Wh-clustering and the role of coordination in Italian multiple *wh*-questions.

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Coordinated questions. In Italian, adverbial multiple *wh*-questions require coordination (Moro 2011). Specifically, there are two different types of coordinated multiple *wh*-questions:

(1)   a.   Vorrei   sapere dove   *(e) come hanno   mangiato.
              Want.COND.1SG know   where   and how   have.3SG eaten
       b.   Vorrei   sapere dove   hanno   mangiato *(e) come.
              Want.COND.1SG know   where   have.3SG eaten   and how.
              I would like to know where did they eat and how.

We refer to the first type as *high coordinated wh-questions* (1a) and to the second type as *low coordinated wh-questions* (1b). Existing analyses for these kinds of structures can be distinguished into *bi-clausal* and *mono-clausal*.

Bi-clausal analyses. In bi-clausal analyses the *wh*-phrases belong to different clauses. Both *high* and *low coordinated wh-questions* can be derived by means of the coordination of two separate clauses and the ellipsis of one of the two conjuncts (Browne 1972, Gracanin-Yuksek & Citko 2010, Tomaszewicz 2011a,b):

(2)   a.   [CoordP [CP wh1[TP ... t1...]] & [CP wh2 [TP ...t1...]]]
       b.   [CoordP [CP wh1[TP ... t1...]] & [CP wh2 [TP ...t2...]]]

Mono-clausal analyses. In mono-clausal analyses the *wh*-phrases are moved from the same clause. As for *high coordinated wh-questions*, Merchant 2007 and Gribanova 2009 proposed that the coordination is inserted between the *wh*-phrases after they have moved to CP, as in (3). As for *low coordination wh-questions*, Moro (2011) proposed that a coordinative head is merged above the moved *wh*-phrases, causing CP-splitting and subsequent remnant movement of the lower clausal constituent, as in (4):

(3) a. [CP wh1 wh2 [TP ... t1 ... t2 ...]]]   (4) a. [CP wh1 [TP ... t1... wh2 ...]]
    b. [CP [CoordP wh1 & wh2] [TP ...t1...t2...]]]   b. [CP wh2 [CP wh1 [TP ...t1...t2...]]]
                                                            c. [CoordP & [CP wh2 [CP wh1 [TP ...t1...t2...]]]]
                                                            d. [CoordP[CP wh1 [TP...t1...t2...]]k [& [CP wh2 tk]]]

New data. Italian coordinated *wh*-questions display the following previously unnoticed properties: **[A]** *high coordinated questions* disallow reason/purpose *wh*-phrases (5a), while *low coordinated wh-questions* do not (5b)**; [B]** *high coordinated wh-questions* forbid the co-occurrence of argument and adjunct *wh*-phrases (6a), while *low coordinated wh-questions* do not (6b) **[C]** *high coordinated questions* allow for more than two *wh*-phrases (7a), whereas *low coordinated wh-questions* do not (7b):

(5)   a.   *Vorrei   sapere perché e   dove   avete   mangiato.
              Want.COND.1SG know   why   and where have.3PL   eaten
       b.   Vorrei   sapere dove avete   mangiato e   perché.
              Want.COND.1SG know   where have.3PL eaten   and why
(6)   a.   *Vorrei   sapere cosa e dove   avete   mangiato.
              Want.COND.1SG know   what and where have.3PL   eaten
       b.   Vorrei   sapere   cosa ha   mangiato e   dove.
              Want.COND.1SG know   what have.3PL eaten   and   where
(7)   a.   Vorrei   sapere come, quando e   dove avete   mangiato.
              Want.COND.1SG know   how, when   and where have.3PL eaten
       b.   *Vorrei   sapere come avete mangiato quando e   dove.

<div align="center">Want.COND.1SG know   how have.3PL eaten   when and where</div>

The complex behaviour illustrated in [A-C] comes unexpected under the current accounts. In particular, both mono-clausal analyses fail to predict the restrictions on the occurrence of reason/purpose *wh*-phrases and the restrictions on the co-occurrence of argument and adjunct *wh*-phrases in *high coordinated wh-questions* [5a;6a]. Additionally, bi-clausal accounts also fail to predict the ban on the occurrence of more than two *wh*-phrases in *low coordinated wh-questions* [7b]. **The proposal.** We propose that Italian *high coordinated wh-questions* are derived by means of an additional mechanism for multiple question formation: *Wh*-Clustering. According to this proposal, coordination is used to build a complex interrogative projection (henceforth, a **Wh-Cluster**) before entering the clausal derivation (8a); than, the *Wh*-Cluster enters the clausal derivation. Crucially, the instructions about the first-merge position of the *Wh*-Cluster are determined by the selectional properties of the elements contained in the *Wh*-Cluster (e.g. Wh-*clusters* containing Manner/Place/Time *wh*-phrases are merged below the VP [see Chomsky 1995, Bowers 2010]) (8b); finally, the *Wh*-Cluster is moved (pied-piped) to the CP, to check the interrogative features of the element it contains:

(8)   a. $[_{CoordP}$ Wh1$[_{CoordP}$ & [Wh2]]]   Build the *Wh*-Cluster
      b.   [TP [VP **[$_{CoordP}$ Wh1[$_{CoordP}$ & [Wh2]]]**]]]   Merge the *Wh*-Cluster
      c.   [CP **[$_{CoordP}$ Wh1[$_{CoordP}$ & [Wh2]]]**$_k$ [TP [VP t$_k$]]]   Move the *Wh*-Cluster to the CP

Deriving [A]. Adverbial *wh*-phrases and reason/purpose *wh*-phrases are first-merged in two different positions. In particular, *reason/purpose wh*-phrases are merged directly in the CP (Rizzi 2001). We claim that these kind of *wh*-phrases cannot be clustered together, because the resulting instruction about the first-merge position of the *wh*-cluster would be ambiguous. **Deriving [B].** For the same reason, argument and adjunct *wh*-phrases cannot co-occur in the same *Wh*-Cluster, since they are first-merged in different positions. Also in this case, the resulting *Wh*-Cluster would receive ambiguous instructions about its first-merge position. **Deriving [C].** The ban on the occurrence of more than two *wh*-phrases in *low coordinated wh-questions* can be accounted for assuming the derivation in (4). Given this, it is impossible to derive the order in (7b):

(9)   a. $[_{CP}$ wh1 [$_{TP}$ ... t1... wh2 ...wh3]]
         b. $[_{CP}$ wh3 $[_{CP}$ wh2 $[_{CP}$ wh1 $[_{TP}$ ...t1...t2...t3]]]]
         c. $[_{CoordP}$ **&** $[_{CP}$ wh3 $[_{CP}$ wh2 $[_{CP}$ wh1 $[_{TP}$ ...t1...t2...]]]]]]
         d. $[_{CoordP}$ $[_{CP}$ wh1 $[_{TP}$...t1...t2...]]$_k$ **[&**$[_{CP}$ wh3 $[_{CP}$ wh2 t$_k$]]]]
         e. $[_{CoordP}$ **&** $[_{CoordP}[_{CP}$ wh1 $[_{TP}$...t1...t2...]]$_k$ **[&**$[_{CP}$ wh3 $[_{CP}$ wh2 t$_k$]]]]]]
         f. $[_{CoordP}$ $[_{CP}$ wh2 t$_k$]$_j$ $[_{CoordP}$ **&** $[_{CoordP}[_{CP}$ wh1 $[_{TP}$...t1...t2...]]$_k$ **[&**$[_{CP}$ wh3 t$_j$]]]]]

On the other hand, since nothing forbids to built a *Wh*-Cluster containing more than two *wh*-phrases, *high coordinated questions* with more than two *wh*-phrases are allowed.

Conclusion. In this paper, after discussing some previously unnoticed properties of coordinated multiple *wh*-questions in Italian, we proposed a new mechanism for multiple *wh*-questions formation. The whole pattern of data can be explained assuming two possible derivations: *low coordinated wh-questions* are derived *via* CP-splitting and subsequent remnant movement (Moro 2011), while *high coordinated wh-questions* are derived *via Wh*-Clustering. A crucial requirement on *Wh*-Clusters is that they obtain the instructions about their first-merge position from the selectional properties of the elements that they contain. We also argue that Italian is not a genuine multiple *wh*-fronting language and that both these derivations can be regarded as strategies to circumvent the ban on multiple interrogative projections in the Italian left-periphery (Rizzi 1997).

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