Set-Merger

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Main point

- There are non-local relations that pose a problem for Chomsky's (2000, *et seq.*) model with Phase Impenetrability Condition (PIC).

- Problems arise because of the assumption that only labels of syntactic objects (SOs) are visible for syntactic operations.

- Solution: Representational-derivational model without the assumption.

1.   Introduction

1.1. Two versions of the Phase Impenetrability Condition

- There are two versions of the PIC: Chomsky (2000, 108) and Chomsky (2001,14).

(1) a.   Strong version of PIC (Chomsky 2000, 108):

   In phase α with head H, the domain of H is not accessible to operations outside α; only H and its edge are accessible to such operations.

   b.
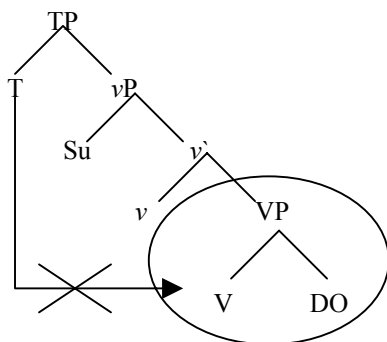
- Chomsky (2001): there is an Agree relation that crosses a phase boundary (quirky subjects with nominative objects).

   T can access an element of the complement of the phase head (2).

   One (*v*P) phase boundary.

(2) Pavlovi se líbil včera ten nový film.   (Czech)
     Pavel$_{DAT}$ self liked$_{SG.M}$ yesterday the new film$_{SG.M.NOM}$
     'Pavel enjoyed the new film yesterday.'

(3) a. Weak version of PIC (Chomsky 2001,14):

     [In the structure [$_{ZP}$ Z… [$_{HP}$ α [H YP]]], with H and Z the heads of phases], the

     domain of H is not accessible to operations at ZP; only H and its edge are accessible to

     such operations.

   b.
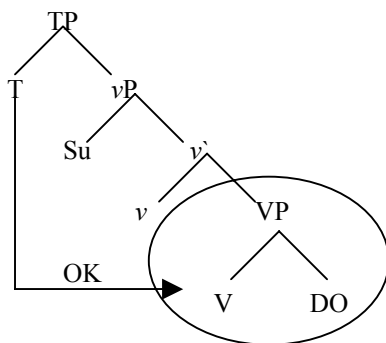
1.2. PIC and locality

- There are non-local relations that also pose a problem for the weak version of PIC.

  They cross more than one phase boundary.

1.2.1. Bottom-up problems

Condition C

- Condition C as a probe-goal relation between the pronoun and the r-expression (Chomsky

2005b, 8, 11).

  Four phase boundaries between the coindexed pronoun and the r-expression:

(4) * Er$_1$ sagte, daß Hans behauptete, daß Andreas$_1$ klug ist.   (German)
      He   said   that Hans claimed   that Andreas   clever is
      'He said that Hans had claimed that Andreas was clever.'

Condition C and coreference

- Coreference between an r-expression within an adjunct clause and a pronoun in the matrix

clause is possible only if the r-expression is scrambled in Czech (Biskup, to appear), see (5b)

vs. (5c).

  Adjunct clauses like in (5) are merged cyclically.

  The CP phase of the matrix clause with the pronoun must 'remember' not only that there is

a coindexed r-expression but also its (scrambling) feature.

(5) a. *violation of Condition C:*
     * pro[1] zuřivě   bránil   některý argument, který (Pavel[1]) přednesl včera (Pavel[1]).
            furiously defended some argument   which Pavel[NOM] gave yesterday Pavel[NOM]
   b. *presuppositional whP with r-expression in situ:*
     * Který argument, který přednesl včera   Pavel[1], pro[1] zuřivě   bránil t?
       which argument which gave   yesterday Pavel[NOM]   furiously defended
   c. *presuppositional whP with scrambled r-expression:*
     ? Který argument, který Pavel[1]   přednesl včera, pro[1] zuřivě   bránil t?
       which argument which Pavel[NOM] gave   yesterday   furiously defended
       'Which argument that Pavel gave yesterday did he defend like a fury?'

Control constructions and Condition A

• Control infinitives as CPs (Chomsky 2000, 105; 2001, 8) and Agree-based analysis of

anaphors (Chomsky 2005b, 8 and 2007, 18, building on Reuland 2001).

   Three phase boundaries between the matrix T probe and the anaphor:

(6) Marie[1]   přikázala Jirkovi[2] citovat sebe[1,2].   (Czech)
    Marie[NOM] ordered   Jirka[DAT] to cite self.
    relevant: 'Marie ordered Jirka to cite her.'
    'Marie ordered Jirka to cite himself.'

Agreement

• Khwarshi: an SOV language spoken in Southern Dagestan.

   Either agreement between the matrix verb (gender 4) and its sentential complement (7a).

   Or agreement between the matrix verb (gender 5) and the absolutive argument in the finite

complement clause (7b).

   Probably two phase boundaries in (7b).

(7) a.   Išet'u-l   **l**-iq'-še   goli   uža   bataxu   y-acc-u.
         Mother/OBL-LAT G4-know-PRS   COP   [boy/ERG bread(G5) G5-eat-PTCP:PST]
         'Mother knows that the boy ate bread.'
    b.   Išet'u-l   **y**-iq'-še   goli   uža   **bataxu**   y-acc-u.
         Mother/OBL-LAT G5-know-PRS   COP   [boy/ERG bread(G5) G5-eat-PTCP:PST]
         'Mother knows that the boy ate bread.'
                                                                        (Khalilova 2007, 4)

Long-distance scrambling and Relativized Minimality

• Shields (2007): short adverb scrambling can cross another adverb in Russian (8a), Japanese

or Korean. And LD scrambling is possible (8b).

   But LD scrambling across the same adverbial induces a RM effect (8c).

   Problem for derivational approaches because they evaluate each derivational step

independently.

She argues for a representational analysis because it has a simultaneous access to information created during different steps of the derivation.

(8) a.   Ona bystro$_1$ často t_1 zavodilas'.
       she quickly often   started
       'It often started quickly.'
   b.   Ja bystro$_1$ xoču [čtoby ona t_1 zavodilas'].
       I quickly want that she   started
       'I want it to start quickly.'
   c. * Ja bystro$_1$ xoču [čtoby ona často t_1 zavodilas'].
       I quickly want that she often   started
       'I want it to often start quickly.'   (Shields 2007, 162)

1.2.2. Top-down problems

ECM in Japanese

- In the optional ECM (9), the matrix verb can value case of the argument within the embedded finite clause.

  Two phase heads (*v*, C) are present.

(9) John-ga [$_{CP}$ sono sigoto-ni$_1$ Mary-ga/**wo** t_1 muite-na-i   to] omo-ta.
    John-NOM the job-DAT Mary-NOM/ACC suitable-NEG-PRES C think-PST
    'John felt that Mary is not suitable for the job.'
                          (Hiraiwa 2001, 72)

Multiple cases in Kayardild

- X phase boundaries between 'know' and 'brother' (depending on the phase status of XPs).
- Four cases on 'brother'.

  Every phase can theoretically add (spell out) new cases.

(10) Ngada mungurru, [maku-ntha   yalawu-jarra-ntha yakuri-naa-ntha   thabuju-karra-nguni-naa-ntha
    I   know   woman-C.Obl catch-Past-C.Obl fish-M.Abl-C.Obl brother-Gen-Ins-M.Abl-C.Obl
    mijil-nguni-naa-nth].
    net-Ins-M.Abl-C.Obl
   'I know that the woman caught the fish with brother's net.'
                 (Merchant 2006, originally Evans 2005)

Depictives in Latin control constructions

- Latin depictives in control (CP) constructions have the same case as the controller in the matrix clause.

(11) Ego iubeo te   [PRO esse   bonum].
    I   order you.acc   to-be good.acc
    'I order you to be good.'
                  (Cecchetto & Oniga 2004, 143)

1.3. Agree vs. Movement

- Agree, in contrast to Move, is not subject to the PIC.

English

- Bošković (2007): coordination phrases are phases.

  Movement of the first conjunct out of the coordination phase is ungrammatical (12a).

  But first conjunct agreement is grammatical (12b).

(12) a.* A woman is and five men in the garden. (Bošković 2007, 15)
     b.   There is a woman and five men in the garden.

Czech

- Agreement between T and *svého* within PP is possible (13a).

  Agreement between C and *kterého* within PP is possible (13b).

  But extraction of *kterého* from PP is not possible (13c).

(13) a. Marie$_1$ vyprávěla historky o životě   svého$_1$ přítele.
        Marie$_{NOM}$ talked   stories   about life self   friend
        'Marie talked about her friend's life.'
     b. Marie   vyprávěla historky o životě   kterého přítele?
        Marie$_{NOM}$ talked   stories   about life which   friend
        'About which friend's life did Marie tell stories?'
     c.* Kterého Marie   vyprávěla historky o životě   t přítele?
        which   Marie$_{NOM}$ talked   stories   about life   friend

Tsez

- The embedded absolutive can trigger LDA agreement (class III), see (14).

  But it cannot raise to the matrix clause (Polinsky & Potsdam 2001, 590; Chandra 2007, 56).

(14) eni-r   [uz-a   magalu   b-ac-ru-li]   b-iy-xo.
     mother-DAT [boy-ERG bread.III.ABS   III-eat-PASTPRT.NMLZ] III-know.PRES
     'The mother knows that the boy ate the bread.'   (Chandra 2007, 48)

2. Proposal

2.1. Set-Merger

- Set-Merger in Chomsky (1995a, 396-397; see also e.g. 2000, 133)

(15) a. Chomsky (1995a, 396-397):

        'Applied to two objects α and β, Merge forms the new object γ. […] γ must therefore

        at least (and we assume at most) be of the form {δ, {α, β}}, where δ identifies the

relevant properties of γ; call δ the *label* of γ.'

'…the label δ is either α or β; one or the other *projects* and is the *head* of γ. If α projects, then γ = {α, {α, β}}.'

b. Chomsky (1995a, 397):

'Thus we might represent γ informally as (15b)…':

$$
\begin{array}{c}
\alpha_1 \\
\diagup\quad\diagdown \\
\alpha_2 \qquad \beta
\end{array}
$$
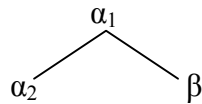
- *Crucial*: I assume that trees (a type of graph) belong to syntactic derivations.
  Then the SO γ is (16):

(16)
$$
\begin{array}{c}
\{\alpha,\ \{\alpha,\ \beta\}\} \\
\diagup\quad\diagdown \\
\alpha \qquad \beta
\end{array}
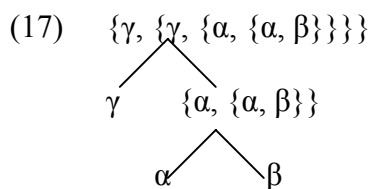$$
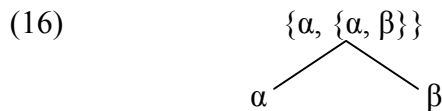
Reasons:

1. Derivations are standardly treated as trees with sets of features.

2. It will derive the difference between Agree and Move.

- Given this, a phase (e.g. *v*P) – with a phase head (γ) and its complement ({α, {α, β}}) - looks like (17).

(17)   {γ, {γ, {α, {α, β}}}}
$$
\begin{array}{c}
\diagup\quad\diagdown \\
\gamma \qquad \{\alpha,\ \{\alpha,\ \beta\}\} \\
\qquad\quad \diagup\quad\diagdown \\
\qquad\quad \alpha \qquad \beta
\end{array}
$$

- Chomsky's assumption (2005a, 14 and 2005b, 7):
  The label of a SO contains all the information relevant for further computations.
  And for syntactic operations only the label of the SO is visible.
- Problem: this is only correct for c-selection.

2.2.   Selection

2.2.1. C-selection

(18) a. *na* selects a DP:
    [PP na [DP stůl]]
         on   table

b. not a VP:
   *[PP na [VP utřít]]
        on   wipe

c. *na* can be combined with the event of 'wiping' if it is a noun:
   [PP na [DP utření]]
        on   wiping

d. *utřít* can be combined with *stůl*:
   [VP utřít [DP stůl]]
       wipe   table

e. *na* cannot select a DP non-locally:
   *[PP na [VP utřít [DP stůl]]]
        on   wipe   table

- *na* (γ) only cares about the label of [*utřít stůl*] – i.e. α – and not about the whole set information (e.g. label of *stůl* (β)):

(19)
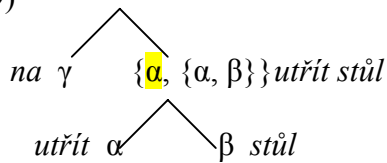
- *utřít stůl* can further project (20a). *rychle* is adjoined: <γ, {α, {α, β}}>.

  Is the label {α, {α, β} as in (20b) or α as in (20c)?

  o Chomsky (2000, 133): 'The constructed objects K, then, are of the form {γ, {α, β}} (substitution) or {γ, <α, β>} (adjunction), where γ is the label of K… On minimal assumption, the label γ should be the label of either α or β.'

  o (20d) is ungrammatical, hence, labeling should be like (20c), not (20b).

(20)   a. rychle   utřít   stůl
          quickly   wipe   table

       b.

7

c.

$$na \quad \delta \qquad \{\alpha, <\gamma, \{\alpha, \{\alpha, \beta\}\}>\}$$
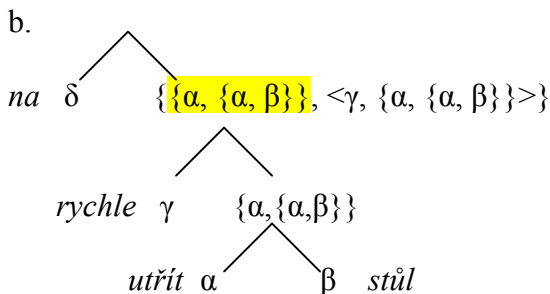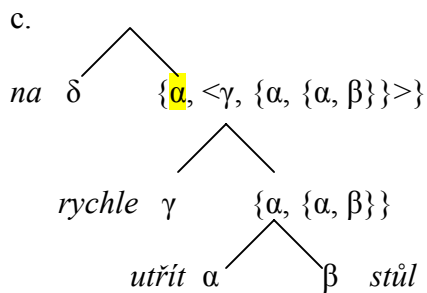
$$rychle \quad \gamma \qquad \{\alpha, \{\alpha, \beta\}\}$$

$$utřít \quad \alpha \qquad \beta \quad stůl$$

d.   * na   rychle   utřít   stůl
           on   quickly   wipe   table

- But the only-label visibility is not correct for semantic selection.

2.2.2. S-selection

- S-selection can see more than just the label.

There are long-distance subcategorizations, e.g. subjunctive in English (Collins 2002).

Demand requires a subjunctive mood.

(21) a. Bill   demanded   that   John leave.   (Collins 2002, 53)
      b.   demand   that   M
                 [_ M]

přikázal wants non-past T in the embedded clause:

(22) a.   Pavel   přikázal Jirkovi, že   musí   zazpívat písničku.   (Czech)
          Pavel$_{NOM}$ ordered Jirka$_{DAT}$ that must$_{PRES}$ sing   song$_{ACC}$
          'Pavel ordered Jirka to sing a song.'
      b.   Pavel   přikázal Jirkovi, že   bude muset zazpívat písničku.
          Pavel$_{NOM}$ ordered Jirka$_{DAT}$ that will   must   sing   song$_{ACC}$
          'Pavel ordered Jirka to sing a song.'
      c. *   Pavel   přikázal Jirkovi, že   musel   zazpívat písničku.
   Pavel$_{NOM}$ ordered Jirka$_{DAT}$ that must$_{PAST}$ sing   song$_{ACC}$

2.3.   Agree and other LD relations

2.3.1. Agree

- *Crucial*: Given data in 1. and 2.2.2., I do not assume that only labels are visible for syntactic operations.

- Thus, for Agree - and it holds generally - the whole set information of SOs is visible.
  In (23), probe δ can see the whole derivation, its sister $\{\gamma, \{\gamma, \{\alpha, \{\alpha, \beta\}\}\}\}$.

- This model is representational-derivational.

• *Crucial*: Given the two types of information – the tree information and the set information – we get a difference between SOs themself (e.g. β in (23)) and the information about them, which is part of other SOs ({α, {α, β}} or {γ, {γ, {α, {α, β}}}}):

(23)
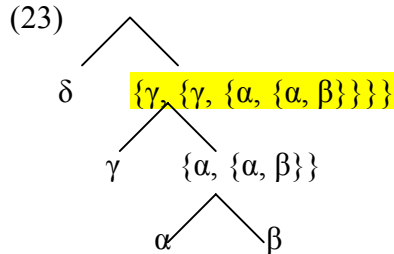
• Given PIC, when a phase (γP) is spelled out, the complement of the phase head ({α, {α, β}}) becomes inaccessible, see (24).

• Difference between the set information about SOs on particular nodes and the presence of the SOs in the structure.

  SOs in the complement of the phase head ({α, {α, β}} in (24)) are inaccessible (sent to spellout) but the information about them is present on the dominating node.

• Non-complement nodes always stay in the derivation after spellout.

  o Hence probing elements (δ) merged later can see the derivation with relevant goals and can be valued.

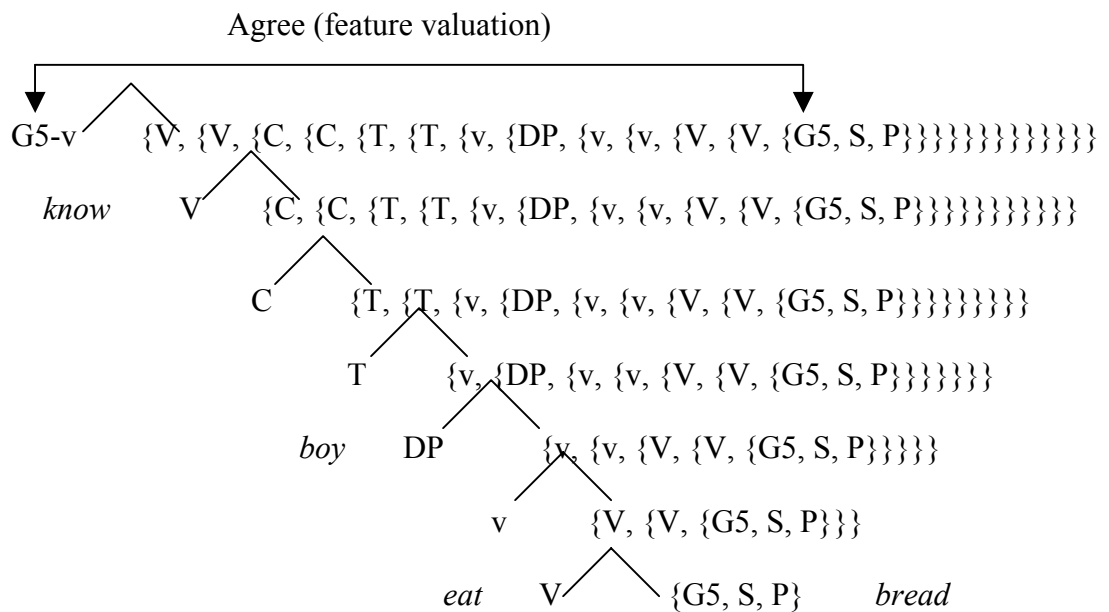 o And goals can get a case (every phase can add (spell out) new cases, see (10)).

(24)
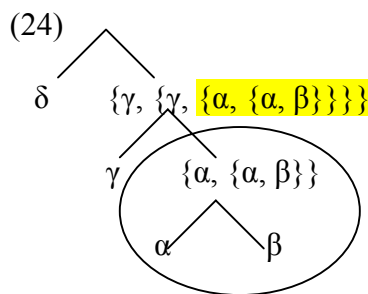
Agree in Khwarshi long-distance agreement (simplified (7b))

• Lexical entries are of the form {P, S, F}; P means phonological features, S semantic features, and F formal features (Chomsky 1995a, 394).

(25) a. Išet'u-l   **y**-iq'-še   goli   uža   **bataxu**   y-acc-u.
      Mother/OBL-LAT   G5-know-PRS   COP   [boy/ERG bread(G5) G5-eat-PTCP:PST]
      'Mother knows that the boy ate bread.'

                                                              (Khalilova 2007, 4)

b.

Agree (feature valuation)

G5-v {V, {V, {C, {C, {T, {T, {v, {DP, {v, {v, {V, {V, {G5, S, P}}}}}}}}}}}}}

know V {C, {C, {T, {T, {v, {DP, {v, {v, {V, {V, {G5, S, P}}}}}}}}}}}

C {T, {T, {v, {DP, {v, {v, {V, {V, {G5, S, P}}}}}}}}}

T {v, {DP, {v, {v, {V, {V, {G5, S, P}}}}}}}

boy DP {v, {v, {V, {V, {G5, S, P}}}}}

v {V, {V, {G5, S, P}}}

eat V {G5, S, P} *bread*

Agree is neither feature movement nor covert movement

- Agree replaced feature movement and covert movement.

(26) Chomsky (1995b, 265): Move F "carries along" FF[F].

- The Agree proposed here is not like feature movement
    o because all types (formal, semantic, phonological) of features are present on the SOs (25b). (Possible arguments also in semantic selection 2.2.2.)
    o Move F adjoins the moved feature to the target head. Head changes: $\alpha \rightarrow \{\alpha, <\beta, \alpha>\}$, in contrast to Agree.
    o Move F obeys restrictions on movement (Adjunct Condition, see Takahashi 1997), in contrast to the proposed Agree.

- The Agree here is not like covert movement
    o because in contrast to Agree, covert movement creates a new SO (Move = Agree + Pied-piping + Merge (Chomsky 2004, 114)).
    o Covert movement is also restricted by constraints on movement (Adjunct Condition, Pesetsky 2001), in contrast to Agree.

2.3.2. Other LD relations

Condition C

• The pronoun probes and sees the coindexed r-expression in its sister (27b), simplified (4).

(27) a. * Er_1 sagte, daß Hans behauptete, daß $Andreas_1$ klug ist.
       He said that Hans claimed that Andreas clever is
      'He said that Hans had claimed that Andreas was clever.'
   b.

er_1 {v,{v,{V,{V,{C,{C,{T,{T,{v,{Hans,{v,{v,{V,{V,{C,{C,{T,{T,{v,{v,{V,{V,{A,{$Andreas_1$, A}}}}}}}}}}}}}}}}}}}}}}}}}
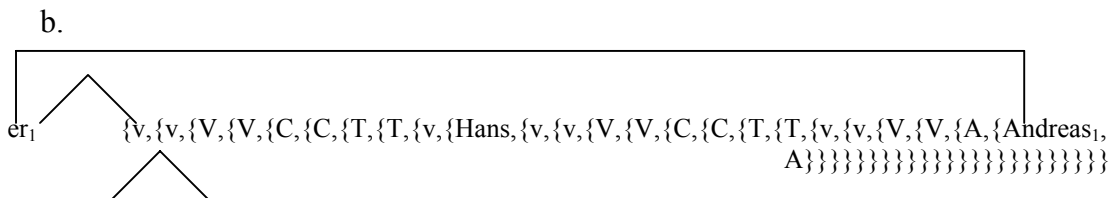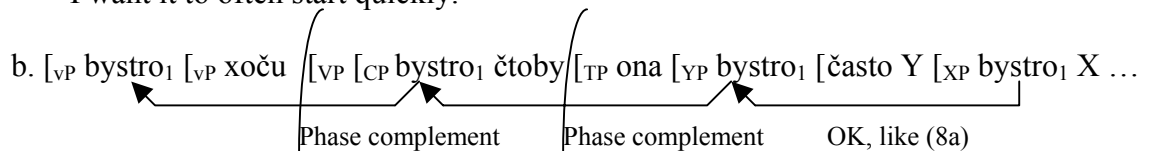
Long-distance scrambling and Relativized Minimality

• Shields (2007): The head and tail of the adverb chain must be in minimal configuration.

The adverb moving across an intervening adverb cannot move beyond the projection immediately dominating the node to which it was adjoined:

(28) $[_{ZP}*ADV_1 [_{YP} {}^{OK}ADV_1 [ADV_2 Y [_{XP} ADV_1 X \ldots$

Then, (8c)=(29a) might look like (29b).

No problems with the phase complements:

(29) a.* Ja $bystro_1$ xoču [čtoby ona často t_1 zavodilas'].
     I quickly want that she often started
     'I want it to often start quickly.'
   b. $[_{vP} bystro_1 [_{vP} xoču [_{VP} [_{CP} bystro_1$ čtoby $[_{TP}$ ona $[_{YP} bystro_1 [$často Y $[_{XP} bystro_1$ X …

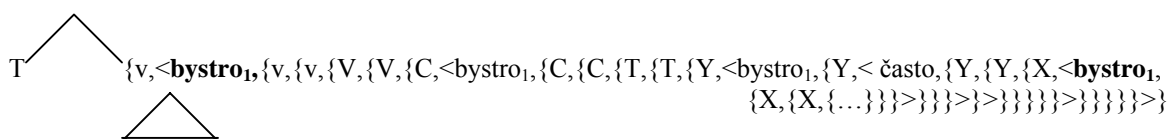   Phase complement   Phase complement   OK, like (8a)

• In the present analysis, representation is on every resulting node.

And the whole set information is visible, not only labels.

Thus, the information about the too distant copies of *bystro* is present on sister of T.
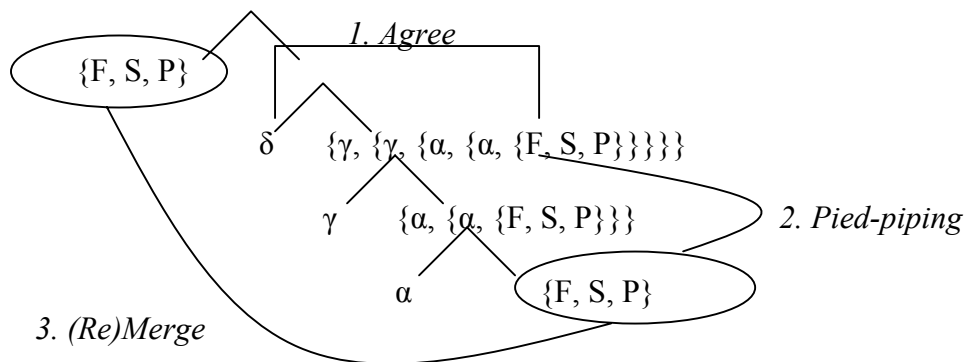

(30)

T   {v,<**$bystro_1$**,{v,{v,{V,{V,{C,<$bystro_1$,{C,{C,{T,{T,{Y,<$bystro_1$,{Y,< často,{Y,{Y,{X,<**$bystro_1$**, {X,{X,{…}}}>}}}>}}}>}>}}}}}>}}}}}>}

2.4. Move

- Chomsky (2004, 114): 'Therefore, Move = Agree + Pied-piping + Merge.'

  See also Chomsky (2000, 101; 2001, 10)

Move in the present analysis

(31) 1. Agree happens between features of sisters.

    2. Pied-piping associates the agreeing goal feature with other features of the SO.

    3. Merge (re)merges the appropriate element up.

- Move and Agree have different locality conditions, see 1.3.

  Because the operations affect different SOs:

    o Agree affects the sister SO.

    o Move (also) affects the associated SO.

- Probe δ sees features of the elements in the phase complement {α, {α, {F, S, P}}} in (32).

  But the elements cannot be moved because they are not present in the structure (they have been sent to spellout).

  Problem with Pied-piping; association is not possible.

(32)
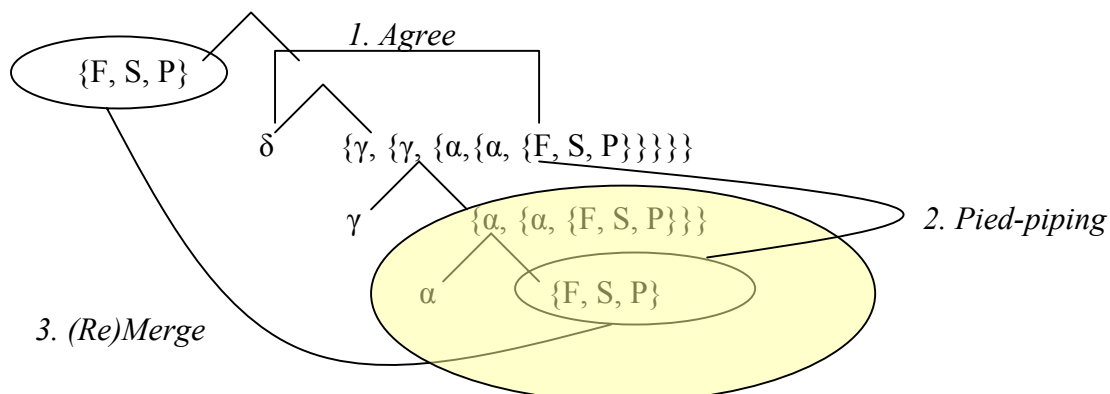
- Can the whole SO ({F, S, P}) be moved from sister of δ? No.
  - o Movement (copy theory) is remerge (Chomsky 2005, 6, note 16).
    Thus, movement of the SO {F, S, P} is remerge of the SO {F, S, P}.
  - o Integrity Condition

  Movement cannot split SOs (the sister of δ: {γ, {γ, {α, {α, {F, S, P}}}}} in (32)); only whole SOs can be moved.

  It may subsume: 1. Only constituents move.

  2. Takahashi's (2000) The PF Integrity Condition:

  Words whose features are isolated or scattered may not be subject to PF rules, making the derivation crash at PF.

- In (13b)=(33a), Agree between C and *kterého* within PP is possible, as in (32.1).

  But subextraction of *kterého* from PP is not possible (33b).

  PP in (33) is a phase, as in other Slavic languages (Abels 2003).

  kterého is already spelled out, hence association (Pied-piping) of the agreeing feature with *kterého* not possible, as in (32.2).

(33) a. Marie   vyprávěla historky o životě   kterého přítele?
        Marie$_{NOM}$ told   stories   about life   which   friend
        'About which friend's life did Marie tell stories?'
     b.* Kterého Marie   vyprávěla historky o životě   t přítele?
        which   Marie$_{NOM}$ told   stories   about life   friend

- Subextraction of the whole DP from PP also impossible (34).

  The dominating node *kterého přítele* also spelled out, association (Pied-piping) of the agreeing feature with it not possible.

(34) * Kterého přítele Marie   vyprávěla historky o životě t?
       which   friend Marie$_{NOM}$ told   stories   about life

- Extraction of the complement of P also impossible (35).

  Phase complements trapped in the phase, Pied-piping not possible.

(35) * Čem   Marie   vyprávěla historky o   t?
       what   Marie$_{NOM}$ told   stories   about

- Prediction: movement of the whole phase (PP and higher) should be OK because association with the SO is possible.

  Correct, see (36):

(36) a. O čem   Marie   vyprávěla historky t?
        about what   Marie$_{NOM}$ told   stories
        'About what did Marie tell stories?'
     b. Historky o čem   Marie   vyprávěla t?
        stories   about what   Marie$_{NOM}$ told
        'About what did Marie tell stories?

3. Conclusion

I have proposed a derivational-represenational model, where the representation on particular

nodes is relevant for Agree and the tree information with PIC is relevant for Move.

C-selection behaves differently from s-selection, Agree and other long-distance relations wrt.

the information given by set-Merge.

For c-selection, only the label in the set information is relevant.

For the other relations, the whole set information on particular nodes is relevant.

Move, though based on Agree, does not affect all elements visible for Agree because some

elements may have already been spelled out.

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