Interfaces on chains: a post-syntactic approach to chain formation

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According to Copy Theory, movement is an epiphenomenon based on how PF interprets collections of non-distinct syntactic objects. The usual approach to this issue involves assuming that some grammatical mechanism mark as non-distinct two syntactic objects related by the Copy operation. In this presentation it will be argued that Non-Distinctiveness does not follow from any particular derivational mechanism but it is obtained post-syntactically at the interfaces by inspecting the featural content of syntactic objects. It will be shown that this approach offers interesting conceptual and empirical advantages regarding multiple copies, what-constructions and reconstruction.

1. Non-Distinctiveness (aka Sameness)

According to Copy Theory (Chomsky 1993) there are no movement operations in language. The displacement property is explained in terms of chains, collections of non-distinct elements in the syntactic structure being interpreted as "the same" element.

(1)   John was kissed ~~John~~.

Thus, *Non-Distinctiveness/Sameness* is maybe the most important property of movement dependencies under Copy Theory.

The problem is defining it…

One prominent view assumes that Non-Distinctiveness follows somehow from the Copy operation (cf. Chomsky 1995, Nunes 1995, 2004). Thus, if syntactic objects are assumed to carry some kind of distinctiveness markings, their copies will also carry the same index.

(2)   a.   *Derivational step α*
               K = [$_{TP}$ was [$_{VP}$ kissed John$_1$]]
        b.   *Copy*
               K = [$_{TP}$ was [$_{VP}$ kissed John$_1$]]
               L = John$_1$
        c.   *Derivational step α+1*
               [$_{TP}$ John$_1$ [$_{T'}$ was [$_{VP}$ kissed John$_1$]]]

Let's call this one the ***Derivational Definition of Sameness*** (DS). Basically, it involves assuming that some operation marks as "the same" two elements during the syntactic computation.

This solution has been object of criticism during the years, mainly because it violates the *Inclusiveness Condition* (cf. Chomsky 1995).

What I am going to propose here is redefining Non-Distinctiveness. My definition is different in two aspects: (i) it is a principled definition of Non-Distinctiveness (i.e., it is based on independent grammatical principles); and (ii) it makes different predictions, basically because it extends the empirical domain of Copy Theory.

2. The system

Following Halle & Marantz (1993), it is assumed a *Late Insertion* model of grammar. Thus, syntactic terminals are taken to be just sets of features, each of them being a pair *attribute-value*, where the attribute denotes a *feature-class* (e.g., Category or Gender) and the value denotes a member of such a class (e.g., V, N, or MASC, FEM).

However, it seems that this assumption is not necessary for the interfaces: only syntactic operations target attributes; features at PF and LF are interpreted as instructions based on *privative* values (e.g., the noun *dogs* is interpreted as a plurality of entities without reference to the *Number* class). Therefore, a syntactic terminal consisting on the features $\{<Att_1,\alpha>,<Att_2,\beta>\}$ will be interpreted at PF and LF simply as the set $\{\alpha,\beta\}$.

As an extension of this idea, a valueless feature $<Att,\_\_>$ will lack a representation at the interfaces, being *uninterpretable*. Thus, a syntactic terminal with the features $\{<Att_1,\alpha>,<Att_2,\beta>,<Att_3,\_\_>\}$ will be interpreted as the set $\{\alpha,\beta\}$.

Chomsky (2000, 2001): the operation Agree relates a Probe carrying an unvalued feature $<Att_1,\_\_>$ with an *active* Goal carrying a valued version of the same feature $<Att_1,\alpha>$; **the activity of the Goal** is determined by an unvalued feature that will get satisfied after Agree

(3)   *Activity Condition (Chomsky 2001)*
        A goal G is accessible for Agree iff G has at least one uninterpretable feature.

I am assuming that Agree participates in both A and A'-dependencies. Thus, some DPs should carry unvalued pairs for both Case κ and left-peripheral ω features.

(4)   a.   [$_{CP}$ Who [$_{TP}$ ~~who~~ seems [$_{TP}$ ~~who~~ to be [~~who~~ happy]]]]?
        b.   Who$_{\{<\kappa,NOM>,<\omega,Q>,\,...\}}$ … who$_{\{<\kappa,T>,<\omega,\_>,\,...\}}$ … who$_{\{<\kappa,\_>,<\omega,\_>,\,...\}}$ … who$_{\{<\kappa,\_>,<\omega,\_>,\,...\}}$
        c.   Who$_{\{NOM,Q,\,...\}}$ … who$_{\{T,\,...\}}$ … who$_{\{...\}}$ … who$_{\{...\}}$

Notice that at the interfaces there is an *inclusion* relation between the occurrences of *who*. Such a relation will arise systematically for every new copy of a constituent (even if XP$_{\{...\}}$ = XP$_{\{...\}}$, the general case for cyclic movement), so it may be capitalized to define Sameness at the interfaces:

(5)   *Representational Sameness (RS)*[1]
        Two constituents α and β are "the same" if:
        a.   α c-commands β,
        b.   the features of β are a subset of the features of α,
        c.   there is no δ between α and β being a proper subset of α or a proper superset of β.

This relation is ***transitive*** (as any other identity-type relation): if A and B are non-distinct, and B and C are non-distinct, then A and C are non-distinct.

Consider the analysis for these sentences.

(5)   a.   John was kissed ~~John~~.
        b.   John$_{\{NOM,\,...\}}$ … John$_{\{...\}}$ [SINGLE CHAIN, ACCORDING TO (5)]

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[1] I call this *Representational Sameness* because it is based on the properties of elements in a syntactic representation. However, the representational nature of the definition may be translated into derivational terms. For example, (5) can be thought as a *Minimal Search* kind of operation (e.g., look for the closest subset).

(6) a. John ~~John~~ kissed John.
   b. John$_{\{NOM, ...\}}$ … John$_{\{...\}}$ … John$_{\{ACC, ...\}}$ [TWO CHAINS, ACCORDING TO (5)]

(7) a. John ~~John~~ said that John was kissed ~~John~~.
   b. John$_{\{NOM, ...\}}$ … John$_{\{...\}}$ … John$_{\{NOM, ...\}}$ … John$_{\{...\}}$ [TWO CHAINS, ACCORDING TO (5)]

This system generates "chains" based on the featural content of constituents; it does not say anything about the Copy operation (which I am still assuming). Notice also that there are no "syntactic" clues of what a "chain" can be, so the interfaces must scan *independently* the syntactic representation in search for non-distinct constituents.

Since there is no direct connection between Copy operations, LF-chains and PF-chains, a set of scenarios with mismatches between these notions is predicted.

Copy operation	LF-chain	PF-chain	Phenomenon
YES	YES	YES	Movement
YES	YES	NO	Multiple Copies
YES	NO	YES	Head Movement???
YES	NO	NO	What-Constructions (partial copying)
NO	YES	YES	Reconstruction asymmetries
NO	YES	NO	Resumption???
NO	NO	YES	Null-Subjects
NO	NO	NO	Trivial Chain (no movement)

Table 1.

DS and multidominance-based approaches only make the first and last predictions, so they require assuming additional machinery in order to explain the remaining phenomena in the table. Under the present approach, these cases (hopefully) follow from the definition in (5).

3. Multiple Copies and What-constructions

In some languages it is possible to pronounce two (or even more) links of the same chain.

(8) *Romani (McDaniel 1986)*
   Kas   misline   **kas**   o Demiri dikhlâ?
   Who   think   who   Demir   saw
   'Who do you think Demir saw?'

(9) *German (McDaniel 1986)*
   Wen   glaubt   Hans   **wen**   Jakob   gesehen   hat?
   Who   thinks   Hans   who   Jakob   seen   has
   'Who does Hans think Jakob saw?'

Some properties: multiple copy pronunciation is restricted to intermediate copies.

(10) *German (Fanselow and Mahajan 1995)*
   Wen   denkst   Du   *wen*   sie   meint   *wen*   Harald   liebt?
   who   think   you   who   she   believes   who   Harald   loves
   'Who do you think that she believes that Harald loves?'

(11) *German (Nunes 2004)*
   *Wen   glaubt   Hans   *wen*   Jakob   *wen*   gesehen   hat?
   whom   thinks   Hans   whom   Jakob   whom   seen   has
   'Who does Hans think Jakob saw?'

Also, this phenomenon is not attested with full wh-phrases:

(12) *German (Nunes 2004)*
   *Wessen Buch   glaubst   du   *wessen Buch*   Hans   liest?
   whose book   think   you   whose book   Hans   reads
   'Whose book do you think Hans is reading?'

Following Nunes' (2004) analysis, I will assume that there is a morphological reanalysis between the wh-pronoun and an embedded C involving an application of the operation *Fusion*.

(13) *Fusion (Embick 2010: 78)*
   $[_x \alpha] \frown [_y \beta] \rightarrow [_{x/y} \alpha, \beta]$
   where α and β are features of X and Y.

When subordinate C and *wen* fuse, the result is a syntactic terminal with a set containing both the features of *wen* and C:

(14) a. Wen glaubt Hans wen Jakob ~~wen~~ gesehen hat?
   b. $[_{CP}$ wen$_{\{Q, ACC, D, \varphi,\}}$ $[_{C'}$ C$_Q$ …$[_{CP}$ #C + wen#$_{\{C, ACC, D, \varphi,\}}$ $[_{TP}$ … $[_{vP}$ wen$_{\{ACC, D, \varphi,\}}$ V]]]]]

According to (5), there are two chains in (14). And, as normal, the head of each chain is pronounced in both cases.

(15) a.   CH$_1$ = (wen$_{\{Q, ACC, D, \varphi,\}}$)
   b.   CH$_2$ = (#C + wen#$_{\{C, ACC, D, \varphi,\}}$, ~~wen$_{\{ACC, D, \varphi,\}}$~~)

Notice that the morphological reanalysis only applies at PF. At LF, only one chain is interpreted from the structure.

(16) a. $[_{CP}$ wen$_{\{Q, ACC, D, \varphi,\}}$ $[_{C'}$ C$_Q$ …$[_{CP}$ wen$_{\{ACC, D, \varphi,\}}$ $[_{TP}$ … $[_{vP}$ wen$_{\{ACC, D, \varphi,\}}$ V]]]]]
   b. CH = (wen$_{\{Q, ACC, D, \varphi,\}}$, wen$_{\{ACC, D, \varphi,\}}$, wen$_{\{ACC, D, \varphi,\}}$)

Therefore, this phenomenon fits with the prediction in Table 1.

A more complex kind of pattern is the one attested by cases of non-identical doubling (or What-Constructions, cf. Fanselow 2006) in Dutch. The following data (and most of the analysis, in fact) is from Barbiers et al (2010).

(17) *Neuter and non-neuter wh-pronouns (Overijssel)*
   Wat   denk   je   **wie**   ik   gezien   heb?
   What   think   you   who   I   seen   have
   'Who do you think I saw?'

(18) *Non-neuter and (non-neuter) relative pronouns (North-Holland)*
   Wie   denk   je   **die**   ik   gezien   heb?
   Who   think   you   rel.pron   I   seen   have
   'Who do you think I saw?'

(19) *Neuter and (non-neuter) relative pronouns (Overijssel)*
   Wat   denk   je   **die**   ik   gezien   heb?
   What   think   you   rel.pron   I   seen   have
   'Who do you think I saw?'

These are the only possible doublings in Dutch. Any other logical combination is unacceptable.

(20)   *__Wie__   denk   je   __wat__   ik   gezien   heb?
          Who   think   you   what   I   seen   have
          'Who do you think I saw?'

(21)   *__Die__   denk   je   __wie__   ik   gezien   heb?
          rel.pron   think   you   who   I   seen   have
          'Who do you think I saw?'

(22)   *__Die__   denk   je   __wat__   ik   gezien   heb?
          rel.pron   think   you   what   I   seen   have
          'Who do you think I saw?'

Thus, the only possible orders are the ones sketched in (23).

(23)   a.   __wat__ (neuter pronoun)   …   __wie__ (non-neuter pronoun)
        b.   __wie__ (non-neuter pronoun)   …   __die__ (non-neuter relative pronoun)
        c.   __wat__ (neuter pronoun)   …   __die__ (non-neuter relative pronoun)

To provide an explanation, Barbiers et al. (2010) provide an analysis of these pronouns according to the following featural composition.

(24)   a.   *wat* = indefinite numeral (N)
        b.   *wie* = *wat* + φ-features (gender, G)
        c.   *die* = *wie* + definiteness (D)

I'll follow Cheng's (2001) analysis of this kind of constructions. According to her, there is *Partial Copying* of a proper subset of the features of the original occurrence of the wh-pronoun/phrase.

(25)   [CP __wat__{N, Q} [C' CQ [CP __wie__{φ,N}   [C' C [TP … __wie__{φ,N}]]]]]

If you assume DS, the wh-elements in (25) will form a chain. This is what Barbiers et al. (2010) propose, so they have problems explaining (i) why *wie* is pronounced (they assume Nunes' 2004 explanation based on Fusion) and (ii) a semantic difference between movement and what-constructions we will see in (27). According to RD in (5), we have two chains here both at PF and LF. At PF we have two elements being pronounced, so pronunciation of *wie* is explained straightforwardly. Regarding LF, consider the following:

(26)   Wie denk je   niet dat zij uitgenodigd heeft?
        who think you   not that she invited   has
        'Who don't you think she has invited?'

(27)   *Wat denk je   niet wie zij   uitgenodigd heeft?
        what think you   not   who she invited   has

Negation intervenes between *wat* and *wie* in what-constructions, but such a phenomenon does not occur in regular movement. This is a mysterious fact if we assume that chains and movement go together. But the present approach predicts this kind of asymmetry: if *wat* and *wie* do not form a chain, they must be "connected" by some other type of dependency. If it is a semantic dependency, it is expected that some scope-bearing element may disrupt the connection.

4. Reconstruction asymmetries

It has been frequently observed that copies of A-movement seem to bleed Condition C (cf. Chomsky 1995).

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

The acceptability of (28) is unexpected under Copy Theory, and it may be even considered surprising if sentences as (29), where a copy of A-movement is reconstructed ($\underline{t_k}$), are taken into consideration.

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

This kind of asymmetry has been interpreted by Lebeaux (1988) as the absence of the relevant R-expression in some traces/unpronounced-copies (e.g., the NP [NP *claim that John was asleep*] would be missing in the original position of the subject in (28)). The problem is, then, ***explaining how different elements, some of them lacking a constituent, may form a movement chain***.

Under DS, where two elements are "the same" only if they are connected through a Copy operation, it is necessary to assume a derivation where:

(30)   a.   Two copies are generated in the syntactic representation.
        b-   An ulterior operation modifies the structure of the higher copy, adding some constituents.

In this line, Takahashi & Hulsey (2009) capture the pattern in (28) and (29) by proposing that some NPs are *counter-cyclically* introduced through *Wholesale Late Merger* (WLM): a D head may be merged in an A-position and undergo movement (31a); its NP restrictor may be merged after that (31b).

(31)   a.   [DP The]$_1$ seems to him to be [DP the]$_1$ correct.
        b.   [DP The [NP claim that John$_i$ was asleep]]$_1$ seems to him$_i$ to be [DP the]$_1$ correct.

The problem is we do not want counter-cyclic operations in our grammar: under a derivational approach, syntactic structure is just the history of application of Merge (e.g., [V OBJ] is a constituent and not [SUBJ V] just because V and OBJ combine first). Thus, cyclical application of Merge is explicative (and we want to keep it that way!). So, an alternative explanation for these patterns is required on conceptual grounds.

According to (5), a D head without an NP complement can form a chain with ***a base-generated full-DP*** in a Case-marked position.

(32)   [TP DP{NOM,D, Per, Num, Gen}[T' T^0 …   [YP… D{D, Per} …]]]   CH = (DP, D)

The derivation sketched in (32) is strictly cyclic and generates the same syntactic representation as (31), explaining in exactly the same way the lack of Condition C effects in (28).

Regarding (29), a derivation like (33) is proposed. Here, the full-DP is merged in the c-command domain of the Case assigner, above the pronoun and below the quantifier, and from there it moves to the Case-marked position. Again, these three elements form a chain in virtue of (5).

(33)   [TP DP{NOM,D, Per, Num, Gen} [T' T^0 … [XP DP{D, Per, Num, Gen} … [YP… D{D, Per} …]]]]
        CH = (DP, DP, D)

Since there is a R-expression in the second occurrence, reconstruction is predicted in this position, as it is attested.

5. Conclusions

In this talk:

- A principled definition of Non-Distinctiveness/Sameness was offered.
- It was shown how multiple copy phenomena may be straightforwardly derived from such definition.
- The system allows for an elegant and strictly cyclic explanation of reconstruction asymmetries.

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