The shape of chains: on the interaction between interpretability and non-redundancy

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Manchester Forum in Linguistics 2018
The University of Manchester – April 26-27

1 Introduction

Syntactic displacement is commonly understood as involving a copying procedure (Chomsky 1993, Nunes 2004). This is known as the *Copy Theory of Movement*.

(1) a. K = [TP was [VP arrested [DP Cosmo]]]
b. Copy
K = [TP was [VP arrested Cosmo]]
L = [DP Cosmo]
c. Merge
K = [TP [DP Cosmo] [T' was [VP arrested [DP ~~Cosmo~~]]]]

Copy Theory is supported by **reconstruction phenomena**, i.e., cases in which a movement gap displays effects of isomorphism with respect to its filler.[1]

(2) * [DP1 Which picture of Cosmo$_i$] did he$_i$ see [DP2 ~~which picture of Cosmo$_i$~~]?

However, **anti-reconstruction effects** do not find a straightforward account in this framework. The sentence in (3) is wrongly predicted to violate Condition C if DP^1 and DP^2 are taken to be isomorphic.

(3) [DP1 The claim that Cosmo$_i$ was asleep] seems to him$_i$ to be ~~DP^2~~ correct.

In this presentation, I suggest that anti-reconstruction phenomena provide evidence for the approach to syntactic movement briefly sketched in (4).

(4) There is no rule of formation of copies or remerge. (Chomsky 2007:10)

The main objective of this talk is to explore the predictions of a system based on Chomsky's idea, and to account for some well-known patterns of reconstruction and anti-reconstruction.

Main characteristics of the system we will discuss today:

- No copying procedures: movement dependencies are formed from base-generated constituents that are computed as pertaining to a single chain.
- The conditions according to which two (or more) elements form a movement chain are independent from lexico-syntactic isomorphism; they are based on a comparison of the features of the labels of two (or more) constituents.
- The lexico-syntactic structure of chain-members is constrained by (i) representational economy and (ii) interpretability requirements.

[1] Numerical indexes on chain-members are merely illustrative.

2 First step: distinguishing copies from repetitions

Copy Theory should be able to distinguish between copies (i.e., constituents that should form part of the same movement chain) and (transformationally) unrelated repetitions.[2]

(5) a. Cosmo^1 was arrested ~~Cosmo~~^{2}.
b. Cosmo^1 arrested Cosmo^2.

In previous work (Muñoz Pérez 2017, 2018), I have maintained that this distinction may be derived from a system that makes two main assumptions: **(i)** features are ordered pairs ⟨Atr,VAL⟩ formed by an Attribute and a corresponding VALUE (Adger & Svenonius 2011); **(ii)** there are activity features for A'-dependencies (i.e., ω-features).

(6) a. [DP the neighbour] = {⟨κ,$\emptyset$⟩,⟨Number,SG⟩,⟨Person,3⟩, ...}
b. [DP which neighbour] = {⟨κ,$\emptyset$⟩,⟨ω,$\emptyset$⟩,⟨Quant,WH⟩,⟨Number,SG⟩,⟨Person,3⟩, ...}[3]

Non-Distinctiveness, i.e., the sameness relation between chain-members under Copy Theory, may be defined as an asymmetric comparison between the feature-values of the labels of two constituents.

(7) Non-Distinctiveness
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.

Suppose for instance that you want to know whether the pronouns *she*$_{\text{NOM}}$ and *her*$_{\text{ACC}}$ are non-distinct.

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

Assume now we have two occurrences of the pronoun *she*, but only one of them received nominative Case through Agree with T, i.e., *she*$_{\text{CASELESS}}$ and *she*$_{\text{NOM}}$. According to (7), the occurrence of *she* without a Case value is non-distinct from its Case-marked counterpart.

(9) $$she_{\text{CASELESS}} = \left\{ \begin{array}{c} \langle \kappa, \emptyset \rangle \\ \langle \text{Cat}, D \rangle \\ \langle \text{Number}, SG \rangle \\ \langle \text{Person}, 3 \rangle \\ \langle \text{Gender}, FEM \rangle \\ \ldots \end{array} \right\} \equiv \left\{ \begin{array}{c} \langle \kappa, \mathbf{NOM} \rangle \\ \langle \text{Cat}, D \rangle \\ \langle \text{Number}, SG \rangle \\ \langle \text{Person}, 3 \rangle \\ \langle \text{Gender}, FEM \rangle \\ \ldots \end{array} \right\} = she_{\text{NOM}}$$

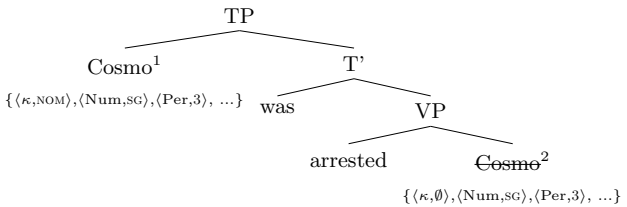
[2] See Collins & Groat (2018) for relevant discussion.
[3] I tentatively follow Rizzi (2004:243) in assuming that wh-features pertain to a Quantificational class.

The definition of Non-Distinctiveness in (7) supposes a representational algorithm of chain recognition as the following.

(10) 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.

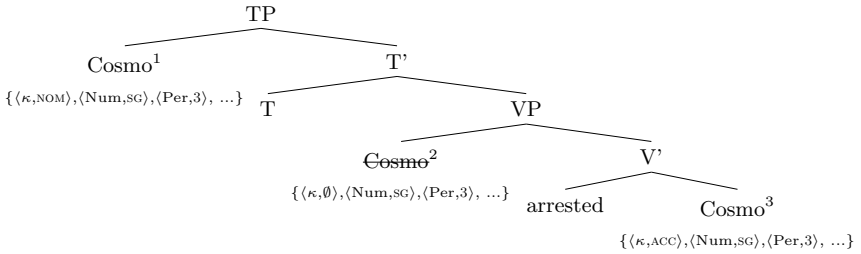
In a sentence like (5a) the occurrences of *Cosmo* form a single chain CH = {Cosmo^1,Cosmo^2}.[4]

(11)



While in (5b), the overt occurrences of *Cosmo* are predicted to pertain to different movement chains CH$_1$ = {Cosmo^1,Cosmo^2} and CH$_2$ = {Cosmo^3}.

(12)



Thus, in a chain CH = {α, β} in which α c-commands β, β **may be *underspecified* with respect to** α.

3 What if we abandon the Copy operation?

There are two immediate main consequences of abandoning the Copy operation:

- Chains must be computed from base-generated constituents.
- Isomorphism between chain-members is no longer a primitive of movement dependencies.

The conditions on chain recognition in (10) do not constrain the lexico-syntactic form of chain-members; they just look at features. Without the Copy operation, the representation in (13) would yield the chain CH = {DP^1,DP^2}.

(13) [$_{TP}$ [$_{DP^1}$ The neighbour] [$_{T'}$ was [$_{VP}$ arrested [$_{DP^2}$ ~~the neighbour that I met when I moved to my new place~~]]]]

[4] I am assuming that Agree may take place in a Spec-Head configuration, so *Cosmo^1* agrees with T in both (11) and (12).

This unwanted result may be filtered by appealing to **representational economy**. Following and adapting the account of Condition C in Schlenker (2005), I take that the distribution of restrictors in DPs is regulated by a principle of non-redundancy. Unlike Schlenker's *Minimize Restrictors!*, I assume that (i) the relevant principle applies under c-command, and (ii) extends to any type of DP, not only definite descriptions.[5]

(14) 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.

This principle introduces a ranking of preferences with respect to the kind of restrictor a D^0 must take.

(15) Ranking of minimization of restrictors
   a. Bare D$^{min/max}$ (no restrictor)
   [$_{DP}$ D]
   b. Pronoun (φ-features as restrictor)
   [$_{DP}$ D$_{\varphi}$]
   c. Noun phrase
   [$_{DP}$ D NP$_{\langle e,t\rangle}$]
   d. Noun phrase + optional modifiers
   [$_{DP}$ D [$_{NP}$ NP$_{\langle e,t\rangle}$ ADJ$_{\langle e,t\rangle}$]]

According to (15), DP^2 in (13) is the worst alternative to function as DP^1's gap.

(16) Alternatives for DP^2 in (13)
   [$_{DP}$ the] > [$_{DP}$ he] > [$_{DP}$ the neighbour] > [$_{DP}$ the neighbour that I met...]

Independently motivated principles also rule out representations like (13), but would not have the "minimizing" effect introduced in (14). For instance, it could be argued that (13) violates the *Full Interpretation Principle*.

(17) 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.

Since none of the constituents within the relative clause in (13) satisfies Full Interpretation, the representation should be ruled-out.[6] **The relevant consequence of adopting (17) is that the lexical material that may be interpreted in a gap position is restricted to what appears in the filler**.

4 Accounting for reconstruction and anti-reconstruction

The system introduced so far allows **understanding reconstruction as the result of the tension between the non-redundancy principle in (14) and interpretability requirements**. In the following subsections I discuss various cases.

[5] Applying this type of principle to chain-members entails an unification of movement and construal relations that I will not discuss now.

[6] A similar kind of prediction could also be obtained by appealing to *conditions on recoverability of deletion*.

4.1 Gaps of A-movement do not reconstruct for Condition C

Let's start with the sentence in (3), repeated for convenience in (18).

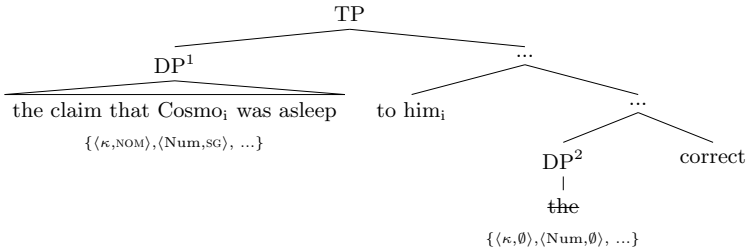
(18) [$_{DP^1}$ The claim that Cosmo$_i$ was asleep] seems to him$_i$ to be ~~DP^2~~ correct.

If DP^2 ***was a copy*** of DP^1, this sentence should be ruled-out due to a Condition C violation. This is not what the principle in (14) predicts.

(19) Alternatives for DP^2 in (18)
[$_{DP}$ the] > [$_{DP}$ it] > [$_{DP}$ the claim that Cosmo was asleep]
THIS ONE!

Since there are no particular semantic conditions on gaps of A-movement other than being placeholders for theta-assignment, the best (i.e., more economical) type of DP to occupy the DP^2 position is a D$^{min/max}$.[7]

(20)



There is an independently motivated constraint on the distribution of D$^{min/max}$: as they lack φ-features, they cannot enter into Agree relations with any Case-assigning Probe. Therefore, they can only function as gaps of A-movement.

4.2 Gaps of A'-movement violate Condition C

There seems to be a redundant occurrence of the NP *picture of Cosmo* within DP^2 in (21).

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

The isomorphism between DP^1 and DP^2 is required to interpret the latter as an anaphoric definite description (i.e., a sort of variable) through *Trace Conversion*.

(22) Trace Conversion (Fox 2002:67)
a. Variable Insertion: (Det) Pred ⟶ (Det [Pred λy (y = x)]
b. Determiner Replacement: (Det) [Pred λy (y = x)] ⟶ the [Pred λy (y = x)]

Since DP^1 needs to form an operator-variable dependency to be interpreted, DP^2 is required to contain the NP *picture of George*.

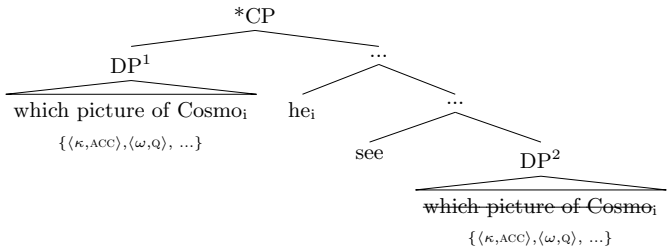
(23) Alternatives for DP^2 in (21)
[$_{DP}$ which$^{min/max}$] > [$_{DP}$ what$_\varphi$] > [$_{DP}$ which picture of George]
* * THIS ONE!

Therefore, **interpretability requirements override the non-redundancy principle in (14)**, which in this sentence leads to a violation of Condition C.[8]

[7] This analysis has been previously advanced by Takahashi & Hulsey (2009), although their account relies on countercyclical operations, i.e., *Wholesale Late Merger*. See Muñoz Pérez (2017, 2018) for relevant discussion.

[8] Notice that both DPs in (24a) have the same feature-values. This issue is discussed in section A.1.

(24) a.



b. * *For what x, x a picture of Cosmo$_i$, he$_i$ saw* ***the picture x of Cosmo$_i$***

4.3 The complement-adjunct asymmetry

As observed by van Riemsdijk & Williams (1981), Freidin (1986), Lebeaux (1988), among others, an R-expression inside an adjunct that modifies a noun does not reconstruct for Condition C (25a) in gaps of A'-movement; however, a violation is obtained if the relevant R-expression is inside an argument (25b).

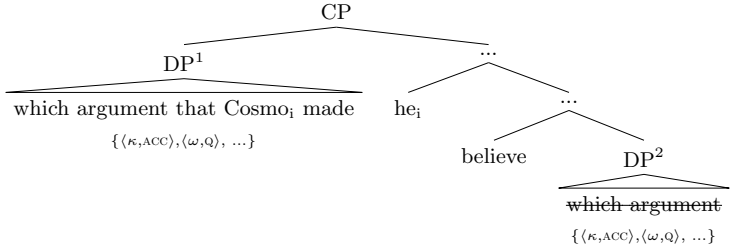
(25) a. [$_{DP^1}$ Which argument [$_{ADJ}$ that Cosmo$_i$ made]] did he$_i$ believe ~~DP^2~~?
b. * [$_{DP^1}$ Which argument [$_{COMP}$ that Cosmo$_i$ is a genius]] did he$_i$ believe ~~DP^2~~?

The asymmetry is easily captured in this framework. The intransitive variant of the noun *argument* does not require other constituents to be interpretable. Therefore, the economy principle in (14) predicts that an "adjunctless" DP must occupy the DP^2 position in this case.

(26) Alternatives for DP^2 in (25a)
... > [$_{DP}$ what$_\varphi$] > [$_{DP}$ which argument] > [$_{DP}$ which argument that Cosmo made]
* THIS ONE!

Therefore, there is no Condition C violation in this type of configuration, as schematically shown in (27a).

(27) a.



b. *For what x, x an argument that Cosmo$_i$ made, he$_i$ believed* ***the argument x***

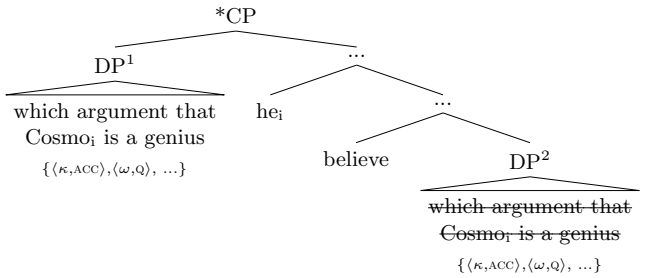
On the contrary, the transitive variant of *argument* in (25b) selects a complement CP. If this subcategorization requirement is not satisfied, the noun is not interpretable.[9]

(28) Alternatives for DP^2 in (25b)
... > [$_{DP}$ what$_\varphi$] > [$_{DP}$ which argument that Cosmo is a genius]
* THIS ONE!

[9] In more technical terms, Trace Conversion only applies to ⟨e,t⟩ expressions. A transitive noun can only satisfy this condition if combined to its complement. Whether the adjunct is there or not is irrelevant.

Since the complement is required to be part of the gap, it may trigger Condition C violations.

(29) a.



b. * *For what x, x an argument that Cosmo$_i$ is a genius, he$_i$ believed* ***the argument x that Cosmo$_i$ is a genius***

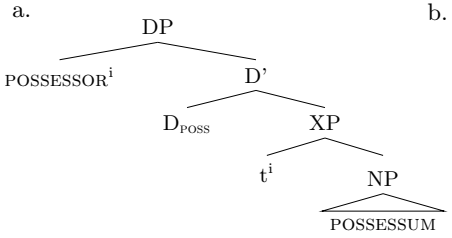
4.4 Optional reconstruction in gaps of A-movement

The following example is taken from Lebeaux (2009:47).

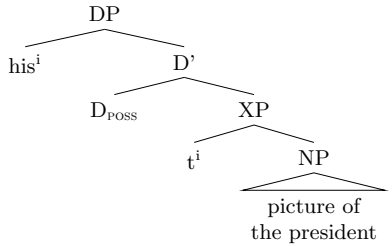
(30) [$_{DP^1}$ His$_i$ picture of the president$_k$] seemed to every man$_i$ ~~DP^2~~ to be seen by him$_k$ ~~DP^3~~ to be a real intrusion.

In this sentence, the NP *picture of the president* must not reconstruct in DP^3, but the pronoun *his* must do so in DP^2 to be bound by the quantifier *every man*. I assume that prenominal possessors involve a DP structure like the one sketched in (31).[10]

(31) a.



b.



I take that **DPs headed by D$_{poss}$ can only form chains with other DPs headed by D$_{poss}$**.[11] As a consequence, there are only two options for the DP^2 position.

(32) Alternatives for DP^2 with respect to DP^1 in (30)
$\underbrace{[_{DP}\ D_{POSS}\ ]}_{\text{OK}} > \underbrace{[_{DP}\ \text{his picture of the president}\ ]}_{\text{ALLOWS BINDING } \textit{his}}$

As pointed out by Schlenker (2005), **violations of the minimization principle are allowed if they introduce new semantic effects**. Therefore, picking a redundant occurrence of *his picture of the president* in the DP^2 position is allowed in this case.

[10] As discussed in Alexiadou et al. (2007), there are a number of alternatives to maintain that the possessor is generated below D^0. I remain agnostic regarding the details of the analysis.

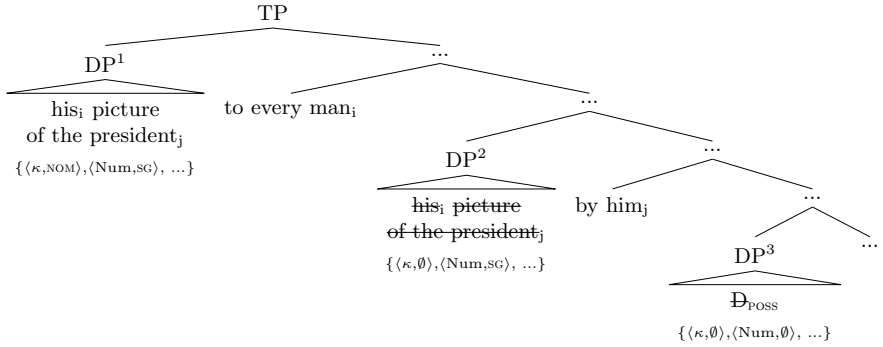
[11] This follows from the conditions in (10) under different assumptions, e.g., suppose that [$_{D^0}$ has an unvalued feature ⟨Atr,∅⟩ that attracts an NP to Spec,D$_{POSS}$, while other elements of the determiner type (i.e., the definite determiner *the*, pronouns, etc.) have a by-default valued version of the same feature ⟨Atr,DEF⟩.

In contrast, there is no interpretative difference whether a full occurrence of *his picture of the president* appears in DP^3 or not. Therefore, D$_{POSS}$ should be preferred:

(33) Alternatives for DP^3 with respect to DP^2 in (30)
$\underbrace{[_{DP}\ D_{POSS}]}_{\text{THIS ONE!}} > [_{DP}$ his picture of the president]

So the resulting representation is the one sketched in (34).

(34)

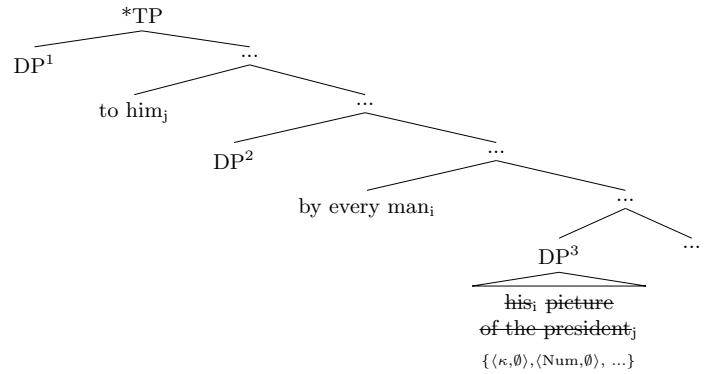


Exactly the same assumptions allow to explain the unacceptability of the sentence in (35), also from Lebeaux (2009):

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

In this case, the whole DP *his picture of the president* must appear in the position DP^3 for the pronoun *his* to be bound by *every man*. However, this causes a Condition C violation as the pronoun *him* c-commands the R-expression *the president*.

(36)



As a last example, take a case of optional reconstruction for narrow scope as the one exemplified in (37). This sentence is ambiguous regarding the scope of the indefinite.

(37) A Russian seems to have won the race. (∃ ≻ seem; seem ≻ ∃)

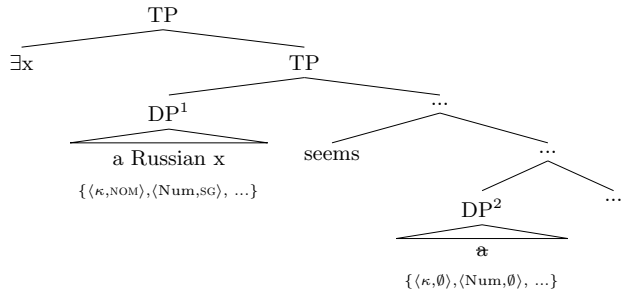
This ambiguity finds a straightforward explanation under the assumption that indefinite DPs are variables that get bound through existential closure (Heim 1982). Assume first that an existential quantifier is introduced at the level of the matrix clause, so the indefinite DP^1 gets bound by it.

(38) $\exists x$ [$_{DP^1}$ A Russian x] seems ~~DP^2~~ to have won the race.

Since DP^1 is the element of the chain $CH = \{DP^1, DP^2\}$ that is interpreted as a variable, there is no use in DP^2 having internal structure.

(39) Alternatives for DP^2 in (38)
$\underbrace{[_{DP}\ a\ ]}_{\text{THIS ONE!}} > [_{DP}$ a Russian]

The resulting representation should be similar to the one sketched in (40).

(40)


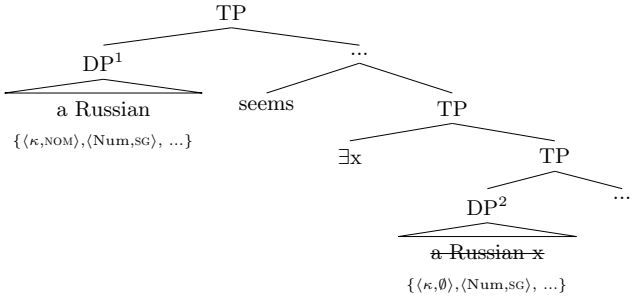
However, things may be different if the existential is introduced in the subordinate clause below *seems*, as sketched in (41).

(41) [$_{DP^1}$ A Russian] seems [$_{TP}$ $\exists$x ~~DP^2~~ to have won the race].

In this configuration, including an NP restrictor in DP^2 introduces a new semantic effect, i.e., the existential can be interpreted in the scope of *seems*.

(42) Alternatives for DP^2 in (41)
$\underbrace{[_{DP}\ a\ ]}_{\text{OK}} > \underbrace{[_{DP}\ a\ \text{Russian}\ ]}_{\text{ALLOWS seem} \succ \exists}$

The basic representation for this interpretation is as follows.

(43)


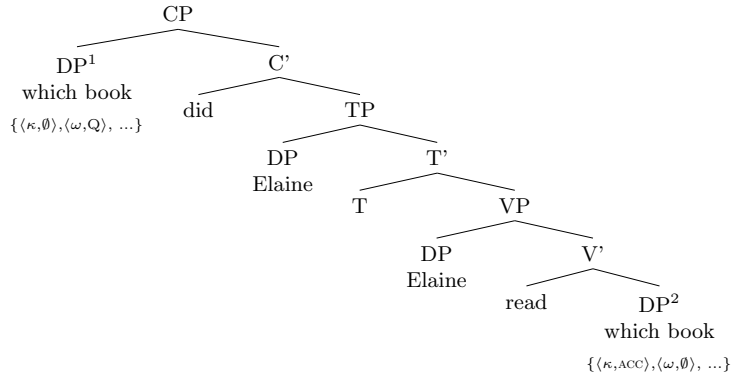
5 Concluding remarks

- A comparison of the feature-values of two constituents allows to know whether they are elements pertaining to the same chain or unrelated repetitions of a constituent.
- Such a mechanism does not enforce any type of isomorphism between chain-members (and therefore cannot account by itself for reconstruction phenomena).
- I argued that isomorphism and non-isomorphism between chain-members is the result of a tension between representational economy and interpretability: movement gaps are the smallest possible syntactic objects unless additional material is required for interpretation/convergence.
- The approach was shown to be able to capture a number of reconstruction and anti-reconstruction patterns.

A Appendix

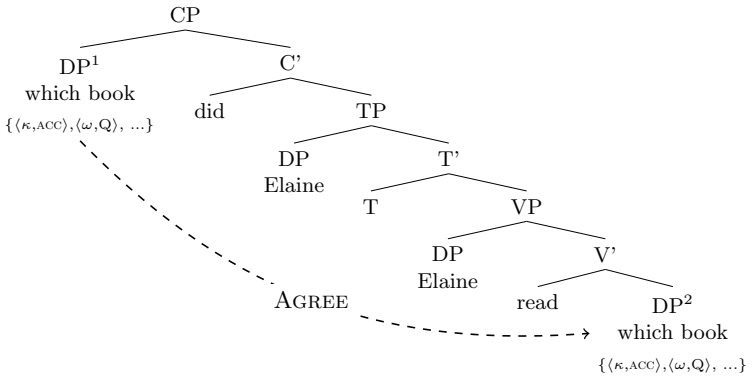
A.1 Base-generating elements in Spec,C

A base-generated wh-phrase in the specifier of an interrogative complementizer can satisfy its ω-feature, but its κ-feature remains unvalued.

(44)


The κ-feature of DP^1 in (44) may be satisfied through Agree with DP^2, as in (45). This way, both DPs get a value for their remaining activity-features, i.e., DP^1 gets a value for its $\langle\kappa,\emptyset\rangle$ and DP^2 for its $\langle\omega,\emptyset\rangle$.

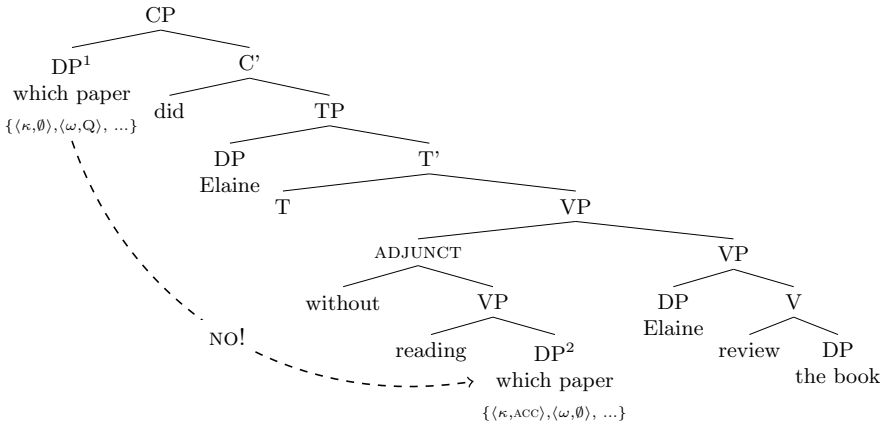
(45)



This predicts an interesting behaviour with respect to strong islands. If DP^2 is inside an island, the Probe DP^1 cannot reach it. Therefore, a sentence like the one exemplified in (46) is unacceptable due to an unvalued κ-feature in DP^1.

(46) * [$_{DP^1}$ Which paper] did Elaine review the book [$_{ADJUNCT}$ without reading ~~DP²~~]?

(47)



References

Adger, David & Peter Svenonius. 2011. Features in minimalist syntax. In Cedric Boeckx (ed.), *The Oxford handbook of linguistic minimalism*, 27–51. Oxford: Oxford University Press.

Alexiadou, Artemis, Liliane Haegeman & Melita Stavrou. 2007. *Noun phrase in the generative perspective* (Studies in Generative Grammar 71). Berlin: Mouton de Gruyter.

Chomsky, Noam. 1986. *Knowledge of language: Its nature, origin, and use*. New York: Praeger.

Chomsky, Noam. 1993. A minimalist program for linguistic theory. In Kenneth Halle & Samuel Keyser (eds.), *The view from building 20*, 1–52. Cambridge, MA: The MIT Press.

Chomsky, Noam. 2007. Approaching UG from below. In Uli Sauerland & Hans-Martin Gärtner (eds.), *Interfaces + Recursion = Language?: Chomsky's minimalism and the view from syntax-semantics*, chap. 1, 1–29. Berlin: Mouton de Gruyter.

Collins, Chris & Erich Groat. 2018. Copies and repetitions. *Ms* .

Fox, Danny. 2002. Antecedent-contained deletion and the copy theory of movement. *Linguistic Inquiry* 33(1). 63–96. doi:10.1162/002438902317382189.

Freidin, Robert. 1986. Fundamental issues in the theory of binding. In Barbara Lust (ed.), *Studies in the acquisition of anaphora*, 151–188. Dordrecht: Reidel.

Heim, Irene. 1982. *The semantics of definite and indefinite noun phrases*: University of Massachusetts dissertation.

Lebeaux, David. 1988. *Language acquisition and the form of the grammar*. Amherst, MA.: University of Massachusetts dissertation.

Lebeaux, David. 2009. *Where does binding theory apply?* Cambridge, MA: MIT Press.

Muñoz Pérez, Carlos. 2017. *Cadenas e interfaces*. Buenos Aires: University of Buenos Aires dissertation.

Muñoz Pérez, Carlos. 2018. Recognizing copies: On the definition of non-distinctiveness. *Glossa: a journal of general linguistics* 3(1). 1–29. doi:10.5334/gjgl.271.

Nunes, Jairo. 2004. *Linearization of chains and sideward movement*. Cambridge, MA: The MIT Press.

Rizzi, Luigi. 2004. Locality and left periphery. In Adriana Belletti (ed.), *Structures and beyond: The cartography of syntactic structures*, vol. 3, chap. 7, 223–251. Oxford: Oxford University Press.

Schlenker, Philippe. 2005. Minimize restrictors! (notes on definite descriptions, condition C and epithets). In Emar Maier, Corien Bary & Janneke Huitink (eds.), *Proceedings of Sinn und Bedeutung 9*. 385–416. Nijmegen: NCS.

Takahashi, Shoichi & Sarah Hulsey. 2009. Wholesale late merger: Beyond the A/$\bar{\text{A}}$ distinction. *Linguistic Inquiry* 40(3). 387–426. doi:10.1162/ling.2009.40.3.387.

van Riemsdijk, Henk & Edwin Williams. 1981. NP-structure. *The Linguistic Review* 1(2). 171–217. doi:10.1515/tlir.1981.1.2.171.