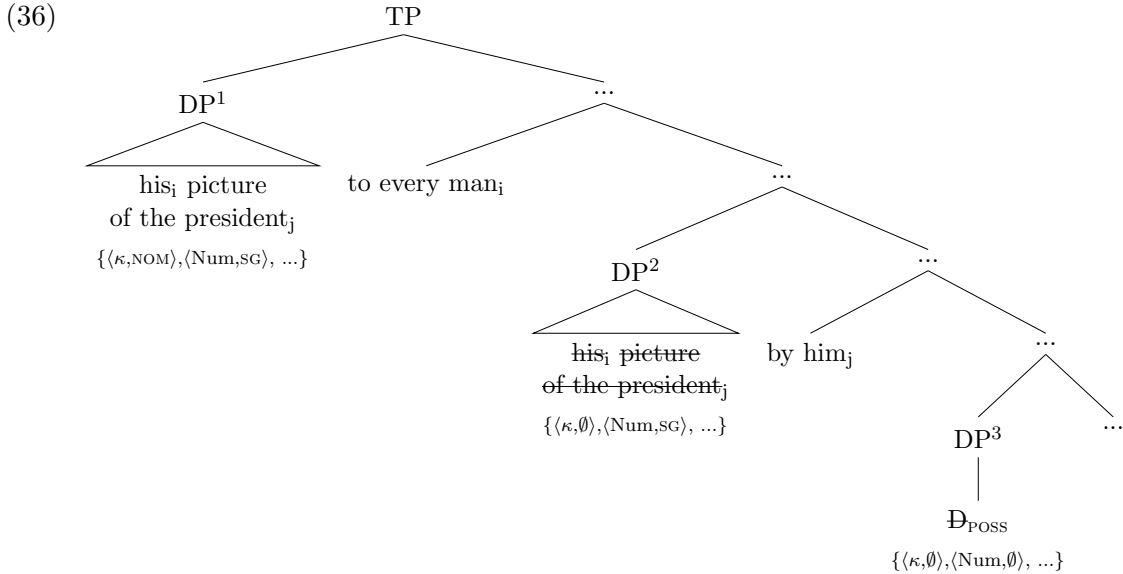
As seen, a theory of chain recognition that does not employ the Copy operation, but relies on the interaction of economy and interpretability to account for the internal structure of gaps captures in an elegant way many otherwise puzzling (anti)reconstruction patterns.

3   Back to parasitic gaps

The article started by asking whether standard movement gaps are the same kind of object than parasitic gaps. There are reasons to believe they are different: while standard gaps of A'-movement trigger weak crossover effects (37a), parasitic gaps do not seem to do so (37b).

(37) a. * Who^i did his$_i$ neighbour vouch for t^i?

  b. Who^i did you gossip about t^i [$_{\text{ADJUNCT}}$ despite his$_i$ neighbour's having vouched for PG^i]?

To account for this asymmetry, Lasnik & Stowell (1991) suggest that parasitic gaps do not function as variables for wh-operators. This idea may be translated to the system advanced here in the following terms: while standard gaps of A'-movement need to be interpreted as anaphoric definite descriptions, i.e., a sort of variable, such a requirement does not hold for parasitic gaps, which may display a more economical structure.

Under this assumption, consider again the sentence in (2), repeated for convenience in (38). As already discussed, this type of example shows that a parasitic gap like DP^3 bleeds Condition C.

(38) [$_{\text{DP}^1}$ Which picture of Jerry$_i$] did Elaine destroy ~~DP^2~~ [$_{\text{ADJUNCT}}$ after he$_i$ saw ~~DP^3~~]

Just as in (25), the gap DP^2 must contain a full occurrence of *which picture of Jerry* in order to be interpreted as an anaphoric definite description bound by DP^1. Therefore, more economical candidates for this position are disregarded (i.e., the bare interrogative determiner *which* and the wh-pronoun *what*).
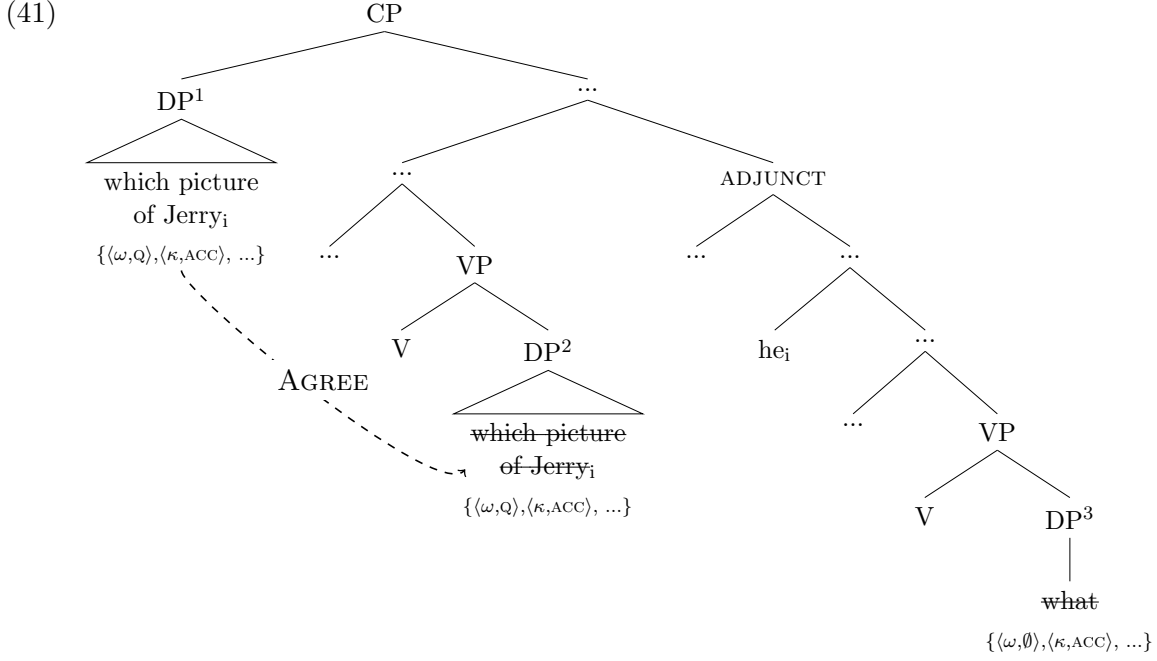
(39) Alternatives for DP^2 in (38)
  $\underbrace{[_{\text{DP}} \text{ which}]}_{*} > \underbrace{[_{\text{DP}} \text{ what}_\varphi]}_{*} > \underbrace{[_{\text{DP}} \text{ which picture of Jerry}]}_{\text{THIS ONE!}}$

While the same options are available for the parasitic gap DP^3, there is an important difference: this constituent is not required to function as a bound variable. Therefore, there is no need to pick a full occurrence of *which picture of Jerry* in the DP^3 position, so more economical alternatives can be considered. The "smallest" candidate, i.e., the bare interrogative determiner *which*, will not work as DP^3 needs to be able to value the φ-features of the v-head within the adjunct. Therefore, "the best pick" for the position DP^3 is the interrogative pronoun *what*.

(40) Alternatives for DP^3 in (38)
  $\underbrace{[_{\text{DP}} \text{ which}]}_{*} > \underbrace{[_{\text{DP}} \text{ what}_\varphi]}_{\text{THIS ONE!}} > [_{\text{DP}} \text{ which picture of Jerry }]$

A sketchy tree for (38) is offered in (41). As argued with respect to (30), the κ-features in DP^1 receive a value through Agree with DP^2. This representation predicts the formation of two chains CH$_1$ = {DP^1,DP^2} and CH$_2$ = {DP^1,DP^3}, from which only CH$_1$ is interpreted as a proper operator-variable dependency. Since the parasitic gap DP^3 is a pronoun, no Condition C violation arises due to coreference between *he* and *Jerry*.

(41)

CP

DP¹ — ...

which picture of Jerry$_i$
$\{\langle\omega,\text{Q}\rangle,\langle\kappa,\text{ACC}\rangle, ...\}$

... — ADJUNCT

... — VP

V — DP²

AGREE

which picture of Jerry$_i$
$\{\langle\omega,\text{Q}\rangle,\langle\kappa,\text{ACC}\rangle, ...\}$

... — ...

he$_i$ — ...

... — VP

V — DP³

what
$\{\langle\omega,\emptyset\rangle,\langle\kappa,\text{ACC}\rangle, ...\}$

The patterns of reconstruction for Condition A in (3) also receive a straightforward analysis within this system. Take the sentence in (3a), repeated in (42). In this case, the anaphor *himself* requires being interpreted within DP² to be bound by *Cosmo*.

(42)   [$_{\text{DP¹}}$ Which picture of himself$_j$] did Cosmo$_j$ destroy D̶P̶² [$_{\text{ADJUNCT}}$ after Elaine saw D̶P̶³]

This behaviour is expected, as only a full occurrence of *which picture of himself* in DP² yields a proper operator-variable dependency.

(43)   Alternatives for DP² in (42)
        [$_{\text{DP}}$ which] > [$_{\text{DP}}$ what$_\varphi$] > [$_{\text{DP}}$ which picture of himself]
        　　　*　　　　　*　　　　　THIS ONE!

As before, an occurrence of the interrogative pronoun *what* in the parasitic gap position DP³ allows to value the φ-features of the v head inside the adjunct. In this case, the full DP *which picture of himself* is not even a proper candidate to function as the parasitic gap DP³, as the R-expression *Elaine* is not a proper antecedent for the anaphor *himself*.

(44)   Alternatives for DP³ in (42)
        [$_{\text{DP}}$ which] > [$_{\text{DP}}$ what$_\varphi$] > [$_{\text{DP}}$ which picture of himself]
        　　　*　　　THIS ONE!　　　　　　*

The resulting representation is sketched in (45), in which the anaphor *himself* in DP² is bound by *Cosmo*. As in the previous example, DP¹ values its κ-feature through Agree with DP², so two movement chains are identified, i.e., CH$_1$ = {DP¹,DP²} and CH$_2$ = {DP¹,DP³}, from which only the former functions as an operator-variable dependency.

14

(45)

CP
DP¹
which picture of himself$_i$
$\{\langle\omega,\text{Q}\rangle,\langle\kappa,\text{ACC}\rangle,...\}$

...
...
TP
Cosmo$_i$
...
V
DP²
which picture of himself$_i$
$\{\langle\omega,\text{Q}\rangle,\langle\kappa,\text{ACC}\rangle,...\}$

AGREE

ADJUNCT
...
...
Elaine
...
...
VP
V
DP³
what
$\{\langle\omega,\emptyset\rangle,\langle\kappa,\text{ACC}\rangle,...\}$
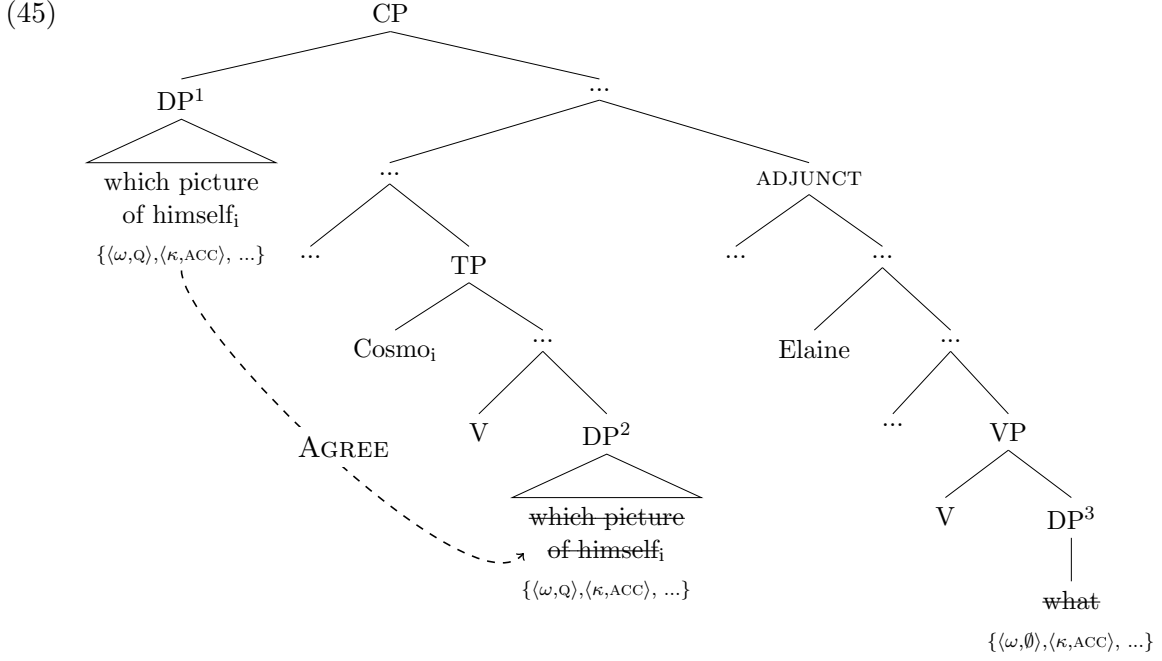
This sentence contrasts with the example presented in (3b), repeated in (46).

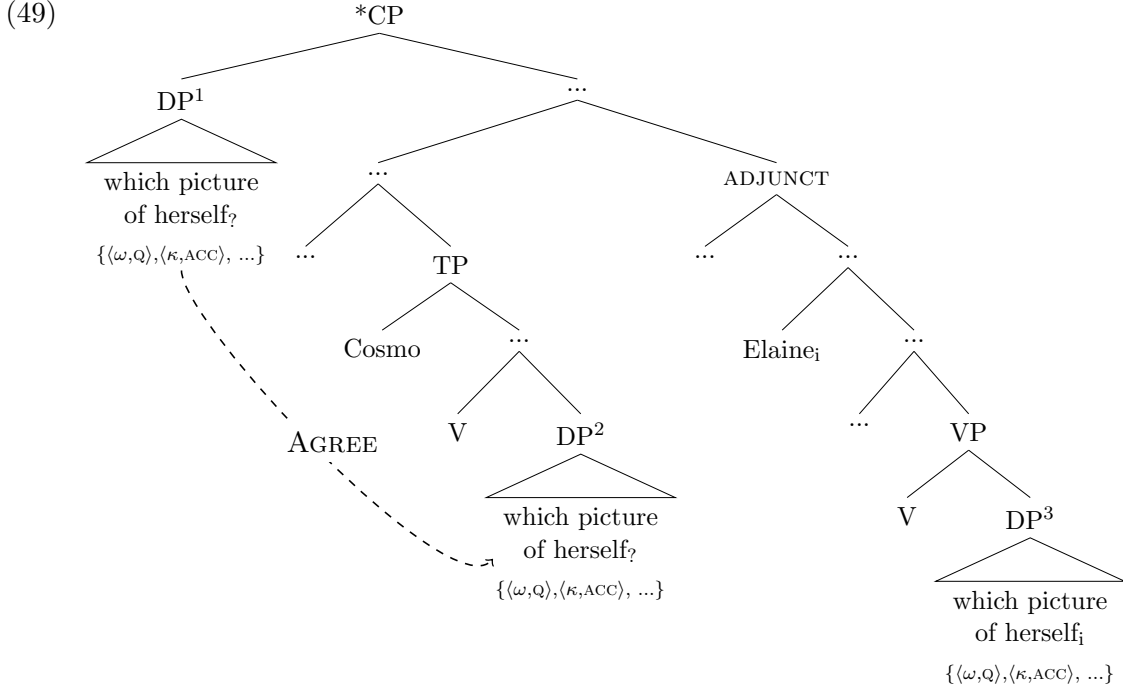(46)   * [$_{DP^1}$ Which picture of herself$_j$] did Cosmo destroy DP^2 [$_{ADJUNCT}$ after Elaine$_j$ saw DP^3]

The problem with (46) is that the filler DP¹ does not determine a proper candidate to occupy the position DP². This gap needs to be interpreted as an anaphoric definite description bound by DP¹. Therefore, DP² is supposed to contain the NP *picture of herself*. However, the anaphor *herself* does not find a proper antecedent in the binding domain of DP², i.e., the phrase *which picture of herself* yields an uninterpretable result if selected for this position.

(47)   Alternatives for DP² in (46)
        [$_{DP}$ which] > [$_{DP}$ what$_\varphi$] > [$_{DP}$ which picture of herself]
             *   *   *

According to this, the unacceptability of (46) does not depend on whether there is reconstruction in the parasitic gap position DP³. In fact, the assumptions introduced so far predict that this should be perfectly possible. Just as discussed regarding the alternatives in (35), violating the economy principle in (15) is permitted if more complex forms produce additional semantic effects, e.g., licensing binding. Therefore, the full phrase *which picture of herself* can be reconstructed in the parasitic gap.

(48)   Alternatives for DP³ in (46)
        [$_{DP}$ which] > [$_{DP}$ what$_\varphi$] > [$_{DP}$ which picture of herself]
   *   OK   ALLOWS BINDING *herself*

The tree in (49) shows that while the occurrence of *herself* within DP³ can be bound by *Elaine*, its counterpart within DP² does not find a proper antecedent. Moreover, as DP¹ is supposed to form chains with both DP² and DP³, i.e., CH$_1$ = {DP¹,DP²} and CH$_2$ = {DP¹,DP³}, the reference of the anaphor within it is also undefined.

15

(49)

*CP

DP¹ ...

which picture
of herself?
$\{\langle\omega,Q\rangle,\langle\kappa,\text{ACC}\rangle, ...\}$

... ADJUNCT

... TP ... ...

Cosmo ... Elaine$_i$ ...

AGREE

V DP² ... VP

which picture
of herself?
$\{\langle\omega,Q\rangle,\langle\kappa,\text{ACC}\rangle, ...\}$

V DP³

which picture
of herself$_i$
$\{\langle\omega,Q\rangle,\langle\kappa,\text{ACC}\rangle, ...\}$

As mentioned in the introduction, there are cases in which parasitic gaps actively exhibit reconstruction effects. The example in (4), repeated for convenience in ((50)), shows that the *whose*-phrase reconstructs in the parasitic gap position DP³ for Condition C, as the sentence becomes unacceptable only with a coreferential interpretation of *he* and *whose*.

(50)   * [DP¹ Whose$_j$ mother] did we warn D̶P̶² [ADJUNCT before he$_j$ arrested D̶P̶³]?

As previously discussed (cf. (33)), prenominal possessors are generated in the c-command domain of a head D$_{\text{POSS}}$, and subsequently move to Spec,D$_{\text{POSS}}$ (51).

(51)

DP

whose^i D'

D$_{\text{POSS}}$ XP

t^i NP
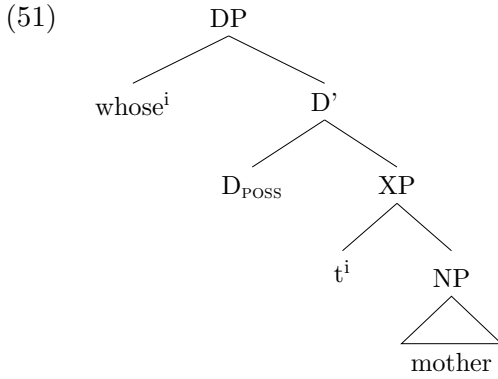
mother

Moreover, it was argued that, due to the relational nature of the determiner head D$_{\text{POSS}}$, there are no pronouns pertaining exactly to the same class, i.e., there are no D$_{\text{POSS}}$ with inherently valued ϕ-features.

Consider first the internal structure of the gap DP² in (50).As there are no D$_{\text{POSS}}$ pronouns, the competition for this position involves only two elements, i.e., a bare determiner D$_{\text{POSS}}$ and a full DP headed by D$_{\text{POSS}}$. As this gap needs to be interpreted as an anaphoric definite description, the full DP is selected.

(52) Alternatives for DP^2 in (50)

$\underbrace{[_{DP}\ D_{POSS}\ ]}_{*} > \underbrace{[_{DP}\ \text{whose mother}\ ]}_{\text{THIS ONE!}}$

As already stated, parasitic gaps are not required to function as bound variables, so DP^3 could in principle have no NP restrictor. However, this DP must, at least, be able to value the φ-features of the v Probe inside the adjunct. Since a bare D_{POSS} cannot do this, the full DP *whose mother* must be picked for this position.

(53) Alternatives for DP^3 in (50)

$\underbrace{[_{DP}\ D_{POSS}\ ]}_{*} > \underbrace{[_{DP}\ \text{whose mother}\ ]}_{\text{THIS ONE!}}$

The resulting structure is sketched in (54). In this representation, DP^1 values it κ-features with DP^2, and the chains $CH_1 = \{DP^1, DP^2\}$ and $CH_2 = \{DP^1, DP^3\}$ are successfully formed. However, the presence of *whose* within DP^3 produces a Condition C violation, as this element is c-commanded by the coreferential pronoun *he*.[13]

(54)
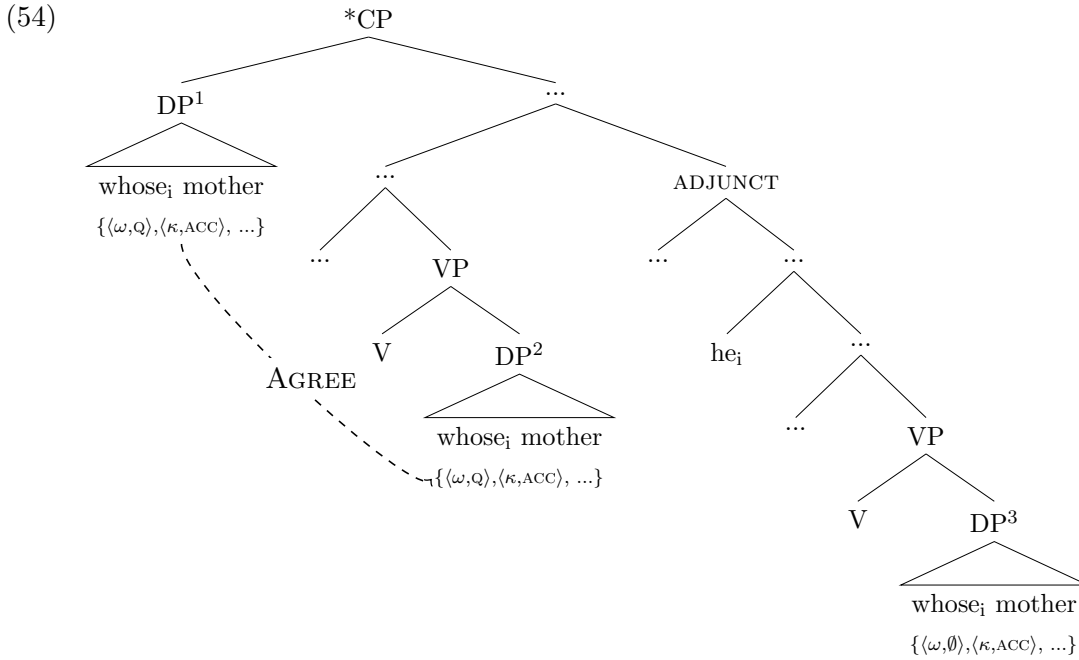
In sum, the proposed system allows to account for puzzling reconstruction and anti-reconstruction patterns in parasitic gaps.[14]

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[13]For concreteness, the ω-features of *whose* are assumed to percolate to the DP node.

[14]While reconstruction patterns in parasitic gaps are successfully accounted for by this system, the proposal exhibits a different type of shortcoming. As shown by Kayne (1983), parasitic gaps within islands inside islands produce unacceptable results.

  ii a. ? $[_{DP}$ The books$]^i$ you should read t^i [before it becomes difficult to talk about PG^i].

        b. * $[_{DP}$ The books$]^i$ you read t^i [before [talking about PG^i] becomes difficult].

The general approach introduced here (in particular, the chain recognition algorithm in (11)) requires extra assumptions to derive this restriction; other analyses of parasitic gaps as pronominals exhibit the same type of problem. Importantly, while the pair in (ii) may be derived by appealing to derivational mechanisms such as *sideward movement* (Nunes 2001, 2004), these alternatives also need additional machinery to derive (anti)reconstruction patterns.

4 Concluding remarks

Anti-reconstruction phenomena are difficult to handle within a theory of movement that takes gaps to be isomorphic to their filler. This paper advanced a system that allows to account for both (i) cases in which filler and gap seem to differ, and (ii) cases in which they have the same structure. The basic intuition is that the lexico-syntactic content of a gap depends on the interaction of economy and interpretability: a gap must be the smallest constituent that yields a convergent representation.

This hypothesis has been applied to the analysis of parasitic gaps. It has been argued that parasitic gaps are not required to function as bound variables, so they do not need to contain an NP restrictor matching that in the wh-operator. Therefore, they may simply be pronouns, i.e., D-elements carrying ϕ-features; these features are exploited to satisfy the Probes in the domain of the parasitic gap. It follows from this analysis that reconstruction effects are not expected to arise in these contexts, at least for negative constraints as Condition C.

However, *whose*-phrases do exhibit reconstruction effects in parasitic gaps for Condition C. This is expected if prenominal possessives involve a particular type of D-element for which there are no pronouns. As no pronoun competes to function as the gap of a *whose*-phrase, the constituent chosen for this position must be an occurrence of the *whose*-phrase itself, i.e., a "copy" of the filler.

While the version of the system advanced here is fairly schematic, the results are promising both in terms of description and explanation. In fact, a more complete version of this theory might be able to function as a principled framework for the study of reconstruction effects.

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