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A mechanism of non-pronunciation for QR

Carlos Muñoz Pérez
Universidad de Buenos Aires, CONICET, Georg-August-Universität Göttingen
cmunozperez@filo.uba.ar

ABSTRACT

This paper proposes a mechanism of phonological realization of chains that allows capturing the asymmetry between "covert" and "overt" movement in a single-output model of syntax. The idea involves assuming that heads of non-trivial chains determine a set of phonological exponents, a *Phonological Numeration*, which is depleted as *Vocabulary Insertion* introduces vocabulary items in the structure according to linear order. The proposed mechanism deals satisfactorily with adjunct extraposition and ACD, both cases where covert and overt operations seem to interact even inside a single constituent.

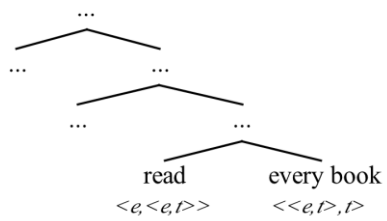
1. QR in a single-output syntax

Quantifier Raising (QR) is an instance of syntactic movement classically supposed to apply *covertly*, in the "road" between *Surface Structure* (SS) and *Logical Form* (LF). It creates an operator-variable dependency involving a quantifier and a movement-trace:

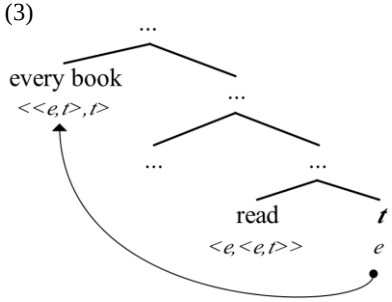
(1) a. Elaine read every book.
b. [Every book]$_i$ Elaine read t_i

There are many reasons to assume the existence of QR. For example, it allows repairing the type-mismatch posed by quantifiers in object positions (cf. Heim & Kratzer 1998):

(2)



(3)



As said, the main difference between QR and other cases of *Move-α* used to involve an ordering relation: in the Y-model (cf. Chomsky & Lasnik 1977), overt movement applies before SS, covert movement applies after.

But what if we assume a *Single-Output Syntax* (Bobaljik 1995, Brody 1995, among others)? In this architecture: (i) syntax generates a single representation that is interpreted differently at the interfaces; (ii) movement operations are restricted to the syntactic component; (iii) the distinction between covert and overt movement follows from *Copy Theory* (Chomsky 1993).

(4) *Wh-Movement*

Syntax:	Which book	did Elaine read ~~which book~~.
LF:	For what book *x*	Elaine read the book *x*

(5) *QR*

Syntax:	~~Every book~~	Elaine read every book.
LF:	For every book *x*	Elaine read the book *x*

Notice that under Copy Theory is not entirely obvious how to derive the repairing mismatch in (3). Sauerland (1998), Fox (2002), Elbourne (2005), among others, propose a LF operation to deal with this problem:

(6) *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)]

Thus, (6) derives the (informal) logical forms in (4) and (5).

If overt and covert movements take place in the same cycle, they should interact somehow: e.g., overt operations are expected to follow covert operations sometimes.

This prediction seems to be true for at least two empirical domains: adjunct extraposition and Antecedent Contained Deletion.

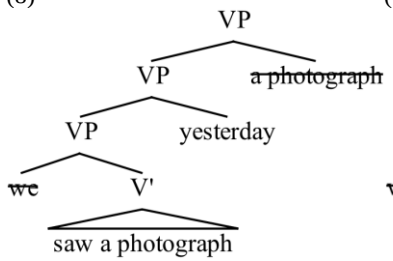
1.1. ADJUNCT EXTRAPOSITION

Fox & Nissenbaum (1999) provide an analysis for extraposition in these terms. According to them, the sentence in (7b) is derived by QR followed by *Late Merger* (cf. Lebeaux 1988)[1].

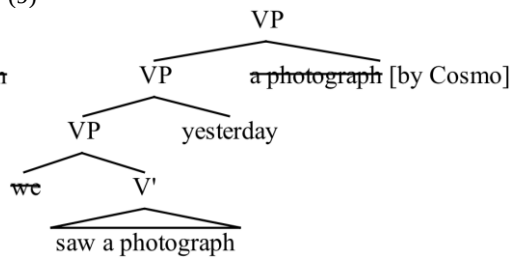
(7) a. We saw a photograph by Cosmo yesterday.
b. We saw a photograph yesterday by Cosmo.

The DP undergoes QR to VP (9), and the adjunct *by Cosmo* is merged to the NP (10).

(8)



(9)



This analysis allows deriving the lack of Condition C effects in adjunct extraposition.

[1]Late Merger and *Wholesale Late Merger* (cf. Takahashi 2006, Takahashi & Hulsey 2009) involve countercyclical operations. A cyclic and extensionally equivalent alternative is discussed in the Appendix.

(10) a. ??/*I gave him$_i$ a photograph from Cosmo's$_i$ collection yesterday.
b. I gave him$_i$ a photograph yesterday from Cosmo's$_i$ collection.

Also, it derives the fact that the NP seems to have wider scope than its surface position.

(11) *Adjunct-extraposition marks scope (Fox & Nissenbaum 1999:5)*
When an extraposed constituent (EC) is an adjunct, the scope of the source NP will be at least as high as the attachment site of EC.

Fox & Nissenbaum exemplify this property by using "free choice" *any*. They observe that *any* must appear in the scope of a modal operator like *look for* or *would* (12a). Therefore, the unacceptability of (12b) follows from (11).

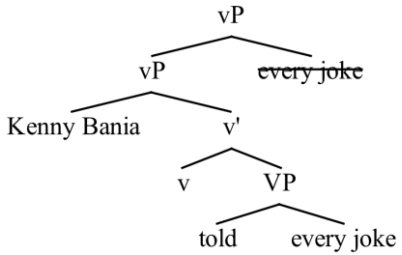
(12) a. Newman looked very intensely for *anything* that would help him against Jerry.
b. *Newman looked for *anything* very intensely that would help him against Jerry.

1.2. ANTECEDENT CONTAINED DELETION
A similar analysis is proposed by Fox (2002) for *Antecedent Contained Deletion* (ACD).

(13) Kenny Bania told every joke Jerry did.

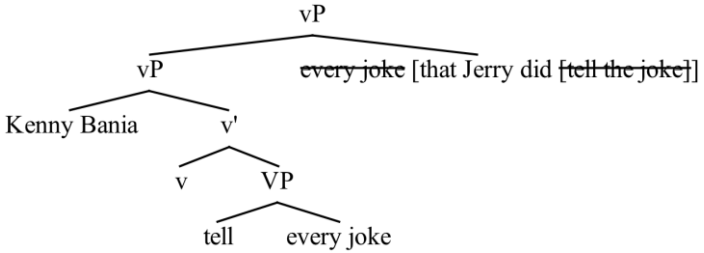
According to Fox, ACD involves two steps: first, QR of the quantified DP to VP.

(14)



Second, Late Merger of the adjunct relative clause to the NP in the higher copy. The VP inside the relative clause is elided under identity with the VP in the matrix clause.

(15)



Remember: Trace Conversion applies on the lower copies of A'-movement. This is actually what explains the identity between both VPs.

(16) *Matrix clause*
a. *Syntax (adjunct omitted)*
[$_{vP}$ every joke [$_{vP}$ Kenny Bania [$_{v'}$ v [$_{VP}$ tell [$_{DP}$ every joke]]]]]
b. *LF (after Trace Conversion, adjunct omitted)*
[$_{vP}$ every joke [$_{vP}$ Kenny Bania [$_{v'}$ v **[$_{VP}$ tell [$_{DP}$ the joke *x*]]**]]]

(17) *Adjunct relative clause*
a. *Syntax*
[$_{CP}$ OP joke [$_{TP}$ Jerry [$_{T'}$ did … [$_{VP}$ tell [$_{DP}$ OP joke]]]]]
b. *LF (after Trace Conversion)*
[$_{CP}$ OP joke [$_{TP}$ Jerry [$_{T'}$ did … **[$_{VP}$ tell [$_{DP}$the jokex]]**]]]

This analysis involves deriving several troubling properties of ACD, as *Tiedeman's Puzzle*. Consider the following pairs. Larson & May (1990) explain the cases in (17) claiming that the quantifier cannot "escape" the complement of *expect* due *Clause Boundedness*.

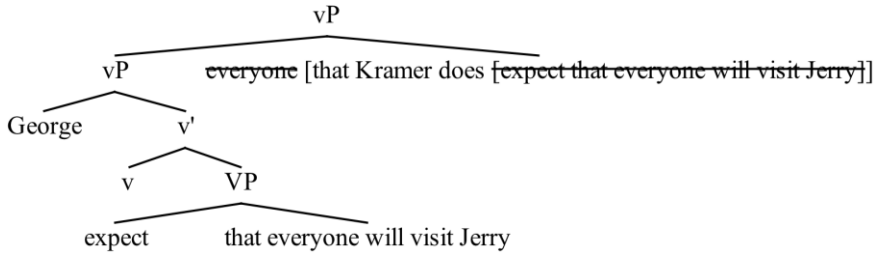
(18) a. *George expects [that everyone Kramer does will visit Jerry].
b. *Newman said [that everyone Kramer did arrived].

However, Tiedeman (1995) observes that the sentences in (18) are acceptable.

(19) a. George expects [that everyone will visit Jerry that Kramer does].
b. Newman said [that everyone arrived that Kramer did].

Fox's analysis allows deriving this contrast: it predicts that the chunk *(that) Kramer does* should follow the complement of the verb:

(20)



Having shown the empirical gain of assuming a Single-Output model, at least two questions should be answered:

- How do we explain the contrast between overt and covert movement in (4) and (5)?
- How do we derive the phonological realization of scattered constituents required by the analyses in (9) and (15)?

A unified answer for these questions will be provided on the basis that QR is, as Fox & Nissenbaum (1999) and Fox (2002) assume, *some kind of rightward movement*.

2. A mechanism of chain pronunciation

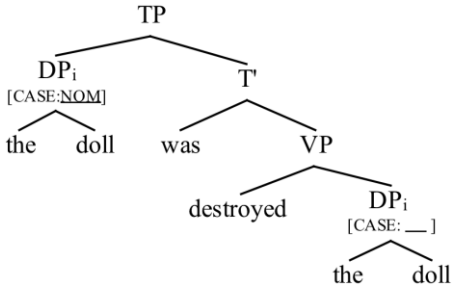
It will be adopted a *Late Insertion* model of grammar (cf. Halle & Marantz 1993). Also (for ease of presentation), it will be assumed that (non-trivial) chains are formed by constituents marked as non-distinct by the computational system (cf. Chomsky 1995, Nunes 1995, 2004)[2].

(21) *Form Chain*
α and β form a chain CH if (i) α c-commands β, and (ii) α and β are non-distinct.

Thus, consider a passive sentence as (22), represented in some detail in (23).

(22) The doll was destroyed.

(23)



According to (21), the occurrences of *the doll* in (23) form a chain CH = (DP_i, DP_i). To phonologically realize this chain, it is proposed a three-step mechanism: (i) formation of a *Phonological Numeration*, (ii) *Linearization* and (iii) *Vocabulary Insertion*.

2.1. STEP 1: PHONOLOGICAL NUMERATION

The element in the chain checking more features determines the *phonological shape* of a chain. This is: the set of phonological exponents of a chain CH are selected by taking into consideration the properties (i.e., features and internal structure) of the link L of CH engaging in more Agree relations. Such a set is the *Phonological Numeration* (PN) of the chain[3].

For the sentence in (23), the PN is determined by the occurrence of the DP checking its Case feature in [Spec,T]. Therefore:

(24) PN = {the_1, $doll_1$}[4]

Every PN requires to be depleted.

2.2. STEP 2: LINEARIZATION

No particular Linearization theory is assumed or proposed here. Basically, it is only required that a structure line (23) should be linearized as in (25).

(25) [DP the doll] < [T was] < [V destroyed] < [DP the doll]

2.3. STEP 3: VOCABULARY INSERTION

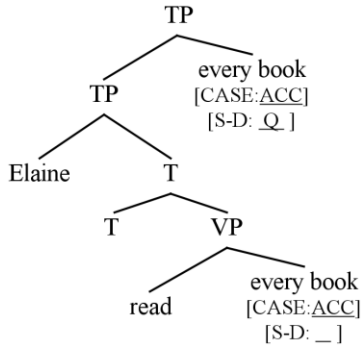
Vocabulary Insertion is assumed to obey an *Earliness* (Pesetsky 1989) kind of logic: *if you can pronounce something, do it*. According to this idea, the first occurrence of a chain in the linear order is the one receiving phonological representation.

(26) [DP the doll] < [T was] < [V destroyed] < ~~[DP the doll]~~

2.4. (NON) PRONOUNCING QR

If it is assumed that QR involve feature checking (e.g., Stowell & Beghelli 1997). Thus, moving a quantifier checks a *Scope & Discourse*-related feature (S-D) as shown in (27).

(27)



For easiness, consider the same structure adopting a bracketing representation.

(28) [TP [TP Elaine [T' T [VP read [DP every book]]]] [DP every book]]

To pronounce this sentence, first a PN should be formed. To do so, it is taken into consideration the link in the chain with more checked features, the copy of *every book* in [Spec,T].

(29) PN = {$every_1$, $book_1$}

Then, the structure should be linearized:

(30) Elaine < T < read < every book < every book

And finally, Vocabulary Insertion applies on the first occurrence in linear order.

(31) Elaine < T < read < every book < ~~every book~~

2.4. PRONOUNCING ADJUNCT EXTRAPOSITION AND ACD

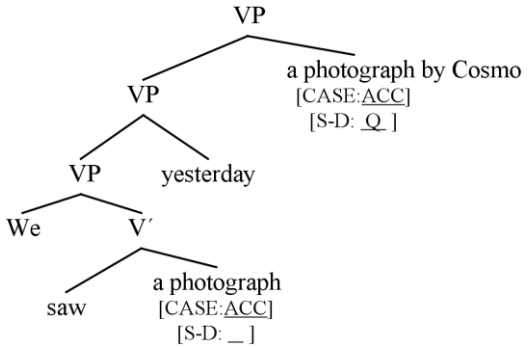
This simple system can account for the phonological realization of the structures in (9) and (15). For adjunct extraposition, first, Fox & Nissenbaum (1999) propose the following bracketing representation.

[2] See the Appendix for a principled definition of Non-Distinctiveness.

[3] There are independent reasons to assume the existence of Phonological Numerations. For example, Franks´ (1998) analysis of clitics in Slavic (or, for the case, several analyses involving low copy pronunciation) shows that phonological exponents introduced in lower positions in the structure conserve the properties of the head (e.g., Case), even if only the head has checked or valuated those properties.

[4] The fine structure of the DP is not important at the moment.

(32)



(33) [VP [VP [VP We [V´ saw [DP a photograph]] yesterday]] [DP a photograph by Cosmo]]

This representation contains the chain CH = ([DP a photograph by Cosmo], [DP a photograph]). Since the occurrence *a photograph by Cosmo* has undergone A´-movement to check a Scope-Discourse feature, it is the link in the chain determining it PN.

(34) PN = {a_1, $photograph_1$, by_1, $Cosmo_1$}

When Linearization applies, the DP *a photograph* precedes the head of chain, thus it receives phonological representation:

(35) We < saw [DP a photograph] < yesterday < [DP ~~a photograph~~ by Cosmo]

However, the PN is not depleted yet because some of its elements cannot be inserted in the first occurrence of the chain.

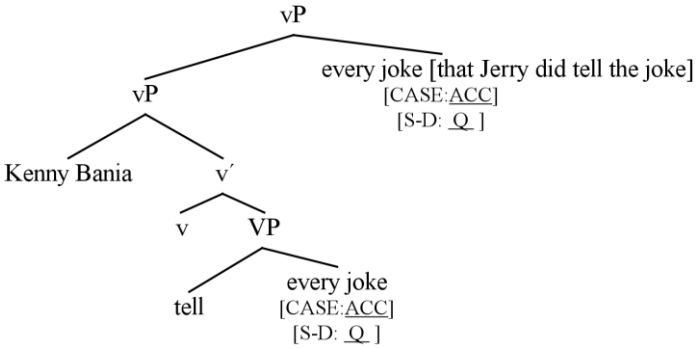
(36) PN = {a_0, $photograph_0$, by_1, $Cosmo_1$}

Thus, in order to deplete the PN, the remaining objects should be introduced in the link in the chain containing the relevant syntactic terminals.

(37) We < saw [DP a photograph] < yesterday < [DP ~~a photograph~~ by Cosmo]

The same mechanism derives also ACD.

(38)



(39) [vP [vP Kenny Bania [v´v [VP tell [DP every joke]] [DP every joke that Jerry did tell the joke]]

(40) PN = ($every_1$, $joke_1$, $that_1$, $Jerry_1$, did_1, $tell_1$)

As before, the PN is depleted by inserting its elements in two different links in the chain.

(41) Kenny Bania < v < tell < ~~every joke~~ < ~~every joke~~ that Jerry did tell the joke

The main difference regarding adjunct extraposition involves an ellipsis operation applying on the VP inside the relative clause.

(42) *VP Ellipsis*
Kenny Bania < v < tell < ~~every joke~~ < ~~every joke~~ that Jerry did ~~tell the joke~~

4. Concluding remarks

It has been advanced a mechanism of phonological realization for non-trivial chains capable of dealing with Fox & Nissenbaum´s (1999) analysis of extraposition and Fox´s (2002) analysis of ACD. However, some questions remain open regarding the rightward nature of QR.

A possibility would be assuming that QR involves some kind of adjunction. Thus, its particular behavior regarding linearization would follow from the same (unclear) principles governing linear ordering regarding adjuncts.

5. Appendix: Non-Distictiveness and a cyclic approach to Late Merger

I will also assume that *chains are not part of narrow syntax* (basically, because they are not *Terms* in Chomsky´s 1995 sense), *but they are created post-syntactically at the interfaces according to (43)*. The idea is that chains are created from the output syntactic representation without any reference to the derivational generative process.

(43) *Chain Linking*
Two constituents α and β are linked in a chain if
a. α c-commands β.
b. The features of β are a subset of the features of α.
c. There are no intervening linking-candidates between α and β.

There are several ways of implementing the mechanism in (14) depending on particular assumptions on the inner workings of narrow syntax. For example, if we take that *Goals* of *Agree* carry uninterpretable or unvalued features (uFF), it is possible to assume that uFF are "invisible" at LF and PF (that would be what "uninterpretable" means). Thus, for the syntactic representations in (44a) and (45a), the interfaces would "see" something as (44b) and (45b), and the chains in (44c) and (45c) would be formed according to (43)[5].

(44) a. [TP $John_K$ [T´ was [vP kissed $John_{uK}$]]].
b. [TP $John_{\{K,D,masc,sing,3\}}$ [T´ was [vP kissed $John_{\{D,masc,sing,3\}}$]]]
c. CH = ($John_{\{K,D,masc,sing,3\}}$, $John_{\{D,masc,sing,3\}}$)

(45) a. [TP $John_K$ [T´ T [vP $John_{uK}$ [v´ kicked $John_K$]]]]
b. [TP $John_{\{Nom,D,masc,sing,3\}}$ [T´ T [vP $John_{\{D,masc,sing,3\}}$ [v´ kicked $John_{\{Acc,D,masc,sing,3\}}$]]]]
c. CH_1 = ($John_{\{Nom,D,masc,sing,3\}}$, $John_{\{D,masc,sing,3\}}$); CH_2 = ($John_{\{Acc,D,masc,sing,3\}}$)

[5] Identical representations would be obtained under the assumption that Goals do not carry uFF and formal features as Case are assigned (and not just checked).

This system may be used, among other things, to offer a cyclic explanation of the reconstruction asymmetries regarding A-movement[6]. It has been observed, for instance, that A-movement typically bleeds Condition C (cf. Chomsky 1995).

(46) [The claim that John$_i$ was asleep]$_j$ seems to him$_i$ to be correct t_j

However, A-movement sometimes allows reconstruction of intermediate copies of A-movement (the underlined $\underline{t_k}$ is the one being interpreted).

(47) [His$_i$ picture of [the president]$_j$]$_k$ seemed to [every man]$_i$$\underline{t_k}$ to be seen by him$_j$$t_k$ to be t_k a real intrusion.

The general explanation for this and some other asymmetries regarding reconstruction involve *Wholesale Late Merger* (Takahashi & Hulsey 2009). In a nutshell, the idea is that some constituents may be merged *counter-cyclically* inside a phrase after moving it. Thus, a sentence as (46) requires a derivation like (48), where the NP complement of the D head is merged after A-movement:

(48) a. *A-Movement*
[$_{TP}$ [$_{DP}$ D] … [$_{DP}$D]]
b. *Wholesale Late Merger*
[$_{TP}$ [$_{DP}$ D NP] … [$_{DP}$ D]]

This would entail the absence of a R-expression in the thematic position of the argument, predicting this way the lack of reconstruction in such position.

The case in (47) is a little more complex. In few words, it involves a D head in the thematic position and Wholesale Late Merger in an intermediate position (49b). This way, the R-expression inside the DP can be coreferential whit *by him* and the possessive pronoun can be bound by *every man.*

(49) a. *Intermediate A-movement*
[$_{TP}$ [$_{DP}$ His] … by him … [$_{DP}$ his]]
b. *Wholesale Late Merger*
[$_{TP}$ [$_{DP}$ his [picture of [the president]$_i$] … by him$_i$ … [$_{DP}$ his]]
c. *A-movement*
[$_{TP}$ [$_{DP}$ his$_j$ [picture of [the president]$_i$] … every man$_j$ … [$_{DP}$ his$_j$ [picture of [the president]$_i$] … by him$_i$ … [$_{DP}$ D]]

The obvious conceptual problem with this approach to reconstruction is counter-cyclicity. The idea that syntactic operations must observe strict cyclicity is a theoretical desideratum in generative linguistics since, at least, Chomsky (1965). Thus, it would be highly desirable being able to capture these interpretative patterns within a cyclic approach to syntax.

This can be done if we assume that the Conditions on Chain Formation in (43) applying post-syntactically. Basically, a derivation for a sentence as (46) may involve a bare D (a D head without its NP complement) in the thematic position and a base-generated full DP in subject position. Schematically:

(50) [$_{TP}$ DP$_{\{Nom,D,Per,Num,Gen\}}$ [$_{T'}$ T … [… D$_{\{D,Per\}}$]]]

These two elements would form a chain CH = (DP$_{\{Nom,D,Per,Num,Gen\}}$, D$_{\{D,Per\}}$) at the interfaces receiving θ-role and Case. However, *no transformational operation in the syntax relates both constituents*. But since the resulting chain is interpretable, the base generated full DP is licensed.

The same idea may be applied to the sentence in (47): a full DP c-commanding a bare-D is base-generated in a position outside the domain of the pronoun *him* but within the c-command domain of *every person.* After that, A-movement applies on this full DP generating a copy of it in the subject position.

(51) a. *Structure with a bare D*
[$_{T'}$ T$_{inf}$ … by him … [D$_{\{D,Per\}}$]]
b. *Full DP merged in an intermediate position*
[$_{TP}$ DP$_{\{D,Per,Num,Gen\}}$ [$_{T'}$ T$_{inf}$ … by him [… D$_{\{D,Per\}}$]]
c. *A-movement*
[$_{TP}$ DP$_{\{Nom,D,Per,Num,Gen\}}$ [$_{T'}$ T … every man … [$_{TP}$ DP$_{\{D,Per,Num,Gen\}}$ [$_{T'}$ T$_{inf}$ … by him [… D$_{\{D,Per\}}$]]

The conditions of chain formation in (43) predict the generation of the chain CH = (DP$_{\{Nom,D,Per,Num,Gen\}}$, DP$_{\{D,Per,Num,Gen\}}$, D$_{\{D,Per\}}$)., which, again, receives θ-role and Case. And, again, the base generated full DP is licensed since it is part of an interpretable chain.

[6] See Muñoz Pérez (2015) for a sketchy but more detailed implementation.

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