Syntax and Semantics of Sharing

Dafina Raţiu
University of Nantes, LLING EA 3827
ellemico@yahoo.fr

I discuss coordinated questions in Romanian of the type in (1), where two selected WHs (a subject & an object) appear coordinated in clause-initial position:

Selected coordinated question:
(1)   **Cine şi   ce**   a   cumpărat ?
      who   and   what   aux   bought
      Literally: 'Who and what bought?'

By comparing selected coordinated questions with selected WHs ((1)) with non-selected coordinated questions ((2)), I argue for a bi-clausal analysis for both types.

Non-selected coordinated question:
(2)   **Cînd si   unde** va   cînta   Filip?
      when   and   where aux   sing   Filip
      'When and where will sing Filip?'

Selected coordinated questions, as opposed to non-selected ones, raise two problems:

- **the shared IP can only be pronounced once**
- **the shared IP has to be pronounced in the second conjunct.**

Ellipsis analysis fails, but the multidominance analysis provides a straightforward account for these two problems.

Furthermore I will address the question of the interpretation of multidominant stuctures, more specifically the interpretation of coordinated questions in Romanian. I propose that the shared material is interpreted in both conjuncts simultaneously: multidominance changes what counts as a constituent ⇒ I argue that, once we allow two rooted constituents and on the assumption that the interpretation feeds on the syntax then we need a step in the semantic interpretation which interpret a two rooted constituent as such.

Two main approaches for selected coordinated questions:
- **coordinated questions are mono-clausal** (Comorovski, 1989; Gribanova, 2009; Kazenin, 2002; Lipták, 2003; Skrabalova, 2006; Zhang, 2007; Merchant, 2007; Citko & Gracanin-Yuksek, 2010; Haida & Repp 2009)
- **coordinated questions are bi-clausal (**Kliashchuk, 2007; Citko & Gracanin-Yuksek, 2010 (ambiguous account); Tomaszewicz, 2010)
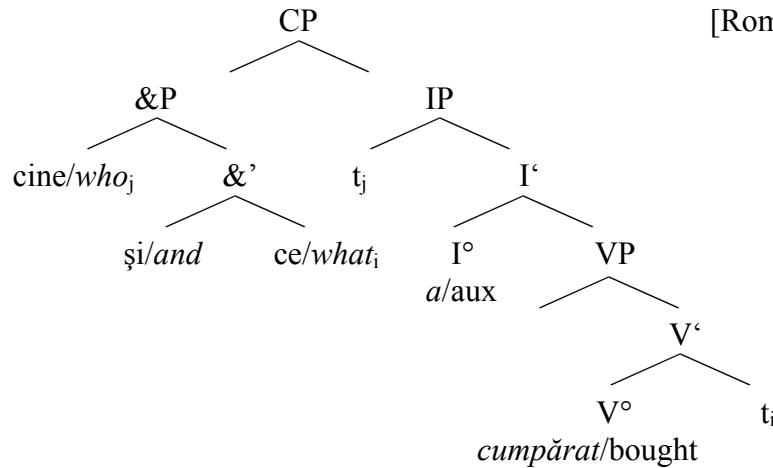
1   **Monoclausal approach :**
Coordinated questions have been analysed, on a par with non-coordinated (multiple/matching) questions, as involving a **coordination of DPs** with one (single) IP from which both WHs have been extracted (*coordination of two WHs* (Comorovski, 1989; Kazenin, 2001; Lipták,

2003, Skrabalova, 2006; Gribanova, 2009; Merchant, 2007); *sideward movement* (Zhang 2007, Haida&Repp 2007))

(3)   Cine   şi   ce   a   cumpărat?
       who   and   what aux bought
       Literally: 'Who and what bought?'

(4)   CP   [Romanian](Comorovski, 1996)

               &P   IP

       cine/*who*ⱼ   &'   tⱼ   I'

                  şi/*and*   ce/*what*ᵢ   I°   VP
                                          a/aux
                                                        V'

                                                  V°   tᵢ
                                              cumpărat/bought

Under a mono-clausal account, coordinated questions presuppose non-coordinated multiple questions; the coordinated question in (5) is directly derived from non-coordinated one in (6):

Coordinated question:
(5)   **Cine şi   ce**   a   cumpărat ?
       who   and   what   aux bought
       Literally: 'Who and what bought?'

Non-coordinated (multiple) question:
(6)   **Cine ce**   a   cumpărat ?
       who   what   aux bought
       'Who bought what?'

     Problem 1
   Violation of the Law of the Coordination of Likes (Williams 1981):

(7)   *Filip   şi   o   chitară a   cumpărat.
       Filip   and   art guitar aux bought
       Literally: 'Filip and a guitar bought.'

(8)   *FILIP şi   o   CHITARA   a   cumpărat.

Problem 2

Coordinated questions and non-coordinated ones, have different syntactic and semantic properties:

i)   Non coordinated multiple questions only allow LP readings, whereas coordinated questions   allow both, SP and LP readings (see Appendix).

ii)   The order of WHs in coordinate questions is free whereas the WHs in non-coordinated multiple questions show strict ordering constraints:

Coordinated questions - no ordering restrictions

(9)   **Cine   şi   ce**   a   cumpărat ?
    who   and   what   aux   bought
    Literally: 'Who and what bought?'

(10)   **Ce   şi   cine**   a   cumpărat ?
    what   and   who   aux   bought
    Literally: 'What and who bought?'

Non-coordinated questions - ordering restrictions[1]

(11)   **Cine   ce**   a   cumpărat ?
    who   what   aux   bought
    'Who bought what?'

(12)   ***Ce   cine**   a   cumpărat ?
    what   who   aux   bought

If the coordinated question in (14) is derived from non-coordinated one in (13), then what rescues the derivation in (14) ?

(13)   ***Ce   cine**   a   cumpărat ?
    what   who   aux   bought

(14)   **Ce   şi   cine**   a   cumpărat ?
    what   and   who   aux   bought
    Literally: 'What and who bought?'

On these grounds, I reject the mono-clausal accounts and I adopt a bi-clausal analysis for coordinated questions in Romanian.

---

[1] Ordering restrictions in matching questions in Romanian are constrained by the principle (governing the bound variable interpretation of a pronoun) responsible for WCO (see Rațiu 2007 (a, b) ms.).

2   Biclausal approach

Proposal: coordinated questions involve coordination (of constituents bigger than DPs) at IP[2] level.

Empirical arguments: the distribution of the interrogative word *oare*:

- ***oare* can only appear in interrogative clause, is optional and can appear in different positions:**

   - non interrogative

(15) *(*Oare)*   *plouă afară?*
      oare   rain   outside
      'Is it raining, outside."

   - total questions:

(16) *(Oare)*   *plouă afară?*
      oare rain   outside
      'Is it raining, outside?'

(17) *Plouă (oare) afară?*

(18) *Plouă afară (oare)?*

   - partial (constituent) questions*:*

(19) *(Oare) cine bate   la   uşă?*
      oare who knocks prep. door
       'Who's knocking at the door?'

(20) *Cine (oare) bate   la   uşă*?

(21) *Cine bate   la   uşă   (oare)?*

---

[2] Citko & Gracanin (2010) suggest a bi-clausal analysis for selected coordinated questions in Romanian, where the two conjuncts share the VP. Nonetheless, if selected coordinated question in Romanian involved conjunction at VP level, we expect the presence of two auxiliaries to be grammatical. This prediction is not borne out; selected (and non-selected) coordinated questions in Romanian do not allow the presence of more than one auxiliary:

(1) *Cine   **a**   şi   ce   **a**   cumpărat ?
     who   aux   and   what   aux   bought
     Literally: 'Who and what bought?'

- multiple question:

(22) **(Oare)**   cine   ce   a   cumpărat?
       oare   who   what   aux   bought
       Literally: 'Who bought what?'

(23) Cine   ce   (**oare)** a   cumpărat ?

(24) Cine   ce   a cumpărat (**oare)**?

- coordinated question:

(25)   **(Oare)**   cine   şi   ce   a   cumpărat ?
       oare   who   and   what   aux   bought

(26) Cine   (**oare)** şi   ce   a   cumpărat ?

      Cine   şi   (**oare)** ce   a   cumpărat ?

(27) Cine   şi   ce   (**oare)** a   cumpărat ?

(28) Cine   şi   ce   a   cumpărat   (**oare)** ?

- **oare can only appear once per clause:**

(29)   **(Oare)**   cine   ce   (***oare)**   a   cumpărat?
       oare   who   what   *oare*   aux   bought

(30) **(*Oare)**   cine   ce   (**oare)** a   cumpăra ?

(31) Cine   ce   **oare**   a   cumpărat   (***oare)**?

(32) Cine   ce   (***oare)**   a   cumpărat   (**oare)**?

- **as opposed to non-coordinated (multiple) questions, in coordinated questions in Romanian *oare* is allowed to appear more than once:**

(33) **Oare** cine   şi   **oare**   ce   a   cumpărat ?
      oare who   and   *oare*   what   aux   bought
      Literally: 'Who and what bought?'

(34) **C**ine **oare** şi   ce   **oare**   a   cumpărat ?
      oare who   and   *oare*   what   aux   bought
      Literally: 'Who and what bought?'

⇒   the contrast in (29)-(33) follows straightforwardly from the assumption that non coordinated multiple questions are mono-clausal whereas and coordinated questions are bi-clausal

⇒ on the assumption that *oare* can only appear once per CP/clause and is presumably a C° (or a higher functional head in the left periphery), the distribution of *oare* in coordinated questions, where it can appear more than once, **is an indication that coordinated questions in Romanian involve a conjunction of two questions[3]**.

2.1 Backwards ellipsis

Ellipsis of IP account for **non selected coordinated questions**: WHs (Chung, Ladusaw & McCloskey (CLM) 1995, Giannakidou & Merchant 1998, Kliashchuk 2005, Cracanin 2007)

(35)   Jack bought something but I don't know **what**.

⇒ <u>CLM (1995)</u>: propose an account of IP ellipsis/sluicing which makes use of three LF operation – *copying*, (*merger*)[4] *sprouting*. *Sprouting* = operation that adds the non-argumental variable that you need in the sluiced (recycled material):
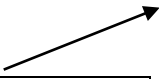- *sprouting* is a structure-building operation which is subject to interpretability conditions at LF
- *sprouting* respects the argument structure of the predicates involved and it respects the category of the WH phrases

(36)   John ate a dinner but I don't know **with whom**.

Copy/recycling+sprout: Copy the antecedent and supply an empty category in the copied IP which is bound by the displaced WH *with whom*:

(37)   John ate a dinner but I don't know **with whom$_i$** <[*John ate a dinner*   ]>.
(38)   John ate a dinner but I don't know **with whom$_i$** <[*John ate a dinner* t_i]>.

Sprout/add the adjunct trace

---

[3] Bilbie&Gazdik (2012) also defend a biclausal approach for conjoined questions in Romanian; they show that sentence-level adverbial can be inserted between the WHs in conjoined questions :

i.   Nu vad **cum** si,   mai important,   **cine** ar putea sa-l dea jos   pe Basescu.
       not see.1 how and,   most importantly,   who could overthrow.SUBJ   Basescu.ACC
       « I don't see how, and most importantly, who could overthrow Ba sescu ».

Moreover, they show that it is possible to coordinate the yes/no marker *daca* 'if' and a Wh-phrase :

ii.   RATB si Metrorex vor anunt, a vineri   **daca**   si   **când** intra în greva generala.
       RATB and Metrorex will announce Friday   if   and   when enter in strike general
       RATB and Metrorex will announce on Friday if and when they enter in general strike.

[4] <u>Copy+merger:</u>
    i.   Jack bought **something** but I don't know **what**
    ii.   Jack bought **something** but I don't know **what$_z$** <[*Jack bought **something**$_z$*]>.

<u>Giannakidou and Merchant (1995)</u> : add another operation - *pruning*. *Pruning* = the opposite of sprouting, it erases a non-argumental variable that is not bound:

-   *pruning* is subject to the same kinds of general constraints on its application as sprouting: it must satisfy the licensing constraints imposed by lexical items within the recycled IP – it cannot alter the argument structure (or delete lexical licensed adverbials).

(39)   It is not clear **if** and **when** the police arrested the demonstrators t_i.

Copy+prune: Copy the antecedent and erase the adjunct trace in the copied IP:

(40)   It is not clear **if** <[*the police arrested the demonstrators* $\boxed{t_i}$]> and **when**$_i$ the police arrested the demonstrators **t_i.**

(41)   It is not clear **if** <[*the police arrested the demonstrators*]> and **when**$_i$ the police arrested the demonstrators **t_i.**

prune/erase the adjunct trace

Problem 1

Under an ellipsis account (irrespective of whether it involves deletion (Merchant (1999)) or recycling/recycling at LF (CLM)), we have to assume that, in selected coordinated questions in Romanian, ellipsis takes place in the first conjunct (i.e reverse sluicing):

(42)   **a.   Cine   şi   ce   a   descoperit?**
who   and   what   aux   discover
Literally: 'Who and what discovered?'

sluicing
↓

(43)   [&P [CP1 **Cine$_j$** <   >] [$_{\&°}$ şi [CP2 **ce$_i$** [IP2 a   descoperit **t_i**]]]?
who   and   what   aux   discover

⇒ the antecedent (the second conjunct) is ill-formed: the verb *discover* is missing its external argument
⇒ after copying/recycling the antecedent IP into :

(44)   **Cine$_j$**   *< [IP a   descoperit t_i] >*   şi   **ce$_i$** [IP a   descoperit **t_i**]?
who   aux discover   and what   aux   discover

   ➢ configuration of vacuous quantification: the operator *cine/who* doesn't bind anything in the first conjunct (we cannot *sproute*/add an argumental trace in the recycled IP)
   ➢ t_i , in the first conjunct, is not bound (you cannot *prune* argumental traces)

The ellipsis analysis hinges on the idea that you either *sprout* or *prune* non-argumental traces
→ **selected coordinated questions are problematic under a ellipsis account since you can neither sprout, nor prune, the argumental traces**.

Let's suppose that, based on the fact that Romanian is a pro-drop language, the external argument in the second conjunct is a *pro* whereas the internal argument in the first conjunct is an *indefinite pro* (Kliashchuk 2008):

(45)

```
                                    &P
                          _____
                        CP1                        &'
                  _____           _____
              whoᵢ          C'          &°              CP2
                      _____         and      _____
                    C°          IP            whatⱼ            C'
                          _____                    _____
                        I°          C°                            IP 2
                        tᵢ      _____                  _____
                              I°          VP             pro              I
                                    _____                      _____
                                  V'                             I°          VP
                            _____                                 _____
                          V°          NP                             V
                       discover   indef pro                    _____
                                                             V°          NP
                                                          discover       tⱼ
```
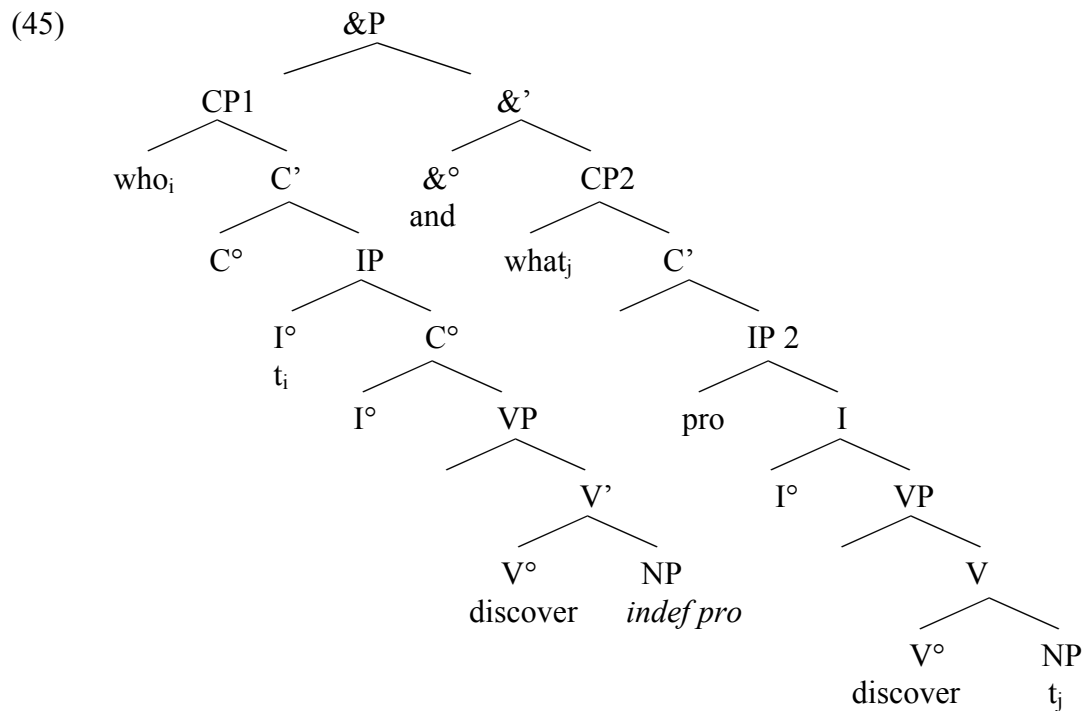
(46)   **a.**   ***Cine*** *şi*   *ce*   *a*   *descoperit?*
              who   end   what   aux   discovered
              Literally: 'Who and what discovered?'

(47)   *b. Interpretation :*   « λp $\exists y$ $\exists z$ **[human (y)** $\wedge$ **thing (z)** $\wedge$ **p = ^**
                                      discovered (y, z)] »

             c. Answer: « Filip discovered coal. »

Problem 2:

There is no binding (no c-command) $\Rightarrow$ the structure in (49) yields an interpretation where the arguments can, in principle refer to different individuals/things in each conjunct :

(48)   *a. Interpretation* :   «"Who discovered something and what did someone
                                      discover ? "

             b. Answer :   # " Filip discovered somethig and someone discovered
                                      coal."

Problem 3 - The target of ellipsis

The directionnality puzzle

Contrary to non selected coordinated questions (in English or Romanian) where ellipsis can, either target the first conjunct or the second conjunct, in selected coordinated questions, ellipsis can olny target the first conjunct !

- **Non-selected coordinated questions in English and Romanian**

  - Ellipsis in the first conjunct = ok

(49)   a. SS: It is not clear if and when the police arrested the demonstrators. (Giannakidou & Merchant 1998)

   LF: It is not clear if < *the police arrested the demonstrators* > and when [**IP the police arrested the demonstrators**]

  Ellipsis in the second conjunct = ok

   b. SS: It is not clear if the police arrested the demonstrators and when?

   LF: It is not clear if [**IP the police arrested the demonstrators**] and when < *the police arrested the demonstrators* > ?

  Ellipsis in the first conjunct = ok

(50)   a. SS: Cînd   şi   unde   vei   cînta ?
             when   and   where   aux.II.SG   sing
             'When and where will you sing?'

   LF: Cînd   < *vei cînta*   >   şi   unde [**IP vei   cînta**] ?
             when   aux.II.SG sing   and   where   aux.II.SG sing

  Ellipsis in the second conjunct = ok

   b. SS: Cînd   vei   cînta   şi   unde?
             where   aux.II.SG   sing   and   where
             'When will you sing and where?'

   b. LF: Cînd   [**IP   vei   cînta**] şi   unde   < *vei cînta*   > ?
             when   aux.II.SG   sing   and   where   aux.II.SG sing

- **Selected coordinated questions in Romanian:**

If selected coordinated questions in Romanian involved sluicing, we also **expect sluicing to successfully target the second conjunct** (on a par with non-selected coordinate questions in Romanian and in English). The expectation is **not bone out**; ellipsis cannot target the second conjunct in selected coordinated questions in Romanian:

Ellipsis in first conjunct = ok

(51)   a. SS: Cine şi   ce   a   descoperit   ?
              who   and what aux   discover
              "Literally: Who and what discovered?"

        b. LF: Cine *< sluicing >* şi   ce   **[IP a   descoperit]** ?
              who   and what   aux   discover

Ellipsis in second conjunct = NO !

(52)   a. SS: *Cine a   descoperit   şi   ce ?
              who aux   discover   and what
              "Literally: Who discovered and what?"

        b. LF: Cine **[IP a   descoperit]** şi   ce   *< sluicing >* ?
              who   aux discover and   what

         If selected coordinated questions in Romanian involved ellipsis, then, why can't the ellipsis target the second conjunct? **Why is that in selected coordinated questions in Romanian ellipsis must target the first conjunct?**

The optionnality puzzle

Ellipsis is, in general, optional:

- **Non-selected coordinated questions English and Romanian**

(53)   a. It is not clear **if** *< ellipsis >* **and when** the police arrested the demonstrators.

       b. It is not clear **if** the police arrested the demonstrators **and when** the police arrested the demonstrators.

(54)   a. **Cînd** *< ellipsis >*   **şi**   **unde** vei   cînta ?
           when   and   where aux.II.SG   sing
           'When and where will you sing?'

       b. **Cînd**   vei   cînta **şi**   **unde** vei   cînta ?
           when   aux.II.SG   sing and   where aux.II.SG   sing
           'When will you sing and where will you sing?'

- **Selected coordinated questions in Romanian**

If selected coordinated questions in Romanian involved sluicing, than **we expect ellipsis, to be optional** (on a par with non selected coordinated questions in English or in Romanian). The expectation is **not confirmed either**:

(55)   a. **Cine**   < *sluicing* >   şi   **ce**   a   descoperit?
       who   and   and   what aux   discover
       Literally: 'Who and what discovered?'

    b. ***Cine**   a   descoperit   şi   **ce**   a   descoperit?
       who   aux   discover   and   what aux   discover
       Literally: 'Who discovered and what discovered?'

Ellipsis seems to be obligatory in selected coordinated questions!

In sum: Under a bi-clausal analysis for selected coordinated questions, the natural assumption is that these structures involve IP ellipsis sluicing/, but then:

> **Why does ellipsis necessarily targets the first conjunct - the IP can only be pronounced in the second conjunct?**
> **and**
> **Why is ellipsis is obligatory - the IP can only be pronounced once?**

Note: these questions don't arise for non-selected coordinated questions (where the IP can be pronounced either in the first conjunct, or in the second, or in both).
     Based on the contrast between selected coordinated questions and non-selected coordinated questions, I conclude that selected coordinated questions in Romanian cannot be analyzed in terms of ellipsis.

2.2   The multidominance analysis

Proposal: Analysis of (at least) selected coordinated questions in Romanian in terms of multidominance. The only linear order which can be derived from a multidominance structure is the order where the IP <u>can only be pronounced once</u> and <u>it has to be pronounce in the second conjunct.</u>
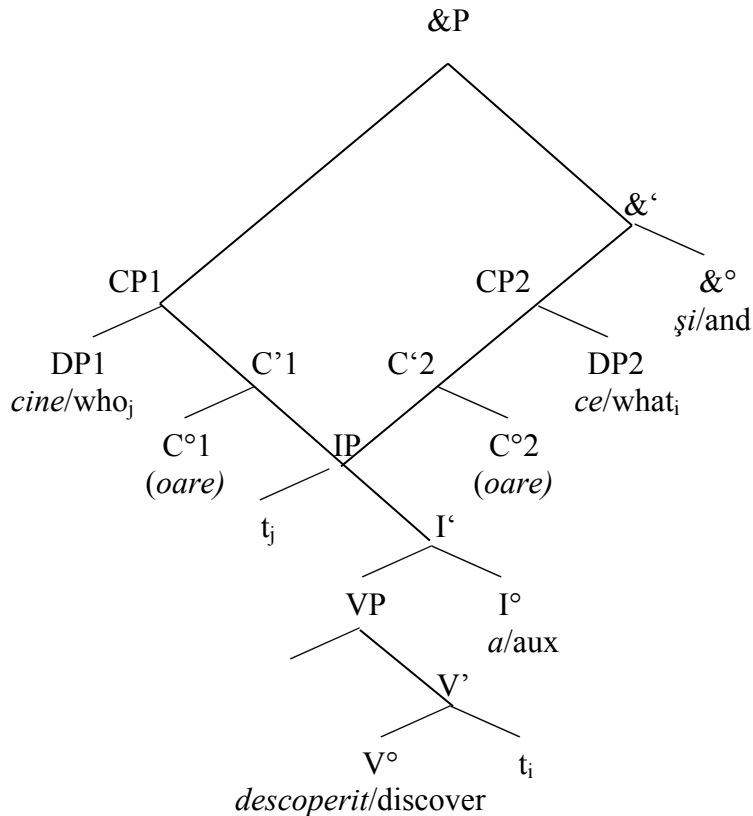
The selected coordinated question in (57) is derived from the conjunction of two CPs, which share the (same) IP[5]:

(56)   **Cine** **(**oare**)** **şi**   **ce**   **(**oare**)** a   descoperit ?
        Who *oare* and   what *oare* aux   discover
        Literally: 'Who and what discovered?'

(57)

```
                              &P
                          ╱        ╲
                        ╱            &'
                      ╱            ╱    ╲
                    ╱            &°
                  CP1        CP2   și/and
                 ╱   ╲      ╱   ╲
               DP1   C'1  C'2   DP2
            cine/whoⱼ        ce/whatᵢ
                   ╱  ╲  ╱  ╲
                 C°1  IP  C°2
                (oare)   (oare)
                   ╱  ╲
                  tⱼ   I'
                     ╱   ╲
                   VP     I°
                  ╱  ╲   a/aux
                     V'
                   ╱   ╲
                  V°    tᵢ
           descoperit/discover
```

☁ **Why can the IP only be pronounced once, in selected coordinated questions in Romanian?**

(58) who < and < what < **IP [aux < discover]**
(59) *who < **IP [aux < discover]** < and < what **IP [aux < discover]**

Because selected coordinated questions in Romanian involve a single IP.

☁ **Why cannot the IP be pronounced in the first conjunct in selected coordinated questions in Romanian?**

(60) who < and < what < **IP [aux < discover]**
(61) *who < **IP [aux < discover]** < and < what

This follows, straightforwardly, from different linearization algorithms applied to multidominance structures (Wilder 1999, Bachrach and Katzir, 2007, de Vries 2007, Gracanin 2007).

Wilder (1999) (based essentially on Kayne's LCA, 1994)

LCA[6], *Kayne (1994):*
- precedence is a relation defined only for terminals of the trees: the LCA = an algorithm of PF component that linearises terminals of <u>dominance-only</u> trees by reading c-command among categories (*input*) and delivering precedence between terminals (*output*).
- precedence among terminals is determined by asymmetric c-command among categories that contain them: if a category X asymmetrically c-command a category Y then the terminals (dominated by) of X precede the terminals (dominated by) of Y

Relaxed version of LCA, Wilder (1999)
(62) $d(X)$ = *the (unordered) set of terminals fully dominated by X*
(63)   *X fully dominates α iff X dominates α and X does not share α.*
(64)   *α is shared by X and Y iff a) neither of X and Y dominates the other and b) both X and Y dominates α. (Wilder I999)*
(65)   **C-command:** *X c-command Y only if X does not fully dominate Y. (Wilder,1994*)

Wilder (1994) replaces the notion of **dominance** (in the LCA) with the notion of **<u>full dominance</u>** and accordingly, modifies the definition of c-command, so that it includes dominance.

⇒⇒⇒ **Because the notion of c-command has been relaxed, to include dominance, the revised LCA (Wilder 1999) has as consequence that shared elements are linearised in final positions.**

(66)   **Cine**   oare   **şi**   **ce**   oare   a   descoperit ?
         Who   *oare*   and   what   *oare*   aux   discover
         Literally: 'Who and what discovered?'

---

[6] **LCA (Kayne 1994)**

   d(A) is a linear ordering of T

   (*T is the set of all terminal elements, d is the set of ordered pairs of non-terminals, where the first member c-commands the second; d(A) is the set of terminals dominated by A* (Kayne 1994).

   C-command: *X c-command Y iff i) X≠Y, ii) X does not dominate Y, iii) Y does not dominate X an iv) all categories that dominate X dominate Y*

   Asymmetric c-command*: X asymmetrically c-command Y if X c-command Y and Y does not c-command X (Kayne 1994).*

(67)
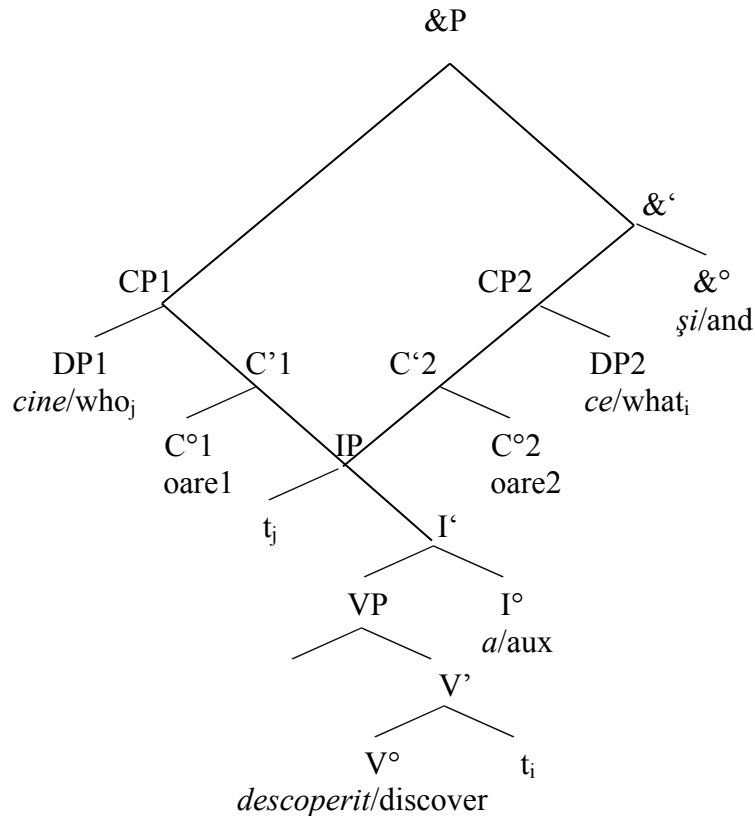
Based on asymmetric c-command, linearization within the shared node IP is (trivial):

(68) **aux < discover**

Important note: shared elements (i.e. IP) count as a unit for linearization (Wilder 1999).

- within CP1, C-command gives us the precedence relations:

(69) **who < oare 1**

- within &', C-command gives us the precedence relations:

(70) **and < what < oare 2**

By the (revised) LCA in (Wilder 1999):

- **everything fully dominated by CP1 must precede everything that CP1 asymmetrically c-commands**
- **by (64) CP1 fully dominates *who, oare1***
- under the relaxed notion of c-command (66), **CP1 asymmetrically c-commands &°, DP2, C°2, IP**
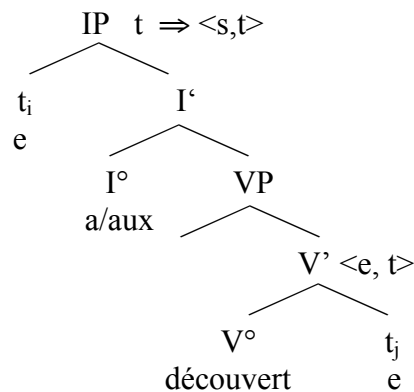-

(71) **who < oare 1 < and < what < oare 2 < IP [*aux < discover*]**

The only possible linear order which can be derived from the multidominated structure in (67) is the order where the **IP appears pronounced once and is pronounced in the second conjunct**.
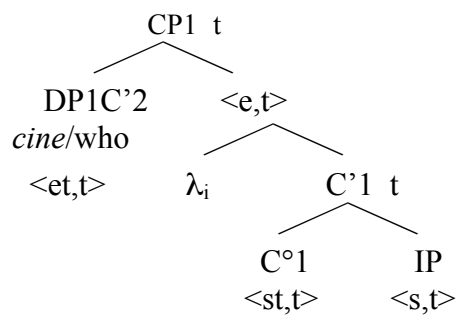
2.3   On the semantics of coordinated questions

(72)   a.   Cine   şi   ce   **a**   **descoperit** ?
           who   and   what   aux   discover
           Literally: 'Who and what discovered?'

(73)

```
                              IP   t ⇒ <s,t>
                             /         \
                           t_i           I'
                           e            /    \
                                      I°        VP
                                     a/aux      /   \
                                             V' <e, t>
                                             /      \
                                           V°         t_j
                                        découvert      e
```

(74)   **[[IP]] =   ^ discovered (x_i, x_j)**

(75)

```
                     CP1  t
                    /       \
               DP1C'2        <e,t>
               cine/who      /    \
             <et,t>    λ_i      C'1  t
                               /     \
                            C°1        IP
                           <st,t>     <s,t>
```

[[C°1]] = $\lambda q\ [\ p=q]$

[[C'1]] = $\lambda q\ [\ p=q]$ (^ discovered (x_i, x_j))

           $\Rightarrow p = $ ^ discovered (x_i, x_j)

           $\Rightarrow \lambda x_i\ [p = $ ^ discovered (x_i, x_j)]

[[DP1]] = $\lambda Q\ \exists y$ [human (y) ∧ Q(y)]

[[CP1]] = $\lambda Q\ \exists y$ [human (y) ∧ Q(y)] ($\lambda x_i\ [p = $ ^ discovered (x_i, x_j)])

           $\Rightarrow \exists y$ [human (y) ∧ $\lambda x_i\ [p = $ ^ discovered (x_i, x_j)] (y)]
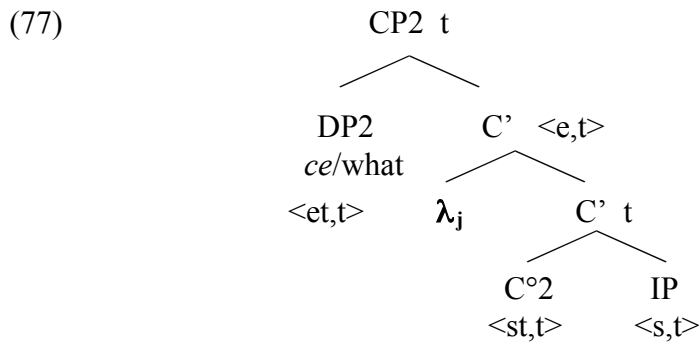
           $\Rightarrow$ **$\exists y$ [human (y) ∧ p = ^ discovered (y, x_j)]**

Problem:

- the first conjunct (CP1) contains a free variable, x_i , created by the movement of the object *ce/what* into the Spec CP2 :

(76)

```
        CP1                          CP2
       /   \                        /   \
     DP1    C'2                   DP2    C'4
  cine/who  λi    C'1        ce/what λj    C'3
                 /   \                      |    \
               C°1    ───────────          |     C°2
                          \        \        |
                           ───── IP ──────
                                /  \
                           xi      I'
                                  /   \
                                I°     VP
                              a/aux    /  \
                                      V'
                                    /    \
                                  V°      xj
                             discovered
```
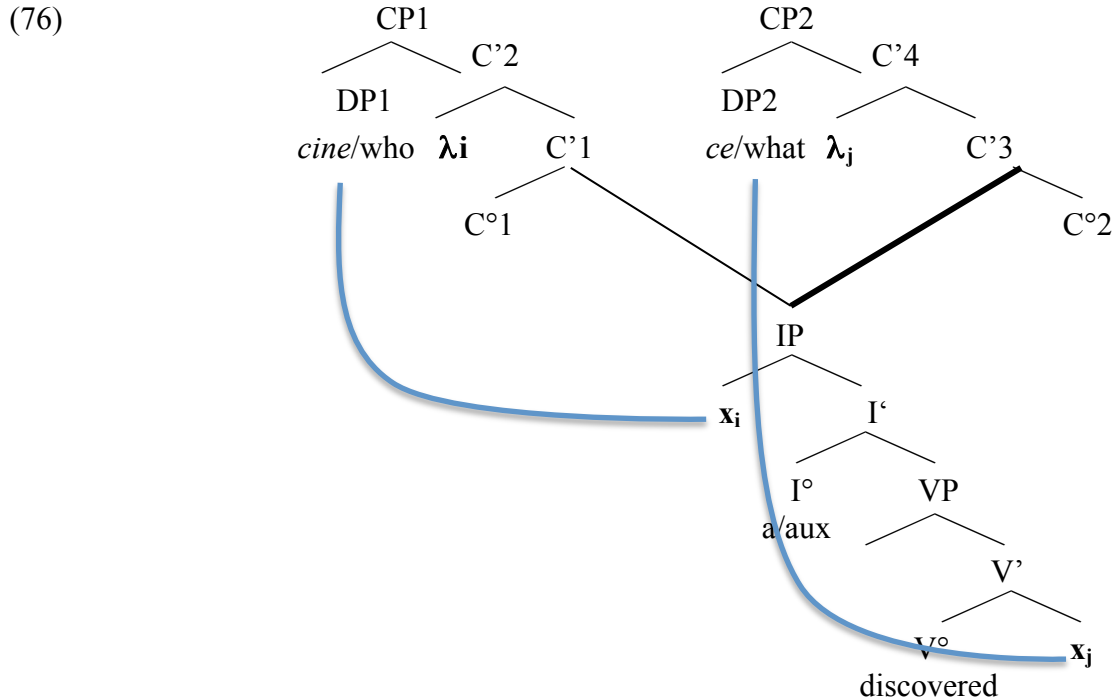
- **conversely, the second conjunct (CP2) contains a free variable, x_i, created by the movement of the subject *cine/who* into the Spec CP1 :**

(77)

```
              CP2  t
             /     \
          DP2       C'  <e,t>
        ce/what    /    \
        <et,t>   λj      C'  t
                        /    \
                      C°2      IP
                     <st,t>   <s,t>
```
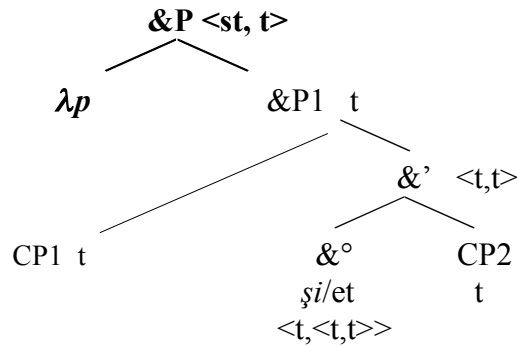
(78) $[[C°2]] = \lambda q \, [\, p{=}q]$

(79) $[[C']] = \lambda q \, [\, p{=}q] \, (^\wedge \text{discovered} \, (x_i, x_j))$

$\Rightarrow p = {}^\wedge \text{discovered} \, (x_i, x_j)$

$\Rightarrow \lambda x_j \, [p = {}^\wedge \text{discovered} \, (x_i, x_j)]$

(80) $[[DP2]] = \lambda Q \, \exists z \, [\text{thing} \, (z) \wedge Q(z)]$

(81) $[[CP2]] = \lambda Q \, \exists z \, [\text{thing} \, (z) \wedge Q(z)] \, (\lambda x_j \, [p = {}^\wedge \text{discovered} \, (x_i, x_j)])$

$\Rightarrow \exists z \, [\text{thing} \, (z) \wedge \lambda x_j \, [p = {}^\wedge \text{discovered} \, (x_i, x_j)](z) \,]$

$\Rightarrow \mathbf{\exists z \, [thing \, (z) \wedge p = {}^\wedge \, discovered \, (x_i, z)]}$

(82)

$$\textbf{\&P <st, t>}$$

```
            &P <st, t>
           /        \
         λp          &P1  t
                    /      \
                   /        &'  <t,t>
                  /        /    \
              CP1  t     &°      CP2
                        şi/et     t
                       <t,<t,t>>
```

$[[\&°]] =$ λP λQ [P∧Q]

$[[\&']] =$ λP λQ [Q∧P] (∃z [thing (z) ∧ p = ^ discovered (x_i, z)])

$\Rightarrow$ λQ [Q ∧ ∃z [chose(z) ∧ p = ^ discovered (x_i, z)]]

$[[\&1]] =$ λQ [Q ∧ ∃z [thing (z) ∧ p = ^ discovered (x_i, z)]] (∃y [human (y) ∧ p = ^ discovered (y, x_j)])

$\Rightarrow$ **∃y [human(y) ∧ p = ^ discovered (y, x_j)] ∧ ∃z [thing (z) ∧ p = ^ discovered (x_i, z)]**

Problem: each of the conjuncts contains a free variable ⇒ the arguments can refer to different individuals/things in each conjunct; the question would mean:

(83)   ***Cine*** *şi*   *ce*   *a*   *descoperit?*
            who end   what aux   discovered

(84)   *a. Interpetation* : « Who discovered something and what did someone
                           discover ? »

          b. Answer :   # « Filip discovered somethig and someone discovered coal. »

However the interpretation we want for the selected coordinated question : the (internal, external) argument in both conjuncts refer to same individulas/things :

(85)   a. *Interpretation* :   **« λp ∃y ∃z [human (y) ∧ thing (z) ∧ p = ^ discovered (y, z)] »**

(86)   *b. Answer*:   « Filip discovered a new planet. »

⇒ **we get to a situation where multidominance raise the same problems as ellipsis with respect to the interpretation of selected coordinated questions (free variables)**

⇒ **recall the criticism of ellipsis analysis : assuming we allow sprouting and pruning - free variables in each conjunct : this is why precisely we abandoned the ellipsis account**

- **ellipsis** : does not account for the interpretation
  does not account for the pronunciation

- **multidominance** : does account for the pronunciation
 does not account for the interpretation

Assuming that coordinated questions with selected *Wh*s involve multidominance (coordination of two CP with shared IP) - how to generate the interpretation where the arguments in both conjuncts refer to the same individuals/thing?

Note: proposition obtained above in (80) (repeated as (85) below) is equivalent to the proposition in (86) :

(87) $[[\&P1]]= \exists y \; [human(y) \wedge p =\; ^\wedge discovered(y, x_j)] \wedge \exists z \; [thing(z) \wedge p =\; ^\wedge$
  $discovered \; (x_i, \; z)]$

(88) $[[\&P1]]= \exists y \; \exists z \; [\; human(y) \wedge thing(z) \wedge \; p =\; ^\wedge discovered \; (y, z) \wedge \; \; y = x_i$
  $\wedge \; z = x_i \;]$
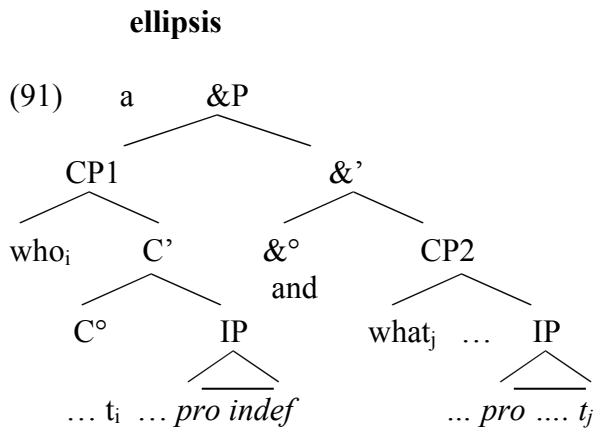 $\Rightarrow human(x_i) \wedge thing(x_i) \wedge \; p =\; ^\wedge discovered \; (x_i, x_i)$

Ratiu (2010): one possible solution to solve our problem is to bind the free variables above the conjunction + existential closure over pairs:
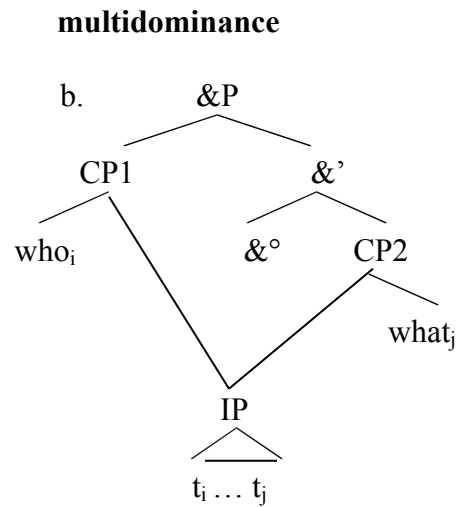
(89)
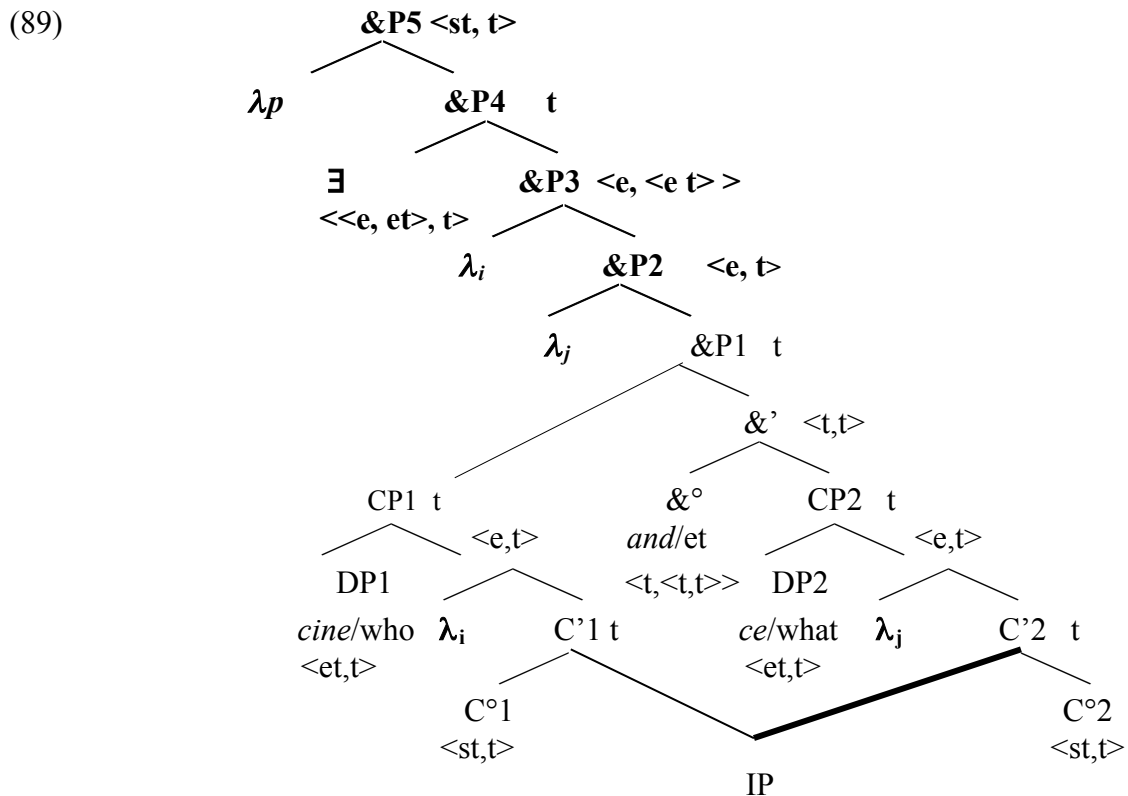
(90) $[[\&P2]] =$ $\lambda x_j \; [human \; (x_i) \wedge thing \; (x_j) \wedge \; p =\; ^\wedge découvert \; (x_i, x_j)]$
  $[[\&P3]] =$ $\lambda x_i \; \lambda x_j \; [humain \; (x_i) \wedge chose \; (x_j) \wedge \; p =\; ^\wedge discovered \; (x_i, x_j)]$
  $[[\&P4]]=$ $\exists y \; \exists z \; [\; human \; (y) \wedge thing \; (z) \wedge \; p =\; ^\wedge discovered(y, z)$
  $[[\&P5]]=$ $\lambda p \; \exists y \; \exists z \; [human \; (y) \wedge thing \; (z) \wedge \; p =\; ^\wedge discovered \; (y, z) \;]$

Problems :
-        the additional abstractions at the top of the tree = is a stipulation

ellipsis	**multidominance**

(91)   a

```
              &P
         ╱         ╲
      CP1            &'
     ╱   ╲         ╱    ╲
  whoᵢ    C'     &°      CP2
         ╱  ╲   and    ╱   ╲
       C°    IP     whatⱼ …   IP
            ╱╲              ╱╲
       … tᵢ … pro indef   … pro …. tⱼ
```

⇒ binding problem

b.

```
              &P
         ╱         ╲
      CP1            &'
     ╱   ╲         ╱    ╲
  whoᵢ    ╲     &°      CP2
            ╲          ╱   ╲
             ╲        ╱   whatⱼ
              ╲      ╱
               IP
              ╱╲
           tᵢ … tⱼ
```

⇒ binding problem disappears
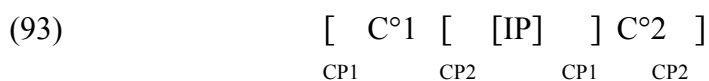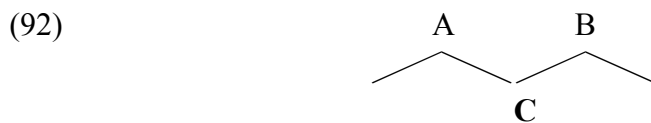⇒ but then why can't we get the right interpretation
⇒ the reason why we don't get the right interpretation with is because the semantic composition ignores multidominance: you interpret first the IP, then CP1, the CP2 ⇒ you get binding problem: so you add two levels of abstraction - but this could also solve the binding problem in the ellipsis structure in a similar way !

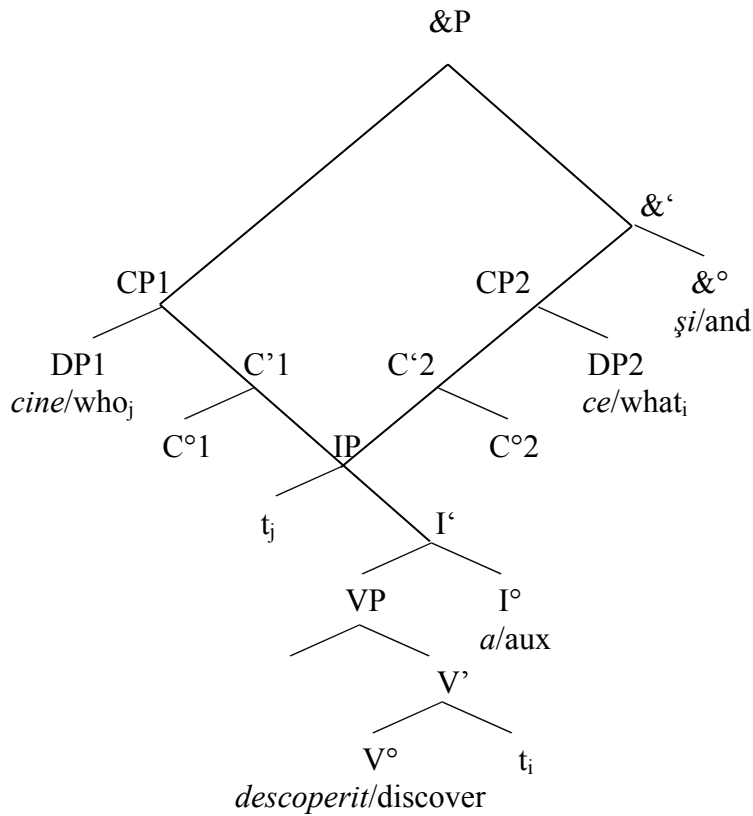Should multidominance provide a solution for linearization/pronunciation ?

No !

If multidominance is the right analysis for selected coordinated questions and on the assumption that semantic interpretation is build on the syntax, multidominance should provide a solution for both the pronunciation and the interpretation.

Proposal : once you allow two rooted constituents, then (91) is a constituent ⇒ **there should be a step in the derivation where the semantics interprets this constituent** (and does not ignore it by interpreting first A, the B):
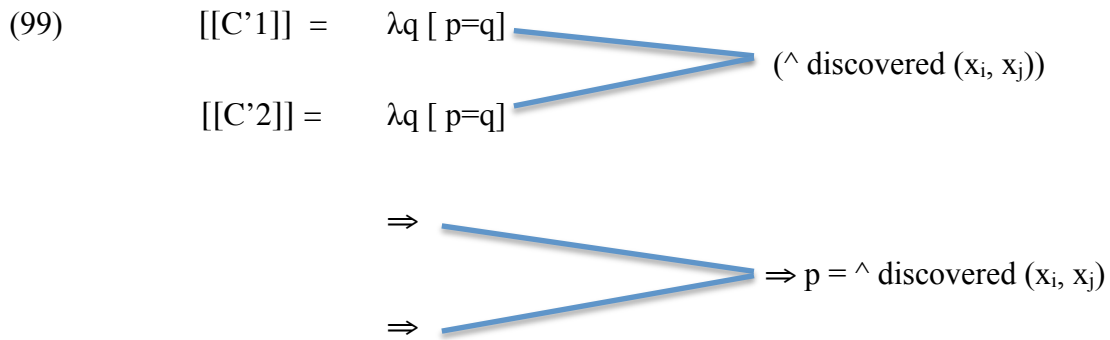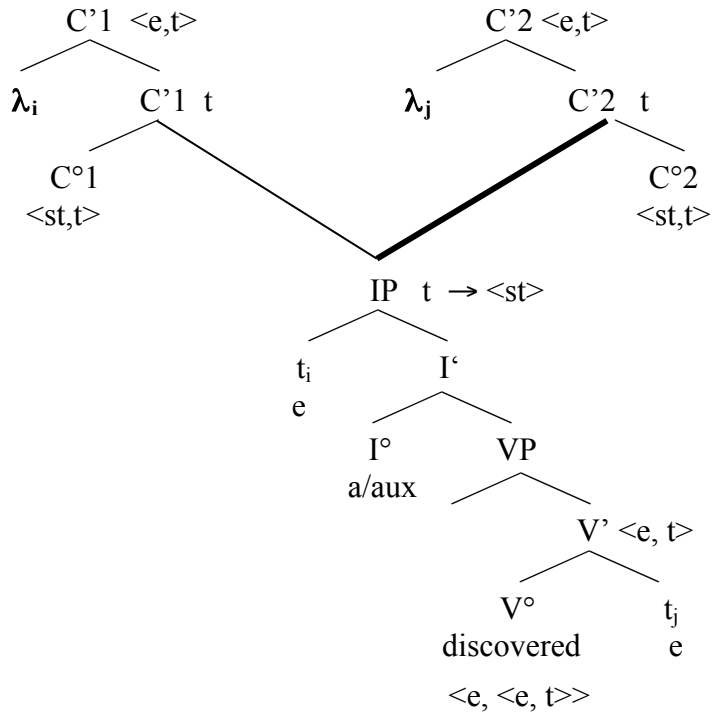
(92)

```
        A         B
       ╱ ╲       ╱ ╲
          ╲     ╱
           C
```

(93)   [C°1 [[IP]   ] C°2]
                      CP1   CP2   CP1   CP2

a. IP
b. CP1   but
c. CP2
d. &P

a. IP
b. [C'1 [IP] C'2]

Constituents with one mother would be interpreted by functional application:

(94)   Functional Application (Heim and Kratzer (1998: 49)

If α is a branching node, {β, γ} is the set of α's daughters, and [[β]] is a function whose domain contains [[γ]], then [[α]] = [[β]]([[γ]]).

Constituents with **two mothers**, should be interpreted by what I call:

(95)   **Simultaneously Functional Application**

If α is a branching node, {β, γ} is the set of α's daughters, and δ is a branching node, {β, φ} is the set of δ 's daughters and

    i. [[γ]] and [[δ]] are functions whose domain contains [[β]] and
    ii. neither α dominates δ, nor δ dominates α, then

    iii. [[α]] = [[γ]]

        ([[β]]

    [[δ]] = [[φ]]

Note: the formula above in (95 iii) is not equivalent to what is expressed in (96):

(96)   [[α]] **=** [[ɣ]] (([[**β**]])

       [[δ]] = [[φ]] (([[**β**]]) (this would send us back to the initial problem

       where each of the conjunct contains a free variable

(97)   Cine   şi   ce   **a**   **descoperit** ?
       who   and   what   aux   discover
       Literally: 'Who and what discovered?'

(98)

Consider now the level where the IP is shared, namely C'1 and C'2: by PAF, C°1 and C°2 are simultaneously applied to IP :

(99) $[[C'1]] = \lambda q\,[\,p=q]$

                                    $(\wedge \text{ discovered }(x_i, x_j))$

       $[[C'2]] = \lambda q\,[\,p=q]$

          $\Rightarrow$

                                      $\Rightarrow p = {}^\wedge \text{ discovered }(x_i, x_j)$

          $\Rightarrow$

The next constituent – the level where lambda abstractions takes place – the two variables are abstracted aver simultaneously:

(100)

C'1 <e,t>

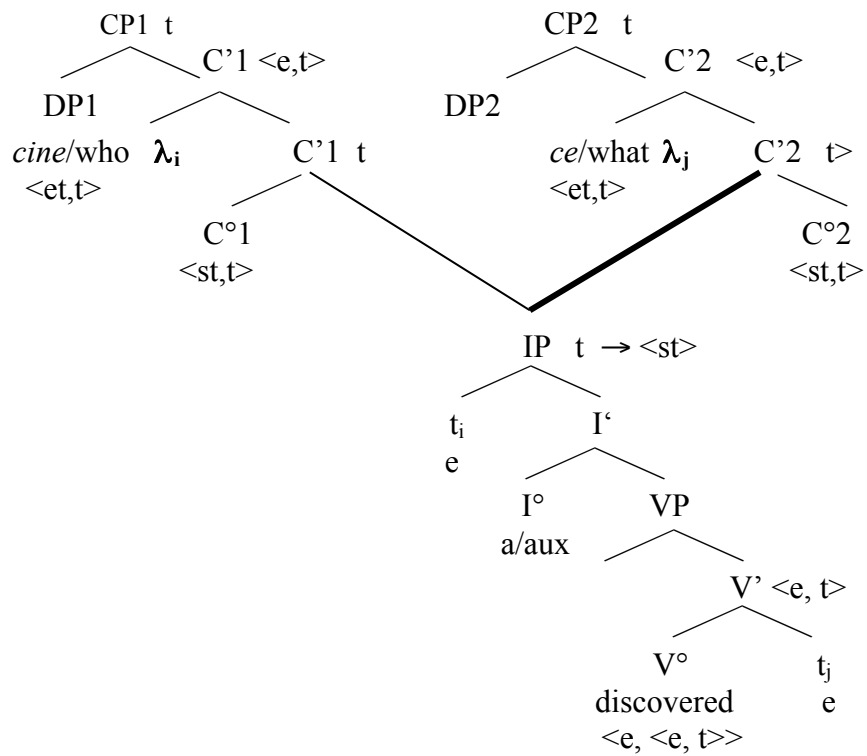λ_i   C'1 t

C°1
<st,t>

C'2 <e,t>

λ_j   C'2 t

C°2
<st,t>

IP   t → <st>

t_i   I'
e

I°   VP
a/aux

V' <e, t>

V°   t_j
discovered   e
<e, <e, t>>

$[[C'1]] = \lambda x_i$

$[p = \wedge \text{ discovered } (x_i, x_j)]$

$[[C'2]] = \lambda x_j$

(101)

CP1 t

C'1 <e,t>

DP1

cine/who λ_i   C'1 t
<et,t>

C°1
<st,t>

CP2 t

C'2 <e,t>

DP2

ce/what λ_j   C'2 t>
<et,t>

C°2
<st,t>

IP   t → <st>

t_i   I'
e

I°   VP
a/aux

V' <e, t>

V°   t_j
discovered   e
<e, <e, t>>

a. $[[CP1]] = \lambda Q \,\exists y \,[human \,(y) \wedge Q(y)]\, (\lambda x_i$

$[p = {^\wedge} discovered \,(x_i, x_j)])$

$[[CP2]] = \lambda Q \,\exists z \,[thing \,(z) \wedge Q(z)]\, (\lambda x_j$

b. $\Rightarrow \exists y \,[human \,(y) \wedge \lambda x_i$

$[p = {^\wedge} discovered \,(x_i, x_j]\, (y)\, (z)]$

$\Rightarrow \exists z \,[thing \,(z) \wedge \lambda x_j$

c. $\Rightarrow \exists y \,[human \,(y) \wedge$

$[p = {^\wedge} discovered \,(y, z)]$

$\Rightarrow \exists z \,[thing \,(z) \wedge$

(102)

```
                    &P <st, t>
                  /          \
               λp            &P   t
                             /  \
                          /    &'  <t,t>
                       /       /  \
                  CP1  t     &°     CP2   t
                            și/et
                          <t,<t,t>>
```
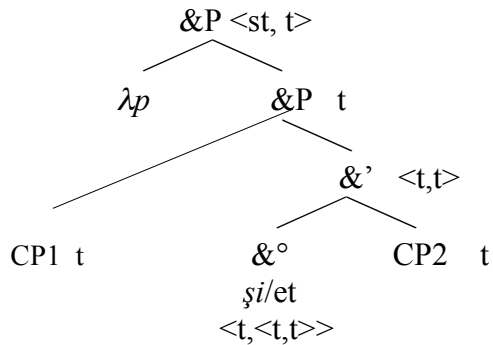
(103) $[[Conj°]] = \lambda P \,\lambda Q \,[P \wedge Q]$

(104) $[[Conj']] = \lambda P \,\lambda Q \,[Q \wedge P]\, (\exists z \,[thing \,(z) \wedge p = {^\wedge} discovered \,(y, z)])$

$\Rightarrow \lambda Q \,[Q \wedge \exists z \,[thing \,(z) \wedge p = {^\wedge} discovered \,(y, z)]]$

(105) $[[ConjP1]] = \lambda Q \,[Q \wedge \exists z \,[thing \,(z) \wedge p = {^\wedge} discovered \,(y, z)]]\; (\exists y \,[human$

$(y) \wedge p = {^\wedge} discovered \,(y, z)])$

$\Rightarrow \exists y \,[human \,(y) \wedge p = {^\wedge} discovered \,(y, z)] \wedge \exists z \,[thing \,(z) \wedge p$

$= {^\wedge} discovered \,(y, z)]$

$\Rightarrow \exists y \,\exists z \,[human \,(y) \wedge thing \,(z) \wedge p = {^\wedge} discovered \,(y, z)]$

(106) $[[ConjP]] = \boldsymbol{\lambda p}\, \exists y \,\exists z \,[human \,(y) \wedge thing \,(z) \wedge p = {^\wedge} discovered \,(y, z)]$ [7]

Appendix:

Coordinated question:

(107) a.   Cine   si   ce   a   descoperit ?
               who   si   what   aux   discovered
               Who discovered what ?

       b.   Filip a descoperit carbune.   **SP**
               "Filip discovered coal"

       c.   Filip a descoerit carbune si petrol.
               "Filip discovered coal and oil."

       d.   Filip a descoperit carbune si Gabi a descoperitpetrol.   **PL**
                "Filip discovered coal and Gabi discovered oil."

Multiple (non coordinated) questions:

(108) a.   Cine   ce   a   descoperit ?
               who   what   aux   discovered
               Who discovered what ?

       b.   #Filip a descoperit carbune.
               "Filip discovered coal"

       c.   #Filip a descoerit carbune si petrol.
                "Filip discovered coal and oil."

       d.   Filip a descoperit carbune si Gabi a descoperit petrol.   **PL**
                "Filip discovered coal and Gabi discovered oil."

- adopting a functional analysis[8] of multiple questions (Dayal (1996) and Hornstein (1995)) - there is a syntactic relation wich establishes a functional dependency - each member of the domain (subject term) must be paired with one member of the range (object term) (the domain must be exhausted) – the answerhood operator pikcs out the unique proposition in the set that entails all the other true propositions: only one proposition will be true and it will be something like "*Filip discovered coal and Gabi discovered oil.*"
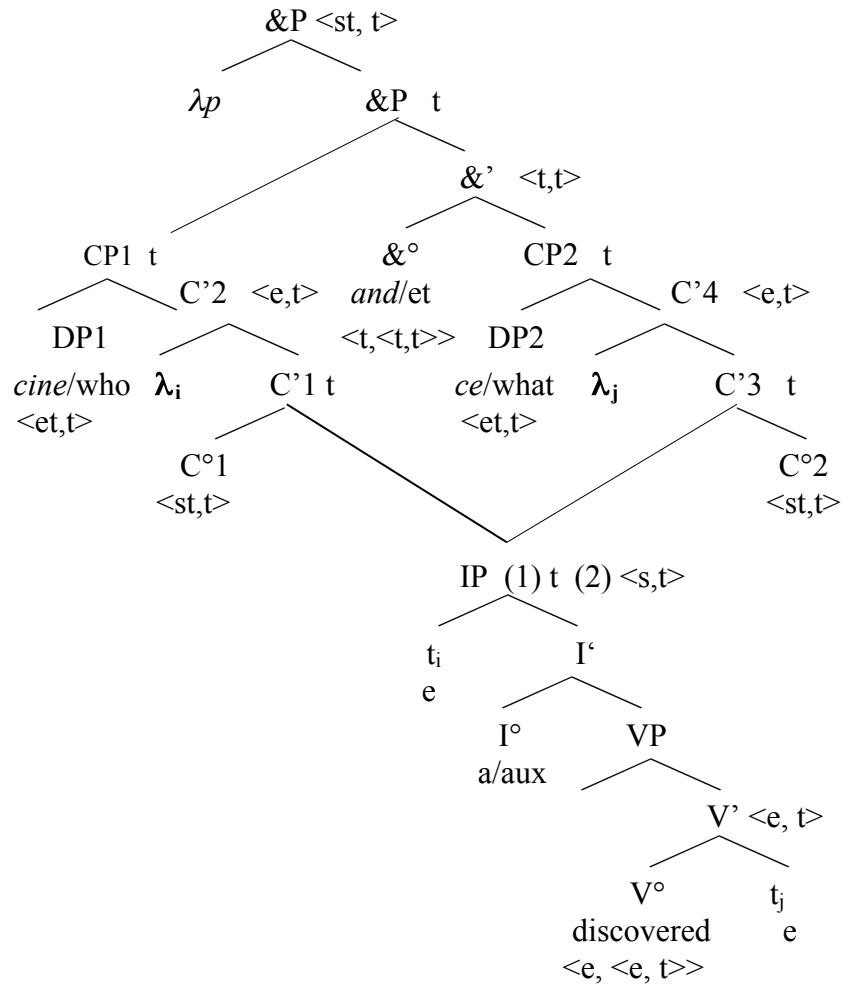
- C° is ambiguous: functional C°/normal C°

---

[8] The ordering restrictions in Romanian non coordinated multiple questions follow from the assumption that multiple questions involve a functional trace (whose pronominal argument is subject to the principle governing WCO).

(109)

&P <st, t>

λp &P   t

&'   <t,t>

CP1   t   &°   CP2   t

C'2   <e,t>   *and*/et   C'4   <e,t>

DP1   <t,<t,t>>   DP2

cine/who λ_i C'1 t   *ce*/what λ_j C'3   t
<et,t>   <et,t>

C°1   C°2
<st,t>   <st,t>

IP   (1) t   (2) <s,t>

t_i I'
e

I°   VP
a/aux

V' <e, t>

V° t_j
discovered   e
<e, <e, t>>

- the multidominant structure does not allow to establish the kind of functional dependency that would lead to a pair list answer (in non coordinated questions)

- however, lists in coordinated questions can come from the fact that WHs can denote plural individuals; this can be expressed as a pair-list: contrary to multiple non-coordinated questions: i) the domain need not be exhausted ii) one individual could in principle discover more than with one things in conjoined questions (85c).

References

Bacrach, Asaf and Roni Katzir. 2008. Right node raising and delayed spellout. In *Interphases: Phase theoretic investigations of linguistic interfaces*, ed. K. Grohmann (ed.). Oxford: Oxford University Press. *pp. 283-316.*

Citko, B. & Gacanin, M. 2009. Ways of WH Coordination. Talk given at *NELS 40*, November 13-15, MIT.

Citko, B & Gracanin, M. 2010. Multiple Guises of Multiple Coordinated WH-Questions. Talk given at *84th LSA Annual Meeting*, Baltimore Maryland.

Chierchia, G. (1993). Questions with quantifiers. *Natural Language Semantics* 1/2, *pp* 181-234.

Comorovski, I. (1989). *Discourse and the syntax of multiple constituent questions*. Diss., Cornell University.

Chung, S., W, Ladusaw. and J, McCloskey. (1995). Sluicing and logical form. *NLS 3*: *pp* 239-282.

Dayal, V. 2006. On Multiple Wh-Fronting. In Martin Everaert and Henk van Riemsdijk (eds.), The Syntax Companion.

Giannakidou, A and J. Merchant. 1998. Reverse sluicing in English and Greek. Linguistic Review 15: 233-256.

Gracanin-Yuksek, M. 2007. About sharing. Doctoral dissertation, MIT.

Gribanova, L. 2007. Structural Adjacency and the Typology if Interrogative. *Linguistic Inquiry 40*.

Haida A and S. Repp 2009. Monoclausal Question Word Coordination Across Languages. Talk given at *Minimalist Approaches to Syntactic Locality (MASL),* Conference, Hungarian Academy of Sciences, Research Institute for Linguistics, Budapest: August 2009.

Kazenin, K. 2002. *On Coordination of Wh-Phrases in Russian*. Ms, Tubingen University and Moscow State University.

Kilashchuk, M. 2007. Proceedings of the 2007 Annual Conference of the Canadian Linguistics Association. Université Western Ontario.

Merchant, J. 2001. The syntax of silence. Sluicing, islands, and the theory of ellipsis. Oxford: Oxford University Press.

Merchant, J. 2007. Spurious coordination in Vlach multiple wh-fronting. MALC Handout. http://home.uchicago.edu/~merchant/pubs/MALC.handout.pdf

Skrabalova, H. 2006. Parataxe apparente et coordination des interrogatifs en tchèque. In : Bril, I. & Rebuschi, G. (eds.), Coordination et subordination; typologie et modélisation. Faits de Langue 28. Paris : Ophrys

Tomaszewicz, B. 2010. Against spurious coordination in multiple wh-questions. Talk given at *WCCFL XXVIII*, University of Southern California.

Wilder, C. 1999. Right node raising and the LCA. In *Proceedings of 19the West Coast Conference on Formal Linguistics (WCCFL 18)*, ed. Sonya Bird et al., 586-598. Somerville Mass.: Cascadilla Press.

Zhang, N. 2007. Derivations of two paired dependency constructions. *Lingua 117 (12)* : 2134-2157.

De Vries, M. 2007. Internal and External Remerge. On Movement, Multidominance, and Linearisation of Syntactic Objects. Unpublished manuscript. University of Groningen