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  și  ce  a  cumpărăt  ?
     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  și  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 structures, 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); \textit{sideward movement} (Zhang 2007, Haida&Repp 2007))

(3) Cine și ce a cumpărat?
who and what aux bought
Literally: ‘Who and what bought?’

(4) \begin{align*}
\text{CP} & \quad \text{[Romanian](Comorovski, 1996)} \\
\&P & \quad IP \\
\text{cine/who}_j & \quad \&' \quad t_j \\
\text{și/and} & \quad ce/what_i \\
\text{a/aux} & \quad V' \\
\text{V°} & \quad t_i \\
\text{cumpărat/bought} & \quad \end{align*}

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):

\textbf{Coordinated question:}

(5) Cine ș i ce a cumpărat ?
who and what aux bought
Literally: ‘Who and what bought?’

\textbf{Non-coordinated (multiple) question:}

(6) Cine ce a cumpărat ?
who what aux bought
‘Who bought what?’

\textbf{Problem 1}

\textbf{Violation of the Law of the Coordination of Likes (Williams 1981)}:

(7) *Filip și o chitară a cumpărat.
Filip and art guitar aux bought
Literally: ‘Filip and a guitar bought.’

(8) *FILIP și 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 și ce a cumpărat?
   who and what aux bought
   Literally: ‘Who and what bought?’

(10) Ce și cine a cumpărat?
    what and who aux bought
    Literally: ‘What and who bought?’

Non-coordinated questions - ordering restrictions¹

(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 și 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 Bicausal 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 ușă?
     oare who knocks prep. door
  ‘Who’s knocking at the door?’

(20) Cine *(oare)* bate la ușă?

(21) Cine bate la ușă *(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 și 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 și ce a cumpărat ?
oare who and what aux bought

(26) Cine *(oare) și ce a cumpărat ?

(27) Cine și ce *(oare) a cumpărat ?

(28) Cine și 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 și oare ce a cumpărat ?
oare who and oare what aux bought
Literally: ‘Who and what bought?’

(34) Cine oare și 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


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

⇒ CLM (1995): 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, \([\text{John ate a dinner}]_i\).

(38) John ate a dinner but I don’t know with whom, \([\text{John ate a dinner}]_i\).

\[\text{Sprout/add the adjunct trace}\]

\(\textbf{Sprout/add the adjunct trace}\)

\(\)\(^3\) 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 câ c um si, mai important, câine ar putea sa-l dea jos pe B ase s cu. not see how and, most importantly, who could overthrow SUBJ Bas escu ACC « I don’t see how, and most importantly, who could overthrow B ascu ».

Moreover, they show that it is possible to coordinate the yes/no marker dac a ‘if’ and a Wh-phrase :

ii. RATB si Metrorex vor anunt, a vineri dac a si când intra in 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.

\(\)\(^4\) Copy+merger:

i. Jack bought something but I don’t know what

ii. Jack bought something but I don’t know what, \([\text{Jack bought something}]_i\).
Giannakidou and Merchant (1995) : 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 t_i.
(41) It is not clear if 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_i < ] [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_i < [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):

\[(45)\]

\[
\text{CP1} \quad \& \quad \text{CP2} \\
\text{who} \quad \text{C'} \quad \&^\circ \quad \text{IP} \quad \text{what} \quad \text{C'} \\
\text{I}^\circ \quad \text{IP} \quad \text{pro} \quad \text{I} \\
\text{V}^\circ \quad \text{I}^\circ \quad \text{VP} \\
\text{V}^\circ \quad \text{discover} \quad \text{NP} \quad \text{indef pro} \\
\text{V}^\circ \quad \text{discover} \quad \text{NP} \quad \text{t}_j
\]

\[(46)\] a. *Cine și ce a descoperit?*  
who end what aux discovered  
Literally: ‘Who and what discovered?’

\[(47)\]  
\text{*b. Interpretation:*}  «\(\lambda p \exists y \exists z [\text{human (y)} \land \text{thing (z)} \land p = ^\wedge \text{discovered (y, z)}]\)»

\text{*c. Answer:*} «Filip discovered coal.»

\[\text{Problem 2:}\]

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

\[(48)\]  
\text{*a. Interpretation:*} «"Who discovered something and what did someone discover? “

\text{*b. Answer:*} # “Filip discovered something 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 only 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 \(<\text{the police arrested the demonstrators}>\) 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 \(<\text{the police arrested the demonstrators}>\) ?

- **Ellipsis in the first conjunct = ok**

    (50) a. SS: Cînd și unde vei cânta?
      when and where aux.II.SG sing
      ‘When and where will you sing?’
    
      LF: Cînd \(<\text{vei cânta}>\) și unde [IP vei cânta]?
      when aux.II.SG sing and where aux.II.SG sing

    **Ellipsis in the second conjunct = ok**

    b. SS: Cînd vei cânta și unde?
      where aux.II.SG sing and where
      ‘When will you sing and where?’
    
    b. LF: Cînd [IP vei cânta] și unde \(<\text{vei cânta}>\) ?
      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 pair with non-selected coordinate questions in Romanian and in English). The expectation is not borne 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. Când <ellipsis> şi unde vei cânta?  
when and where aux.II.SG sing  
“When and where will you sing?”

b. Când vei cânta şi unde vei cânta?  
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, then 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> și ce a descoperit?
who and and what aux discover

Literally: ‘Who and what discovered?’

b. *Cine a descoperit și 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:

<table>
<thead>
<tr>
<th>Why does ellipsis necessarily targets the first conjunct - the IP can only be pronounced in the second conjunct?</th>
</tr>
</thead>
<tbody>
<tr>
<td>and</td>
</tr>
<tr>
<td>Why is ellipsis is obligatory - the IP can only be pronounced once?</td>
</tr>
</tbody>
</table>

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 _can only be pronounced once and it has to be pronounce in the second conjunct_.

The selected coordinated question in (57) is derived from the conjunction of two CPs, which share the (same) IP:

(56) Cine (oare) și ce (oare) a descoperit?
Who _oare_ and what _oare_ aux discover

Literally: ‘Who and what discovered?’
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, Kayne (1994):
- precedence is a relation defined only for terminals of the trees: the LCA = an algorithm of PF component that linearises terminals of dominance-only 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) \(d(X) = \text{the (unordered) set of terminals fully dominated by } X\)
(63) \(X \text{ fully dominates } \alpha \iff X \text{ dominates } \alpha \text{ and } X \text{ does not share } \alpha.\)
(64) \(\alpha \text{ is shared by } X \text{ and } Y \iff a) \text{ neither of } X \text{ and } Y \text{ dominates the other and } b) \text{ both } X \text{ and } Y \text{ dominates } \alpha. \) (Wilder 1999)
(65) \(C\text{-command: } X \text{ c-command } Y \text{ only if } X \text{ does not fully dominate } Y. \) (Wilder, 1994)

Wilder (1994) replaces the notion of dominance (in the LCA) with the notion of full dominance 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 şì 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 \(T\)
\((T \text{ is the set of all terminal elements, } d \text{ is the set of ordered pairs of non-terminals, where the first member c-commands the second; } d(A) \text{ is the set of terminals dominated by } A \text{ (Kayne 1994).})\)

C-command: \(X \text{ c-command } Y \iff i) \ X \# Y, \ ii) \ X \text{ does not dominate } Y, \ iii) \ Y \text{ does not dominate } X \text{ and } iv) \text{ all categories that dominate } X \text{ dominate } Y\)

Asymmetric c-command: \(X \text{ asymmetrically c-command } Y \text{ if } X \text{ c-command } Y \text{ and } Y \text{ does not c-command } X \) (Kayne 1994).
Based on asymmetric c-command, linearization within the shared node IP is (trivial):

(68)  \( \text{aux} < \text{discover} \)

**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)  \( \text{who} < \text{oare} 1 \)

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

(70)  \( \text{and} < \text{what} < \text{oare} 2 \)

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)  \( \text{who} < \text{oare} 1 < \text{and} < \text{what} < \text{oare} 2 < [\text{IP} [\text{aux} < \text{discover}]] \)
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 și ce a descoperit?

who and what aux discover

Literally: ‘Who and what discovered?’

\[
\begin{array}{c}
\text{IP} \quad t \Rightarrow <s,t> \\
t_i \quad e \\
\lambda \quad I' \\
\lambda \quad I^o \quad \text{VP} \\
\lambda \quad \text{a/aux} \\
\lambda \quad V' <e,t> \\
\lambda \quad V^o \quad t_j \\
\lambda \quad découvert \\
\lambda \quad e
\end{array}
\]

(73) 

\[
[[\text{IP}]] = \lambda q[p=q]
\]

\[
[[\text{C}^1]] = \lambda q[p=q](\lambda x_i[p = \wedge \text{discovered}(x_i, x_j)])
\Rightarrow p = \wedge \text{discovered}(x_i, x_j)
\Rightarrow \lambda x_i[p = \wedge \text{discovered}(x_i, x_j)]
\]

\[
[[\text{DP1}]] = \lambda Q \exists y [\text{human}(y) \land Q(y)]
\]

\[
[[\text{CP1}]] = \lambda Q \exists y [\text{human}(y) \land Q(y)] (\lambda x_i[p = \wedge \text{discovered}(x_i, x_j)])
\Rightarrow \exists y [\text{human}(y) \land \lambda x_i[p = \wedge \text{discovered}(x_i, x_j)](y)]
\Rightarrow \exists y [\text{human}(y) \land p = \wedge \text{discovered}(y, x_j)]
\]
Problem:
- the first conjunct (CP1) contains a free variable, \( x_j \), created by the movement of the object ce/what into the Spec CP2:

\[
(76) \quad \begin{array}{c}
\text{CP1} \\
\text{DP1} \\
cine/\text{who} \\
\lambda_i \\
\text{C'}1 \\
\text{C'}2 \\
\lambda_j \\
\text{C'}3 \\
\text{C'}4 \\
\text{IP} \\
x_i \\
\text{I'} \\
\text{I}° \\
\text{aux} \\
\text{VP} \\
\text{V'} \\
\text{V}° \\
x_j \\
discovered
\end{array}
\]

- conversely, the second conjunct (CP2) contains a free variable, \( x_i \), created by the movement of the subject cine/who into the Spec CP1:

\[
(77) \quad \begin{array}{c}
\text{CP2} \\
\text{t} \\
\text{DP2} \\
ce/\text{what} \\
\lambda_j \\
\text{C'}1 \\
\text{C'}2 \\
\text{IP} \\
x_i \\
\text{I'} \\
\text{I}° \\
\text{aux} \\
\text{VP} \\
\text{V'} \\
\text{V}° \\
x_j \\
discovered
\end{array}
\]

\[
(78) \quad [[\text{C'}2]] = \lambda q \ [p = q]
\]
\[
(79) \quad [[\text{C'}]] = \lambda q \ [p = q] (\wedge \text{discovered} \ (x_i, x_j))
\quad \Rightarrow p = \wedge \text{discovered} \ (x_i, x_j)
\quad \Rightarrow \lambda x_j \ [p = \wedge \text{discovered} \ (x_i, x_j)]
\]

\[
(80) \quad [[\text{DP2}]] = \lambda Q \ \exists z \ [\text{thing} \ (z) \wedge Q(z)]
\]
\[
(81) \quad [[\text{CP2}]] = \lambda Q \ \exists z \ [\text{thing} \ (z) \wedge Q(z)] \ (\lambda x_j \ [p = \wedge \text{discovered} \ (x_i, x_j)](z))
\quad \Rightarrow \exists z \ [\text{thing} \ (z) \wedge \lambda x_j \ [p = \wedge \text{discovered} \ (x_i, x_j)](z)]
\quad \Rightarrow \exists z \ [\text{thing} \ (z) \wedge p = \wedge \text{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  și  ce  a descoperit?
who end  what  aux  discovered

(84)  
a. Interpretation : « 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 Whs 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):

\[
[[\&P1]] = \exists y [\text{human}(y) \land p = ^\text{discovered}(y, x_j)] \land \exists z [\text{thing}(z) \land p = ^\text{discovered} (x_i, z)]
\]

\[
[[\&P1]] = \exists y \forall z [\text{human}(y) \land \text{thing}(z) \land p = ^\text{discovered} (y, z) \land y = x_i \land z = x_j] \\
\Rightarrow \text{human}(x_i) \land \text{thing}(x_j) \land p = ^\text{discovered} (x_i, x_j)
\]

Ratiu (2010): one possible solution to solve our problem is to bind the free variables above the conjunction + existential closure over pairs:

\[
[[\&P2]] = \lambda x_j [\text{human} (x_i) \land \text{thing} (x_j) \land p = ^\text{découvert} (x_i, x_j)
\]

\[
[[\&P3]] = \lambda x_i \lambda x_j [\text{humain} (x_i) \land \text{chose} (x_j) \land p = ^\text{discovered} (x_i, x_j)
\]

\[
[[\&P4]] = \exists y \exists z [\text{human} (y) \land \text{thing} (z) \land p = ^\text{discovered} (y, z)
\]

\[
[[\&P5]] = \lambda p \exists y \exists z [\text{human} (y) \land \text{thing} (z) \land p = ^\text{discovered} (y, z)]
\]
**Problems:**
- the additional abstractions at the top of the tree = is a stipulation

**ellipsis**

(91) a &P

CP1 &'

who_i C' &° and CP2

C° IP

... t_i ... pro indef ... pro .... t_j

⇒ binding problem

**multidominance**

b. &P

CP1 &'

who_i &° CP2

C° IP

what_j ...

⇒ 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

(93) [ C°1 [ IP ] C°2 ]

CP1 CP2 CP1 CP2
Constituents with one mother would be interpreted by functional application:

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

If $\alpha$ is a branching node, $\{\beta, \gamma\}$ is the set of $\alpha$'s daughters, and $[[\beta]]$ is a function whose domain contains $[[\gamma]]$, then $[[\alpha]] = [[\beta]]([[\gamma]])$.

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

(95) Simultaneously Functional Application

If $\alpha$ is a branching node, $\{\beta, \gamma\}$ is the set of $\alpha$'s daughters, and $\delta$ is a branching node, $\{\beta, \varphi\}$ is the set of $\delta$'s daughters and

i. $[[\gamma]]$ and $[[\delta]]$ are functions whose domain contains $[[\beta]]$ and

ii. neither $\alpha$ dominates $\delta$, nor $\delta$ dominates $\alpha$, then

iii. $[[\alpha]] = [[\gamma]]$

$[[\delta]] = [[\varphi]]$

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

(96) $[[\alpha]] = [[\gamma]] (([[\beta]])$

$[[\delta]] = [[\varphi]] (([[\beta]]))$ (this would send us back to the initial problem where each of the conjunct contains a free variable)

(97) Cine și ce a descoperit?
who and what aux discover
Literally: ‘Who and what discovered?’
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:

\[
[[C'1]] = \lambda q \ [p=q] \\
[[C'2]] = \lambda q \ [p=q]
\]

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

The next constituent – the level where lambda abstractions takes place – the two variables are abstracted over simultaneously:
\[(100)\]

\[
\begin{align*}
\lambda_i & \quad C'1 <e,t> \\
C^o1 & \quad <st,t> \\
\lambda_j & \quad C'2 <e,t> \\
C^o2 & \quad <st,t> \\
\end{align*}
\]

\[
\begin{align*}
\text{IP} & \quad t \rightarrow <st> \\
t_i & \quad \text{e} \\
I^* & \\
I^0 & \quad \text{VP} \\
& \quad \text{a/aux} \\
V' & \quad <e,t> \\
& \quad \text{discovered} \quad \text{e} \\
& \quad <e, <e, t>> \\
\end{align*}
\]

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

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

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

\[
(101)
\]

\[
\begin{align*}
\text{CP1} & \quad t \\
\text{DP1} & \quad \text{cine/who} \quad <et,t> \\
\lambda_i & \quad C'1 <e,t> \\
C^o1 & \quad <st,t> \\
\text{CP2} & \quad t \\
\text{DP2} & \quad \text{ce/what} \quad <et,t> \\
\lambda_j & \quad C'2 <e,t> \\
C^o2 & \quad <st,t> \\
\end{align*}
\]

\[
\begin{align*}
\text{IP} & \quad t \rightarrow <st> \\
t_i & \quad \text{e} \\
I^* & \\
I^0 & \quad \text{VP} \\
& \quad \text{a/aux} \\
V' & \quad <e,t> \\
& \quad \text{discovered} \quad \text{e} \\
& \quad <e, <e, t>> \\
\end{align*}
\]
a. \[[\text{CP1}]\] =  \[\lambda Q \exists y \left[ \text{human} (y) \land Q(y) \right] \left( \lambda x_i \left[ p = \wedge \text{discovered} \left( x_i, x_j \right) \right] \right) \]

\[[\text{CP2}]\] =  \[\lambda Q \exists z \left[ \text{thing} (z) \land Q(z) \right] \left( \lambda x_j \left[ p = \wedge \text{discovered} \left( x_i, x_j \right) \right] \right) \]

b.  \[\Rightarrow \exists y \left[ \text{human} (y) \land \lambda x_i \left[ p = \wedge \text{discovered} \left( x_i, x_j \right) \right] \right] \]

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

c.  \[\Rightarrow \exists y \left[ \text{human} (y) \right] \]

\[\Rightarrow \exists z \left[ \text{thing} (z) \right] \]

(102)

\[\begin{array}{c}
\lambda p & \& P <st, t> \\
\& P t \\
\&' \ <t, t> \\
CP1 t \\
\&' \ <t, t> \\
CP2 t \\
\end{array} \]

\[\text{si/et} \]

(103) \[[\text{Conj}^\wedge]\] =  \[\lambda P \lambda Q \left[ P \land Q \right] \]

(104) \[[\text{Conj}']\] =  \[\lambda P \lambda Q \left[ Q \land P \right] \left( \exists z \left[ \text{thing} (z) \land p = \wedge \text{discovered} \left( y, z \right) \right] \right) \]

\[\Rightarrow \lambda Q \left[ Q \land z \left[ \text{thing} (z) \land p = \wedge \text{discovered} \left( y, z \right) \right] \right] \]

(105) \[[\text{ConjP}1]\] =  \[\lambda Q \left[ Q \land z \left[ \text{thing} (z) \land p = \wedge \text{discovered} \left( y, z \right) \right] \right] \left( \exists y \left[ \text{human} \left( y \right) \land p = \wedge \text{discovered} \left( y, z \right) \right] \right) \]

\[\Rightarrow \exists y \left[ \text{human} \left( y \right) \land p = \wedge \text{discovered} \left( y, z \right) \right] \land \exists z \left[ \text{thing} (z) \land p = \wedge \text{discovered} \left( y, z \right) \right] \]

\[\Rightarrow \exists y \exists z \left[ \text{human} (y) \land \text{thing} (z) \land p = \wedge \text{discovered} \left( y, z \right) \right] \]

(106) \[[\text{ConjP}]\] =  \[\lambda p \exists y \exists z \left[ \text{human} (y) \land \text{thing} (z) \land p = \wedge \text{discovered} \left( y, z \right) \right] \]

\[^{7}\] Many thanks to Hamida Demirdache, Veneeta Dayal, Anamaria Falaus, Orin Percus and Guillaume Thomas for their helpful comments and advise.
**Appendix:**

**Coordinated question:**

(107) a. Cine a descoperit?  
Who discovered?

b. Filip a descoperit carbune.  
“Filip discovered coal”

c. Filip a descoperit carbune si petrol.  
“Filip discovered coal and oil.”

d. Filip a descoperit carbune si Gabi a descoperit petrol.  
“Filip discovered coal and Gabi discovered oil.”

**Multiple (non coordinated) questions:**

(108) a. Cine a descoperit?  
Who discovered?

b. #Filip a descoperit carbune.  
“Filip discovered coal”

c. #Filip a descoperit carbune si petrol.  
“Filip discovered coal and oil.”

d. Filip a descoperit carbune si Gabi a descoperit petrol.  
“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 which 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 picks 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\(^o\) is ambiguous: functional C\(^o\)/normal C\(^o\)

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\(^8\) 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)

- 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


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