Agree, Move, Selection, and Set-Merge

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In this paper, I show that there are many different relations in derivations that pose a problem for Chomsky's (2000, *et seq.*) phase model with the Phase Impenetrability Condition and 'forgotten' phases. These relations are too non-local for the Phase Impenetrability Condition. I argue that the problem lies in the assumption that only labels of syntactic objects are visible for syntactic operations. Therefore, I propose a representational-derivational model that does not make this assumption. Specifically, the whole set information resulting from the operation Set-Merge is visible for syntactic operations. This allows deriving the non-local relations in several local steps. To derive the difference in locality behaviour between the operation Agree and Move, I propose that for the operation Agree, only the set information on the sister syntactic object is relevant and that for the operation Move, also the tree information with the Phase Impenetrability Condition is relevant because it is a composed operation. I also show that c-selection behaves differently from s-selection, Agree and other long-distance relations with respect to the information given by the operation Set-Merge.

1. Introduction

It is a well-known fact that there are two versions of the Phase Impenetrability Condition. According to the first version (Chomsky 2000, 108) - which is the stronger one - no operation outside the phase can affect the complement of the phase head; consider (1):

(1) Strong version of PIC
    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.

However, later Chomsky recognizes that this condition is too strong because in certain cases, like in the Icelandic dative-nominative construction (2), taken from Sigurðsson (2004, 147), a probe in the next higher phase can access a goal in the complement of the lower phase head. More concretely, in (2), the probing T *höfðu* 'had' Agrees with object *hestarnir* 'horses', which occurs in the complement of the phase head *v*.

(2) Henni   höfðu   ekki líkað   hestarnir
    her.DAT   had.3PL   not liked   horses.the.NOM[1]
    'She had not liked the horses.'

This means that the Agree relation must cross one phase boundary in cases like (2). Therefore Chomsky (2001, 14) proposes the weaker version of the Phase Impenetrability Condition,

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[1] The following abbreviations are used in this paper: ABS = absolutive, ACC = accusative, C.OBL = complementizing oblique, COP = copula, DAT = dative, ERG = ergative, G = gender, GEN = genitive, INS = instrumental, LAT = lative, M.ABL = modal ablative, NEG = negation, NMLZ = nominalizer, NOM = nominative, OBL = oblique, PL = plural, PRS = present, PST = past, PTCP = participle.

which allows the head T to access the object in the vP phase. More generally, according to this version, operations outside the phase can access the complement of the phase head, but only till the next higher phase head is merged into the structure; consider (3). It is crucial here that this version of the Phase Impenetrability Condition allows operations to cross maximally one phase boundary.

(3) Weak version of PIC
[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.

2. The Phase Impenetrability Condition and locality

In this section, I show that there are non-local relations in derivations that also pose a problem for the weak version of the Phase Impenetrability Condition because either they cross more than one phase boundary or they cross just one phase boundary but in addition the next higher phase head is present in the derivation. There are two types of problematic non-local relations. In the first type – the so-called bottom-up problems – a piece of information about an element from a lower phase must be present in a higher phase. In the second type – the so-called top-down problems – a piece of information about an element from a higher phase must appear in a lower phase.

2.1. Bottom-up problems

Let us begin with binding principles and Condition A. Chomsky (2008, 142 and 2007, 18), building on Reuland's analysis (2001), proposes an Agree-based analysis of anaphors. However, if the operation Agree indeed shall replace the earlier feature movement or covert movement, then a problem arises in the case of long-distance anaphors. Since control infinitives are standardly analyzed as CPs (e.g. Chomsky 2000, 105 or 2001, 8), then in example (4), which is taken from Bailyn (2007, 29), there are three phase boundaries – matrix vP, embedded CP and embedded vP - between the matrix T probe and the anaphor, which goes against the one-phase-boundary requirement of the weak Phase Impenetrability Condition.[2]

(4) General$_1$ poprosil   polkovnika$_2$ [PRO   narisovat' sebja$_{1,2}$].   (Russian)
    general   requested colonel   to draw   self
    'The general asked the colonel to draw himself.'

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[2] The distance (number of the crossed phase boundaries) can be even higher because long-distance binding can cross more than one infinitive boundary in Russian.

According to Chomsky (2008, 141, 145), Condition C can be treated as a probe-goal relation between the appropriate pronoun and the R-expression. This, however, means that in the following example - which is ungrammatical because the pronoun c-commands the coindexed R-expression - there are four phase boundaries intervening between the two elements[3], which again poses a problem for the weak Phase Impenetrability Condition, which allows maximally one phase boundary. Note that theoretically, the pronoun and the R-expression can be indefinitely remote.

(5) * 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.'

The third problem concerns Condition C and coreference. Biskup (to appear) shows that 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. He argues that adjunct clauses like the one in (6) are merged cyclically. Example (6)a shows that the c-commanded R-expression violates Condition C independently of in which position it appears in the adjunct clause. Example (6)b demonstrates that if the R-expression occurs *in situ* in the adjunct clause contained in the moved presuppositional wh-phrase, the sentence is ungrammatical. In contrast, if the R-expression is scrambled in the adjunct clause, the sentence is grammatical, as illustrated by example (6)c. This means - under the assumption that sentences are sent to the interfaces in the phase-by-phase fashion - that the CP phase of the matrix clause with the appropriate pronoun must 'remember' not only that there is a coindexed R-expression, which was sent to the interfaces in a phase of the adjunct clause, but it must also 'remember' its (scrambling) feature.

(6) a. * pro_1 zuřivě bránil některý argument, který $(Pavel_1)$ přednesl včera $(Pavel_1)$.
       furiously defended some argument which Pavel gave yesterday Pavel
   b. * Který argument, který přednesl včera $Pavel_1$, pro_1 zuřivě bránil t?
      which argument which gave yesterday Pavel furiously defended
   c. ? Který argument, který $Pavel_1$ přednesl včera, pro_1 zuřivě bránil t?
      which argument which Pavel gave yesterday furiously defended
      'Which argument that Pavel gave yesterday did he defend like a fury?'

Another bottom-up problem is related to the morphological agreement. In Khwarshi - which is an SOV language spoken in southern Dagestan - the matrix verb can either Agree with its sentential complement, as illustrated by (7)a from Khalilova (2007, 4), where it bears the gender-four marker (G4), or it can Agree with the absolutive argument in the finite

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[3] For details, see discussion in section 3.4.

complement clause, as shown in (7)b, where the verb is marked by the gender-five marker. Thus, (7)b is problematic for the Phase Impenetrability Condition because in the time when the matrix *v* is merged, the absolutive object in the embedded clause should already be spelled out and 'forgotten'.

(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-PST.PTCP
        '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-PST.PTCP
        'Mother knows that the boy ate bread.'

The last problematic case in this section is related to long-distance scrambling and Relativized Minimality. Shields (2007) shows that short adverb scrambling can cross another adverb in Russian, Japanese or Korean, as demonstrated by the Russian example (8)a, taken from Shields (2007, 162). Example (8)b shows that the adverb can also be long-distance scrambled. However, if the adverbial long-distance scrambling crosses another adverb (8)c - note that the adverb is the same as in (8)a – a Relativized-Minimality effect arises. Shields (2007) argues that these data pose a problem for derivational approaches because they evaluate each derivational step independently and argues for a representational approach 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.'

2.2. Top-down problems

As mentioned above, in the top-down problems, we find a reflection of the non-local relation either on a goal that is more than one phase boundary lower than the probe or on a goal in cases where two relevant phase heads are present in the derivation in the time of the appropriate operation.

Let us begin with Japanese Exceptional Case Marking constructions. Hiraiwa (2001) argues that Japanese allows optional ECM across a CP clause boundary. This is illustrated by example (9) from Hiraiwa (2001, 72), where *v* of the matrix ECM verb can value case of the

argument within the embedded clause. According to Hiraiwa, the placement of the dative argument before the goal argument *Mary* indicates that *Mary* does not raise into the matrix clause. Although there is only one intervening phase head (i.e. C) between the appropriate probe and goal in (9), this derivation also violates the weak version of the Phase Impenetrability Condition because the presence of the probing phase head *v* in the time of the case assignment is also relevant; see definition (3) again.

(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-PRS   C think-PST
     'John felt that Mary is not suitable for the job.'

There are languages - e.g. Australian languages, Japanese or Korean - that allow more cases on one element. In the Kayardild example (10) from Evans (2005, 5), we find a typical case of multiple adnominal case marking, also known as 'Suffixaufnahme'. Concretely, 'brother' bears four different cases that are ordered in accordance with the syntactic structure: the innermost genitive, which is assigned to 'brother' as a possessor of 'net', instrumental, inherited from 'net', modal ablative, which codes a certain type of tense and complementizing oblique case, which is assigned to all elements in the clausal complement of 'know'. Depending on the phase status of particular XPs in (10), there can be x number of phase boundaries between the case-assigning matrix *v* and 'brother' (in the maximal case: DP 'net', PP 'with net', embedded *v*P, embedded CP). Even if we consider only *v*P and CP as phases, there is still at least one phase boundary (CP)[4] between the case-assigning matrix verb and 'brother' plus the presence of the probing matrix phase head *v* itself, as in the problematic Japanese example above. To avoid the problem with non-local Agree and case assigning in languages where cases can 'fall' through the whole sentence, one would have to assume that there are no phases or that all appropriate elements always move from the the complement of the phase head to the phase edge to escape spellout.

(10) Ngada mungurru, [maku-ntha   yalawu-jarra-ntha   yakuri-naa-ntha
      I   know   woman-C.OBL catch-PST-C.OBL   fish-M.ABL-C.OBL
      thabuju-karra-nguni-naa-ntha   mijil-nguni-naa-nth].
      brother-GEN-INS-M.ABL-C.OBL   net-INS-M.ABL-C.OBL
      'I know that the woman caught the fish with brother's net.'

The last top-down problem concerns Latin control constructions and depictive predicates. As demonstrated by example (11), taken from Cecchetto & Oniga (2004, 143), the depictive predicate in the embedded clause is marked with the same case as the controller in the matrix

clause. Independently of whether or not the depictive predicate *bonum* 'good' is spelled out in the embedded *v*P phase, this example also poses a problem for the weak version of the Phase Impenetrability Condition because there is still one intervening phase boundary and the matrix phase head *v*, assigning the accusative case.

(11) Ego iubeo te   [PRO esse   bonum].
     I   order you.ACC   to-be good.ACC
     'I order you to be good.'

Anaphors are referentially defective, therefore they should Agree in φ-features with their antecedent. Thus, in the Condition A example (4), not only the piece of information about the presence of the anaphor must appear in the matrix CP phase but also the piece of information about φ-features of the antecedent must get to the anaphor in the embedded *v*P phase. This means that the example also represents a top-down problem.[5]

2.3. Agree vs. Move

In this section, I show that the operation Agree and Move differ in locality conditions. Specifically, Agree, in contrast to the Move operation, is not subject to the Phase Impenetrability Condition. This is demonstrated by three typologically different languages. Let us begin with Tsez, Northeast Caucasian language spoken in southern and western Dagestan. In Tsez, the embedded absolutive argument can trigger long-distance agreement on the matrix verb (marked as class III), as shown by example (12) taken from Chandra (2007, 48). However, as argued by Polinsky & Potsdam (2001, 590) or Chandra (2007, 56), the absolutive argument cannot raise to the matrix clause.

(12) Eni-r   [uz-a   magalu   b-ac-ru-li]   b-iy-xo.
     mother-DAT   [boy-ERG bread.III.ABS III-eat-PST.PRT.NMLZ] III-know.PRS
     'The mother knows that the boy ate the bread.'

The second example comes from English (see Bošković 2007, 15). According to Bošković, coordination phrases are phases; therefore in example (13)a movement of the first conjunct out of the coordination phase is ungrammatical. In contrast, when the first conjunct just Agrees with the verb, the sentence is grammatical, as shown in (13)b.[6]

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[4] Whether or not the embedded *v*P intervenes, depends on the position of the adverbial istrumental phrase containing 'brother'.

[5] To be accurate, there are also approaches according to which long-distance anaphors are subject to discourse principles and not syntactic binding conditions.

[6] See Bošković (ibid.) and references therein for other examples. According to Bošković (2005, 2007), Agree, in contrast to successive cyclic movement, is not subject to the Phase Impenetrability Condition because the Phase Impenetrability Condition effects follow from phonological considerations (similarly as in Fox & Pesetsky

(13) a.* A woman is and five men in the garden.
      b. There is a woman and five men in the garden.

Czech also shows differences between the operation Agree and Move. As illustrated by example (14)a, Agreement between the head T and the anaphor *svého* 'self' contained in the prepositional phrase is possible.[7] Example (14)b shows that Agreement between the head C and wh-phrase *kterého* 'which' contained in the prepositional phrase is also possible. However, if *kterého* moves out of the prepositional phrase, the sentence becomes ungrammatical, as shown in example (14)c.

(14) a. Marie$_1$ vyprávěla legrační historky o životě   svého$_1$ přítele.
          Marie   told   funny   stories   about life self   friend
          'Marie told funny stories about her friend's life.'
      b. Marie   vyprávěla legrační historky o životě   kterého přítele?
          Marie   told   funny   stories   about life which   friend
          'About which friend's life did Marie tell funny stories?'
      c.* Kterého$_1$ Marie   vyprávěla legrační historky o životě   t$_1$ přítele?
          which   Marie   told   funny   stories   about life   friend

To conclude section 2., we have seen that there are non-local relations in the syntactic computation that go against the weak version of the Phase Impenetrability Condition and that morphological reflections of the non-local relations can appear in both directions. We have also seen that there is a difference in locality behaviour between the operation Agree and Move.
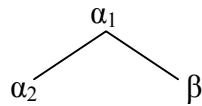

3. Proposal

This section is concerned with the syntactic operations Selection, Agree and Move. I will show that the problematic non-local relations from the preceding section can be derived in a local fashion if the whole set information resulting from the operation Set-Merge is visible for syntactic operations. I will also show that c-selection behaves differently from s-selection, Agree and other long-distance relations with respect to the information resulting from the operation Set-Merge. To derive the difference in locality behaviour between the operation Agree and Move, I propose that for the operation Agree, only the set information on the sister syntactic object is relevant and that for the operation Move – because it is a composed operation – also the tree information with the Phase Impenetrability Condition is relevant.

2005). Thus, since the Phase Impenetrability Condition effect of phases is achieved via PF, phases and the Phase Impenetrability Condition as a syntactic locality condition can be eliminated. Even approaches that are strongly derivational and take every phrase to be a phase exempt Agree from the Phase Impenetrability Condition, see e.g. Müller (2008).

3.1. Set-Merge

In my analysis, I follow Chomsky's Set-Merge proposal (1995a, 396-397 or 2000, 133).[8] Chomsky proposes that the operation Set-Merge combines two elements and forms a new element with a label, which is identical to one of the original elements; see Chomsky's (1995a, 396-397) formulation in (15)a.[9] According to Chomsky (1995a, 397), the new object γ can be represented as the tree in (15)b. This, however, is only informal notation according to Chomsky.

(15) a. Set-Merge
'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 $\{\delta, \{\alpha, \beta\}\}$, 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 $\gamma = \{\alpha, \{\alpha, \beta\}\}$.'

   b. The new object
Chomsky (1995a, 397): 'Thus we might represent γ informally as:'

$$
\begin{array}{c}
\alpha_1 \\
\diagup \quad \diagdown \\
\alpha_2 \qquad \beta
\end{array}
$$

In this respect, I differ from Chomsky because I assume that trees belong to the syntactic derivation. Consequently, for the new syntactic object γ, I propose the following representation:

(16) $\{\alpha, \{\alpha, \beta\}\}$

$$
\begin{array}{c}
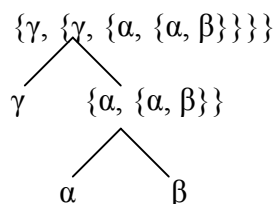\diagup \quad \diagdown \\
\alpha \qquad \beta
\end{array}
$$
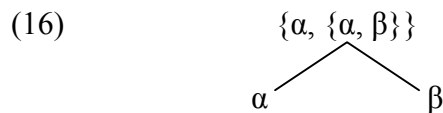
I have two reasons for this proposal. The first reason is that derivations are standardly treated as trees with sets of features. The second reason, which is more important, is that this proposal can account for the problematic non-local relations and the difference between the operation Agree and Move. Given this proposal, a phase – with the phase head γ and its complement $\{\alpha, \{\alpha, \beta\}\}$ – is represented as (17).

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[7] As we saw above in connection with example (4), according to Reuland (2001) and Chomsky (2007 and 2008) the head T mediates between the binder (subject) and the bindee (the anaphor).
[8] Chomsky (1995a, 396-397) uses just the term 'Merge'; he does not differentiate between 'Set-Merge' and 'Pair-Merge' as Chomsky (2000, 133). For reasons of clarity, I use the term 'Set-Merge'.
[9] This means that the operation Set-Merge is, in fact, composed of two operations: the set-constructing operation and the labelling operation; (see also discussion in Gärtner 2002, 64).

(17)

$$\{\gamma, \{\gamma, \{\alpha, \{\alpha, \beta\}\}\}\}$$

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        {γ, {γ, {α, {α, β}}}}
         /          \
        γ         {α, {α, β}}
                   /       \
                  α         β
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Concerning the label of the resulting syntactic object, Chomsky (2005, 14 and 2008, 141) assumes that the label of syntactic objects contains all the information relevant for further computations and that for syntactic operations only the label of the syntactic object is visible. However, this seems to be correct only for c-selection, as I will show in the following section.

3.2. Selection

In this section, I show that c-selection behaves differently from s-selection. More concretely, the only-label visibility is not correct for semantic selection because the s-selecting element can 'see' more than just the label of its sister.

3.2.1. C-selection

First, let us look at c-selection. Example (18)a shows that preposition *na* 'on' selects a noun and (18)b shows that it does not select a verbal category. Example (18)c demonstrates that the preposition can be combined with the event of 'wiping' when it is categorically a noun, which means that the ungrammaticality of (18)b does not lie in semantic properties of the syntactic object *utřít* 'to-wipe' but in its categorical status. Then, (18)d demonstrates that there is no problem when verb *utřít* is combined with noun *stůl* 'table'. The crucial datum is (18)e, which shows that the preposition cannot select a noun non-locally, across the verb. Thus, c-selection behaves in accordance with Chomsky's only-label visibility.

(18) a.   [PP na [DP stůl]]   (Czech)
                   on   table
      b. * [PP na [VP utřít]]
                   on   to-wipe
      c.   [PP na [DP utření]]
                   on   wiping
      d.   [VP utřít [DP stůl]]
                   to-wipe   table
      e. * [PP na [VP utřít [DP stůl]]]
                   on   to-wipe table

In terms of my analysis, this means that preposition *na* only cares about the label of the verbal phrase *utřít stůl* 'to wipe table' - i.e. only about α, as marked by the yellow colour in (19) - and not about the whole set information (i.e. about the label of *stůl*).
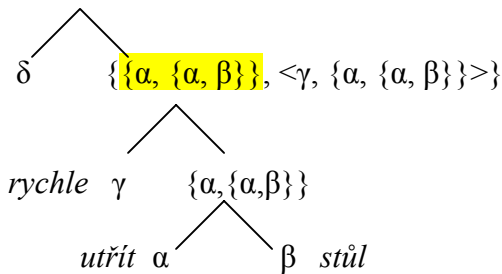
(19)

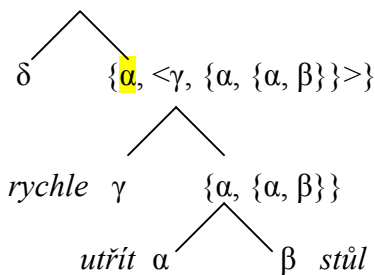*na* γ   {<mark>α</mark>, {α, β}}

     utřít α   β *stůl*
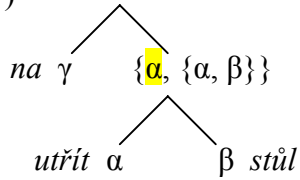
As demonstrated in (20)a, the verbal phrase *utřít stůl* can further project. Given the difference between the operation Set-Merge and Pair-Merge (see e.g. Chomsky 2000), when adverb *rychle* 'quickly' is adjoined to it, it results in the following ordered pair: <γ, {α, {α, β}}>. Now, the question arises whether the label of the new syntactic object is the whole set {α, {α, β}, as shown in (20)b, or just α, as shown in (20)c.

(20) a. rychle   utřít   stůl
          quickly   to-wipe   table

      b.

          δ   {<mark>{α, {α, β}}</mark>, <γ, {α, {α, β}}>}

              rychle γ   {α,{α,β}}

                  utřít α   β *stůl*

      c.

          δ   {<mark>α</mark>, <γ, {α, {α, β}}>}

              rychle γ   {α, {α, β}}

                  utřít α   β *stůl*

According to Chomsky's (1995a) formulation in (15)a, the label of the new syntactic object is identical to one of the original objects, which could be interpreted as a support for the choice of tree (20)b. However, according to Chomsky (2000, 133), the label of the new object should be the label of one of the original objects; consider Chomsky's formulation in (21). Thus, (21) supports the choice of tree (20)c.

(21) '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.'

Another support for the choice of tree (20)c comes from the example below, which is a modified example (20)a. The example is ungrammatical, hence, the label of the new syntactic object should be like (20)c, and not like (20)b because if (20)b were the right choice, preposition *na* (i.e. δ in (20)b) could see and select β in the label of its sister.[10]

(22) * na rychle   utřít   stůl
        on quickly to-wipe table

3.2.2. S-selection

Let us now look at how s-selection behaves with respect to the only-label visibility. Selection is standardly taken to be an operation under sisterhood. And we have seen that according to Chomsky (2005, 14 and 2008, 141), only the label of the syntactic object is visible for syntactic operations. The following examples, however, demonstrate that the s-selecting element, in fact, sees more than just the label of its sister. Collins (2002) shows that there are cases with long-distance subcategorizations, e.g. subjunctive constructions in English. In example (23), which is taken from Collins (2002, 53), the matrix predicate *demand* with the subcategorization frame [_ M] requires a subjunctive mood, which is lower than the complementizer in the embedded clause. Thus, the s-selection operation must somehow see into CP projected by *that*.

(23) a. Bill demanded that   John leave.
     b.   demand   that M
                  [_ M]

As shown in the Czech example below, the matrix verb *přikázal* 'ordered' selects a non-past tense in the embedded clause, which under the standard analysis is located in the head T. This means that in both (24)a and (24)b, s-selection crosses the complementizer projection and that the s-selecting verb sees more than just the label of its sister.

(24) a. Pavel   přikázal Jirkovi,   že   musí   zazpívat písničku.
         Pavel.NOM ordered Jirka.DAT that must.PRS   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.'

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[10] Unless we specify how exactly the selection works in such cases, e.g., that the presence of α in the label blocks the selection of β.

c. * Pavel   přikázal Jirkovi,   že   musel   zazpívat písničku.
Pavel.NOM ordered Jirka.DAT   that must.PST   sing   song.ACC

To conclude this discussion, s-selection, in contrast to c-selection, goes against Chomsky's assumption that only labels of syntactic objects are visible for syntactic operations.

3.3. Agree

In the preceding section, we saw that s-selecting elements see more than just the label of the sister node. And in section 2., we saw that there are non-local relations in derivations that go against the weak version of the Phase Impenetrability Condition and that in certain cases, a probe can see into the spelled-out phases. Given these facts, I do not make the assumption that only labels are visible for syntactic operations. This is the crucial difference between the analysis proposed here and Chomsky's model (2005, 2008). This means that generally the whole set information of syntactic objects is visible for syntactic operations. More concretely, in (25), probe δ can see the whole set information of its sister, as marked by the yellow colour, which means that it sees the whole derivation. What is important is that given the two types of information – the tree information and the set information – we get a difference between syntactic objects themself (e.g. node β in tree (25)) and the information about them, which is part of other syntactic objects ({α, {α, β}} or {γ, {γ, {α, {α, β}}}}).


(25)
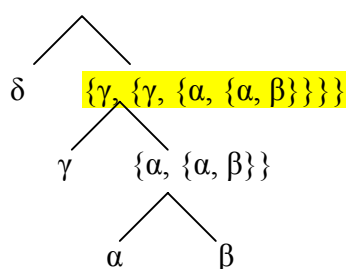
Given the Phase Impenetrability Condition (no matter which version), when a phase (suppose that γ is the phase head in (26)) is spelled out, the complement of the phase head (i.e. {α, {α, β}}) becomes inaccessible to syntactic operations, as illustrated by the ellipse in (26). Consequently, we get a difference between the set information about syntactic objects on particular nodes and the presence of the syntactic objects in the derivation. Although syntactic objects in the complement of the phase head are inaccessible to syntactic operations (they have been spelled out), the information about them is present on the dominating node, as illustrated by the yellow colour in (26). Since non-complement nodes always stay in the derivation after spellout, the appropriate information always gets higher in the tree. Hence,

probing elements (e.g. δ in (26) or some higher probe) merged later can see the derivation with relevant goals and can be valued.
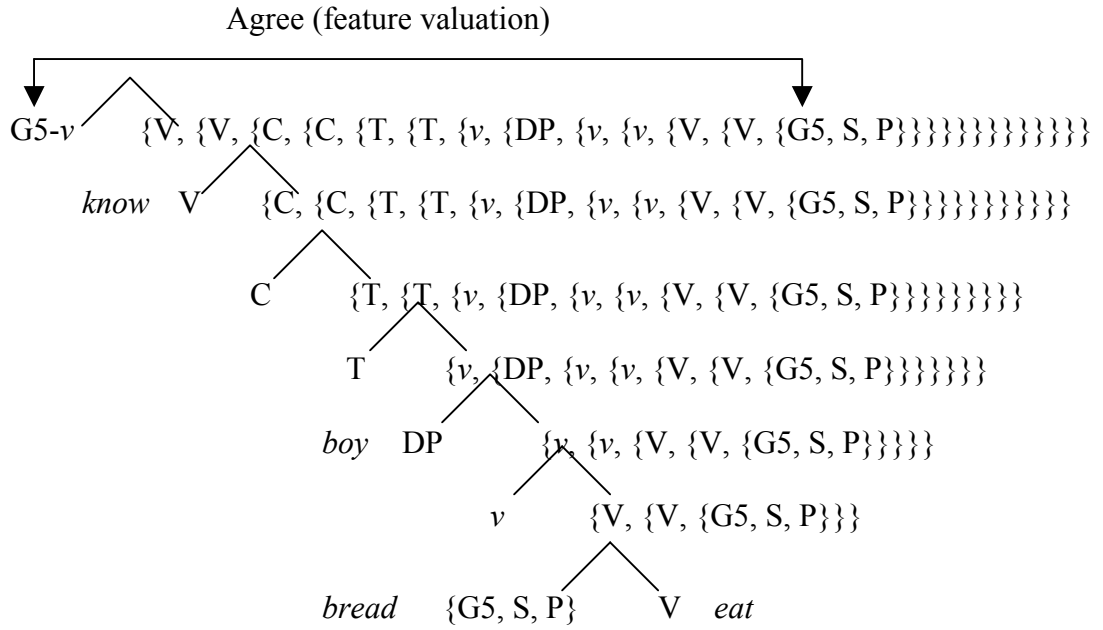
(26)
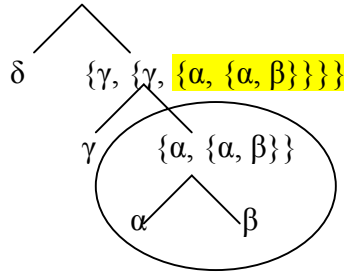
Let us look at how the proposal works e.g. in the Khwarshi example with long-distance Agreement (7)b, repeated here for convenience as (27)a. If the absolute argument *bataxu* 'bread' stays in situ, then the operation Agree between it and the matrix *v* would have to cross two phase boundaries in Chomsky's phase model, which is not possible because in the time when the matrix *v* is merged, the absolutive object in the embedded clause is already spelled out and 'forgotten', given (both versions of) the Phase Impenetrability Condition.[11] I make the standard assumption that lexical entries are triples of features {P, S, F}, where P indicates phonological features, S semantic features, and F formal features (see e.g. Chomsky 1995a, 394). Then, in my analysis, the relevant parts of the derivation of (27)a look like (27)b. Since the whole set information of syntactic objects is visible for syntactic operations, when the unvalued uninterpretable φ-features on the matrix *v* probe, they find the interpretable φ-features of *bataxu* on its sister, as illustrated in (27)b. In this way, Agree can happen and the φ-features of the matrix verb can be valued, though *bataxu* (i.e. node {G5, S, P}) is already spelled out.

(27) 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-PST.PTCP
       'Mother knows that the boy ate bread.'

---

[11] Even if the object moves out of the *v*P-phase complement in the embedded clause, it does not help because there is still one phase boundary and the probing matrix phase head.

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

In the same way, through this sister Agree operation, cases are assigned to goals that are already spelled out. We already saw in section 2.2., which is concerned with the top-down problems, that reflections of the non-local Agree operation can appear on a goal that is more than one phase boundary lower than the probe. And in the Kayardild example (10), we saw that elements can get more cases and that the particular cases can be assigned in different phases. Since the set information about the appropriate goal is visible on all dominating nodes (as in tree (27)b), then in every phase there can be a probe that Agrees with goal's feature(s) present in the set information on its sister.

It is usually assumed that the operation Agree replaced the earlier feature movement and covert movement, hence the question arises what the relation between the sister Agree operation proposed here and feature movement or covert movement is. In what follows, I argue that the operation Agree proposed here is neither feature movement nor covert movement.

Let us begin with feature movement. The feature movement operation adjoins the moved feature to the target head, which means that the target head changes. More specifically, if β adjoins to the target head α, then the new head is of the form {α, <β, α>}. However, such a change does not happen in the operation Agree proposed here.

Secondly, according to Chomsky (1995b, 265) feature movement takes along all formal features of the appropriate element (goal), as stated in (28).

(28) Move F "carries along" FF[F].

The operation Agree proposed here (and the model generally) differs from Move F because all types of features - i.e. not only formal but also semantic and phonological features of the goal element – are carried along by the dominating nodes; consider (27)b again.

The third reason why the sister Agree operation is not like feature movement is that the feature movement operation, in contrast to the operation Agree, obeys restrictions on movement, e.g. Adjunct Condition (see Takahashi 1997).

The sister Agree operation proposed here is not like covert movement because covert movement, in contrast to the operation Agree, creates a new syntactic object. The covert movement operation is a type of the operation Move and according to Chomsky (2004, 114) Move itself is composed of the operation Agree, Pied-piping and Merge, consider the original formulation in (29). Since the operation Merge - no matter whether Set-Merge or Pair-Merge - always creates a new syntactic object, covert movement necessarily differs from the operation Agree.

(29) 'Therefore, Move = Agree + Pied-piping + Merge.'

The second reason why the sister Agree operation is not like covert movement is that the covert movement operation, in contrast to the Agree operation, is also restricted by constraints on movement like Adjunct Condition (see e.g. Pesetsky 2000).
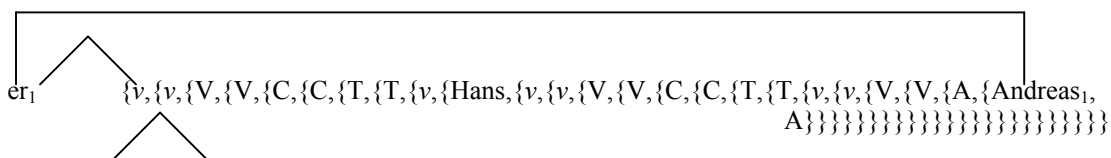

3.4. Other long-distance relations

In section 2.1. we saw that certain Condition C relations pose a problem for Chomsky's phase model with the Phase Impenetrability Condition because they are too non-local. The problematic data, e.g. example (5), repeated here as (30)a, I analyse in the same way as the Agreement data in the preceding section. More concretely, when the appropriate pronoun is merged into the structure, it probes and finds the information about the coindexed R-expression in the set information on its sister, though the R-expression is already spelled out; consider the simplified tree (30)b. Given the c-command relation between them, the derivation violates Condition C and crashes. If it is the index on the pronoun that triggers the probing process (Chomsky 2008 is silent about what on the pronoun probes) and indices are assigned in the Numeration, then the pronoun already probes in its base position, as illustrated in (30)b. If (co)indexation is not allowed because of the Inclusiveness Condition (Chomsky 2001, 2-3), it must be something else that triggers the probing process.[12,13] In any case,

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[12] It could be e.g. the pronounness (the variable nature of pronouns) and it cannot be φ-features because all φ-features of *er* are valued and interpretable.

whatever probes in Chomsky (2008, 141, 145), it can probe in my analysis as well and given the total visibility here, it excludes example (30)a as ungrammatical without coindexation as well.

(30) 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,{$Andreas_1$,
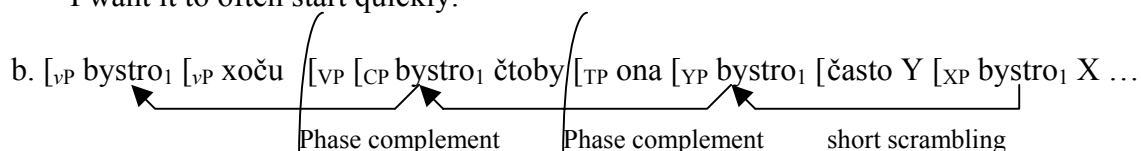   A}}}}}}}}}}}}}}}}}}}}}}}}

Another interesting case is long-distance scrambling and its relation to Relativized Minimality effects. As already discussed in section 2.2., if an adverb crosses another adverb in long-distance scrambling, it induces a Relativized Minimality effect, but when the crossing happens in short scrambling, the sentence is grammatical. According to Shields (2007), the head and tail of the adverb chain must be in minimal configuration, which means that the adverb moving across an intervening adverb cannot move beyond the projection immediately dominating the node to which it was adjoined, as illustrated in (31).

(31) $[_{ZP}$*ADV_1 $[_{YP}$ $^{OK}ADV_1$ $[ADV_2$ Y $[_{XP}$ ADV_1 X …

Then, the problematic example with long-distance scrambling (8)c, repeated for convenience as (32)a, might look like (32)b. If one treats the example derivationally in the phase-by-phase fashion and evaluates each derivational step independently, there is no problem with the derivation and the phase complements, as shown in (32)b. Thus, one needs a simultaneous access to information created during different steps of the derivation.
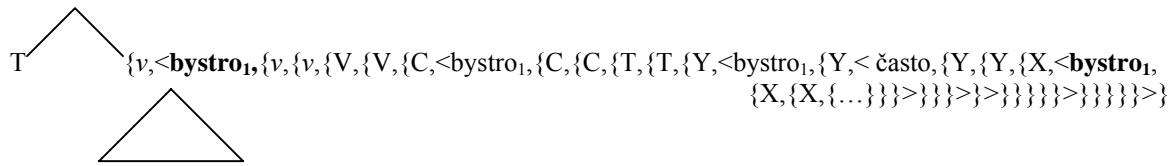
(32) a.* Ja $bystro_1$ xoču [čtoby ona často t_1 zavodilas'].
         I   quickly   want that   she often   started
         'I want it to often start quickly.'

     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   short scrambling

---

[13] But note that e.g. Chomsky's (2001, 34) assigning an EPP feature to the phase head also violates the Inclusiveness Condition.

The model proposed here is derivational-representational and the history of the derivation (representation) is present on every node resulting from the operation Merge. We have also seen that the whole set information on particular nodes is visible for syntactic operations, not only the label. Thus, the piece of information about the too distant copies of adverb *bystro* (in boldface) in example (32)a is present on the matrix vP node, as illustrated in tree (33), and consequently in this step, the derivation crashes.[14]

(33)

$\{v,<\textbf{bystro}_1,\{v,\{v,\{V,\{V,\{C,<bystro_1,\{C,\{C,\{T,\{T,\{Y,<bystro_1,\{Y,< \text{často},\{Y,\{Y,\{X,<\textbf{bystro}_1, \{X,\{X,\{...\}\}\}>\}\}\}>\}>\}\}\}\}\}>\}\}\}\}>\}$

3.5. Move

We have already seen that according to Chomsky (2004, 114), the operation Move is composed of the operation Agree, Pied-piping and Merge; see also Chomsky (2000, 101 or 2001, 10). In my analysis, the operation Move with its three components looks like (34). In the first step, Agree happens between formal features of the sisters. In the second step, the operation Pied-piping associates the Agreeing goal feature (F in tree (34)) with other features of the syntactic object (i.e. set {F, S, P} in (34)). In the third step, the operation Merge (re)merges the appropriate element up in the tree.

(34)
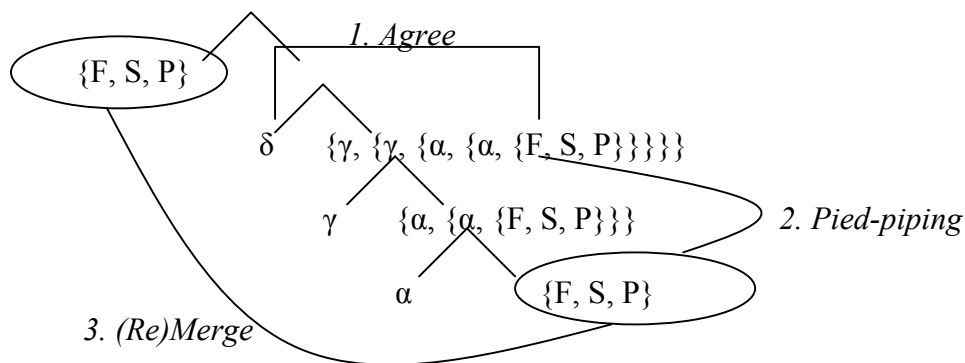
In section 2.3., I showed that the operation Move and Agree have different locality conditions. The reason for this is that the operations affect different syntactic objects, as is obvious from tree (34). The operation Agree only affects the sister syntactic object (and only its formal

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[14] If the condition on minimal configuration applies at the semantic interface, then the derivation crashes when the matrix CP phase is spelled out.

features). In contrast, the operation Move – as a composed operation - also affects the associated syntactic object.

Suppose that in tree (35) γ is a phase head, set {α, {α, {F, S, P}}} is the complement of the phase head and γP (i.e. set {γ, {γ, {α, {α, {F, S, P}}}}}) is the phase. Then, for simplicity, suppose the strong version of the Phase Impenetrability Condition.[15] The tree shows that probe δ, which is outside the γP phase, sees features of the elements in the phase complement {α, {α, {F, S, P}}} in the set information on its sister and that it can Agree with the formal feature F. However, the elements in the phase complement cannot be moved because they are not present in the derivation; they were spelled out, as illustrated by the yellow ellipse in (35). To be more specific, the problem lies in the operation Pied-piping because the association of the Agreeing formal feature F with the syntactic object in the phase complement is not possible.

(35)
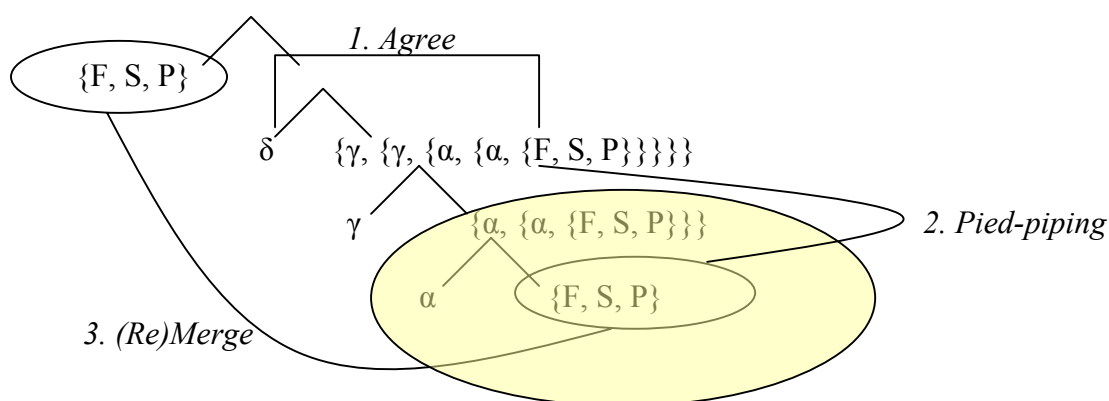
The question arises whether in such cases movement can happen out of the sister node, i.e., whether the syntactic object {F, S, P} can move directly out of sister of δ in (35). The answer is negative. According to Chomsky (2008, 158, note 17), the operation Move (copy theory) is Remerge. This means that movement of the syntactic object {F, S, P} should be Remerge of the same syntactic object, and not a part of other syntactic object. I assume that there is a Syntactic Integrity Condition at work, which prohibits the operation Move from splitting syntactic objects. In other words, the Syntactic Integrity Condition states that only whole syntactic objects can be moved.[16] This is parallel to Chomsky's (2008, 138) No-Tampering Condition, according to which the operation Merge leaves the original syntactic objects unchanged. Specifically, the operation Merge cannot break up the original objects or add new

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[15] The same point can be made with the weak version of the Phase Impenetrability Condition as well but the tree would have to be more complex.
[16] This subsumes the standard syntactic condition according to which only constituents can move.

features to them, which is dubbed as the Extension Condition and the Inclusiveness Condition.

To be more concrete and show how the operation Move works in particular sentences, consider example (36). In (36)a=(14)b, Agree between the head C and wh-phrase *kterého* 'which' within the prepositional phrase is possible, analogically to the Agree operation in tree (35). However, subextraction of *kterého* out of the prepositional phrase is not possible, as shown by example (36)b=(14)c. Abels (2003) argues that prepositional phrases in Russian and other Slavic languages are phases. If it also holds true for the prepositional phrase in example (36) and if the adverbial prepositional phrase is adjoined to *v*P, then given (both version of) the Phase Impenetrability Condition, *kterého* is not accessible when the phase head C probes. Therefore the association (i.e. the operation Pied-piping) of the Agreeing wh-feature on sister of C with the syntactic object *kterého* is not possible, analogically to the second step in tree (35).

(36) a. Marie vyprávěla legrační historky o životě   kterého přítele?
          Marie told   funny   stories   about life which   friend
          'About which friend's life did Marie tell funny stories?'
     b.* Kterého Marie vyprávěla legrační historky o životě   t přítele?
          which   Marie told   funny   stories   about life   friend

Now, the question arises what happens when the operation Pied-piping associates the Agreeing wh-feature on sister of C with a node that dominates the syntactic object *kterého*. Given the model proposed here, this is theoretically possible because the wh-feature of *kterého* is visible on all dominating nodes. The following example, however, shows that subextraction of the whole DP *kterého přítele* 'which friend' from the prepositional phrase is ungrammatical. The syntactic object *kterého přítele* is also spelled out when the head C probes; hence the association (Pied-piping) of the Agreeing wh-feature with it is also not possible.

(37) * Kterého přítele Marie vyprávěla legrační historky o životě t?
         which   friend Marie told   funny   stories   about life

The same also holds for the complement of the prepositional phase head. As shown by example (38), extraction of *životě kterého přítele* 'which friend's life' out of the prepositional phase is ungrammatical as well. Although the probing wh-feature on the head C Agrees with the wh-feature on its sister, Pied-piping of the prepositional complement again cannot happen because this syntactic object, too, was already spelled out.

(38) * Životě kterého přítele Marie vyprávěla legrační historky o t?
       life   which   friend Marie told   funny   stories   about

Then, one expects that movement of a syntactic object that is not trapped in the phase complement is grammatical because the association of the Agreeing feature with the appropriate syntactic object is possible. This expectation is correct, as shown by the example below. The Agreeing wh-feature in the set information on sister of C can be associated with node *o životě kterého přítele* 'about which friend's life' bearing the wh-feature and consequently the whole prepositional phrase is moved.

(39) O životě kterého přítele   Marie vyprávěla legrační historky t?
       about life which   friend   Marie told   funny   stories
       'About which friend's life did Marie funny stories?'

To conclude this section, for movement to be possible, the operation Pied-piping must associate the Agreeing feature with a syntactic object that dominates the phase complement.

4. Conclusion

I have proposed a derivational-representational model that can account for the difference in locality behaviour between the operation Agree and Move and that can derive non-local relations that are problematic for Chomsky's (2000, *et seq.*) phase model with the Phase Impenetrability Condition. The problematic non-local relations can be derived in a local fashion if the whole set information resulting from the operation Set-Merge is visible for syntactic operations. As to the difference between the operation Agree and Move, I have proposed that for Agree, only the set information on the sister syntactic object is relevant and that for Move, also the tree information with the Phase Impenetrability Condition is relevant. The operation Move, though it is based on the operation Agree, does not affect all elements visible for Agree because some elements may have already been spelled out. I have also shown that c-selection behaves differently from s-selection, Agree and other long-distance relations with respect to the information given by Set-Merge. Whereas for c-selection, only the label in the set information on particular nodes is relevant, for the other relations, the whole set information on particular nodes is relevant.

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