

## Wh&wh coordinations

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### ABSTRACT

The paper examines wh&wh coordinations (wh&wh), arguing that what makes them possible in a language is not the availability of multiple wh-fronting (MWF), as previously assumed, but the availability of an indeterminate system. Such coordinations are argued to involve derivational coordination formation via sideward merger where the affected elements undergo movement before coordination formation, sideward merger being disallowed from interpreted positions. The derivationally formed coordination undergoes movement upon insertion into the structure. The account captures a clause-mate requirement and ordering constraints on elements involved in wh&wh, as well as a single-pair reading restriction. A typological prediction is that since both MWF and wh&wh depend on the availability of an indeterminate system, but in different ways, there should be a good deal of overlap between MWF languages and languages allowing wh&wh but there should still be languages that allow wh&wh but not MWF, which is borne out.

**KEYWORDS** coordination · indeterminates · multiple wh-fronting · quantifiers · sideward merger · superiority · typology

### 1 INTRODUCTION

The goal of this paper is to examine wh&wh coordinations like Bulgarian and Serbo-Croatian (1)-(2), in an attempt to shed light on a broader question, what is needed to make such coordinations possible in a language. In the attempt to answer that question, the paper will also establish several restrictions on such coordinations.

- (1) Koj i kakvo e kupil?  
who and what is bought  
'Who bought what?' (Bulgarian)
- (2) Ko i šta kupuje?  
who and what is-buying  
'Who is buying what?' (Serbo-Croatian/SC)

A precise derivation of such constructions will be proposed which involves derivational coordination formation, where the coordination structure is formed during the derivation, which accounts for a number of restrictions on wh&wh coordinations and more generally, derivational coordination formation noted in the paper. Based on another construction that involves derivational coordination formation, the paper will establish a typology of such coordinations as well as establish a typological prerequisite a language needs to allow wh&wh coordinations, which partially, but not fully, correlates with a typological prerequisite for multiple wh-fronting.

There are many works on wh&wh coordinations in Slavic. Since their analysis is closest to what will be argued for in this paper and because they address the larger question this paper is concerned with, what is needed to make such coordinations possible in a language, I will discuss here only one previous work, namely Citko & Gračanin-Yuksek (2013) (CG). CG argue constructions like (3) cross-linguistically can involve either larger (i.e. clausal) coordination, where only the wh-phrase is realized in the first conjunct, or coordination of wh-phrases. Bulgarian (1) involves wh&wh coordination while English

(3) involves clausal coordination, with the first conjunct a clause that undergoes ellipsis.<sup>1</sup>

(3) What and where did you eat?

One argument to this effect concerns the fact that in English, it is not possible to have obligatory arguments in such coordinations (see (4); (1) is also disallowed in English, which quite generally bans such coordinations involving subject wh-phrases, see Browne (1972)). This follows under the clausal coordination analysis, where (3) involves coordination of two clauses, *what did you eat and where did you eat?*

(4) \*What and where did you buy?

(1) then indicates that in Bulgarian, we are dealing with wh&wh rather than clausal coordination. What is also important here is that it is not possible to coordinate a subject and an object of the same clause; this means (1) cannot involve base coordination which then undergoes movement: the coordination can only be formed outside the base positions (see also Zhang (2007); I return to this issue below).

CG also note that wh-DP external material can occur within the relevant ConjP in English, as in *what did Peter and why did Peter eat*, which is not possible in Bulgarian.

Turning to SC, SC allows both obligatory arguments and DP-external material in the coordinations in question (5), which means SC allows both wh&wh and larger clausal coordination.

(5) Ko je i šta je kupio?  
who is and what is bought  
'Who bought what?' (SC)

In the next section, I will discuss an argument CG give that also addresses the broader question regarding the crosslinguistic availability of wh&wh coordinations noted at the beginning of this paper.<sup>2</sup>

## 2 SUPERIORITY/ORDERING EFFECTS

As another argument for the wh&wh coordination account of (1), CG observe that Bulgarian wh&wh coordinations show superiority effects. They argue that this would not be expected if (6) involves coordination of two clauses, where each clause would have only one wh-phrase.

(6) a. Koj i kakvo e kupil?  
who and what is bought  
'Who bought what?' (Bulgarian)  
b. \*Kakvo i koj e kupil?

<sup>1</sup>For different clausal coordination approaches to (3) see also Giannakidou & Merchant (1998) and Larson (2012); see also Potter & Frazier (2021) for an opposing view (see also Browne 1972 and Grosu 1987 for earlier discussions of English examples like (3)). This paper will focus on (1)-(2).

<sup>2</sup>While the paper is crosslinguistic in nature, most of the data come from SC. The judgements for the data not cited from the literature are the author's, with each data point confirmed by additional speakers of the Bosnian variety of SC. Judgments reported in the previous literature on wh&wh coordinations reveal that there is speaker variation on many aspects of the phenomenon—speaker variation is in fact noted in several places in this work. Language labels should therefore be taken with some caution in any work dealing with wh&wh coordinations—there is no monolith SC, Bulgarian...when it comes to more sophisticated aspects of the phenomenon (prosody is also often not controlled for in the literature, see below). This isn't surprising—this is a classic case of poverty of stimulus, where there is very little basis in the input to acquire more sophisticated aspects of the phenomenon. In the absence of such evidence, speakers may simply adopt different options that are not ruled out, with different speakers of the "same" language adopting different options. The reader should bear this in mind more generally, independently of this work, when comparing data claims regarding more sophisticated aspects of the phenomenon under consideration made in the literature.

Multiple wh-fronting (MWF) languages differ regarding whether they exhibit superiority effects under MWF. Bulgarian shows such effects with MWF (7), just as it does with wh&wh coordinations.

- (7) a. Koj kakvo e kupil?  
       who what is bought  
       ‘Who bought what?’ (Bulgarian)  
       b. \*Kakvo koj e kupil?

Based on this, CG tie the possibility of wh&wh coordinations to the possibility of MWF. Bošković (2022), however, notes several problems with the superiority argument. First, it is not clear why MWF should be relevant here. Under CG’s analysis, the interrogative C in (1) has only one Spec, which is filled by the ConjP. Under the standard account of superiority effects with MWF, the superiority effect in (7) arises as a result of the wh-C attracting two wh-phrases, where the wh-phrases undergo separate wh-movements, occupying separate CP Specs. This is not the case with (6) under CG’s analysis, where the coordination of the wh-phrases (more precisely, the ConjP that dominates the wh-phrases) is merged into SpecCP—there are then no two separate wh-movements or two CP Specs in (7).

Furthermore, SC does not show matching in the ordering of wh-phrases in MWF and wh&wh coordinations. SC does not show superiority effects in simple MWF constructions like (8).

- (8) a. Ko šta kupuje?  
       who what is-buying  
       ‘Who is buying what?’ (SC)  
       b. Šta ko kupuje?

However, it does show ordering effects with wh&wh coordinations.<sup>3</sup>

- (9) a. Ko i šta kupuje?  
       who and what is-buying  
       ‘Who is buying what?’ (SC)  
       b. \*Šta i ko kupuje?

Recall that SC also allows larger coordinations involving wh-phrases: additional material can be present within what appear to be wh&wh conjuncts.<sup>4</sup>

- (10) Ko je i šta (je) kupio?  
       who is and what is bought  
       ‘Who bought what?’ (SC)

The presence of the aux-clitic in (10) indicates the first conjunct is a clause. Interestingly, such cases, which must involve coordination that is larger than wh&wh, do not display superiority effects.<sup>5</sup>

- (11) Šta je i ko (je) kupio?  
       what is and who is bought  
       ‘Who bought what?’ (SC)

<sup>3</sup>(9-b) improves with a pause following the first wh-phrase, which is not necessary in (8-b). I return to this issue below. (A referee, however, does not get the improvement with a pause; for similar speaker variation regarding prosody in English and Italian see fn 7. That prosodic factors may matter to the ordering of conjoined wh-phrases was also noted by Lipták 2003 for Hungarian.)

<sup>4</sup>A referee reports a slight preference for not repeating the second auxiliary, which is a Max Elide type effect (see Merchant 2001) that does not affect the point made here.

<sup>5</sup>There may be a null subject in the first conjunct (SC is a pro-drop language) and a null object in the second conjunct. On null objects in similar constructions, see Zanon 2015.

When there is nothing between the first wh-phrase and the coordinator there is a superiority effect, cf. (9) and (12), where the clitic follows the wh-phrases.

- (12) a. Ko i šta je kupio?  
           who and what is bought  
           ‘Who bought what?’ (SC)  
       b. \*Šta i ko je kupio?

When the clitic follows the first wh-phrase, which unambiguously shows that the first conjunct is larger than the wh-phrase itself, there are no superiority effects (10)–(11).

What this shows is that when there is no additional material following the first wh-phrase (i.e. when there is nothing intervening between the first wh-phrase and the coordinator) we have a wh&wh coordination. Additionally, these data show that there is no parallelism between superiority effects in MWF and wh&wh constructions, cf. the contrast between (8-b) and (9-b) (the parallelism shown by Bulgarian (7) and (6) is apparently accidental, as the discussion below will make clear).<sup>6</sup>

Why is it that when there is no material following the first wh-phrase we have wh&wh coordination? One possibility is that this may be an economy of representation effect (see Bošković 2011): when both a smaller and a larger structure are in principle available for X, if there is no evidence for the latter X is analyzed in terms of the former.

There is, however, an alternative. Recall that (9-b) improves with a pause following the first wh-phrase (cf. fn 3). Wh&wh and clausal coordination may then be associated with two distinct prosodic patterns when there is nothing (but the coordinator) intervening between the coordinated wh-phrases: the prosodic pattern with a pause following the first wh reflects a clausal coordination structure.<sup>7</sup> This prosodic pattern is forced by a superiority violation, which is disallowed on the wh&wh derivation.<sup>8</sup>

Bošković (2022) points out another issue regarding superiority. Bošković (2002) shows that when the superiority effect is found with MWF it holds only for the first and second wh-phrase; beyond that the wh-ordering is free. Bulgarian (13) illustrates this: when only two objects undergo wh-movement, the IO must precede the DO—a superiority effect since IO is higher than DO before wh-movement. Importantly, when another, higher wh-phrase is present, the ordering of the objects is free. This is also illustrated by SC (14), where the superiority effect also holds only for the first and second wh-phrase (as discussed in Bošković 2002, SC shows superiority effects in certain contexts).

- (13) Bulgarian  
       a. Kogo kakvo e pital Ivan?  
           whom what is asked Ivan  
           ‘Who did Ivan ask what?’  
       b. ?\*Kakvo kogo e pital Ivan?  
       c. Koj kogo kakvo e pital?  
           who whom what is asked  
           ‘Who asked whom what?’  
       d. Koj kakvo kogo e pital? (Bošković 2002: p.366)

<sup>6</sup>There is also an ordering restriction on wh&wh coordinations in Japanese (Ishii 2014, Kasai 2016), which obviously cannot be tied to MWF (see section 3 for discussion of Japanese).

<sup>7</sup>At least for some speakers, this is the most natural prosody for English (3) and the corresponding example in Italian.

<sup>8</sup>CG report no superiority effects with wh&wh coordinations in Croatian. (All the speakers I consulted, as well as an anonymous referee, do report such superiority effects.) Since CG do not seem to have controlled for prosody, this may be reflecting the prosodic pattern associated with clausal coordination (this may also be behind what they report as speaker variation in Bulgarian, and with the reported free ordering of wh-phrases in Romanian in Comorovski (1996) (the ordering was also reported to be free in Russian in Kazenin 2002 but prosody does matter in Russian (Ksenia Zanon, p.c.)).

- (14) Serbo-Croatian
- a. ?Ima kome kako da pomogne.  
has whom how part helps  
'(S)he has someone to help somehow.'
  - b. \*Ima kako kome da pomogne.
  - c. ?Ima ko kako kome da pomogne.  
has who how whom part helps  
'There is someone who can somehow help somebody.' (Bošković 2002: p.367)

As noted above, SC shows ordering effects with wh&wh coordinations with two wh-phrases. But the effect extends to all wh-phrases. When there are more than two wh-phrases there is strict ordering for all of them.

- (15) a. Ko kome i šta prodaje?  
who whom and what is-selling  
'Who is selling what to whom?' (SC)
- b. \*Ko šta i kome prodaje?

This is, then, another case of a divorce between superiority effects with MWF and the ordering effects in wh&wh coordinations.

Additionally, Stjepanović (2022) shows that if MWF involves multiple left-branch extraction there are ordering effects (16)-(17). Importantly, wh&wh coordinations differ from MWF regarding these ordering effects (18)-(19), which confirms that there is no superiority parallelism between the two. (Note that the factor Stjepanović argues is responsible for the effect in (16)-(17) doesn't arise in (18)-(19)—what is crucial in her account is that the left-branch alone undergoes wh-movement in (16)-(17) (and has the uK feature that drives movement in Bošković's 2007 system); what undergoes it in (18)-(19) under the analysis adopted below is ConjP (so the ConjP has the uK feature driving movement).)

- (16) \*Čiji<sub>i</sub> kakva<sub>j</sub> danas [t<sub>i</sub> otac] kupuje [t<sub>j</sub> kola]?  
whose what-kind-of today father is-buying car  
intended: 'Whose father is buying what kind of a car today?' (SC)
- (17) ?Kakva<sub>i</sub> čiji<sub>j</sub> danas [t<sub>j</sub> otac] kupuje [t<sub>i</sub> kola]? (SC)
- (18) ?Čiji<sub>i</sub> i kakva<sub>j</sub> danas [t<sub>i</sub> otac] kupuje [t<sub>j</sub> kola]?  
whose and what-kind-of today father is-buying car  
'Whose father is buying what kind of a car today?' (SC)
- (19) \*Kakva<sub>i</sub> i čiji<sub>j</sub> danas [t<sub>j</sub> otac] kupuje [t<sub>i</sub> kola]? (SC)

The ordering effect in wh&wh coordinations is thus quite clearly independent of superiority (cf. also fn. 6). CG take the superiority parallel in Bulgarian (7)/(6) to indicate that MWF is needed for wh&wh coordinations. That wh&wh coordinations do not track MWF regarding superiority suggests the two should be divorced. The lack of MWF should then not be the reason why English disallows wh&wh coordinations.

### 3 A DIFFERENT FACTOR MATTERS

Consider now coordination outside of wh-movement/wh-phrases. (20-a),(20-b) are ungrammatical. As discussed in Bošković (2004b), the fronting in (20-a) can in principle involve topicalization, focalization, or scrambling: the example is apparently ruled out on all these options, in clear contrast with (2). (20) then seems to show the coordination in question is limited to wh-movement/wh-phrases.

- (20) a. \*Ivanu i kola prodaju.  
Ivanu.DAT and car.ACC they-are-selling  
intended: 'They are selling Ivan a car.'  
b. \*Ivan i kola kupuje.  
Ivan.NOM and car.ACC is-buying  
intended: 'Ivan is buying a car.' (SC)

There are, however, exceptions: such constructions are possible with indefinite, negative concord, NPI, and universal quantifier pronouns (21) and the corresponding adjectives in (22).<sup>9</sup>

- (21) a. Neko i nešto kupuje.  
someone and something buys  
'Someone is buying something.'  
b. Svako i svašta kupuje.  
everyone and everything buys  
c. Niko i ništa ne kupuje.  
nobody and nothing not buys  
d. Nije nam rekao da li iko i išta kupuje.  
isn't us told whether anybody and anything buys  
'He didn't tell us whether anybody is buying anything.' (SC)
- (22) a. Nečiji/svačiji i nekakva/svakakva otac kupuje kola.  
someone's/everyone's and some kind/all kind father buys car  
'Someone's/everyone's father is buying some kind/all kind of cars.'  
b. Ničiji i nikakva otac ne kupuje kola.  
nobody's and no-type father not buys car  
'Nobody's father is buying any type of a car.'  
c. Nije nam rekao da li ičiji i ikakva otac kupuje kola.  
isn't us told whether anybody's and any-type father buys car  
'He didn't tell us whether anybody's father is buying any type of a car.' (SC)

There is something all these have in common, namely, an indeterminate system. In many languages, the forms that are used for wh-words have a variety of other usages, like existentials, universal quantifiers, negative concord/NPI items, free choice, depending on the context where they occur. SC has an indeterminate system where an affix is added to a wh-phrase, illustrated with a partial paradigm below.

- (23) i. a. ko 'who' b. iko 'anyone' c. niko 'no one' d. neko 'someone' e. svako 'everyone'  
ii. a. šta 'what' b. išta 'anything' c. ništa 'nothing' d. nešto 'something' e. svašta 'everything'

I take this to indicate that an indeterminate system (Bulgarian also has it, see Haspelmath 1997) is a prerequisite for the coordination in question. This in itself rules it out in English, which does not have an indeterminate system (note that we are dealing here

<sup>9</sup> For examples with other quantifiers from other languages, see e.g. Kazenin (2002), Lipták (2003), Skrabalova (2007), Paperno (2010), Przepiórkowski (2022). Note that mixing of different types of quantifiers is disallowed—it seems plausible that this is due to a parallelism requirement along the lines of traditional coordination-of-likes (see also Appendix; this actually confirms that the relevant cases don't involve clausal coordination+ellipsis; rather, what is coordinated is the quantifiers themselves).

- (i) \*Neko i svašta kupuje.  
someone and everything is-buying  
intended: 'Someone is buying everything.' (SC)

with a one-way correlation).<sup>10,11</sup>

(24), involving D-linked wh-phrases, provides a confirmation that an indeterminate status matters:

- (24) ?\*Koja žena i koju kuću kupuje?  
 which woman and which house is-buying  
 ‘Which woman is buying which house?’ (SC)

Note that this is not simply an issue of D-linking since (25), which also involves D-linked wh-phrases, is acceptable. There is, however, a difference between the two: the wh-phrase in (24) is not part of the indeterminate system, while the one in (25) is (cf. *ičija/ničija/nečija/svačija*).<sup>12</sup>

- (25) Čija žena i čiju kuću kupuje?  
 whose wife and whose house is-buying  
 ‘Whose wife is buying whose house?’ (SC)

Note also that both (26) and (27) are fine in Russian; importantly, the wh-phrase in both examples is part of the indeterminate system.

- (26) Kakaja studentka i kakuju knigu kupila?  
 which student and which book bought  
 ‘Which student bought which book?’ (Russian)
- (27) Čej student i č’ju stat’ju pročitao?  
 whose student and whose article read  
 ‘Whose student read whose article?’ (Russian)

Above, we have seen evidence against the MWF account of wh&wh coordinations (i.e. an account that ties wh&wh coordinations to the possibility of MWF). There is, however, somewhat of a correlation with MWF, but through a third factor. The indeterminate

<sup>10</sup>Incidentally, Oda (2022) observes that indeterminate systems are found only in languages without articles and languages with affixal articles, they are not found in languages with free standing articles.

<sup>11</sup>What is important here is that the relevant language has an indeterminate system. There can still be a quantifier in such a language that could undergo the kind of coordination investigated here even if it is not transparently morphologically related to a wh-phrase; in that case whatever syntactic and semantic relations the morphology normally reflects in the relevant language type would still be present abstractly. This could be an appropriate treatment for (i), where the quantifier is not part of an indeterminate system. Notice, however, that (i) is somewhat worse than (21) ((21-b) is especially interesting given that it also involves a universal quantifier).

- (i) (??) Svi i sve kupuju.  
 all.NOM and all.ACC are-buying (SC)

There is another issue: the indeterminate requirement holds for arguments in wh&wh coordinations (which is what I’ll focus on whenever possible). It is less clear whether it holds for adjuncts/non-arguments, where it is also harder to rule out the larger ellipsis option (larger ellipsis cases are in fact most productive with adjuncts; note that for this reason all left-branch extraction cases discussed in the paper should be taken with some reservation). In this respect, *svi/sve* also have an attributive (essentially adjunct) function where they modify a noun like an adjective. It’s not out of the question that this is what we are dealing with here given that SC quite productively allows free-standing adjectives without an overt noun (see Bošković 2013a).

<sup>12</sup>Mixed cases like (i), where one wh-phrase is an indeterminate and the other one is not (*kakvu* is part of an indeterminate system), have an intermediate status. (It should be noted that a referee finds wh&wh coordinations involving D-linked wh-phrases like ‘which woman’ acceptable, which can be handled along the lines suggested in the first passage of fn 11).

- (i) ???Koja žena i čiju/kakvu kuću prodaje?  
 which woman and whose/what-kind-of house is-selling  
 ‘Which woman is selling whose/what kind of a house?’ (SC)

system also turns out to be involved in MWF, though not in the same way as in wh&wh coordinations.

Bošković (2023), noting that there are different types of indeterminate systems, defines a particular type, dubbed sub-wh system: a fully productive system where addition of an inseparable affix to a wh-phrase results in a series of meanings shown in SC (23), with a morphological subset-superset relation between the wh (i.e. question) usage and other usages, as indicated in (28).

- (28) sub-wh system: who+X for other pronouns (wh+X is inseparable, fully productive, order does not matter)

What is not a sub-wh system is the situation in Chinese, where the same form has different functions (e.g. *shenme* can mean ‘what’, ‘something’, ‘anything’, see (29)),<sup>13</sup> or Japanese, where a particle occurs on each function (in some cases inseparable, in some cases separable; note that *-ka*, which is always separated on the wh-usage in Standard Japanese, need not be separated in Okinawan). English also does not have a sub-wh system since the relevant system is not fully productive (*somewhere*, *everywhere*, *nowhere*, *anywhere* but *\*somewho/everywho/nowho*), i.e., it is lexicalized.

- (29) Chinese
- a. ni xiang mai shenme (ne)?  
you want buy what Q  
‘What do you want to buy?’
  - b. wo bu xiang mai shenme  
I not want buy anything  
‘I don’t want to buy anything.’
  - c. wo xiang mai yi-dian shenme  
I want buy one-cl something  
‘I want to buy something.’

Bošković (2023) identifies 18 typologically diverse MWF languages (SC, Romanian, Polish, Russian, Bulgarian, Macedonian, Czech, Slovenian, Ukrainian, Yiddish, Lithuanian, Hungarian, Basque, Mohawk, Georgian, Ossetic, Svan, and Latin) and shows that they all have this particular type of indeterminates, as stated in the generalization in (30) (note that (30) is a one-way correlation; see Bošković 2023 for a deduction of (30)).

- (30) If a language has multiple wh-fronting, it has a sub-wh system.

Particularly interesting is Romance. Latin was a MWF language (Ledgeway 2012, Dadan 2019) with a fully productive sub-wh system. The system got lost in all modern Romance languages but one: Romanian, which is the only modern Romance language that still has MWF, a strong confirmation of (30). An indeterminate system is thus a prerequisite for both wh&wh coordinations and MWF (though in different ways).

Given this, it is not surprising that there is a great deal of overlap between MWF languages and languages allowing wh&wh coordinations. However, the above discussion doesn’t rule out the possibility of a non-MWF language allowing wh&wh coordinations. This is in fact attested. Haida & Repp (2011) note that Greek, which is not a MWF language (cf. (31)), allows wh&wh coordinations, based on (32).

- (31) Pjos agorase ti?  
who bought what  
‘Who bought what?’ (Greek)

<sup>13</sup> Note that the presence of a sub-wh system does not prevent bare wh-indeterminates in MWF languages, like *ko* from (23), from having other usages; e.g. in restricted contexts they can be interpreted as indefinites (see e.g. Bošković 2023, Hengevelt et al. 2023, Zanon 2022).



- (32) Kséro pjos ce ti píre.  
I.know who and what took  
'I know who took something and what he took.' (Greek)

Haida & Repp (2011) note only (32) but the coordination is not limited to wh-phrases:

- (33) Ka-pjos ce ka-ti agorázei.  
someone and something buys  
'Someone is buying something.' (Greek)

Importantly, Greek has an indeterminate system, as discussed in Oda (2022).<sup>14</sup>

Additionally, Chinese and Japanese, proto-typical indeterminate languages which, as noted above, do not have a sub-wh indeterminate system, also allow wh&wh coordinations (see Zhang 2007 for Chinese and Ishii 2014, Kasai 2016 for Japanese) in spite of not allowing MWF (both are in fact wh-in-situ languages), as illustrated below for Chinese.

- (34) Shui yiji cong nali tingshuo-le zhexie yaoyan?  
who and from where hear-PRF these rumor  
'Who and from where heard these rumors?' (Chinese, Zhang 2007: p.213)

Chinese and Japanese strongly confirm the typological proposals made here: they have productive indeterminate systems but not sub-wh indeterminate systems and they allow wh&wh coordinations but not MWF, all of which straightforwardly falls out from the current system. Chinese and Japanese also argue against analyses that require wh-movement for wh&wh coordinations (see e.g. Haida & Repp 2011) given that they are wh-in-situ languages. This is not the case with the analysis proposed below. We will see that the wh&wh coordination does undergo movement in wh-movement languages, but this is only because it has to be inserted very close to where the relevant elements are interpreted—when a language in question requires wh-movement the derivationally formed wh-coordination then has to undergo it.<sup>15</sup>

Also relevant is German, another language which has an indeterminate system (see Haspelmath 1997) but not a sub-wh indeterminate system.<sup>16</sup> German is not a MWF language, but, as Przepiórkowski et al. (2023) show, allows wh&wh coordination (including coordinations with other quantifiers), as illustrated by the actually occurring examples in (35).

<sup>14</sup>It is illustrated below for person/time.

- |     |        |      |             |                |                |
|-----|--------|------|-------------|----------------|----------------|
| (i) |        | wh   | existential | neg-polarity   | free choice    |
|     | person | pjos | ka-pjos     | kanenas, kanis | o-pjos-dhipote |
|     | time   | pote | ka-pote     | pote           | o-pote-dhipote |

It is not quite as productive as in SC. As discussed in Oda (2022: p.222–224), what is derived from indeterminate pronouns in Greek are indefinite pronouns (this may in fact be what is important for the availability of wh&wh coordinations). As observed by Oda, universal quantifiers are missing from the indeterminate system in Greek, in contrast to SC. It is possible that a broader indeterminate system, which would include universal quantifiers, is needed for MWF.

<sup>15</sup>Under the analysis proposed below there is actually a short step of regular movement prior to the derivational coordination formation, which will in fact be confirmed by Chinese and Japanese.

<sup>16</sup>I do not consider German as having a productive sub-wh system since in German only one series is related to wh-words, as shown by (i) (data from Haspelmath 1997). In fact, the indeterminate system itself is less productive in German than in other languages discussed above, see below for potential relevance of this.

- |     |        |      |              |                           |          |
|-----|--------|------|--------------|---------------------------|----------|
| (i) |        | wh   | etwas-series | irgend-series             | n-series |
|     | person | wer  | jemand       | irgend-wer, irgend-jemand | niemand  |
|     | thing  | was  | etwas        | irgend-was, irgend-etwas  | nichts   |
|     | place  | wo   |              | irgend-wo                 | nirgends |
|     | time   | wann |              | irgend-wann               | nie      |

- (35) a. Der Handler hat dadurch einen Überblick, [wer, was und  
the merchant has this.way an overview who<sub>NOM</sub> what<sub>ACC</sub> and  
wo] eingekauft hat.  
where bought has  
'The merchant thus has an overview of who has bought what and where.'
- b. Wer und wo wird gewählt?  
who<sub>ACC</sub> and where AUX elected  
'Who is elected and where?' (German, Przepiórkowski et al. 2023)

As noted in fn 16, the indeterminate system is less productive in German than in other languages discussed above. Interestingly, the discussion in Przepiórkowski et al. (2023) indicates that wh&wh coordinations that do not involve clausal coordination are also much less productive in German than in other languages discussed above (some authors actually deny it, see e.g. Haida & Repp 2011). Intuitively, this makes sense under the current analysis, where the indeterminate system and such wh&wh coordinations are related: both the indeterminate system and wh&wh coordinations are less productive in German (in fact, the same seems to hold for Greek). The intuition is, however, not easy to implement formally (for relevant discussion from a very different perspective, see Przepiórkowski et al. 2023).

At any rate, the current analysis, where both wh&wh coordinations and MWF depend on an indeterminate system but the two are not fully correlated in this respect since wh&wh coordinations simply require an indeterminate system while MWF requires a particular type of indeterminate system, predicts that there should be a good deal of overlap between MWF languages and languages that allow wh&wh coordinations but that there should still be non-MWF languages that allow wh&wh coordinations, which is exactly what we find, Greek, Chinese, Japanese, and German being such languages.

#### 4 DERIVATION AND AN ACCOUNT OF THE ORDERING RESTRICTION

I now turn to the derivation of wh&wh coordinations, which will also account for the ordering restriction. As noted above, it is not possible to coordinate a subject and an object of the same clause, which means (1) cannot involve base coordination which then undergoes movement: the coordination can only be formed outside the base positions. Following Zhang (2007), CG suggest that wh&wh coordinations indeed involve derivational ConjP formation, with the wh-phrases in Bulgarian (1) sideward merged (see also Haida & Repp 2011 for sideward merger in wh&wh coordinations and Nunes 2004 on sideward merger in general) into a ConjP, which is inserted in SpecCP. I will also adopt this overall approach, fleshing out the details of the derivation in a way that will capture the ordering restriction as well as another restriction discussed below. The main suggestion regarding derivational coordination formation is given in (36) (cf. Bošković 2022), where the merger in question involves sideward merger. (Pending section 5, which introduces a slight complication that does not affect the main point made here, the reader can take (36) to mean that sideward merger with the coordinator occurs right after regular merger of the relevant element, as discussed directly below; see also Appendix regarding motivation for (36), where (36) is suggested to be an interpretative mechanism).

- (36) Merge the relevant element with the coordinator as soon as possible.

The derivation of (9) ('who and what bought', using English words) observing (36) is given below.

- (37) a. [<sub>VP</sub> bought what]  
b. [and what] (sideward merger)

- c. [<sub>VP</sub> who bought what]
- d. [<sub>ConjP</sub> who and what] (sideward merger)

Given (36), *what* has to undergo sideward merger with the coordinator as soon as possible, which means before the subject wh-phrase enters the structure. After merging with the verb (step (37-a)), *what* undergoes sideward merger with the coordinator (step (37-b)). After the subject wh-phrase enters the structure (step (37-c)) it also undergoes sideward merger into the ConjP (step (37-d)). The condition in (36) imposes a strict ordering of the wh-phrases. While I have illustrated this with constructions involving two wh-phrases, nothing changes if there are more than two: if there are more than two wh-phrases strict ordering is crucially imposed on all conjuncts, not just one (in contrast to what is found with superiority effects). Furthermore, (36) has no relevance for clausal coordination, which does not involve a derivationally formed coordination: both ‘who is & what is’ (see (10)) and ‘what is & who is’ (see (11)) are then allowed with wh&wh coordination that is derived from clausal coordination.

Crucially, the derivationally formed ConjP cannot be inserted directly into SpecCP (contra CG; they actually simply assume this without arguing for it). Sideward merger voids islandhood (see Nunes 2004). The wh-phrases cannot be merged directly from their theta-positions into ConjP, with the ConjP inserted directly into SpecCP, since that would void islandhood effects, but islandhood effects are present with wh&wh coordinations, as illustrated by (38) with respect to the ban on extraction from adjuncts. Directly merging the derivationally formed ConjP into the matrix SpecCP in (38) would incorrectly void the islandhood effect.<sup>17</sup>

- (38) \*Koj i kakvo si jadosan [zaštoto e kupil]?  
 who and what are angry because is bought  
 intended: ‘You are angry because who bought what?’ (Bulgarian)

## 5 ANOTHER FACTOR: MOBILITY OF THE CONJUNCTS

As discussed above, SC also allows wh&wh coordinations, which can involve other indeterminates. I will now show that crucially, only mobile elements can be involved in such coordinations. In other words, such coordinations are subject to the not-directly-from-the-interpreted-position requirement: the relevant elements have to be mobile.

To show this, consider Bošković’s (2013b) observation that genitive complements of nouns in SC cannot move, while inherently case-marked complements of nouns can move. The former is illustrated by (39-b) and the latter by (40-b). Importantly, the same pattern is found in the corresponding wh&wh coordinations, as shown by (39-a) and (40-a), (39-a) being better than (40-a).

- (39) a. ?Neko<sub>i</sub> i nekome<sub>j</sub> t<sub>i</sub> podržava [otpor t<sub>j</sub>].  
 someone.NOM and someone.DAT supports resistance  
 ‘Someone is supporting resistance to someone.’ (SC)  
 b. cf. Nekome<sub>j</sub> podržava [otpor t<sub>j</sub>].  
 someone.DAT supports resistance
- (40) a. \*Neko<sub>i</sub> i nečega<sub>j</sub> t<sub>i</sub> podržava [vlasnike t<sub>j</sub>].  
 someone.NOM and something.GEN supports owners  
 intended: ‘Someone is supporting owners of something.’ (SC)  
 b. cf. \*Nečega<sub>j</sub> podržava [vlasnike t<sub>j</sub>].  
 something.GEN supports owners

<sup>17</sup>Russian allows wh&wh coordination out of subjunctive but not indicative clauses (Kazenin 2002), which parallels the well-known locality effect found in Russian, indicative but not subjunctive clauses disallowing wh-extraction (the discussion of the clause-mate effect in section 5 may actually indicate that subjunctive clauses in Russian are not phases, given Kazenin’s observation).

Another argument is provided by deep left-branch extraction. Bošković (2013b) observes that the same kind of genitive/inherent case contrast is found with deep left-branch extraction (i.e. left-branch extraction from a nominal complement). Such extraction is disallowed in the genitive case environment but allowed in an inherent case environment, as (41)-(42) show.

- (41) \*Kakvih<sub>i</sub> je vidio vlasnike [<sub>NP</sub> t<sub>i</sub> kuća]?  
 what-kind-of.GEN is seen owners houses.GEN  
 intended: 'What kind of houses did he see owners of?' (SC)
- (42) ?Čijem<sub>i</sub> je podržao otpor [<sub>NP</sub> t<sub>i</sub> kongresu]?  
 whose.DAT is supported resistance congress.DAT  
 'Whose congress did he support resistance to?' (SC)

The parallelism again extends to wh&wh coordinations (43)-(44), confirming that only mobile elements can participate in the construction in question. This indicates that the elements participating in the coordination in question must undergo movement on their own.

- (43) \*Kakva<sub>i</sub> i čije<sub>j</sub> je [t<sub>i</sub> djevojka] vidjela podstanara [<sub>NP</sub> t<sub>j</sub> kuće]?  
 what-kind-of.NOM and whose.GEN is girl.NOM seen tenant houses.GEN  
 intended: 'What kind of a girl saw a tenant of whose house?' (SC)
- (44) ??Kakva<sub>i</sub> i čijem<sub>j</sub> je [t<sub>i</sub> djevojka] podržala otpor [<sub>NP</sub> t<sub>j</sub> kongresu]?  
 what-kind-of.NOM and whose.DAT is girl.NOM supported resistance congress.DAT  
 'What kind of a girl supported resistance to whose congress?' (SC)

Getting more precise about the derivation of wh&wh coordinations in light of the mobility effect just discussed, the relevant elements apparently need to undergo a short step of regular movement prior to sideward merger into the derivationally formed ConjP. In (40-a), the problem arises with this regular step of movement (of *nečega*, cf. (40-b)). The above discussion then needs to be adjusted to the effect that the wh-phrase that enters the structure first does not have to undergo merger with the coordinator immediately, but simply before the other wh-phrase enters the structure.

In light of the discussion in this section, in a construction like (9), whose derivation was given in (37) above, the wh-phrase that enters the structure first then undergoes merger with the coordinator after undergoing a short step of movement, but it still merges with the coordinator before the other wh-phrase enters the structure; the relevant part of (37) is then adjusted as in (45).<sup>18</sup>

- (45) a. [<sub>VP</sub> bought what]  
 b. what [<sub>VP</sub> bought what]  
 c. [and what] (sideward merge)

It should, however, be noted that sideward merger into ConjP could actually take place even before (or simultaneously with) the step of regular movement—in that case the original copy of the affected element would undergo both sideward merger and the step of regular movement—step (45-b) then would not precede (45-c).<sup>19</sup> At any rate, I speculate that the short step of movement can be tied to the indeterminate nature of

<sup>18</sup>There are several possibilities for where the first *what* in (45-b) is located: SpecvP (the subject would then be inserted in a higher SpecvP after the steps in (45-a)-(45-c)), VP-adjunction, or SpecVP.

<sup>19</sup>This option would, however, eliminate one of the two accounts of the clause-mate effect discussed directly below (see fn 21); see also the discussion in the Appendix (I will generally put this option aside below).

the relevant elements since indeterminates in general undergo movement (see Bošković 2008, Citko 1998; the need for indeterminates to be licensed may also matter here, see Appendix).

Note also that once the full ConjP is formed through sideward merger, it must be inserted in the clause where the relevant elements are interpreted.<sup>20</sup> The reason for this is that there is a ban on cross-clausal derivational coordination formation: since the wh-phrases come from different clauses in (46-a)/(47-a), derivationally formed ConjP, which cannot be inserted before the higher wh-phrase enters the structure, is inserted outside of the clause where the lower wh-phrase is interpreted. (Note that simple MWF (47-b) differs from (47-a), which is another difference between MWF and wh&wh coordinations.)

- (46) a. \*[Čiji<sub>i</sub> i kakvu<sub>j</sub>] je [t<sub>i</sub> momak] tvrdio da je vidio [t<sub>j</sub>  
whose and what-kind-of is boyfriend claim that is seen  
djevojku]?  
girl  
intended: ‘Whose boyfriend claimed that he saw what kind of a girl?’ (SC)
- b. cf. [Čiji<sub>i</sub> i kakvu<sub>j</sub>] je [t<sub>i</sub> momak] vidio [t<sub>j</sub> djevojku]?  
whose and what-kind-of is boyfriend seen girl
- (47) a. \*[Koga<sub>i</sub> i šta<sub>j</sub>] ubjeduješ t<sub>i</sub> da je Petar kupio t<sub>j</sub>?  
whom and what persuade that is Peter bought  
intended: ‘Who are you persuading that Peter bought what?’ (SC)
- b. Koga<sub>i</sub> šta<sub>j</sub> ubjeduješ t<sub>i</sub> da je Petar kupio t<sub>j</sub>?  
whom what persuade that is Peter bought

This can be accounted for if the ConjP created by sideward merger must be integrated into the structure at the CP level, in other words, if there can be only one root phrase when CP is a root phrase. The condition can actually be stated in terms of phases if vP is not a phase, as argued by Keine (2017), Keine & Zeijlstra (2021), to the effect that there can be only one root once the phasal level is reached. I leave it open whether the one-root requirement should be stated in terms of CP or phases more generally.<sup>21</sup>

At any rate, the above discussion indicates that the derivationally formed ConjP is inserted into the structure in the clause where the relevant elements are interpreted, and undergoes movement to its final position, hence the more general islandhood effect noted earlier (cf. (38)).

The main point of this section, however, is that the relevant elements must undergo a step of regular movement before merging into the derivationally-formed ConjP. Interestingly, Zhang (2007) and Ishii (2014) observe that the wh&wh coordination in Chinese and Japanese cannot be in situ although these are wh-in-situ languages. From the current perspective, the reason for this may be that the in-situ placement would prevent the required step of regular movement.

<sup>20</sup>I take the clause here to mean indicative clause. This evokes other types of clause-mate requirements; e.g. Villa-García (2015) shows arguments that are base-generated higher than the position in which they are interpreted in Spanish still must be generated in the same clause as the position where they are interpreted; see also Abels & Dayal (2023) on clause-mate effects with regular MWF in some MWF languages. I leave it open whether there can be some unification here.

<sup>21</sup>The phase alternative appears to require NPs not to be phases, or it would rule out examples like (18), (44) and (57) if sideward merger takes place from the base position of the element extracted from the second conjunct—if NP is a phase there would then be two roots at the NP phase level. Recall, however, that there is also a step of regular movement. This movement, which precedes sideward movement, will take the relevant element outside the NP (see Bošković 2022 regarding (57)), obviating the problem in question.

## 6 PAIR-LIST VS SINGLE-PAIR READINGS

I now turn to a peculiarity of wh&wh coordinations that has been noted by a number of authors for various languages with wh&wh coordinations. Regarding regular MWF questions in SC, Bošković (2003) shows that (48) allows both pair-list and single-pair answers. (49), involving a wh&wh coordination, on the other hand, allows only the single-pair reading (see e.g. Gračanin-Yuksek 2007, Gribanova 2009 for this restriction in various wh&wh coordination languages).

- (48) Ko šta kupuje?  
 who what is-buying  
 'Who is buying what? (SC)
- (49) Ko i šta kupuje?  
 who and what is-buying  
 'Who is buying what? (SC)

Bošković (2003) provides an account of the different behavior of SC and English regarding (48) (in English only pair-list answers are allowed here) based on Hagstrom's (1998) semantics of questions. Its gist is that the Q-morpheme is an existential quantifier over choice functions which originates in a clause internal position and then moves to the interrogative CP projection. There are two possibilities for movement in multiple questions: from the lower wh-phrase (Q is then merged with the lower wh-phrase), in which case the choice function variable left behind by Q-movement has the lower, but not the higher wh-phrase in its scope, or from a position above both wh-phrases (Q is then merged with a node dominating both wh-phrases), in which case the choice function variable left behind by Q-movement has both wh-phrases in its scope. The first option yields questions with pair-list answers and the second single-pair answers. Turning now to (49), merging the Q-morpheme with the lower wh-phrase in a wh&wh coordination will block its movement given the Coordinate Structure Constraint. The Q-morpheme can then only be merged with the coordination or above it. It then has both wh-phrases in its scope, yielding a single-pair reading only (for alternative accounts see e.g. Gribanova 2009, Haida & Repp 2011, Merchant 2017).

## 7 CONCLUSION

Citko & Gračanin-Yuksek (2013) took the superiority parallelism between Bulgarian (6) and (7) to indicate that the availability of MWF underlines the availability of wh&wh coordinations. We have seen that wh&wh coordinations actually do not track MWF regarding superiority (i.e. ordering effects); the two should then be divorced. Rather, the availability of wh&wh coordinations depends on the availability of the indeterminate system (see Appendix for a possible deduction of the dependency). MWF also depends on the availability of a particular indeterminate system, so the two are actually related, but through a third factor. The typological prerequisite for wh&wh coordinations, however, does not fully correlate with the typological prerequisite for MWF since the latter requires a particular type of indeterminate system while the former simply requires an indeterminate system. As a result, it is possible to have a non-MWF language allowing wh&wh coordinations, which we have seen is attested.

I have argued that wh&wh coordinations involve derivational coordination formation via sideward merger (see also Zhang 2007, Haida & Repp 2011, Citko & Gračanin-Yuksek 2013), fleshing out the sideward merger analysis. We have seen that the affected elements undergo movement before derivational coordination formation and that the derivationally formed coordination itself undergoes movement upon insertion into the structure. There is also a clause-mate requirement on the elements involved in wh&wh

coordinations. A derivation of wh&wh coordinations was proposed that captures all these properties as well as the ordering effect and the single-pair reading restriction on wh&wh coordinations.

## 8 APPENDIX: A SHORT TYPOLOGY EXCURSION AND GENERAL PROPERTIES OF DERIVATIONAL COORDINATION FORMATION

I will conclude with a short typological excursion based on another construction that involves derivational coordination formation and a discussion of more general properties of derivational coordination formation that will also address the issue of why an indeterminate system is a prerequisite for wh&wh coordinations and suggest a reason for the condition in (36).

### 8.1 GENERAL PROPERTIES OF DERIVATIONAL COORDINATION FORMATION AND SIDEWARD MOVEMENT

Bošković (2022) argues that distributed coordination constructions (DCCs) with an additional lower coordination like (50) also involve derivational coordination formation (see also Zhang 2007, 2010).

- (50) Which book<sub>i</sub>, which papers<sub>j</sub>, and which novel<sub>k</sub> did [Ann buy t<sub>i</sub>], [Jon read t<sub>j</sub>] and [Sue write t<sub>k</sub>] respectively?
- (51) The dogs and the roosters barked and crowed all night.

Such constructions parallel wh&wh coordinations in a number of respects (see Bošković 2022), e.g. regarding the ordering effect (the indicated indexation gives the only possible interpretation for (50)), the mobility of the affected element requirement (only mobile elements can participate in DCCs—thus, DCCs pattern with wh&wh coordinations regarding (40) and (43)/(44)), the islandhood effect (DCCs are island-sensitive; see Bošković 2022 for demonstration of all these properties), all of which can then be taken to be general properties of derivational coordination formation.

A note is in order regarding the ordering effect. While there is a strict ordering effect in DCCs like (50), Steven Franks (p.c.) observes that in pragmatically conditioned cases like (51), there is no strict ordering requirement, (52-a) also being possible. This is, however, only the case in the absence of respectively, as shown by (52-b) (the judgment in (52-a),(52-b) is given for the dogs barked/roosters crowed reading). Another relevant case (provided by Donald Reindl) is given in (52-c). As Steven Franks notes, the freedom of ordering is only there when the pragmatics fully distributes the conjuncts, as shown by the contrast in (52-d).

- (52) a. The dogs and the roosters crowed and barked all night.  
 b. \*The dogs and the roosters respectively crowed and barked all night.  
 c. Lightning and thunder crashed and flashed together in a perfect fury!  
 (Carol Ryrie Brink, *Caddie Woodlawn* 1935)  
 d. The dog and the pig oinked/?\*ate and barked all night.

For some but not all speakers the strict ordering requirement is also relaxed across coordinations in double coordination cases, as in (53-c).

- (53) a. On every side, the birds and roosters, the distant dogs and cows, cooed and crowed, barked and mooed.  
 b. On every side, the birds and roosters, the distant dogs and cows, crowed and cooed, mooed and barked.  
 c. (??)On every side, the birds and roosters, the distant dogs and cows, cooed and mooed, crowed and barked.

The above cases all involve A-movement. The ordering requirement is also relaxed with pragmatically motivated A'-movement, (54-b) being only slightly worse than (54-a).

- (54) a. How many cakes and how many letters did Mary bake and Sue write (respectively)?  
 b. ?How many cakes and how many letters did Mary write and Sue bake?  
 c. \*How many cakes and how many letters did respectively Mary write and Sue bake?

Bošković (2022) gives an account of the strict ordering effect in DCCs with *respectively* essentially along the lines of (36). For DCCs, the distributor *respectively* can be taken to impose it. There is no distribution of that kind in wh&wh coordinations though. (36), applying to both wh&wh coordinations and DCCs, can then be taken to be an interpretative mechanism—it is there to ensure proper interpretation so it is not the case that anything goes. There is no need for that in pragmatically motivated cases, where the pragmatics ensures proper interpretation/interpretive “pairing”, hence there is no need for (36) in such cases.

Bošković (2022) argues that DCCs, like wh&wh coordinations, involve sideward merger (see also Zhang 2010). Nunes (2004) also treats parasitic gaps and across-the-board movement in terms of sideward merger. Well-known locality effects found in those constructions indicate that the affected element must also undergo regular movement before undergoing sideward merger. There may then be a general condition to the effect that sideward merger in general is not possible from a base position (what may be relevant here is that base positions are the interpretation positions).<sup>22</sup> There could also be a connection with other operations that are not possible from a base position, e.g. Bošković (2004a) shows that quantifier float is not possible in the base position (cf. \**The students were arrested all*). In Bošković's (2004a) account, Q-float involves an acyclic operation (the Q is acyclically adjoined to the relevant nominal). Sideward merger is also in essence acyclic (it doesn't make the tree bigger). Acyclicity could then be a connection here, where acyclicity could only be associated with positions that are not created by regular internal Merge. (Note that this would mean that only external merge adjunction could be acyclic.)

Returning to derivationally formed coordination, the coordination in such cases appears to be semantically expletive ((1) is interpreted as ‘who bought what’, there is no coordination of the wh-phrases in the interpretation of (1); Merchant 2017 in fact calls it spurious coordination,<sup>23</sup> see also Lipták 2003); the same holds for (50), which is interpreted as ‘which book did Ann buy, which papers did Jon read, and which novel did Sue write’, there is no coordination of the wh-phrases in the interpretation of (50). Semantic expletiveness can then be taken as another general property of derivational coordination formation (see Bošković 2022).

## 8.2 TYPOLOGY OF DERIVATIONAL COORDINATION FORMATION: POTENTIAL TYPOLOGICAL GAPS

While derivational coordination formation is possible both with (in DCCs) and without (in wh&wh coordinations) lower coordination, this does not mean that if it's possible with a lower coordination it will be possible without it. (English allows DCCs but not wh&wh coordinations; recall, however, that the latter are subject to the indeterminate system requirement, which the former are not).

SC allows both wh&wh coordinations and distributed extractions, which involve coordination in the lower position (see Bošković 2022 on the latter).

<sup>22</sup>Under one of the options explored in section 5, on which sideward movement precedes (or is simultaneous with) regular movement, this would mean that an element that undergoes sideward movement would also have to undergo regular movement.

<sup>23</sup>But see Paperno (2010) and Przepiórkowski (2022) for the semantics of wh&wh coordinations where the coordinator has its usual semantics (for relevant discussion, see also Grosu 1987).



- (55) Psi i pjevci su cijelu noć lajali i kukurikali.  
 dogs and roosters are all night barked and crowed  
 ‘The dogs and the roosters barked and crowed all night.’ (SC)

However, distributed wh-movement coordinations are more restricted than in English. SC has no counterpart of *respectively*. This could be why the non-distributed reading where the wh-coordination undergoes across-the-board movement (ATB) from the object position of each verb is the only reading in (56).<sup>24</sup>

- (56) [Koji knjigu i koji časopis]<sub>i</sub> je Petar kupio t<sub>i</sub> i Ivan prodao t<sub>i</sub>?  
 which book and which magazine is Petar bought and Ivan sold  
 ‘Which book and which magazine did Petar buy and which book and which magazine did Ivan sell?’ (SC)

This may also be an economy of representation effect, given that regular ATB is structurally simpler than distributed coordination extractions (see Bošković 2022 on the structure of the latter). Notice also that when the non-distributed ATB parse is blocked, distributed coordination is available with wh-phrases in SC. This is the case with (57), where the ATB parse is ruled out because the nouns *otpor* ‘resistance’ and *potragu* ‘pursuit’ take different prepositions in their complements.

- (57) ?Prema kome<sub>i</sub> i za kim<sub>j</sub> podržavaju [otpor t<sub>i</sub>] i [potragu t<sub>j</sub>]?  
 to whom and for whom are-supporting resistance and pursuit  
 ‘Resistance to whom and pursuit of whom are they supporting?’ (SC)

It is also available in cases more similar to (56) if the pragmatics increases the saliency of the distributed reading. This is the case with (58) (another such case, with A-movement, is given in (55)). Note, however, that (58) is best with a different, i.e. clausal (cf. (59)–(60)) lower coordinator.<sup>25</sup>

- (58) Koliko jela i koliko pisama je Jovan skuvao a Asmir  
 how-many dishes and how-many letters is Jovan cooked and Asmir  
 napisao?  
 wrote  
 ‘How many dishes and how many letters did Jovan cook and Asmir write?’

<sup>24</sup>The same holds for the quantifier example in (i), where only the non-distributed ATB reading is possible.

- (i) [Neku knjigu i neki magazin]<sub>i</sub> je Petar kupio t<sub>i</sub> i Ivan prodao t<sub>i</sub>.  
 some book and some magazine is Petar bought and Ivan sold  
 ‘Petar bought some book and some magazine and Ivan sold some book and some magazine.’ (SC)

<sup>25</sup>Using *a* instead of *i* does not make a difference in (56), only the ATB reading is possible here even with *a*. Note also that *i* and *a* are not simply interchangeable with clausal coordination, as (i) shows.

- (i) Jovan misli da će biti novca za taj posao i/\*a da će ga Marija dobiti.  
 Jovan thinks that will be money for that job and that will it Marija get  
 ‘Jovan thinks that there will be money for that job and that Marija will get it.’ (SC)

Note also that SC patterns with English (cf. (52), (54)) in that the ordering requirement is relaxed in pragmatically conditioned cases, (iia-b) being only slightly worse than (55) and (58).

- (ii) a. ?Psi i pjevci su cijelu noć kukurikali i lajali.  
 dogs and roosters are all night crowed and barked  
 ‘Dogs and roosters barked and crowed all night.’  
 b. ?Koliko jela i koliko pisama je Jovan napisao a Asmir skuvao?  
 how-many dishes and how-many letters is Jovan written and Asmir cooked  
 ‘How many dishes and how many letters did Jovan write and Asmir cook?’ (SC)

- (59) Jovan voli Mariju i/\*a Ivana.  
Jovan loves Marija and Ivan  
'Jovan loves Marija and Ivana.' (SC)
- (60) Ana misli da Petar voli Mariju i/a da Ivan voli Katarinu.  
Ana thinks that Peter loves Marija and that Ivan loves Katarina  
'Ana thinks that Peter loves Marija and that Ivan loves Katarina.' (SC)

A question then arises: are there languages that allow derivational coordination formation only if it does not involve extraction from a ConjP (i.e. languages that allow wh&wh coordination but not distributed coordination extraction/DCCs)? If not, this would mean that the availability of the former implies the availability of the latter, i.e. we would have an implicational universal here: if a language allows wh&wh coordinations it also allows DCCs. (Note that Russian and Bulgarian allow DCCs like (61)-(62) (though they seem to be more resistant to distributed wh-movement coordinations, which we have seen is also the case with SC; it should be noted that the A/A' movement distinction matters in the availability of DCCs crosslinguistically and that DCC head-movement is never allowed, see Bošković 2022)).

- (61) Sobaki i petuxi vsju noč lajali i kukarekali.  
dogs and roosters all night barked and crowed  
'Dogs and roosters barked and crowed all night.' (Russian)
- (62) Kučetata i petlite laeha i kukurigaha tsjala nošt.  
dogs.def and roosters.def barked and crowed all night  
'The dogs and the roosters barked and crowed all night.' (Bulgarian)

There is also a typological gap if we consider interaction between regular coordination from which movement takes place and derivationally formed coordination. The two can co-occur: (63) (repeated from (57)) involves both a regular (lower) coordination from which movement takes place and a higher, derivationally formed coordination.

- (63) ?Prema kome<sub>i</sub> i za kim<sub>j</sub> podržavaju [otpor t<sub>i</sub>] i [potragu t<sub>j</sub>]?  
to whom and for whom are-supporting resistance and pursuit  
'Resistance to whom and pursuit of whom are they supporting?' (SC)

We also find constructions with only the latter, i.e. involving only a derivationally formed coordination (the higher coordination from (63)), without lower coordination.

- (64) Ko i šta kupuje?  
who and what is-buying  
'Who is buying what?' (SC)

How about only the former, a construction with a regular coordination from which movement takes place (lower coordination from (63)) but without higher (derivationally) formed coordination? SC (65) illustrates what such a case would look like. Bošković (2022) shows that SC disallows such constructions. I am in fact not aware of any language that would allow them, which means that movement of different elements from a single ConjP requires these elements to undergo derivationally formed coordination.

- (65) \*Prema kome<sub>i</sub> za kim<sub>j</sub> podržavaju [otpor t<sub>i</sub>] i [potragu t<sub>j</sub>]?  
to whom for whom are-supporting resistance and pursuit  
intended: 'Who are they supporting the resistance to and who are they supporting the pursuit of?' (SC)

### 8.3 MOTIVATION FOR DERIVATIONAL COORDINATION FORMATION: WHY AN INDETERMINATE SYSTEM IS NEEDED FOR WH&WH COORDINATIONS

The above facts can be interpreted as indicating that there must be a reason for derivational coordination formation. It seems safe to assume that regular movement of different elements from a single ConjP is not possible; this is why (65) is unacceptable. Sideward merger makes it possible to get around that restriction (sideward merger was originally employed by Nunes 2004 to get around islandhood effects) and derivational coordination formation is what provides the needed sideward merger mechanism in (63). If there must be a reason for derivational coordination formation there would then need to be a reason for it with wh&wh coordinations too. The reason here may be tied to indeterminate licensing, with something like Higginbotham & May's (1981) quantifier absorption involved. A FASL referee in fact suggests that the "coordination structure in this case is the morphological realisation of what semanticists call absorption, the simultaneous binding of two variables by the same operator". We can then assume that indeterminates have a feature to be licensed/checked, and that in the coordination in question the feature is licensed through the coordination structure, not in its usual manner (see Oda 2022).

The above analysis can also provide a way to deduce the generalization from section 3 that an indeterminate system is needed for wh&wh coordinations. Such coordinations involve derivational coordination formation. As suggested above, derivational coordination formation needs to have motivation. With indeterminates, indeterminate licensing provides such motivation. Examples like (20) are then ruled out because there is no reason for derivational coordination formation in those cases. The same would also hold more generally for languages where the relevant elements are not indeterminates.<sup>26</sup>

The absorption analysis outlined above can also explain why mixing of different types of quantifiers is not allowed (see fn 9), given the natural assumption that quantifiers of different types cannot undergo absorption. It may also help us address the puzzle regarding the impossibility of adjunct MWF questions like (66-a).

- (66) a. \*Zašto kako tuče Petra?  
           why how is-beating Petar  
           intended: 'Why is he beating Petar how?' (SC)  
       b. \*Kako zašto tuče Petra?
- (67) Zašto i kako tuče Petra?  
       why and how is-beating Petar  
       'Why is he beating Petar how?' (SC)

If regular licensing is not possible when there is more than one adjunct (*why* is actually crosslinguistically often degraded in multiple questions), (67) will not face that issue due to the alternative licensing through coordination.

To summarize the discussion in the appendix, the following are more general properties of derivational coordination formation, holding for both wh&wh coordinations and DCCs:

- there is a strict ordering requirement for non-pragmatically motivated cases
- the derivationally formed coordination is semantically expletive
- there is an islandhood effect, which indicates that the derivationally formed coordination undergoes movement after insertion into the structure

<sup>26</sup>Furthermore, indeterminates are standardly assumed not to have inherent quantificational force, their interpretation being determined by the licensing context in which they are found. In non-indeterminate languages, the relevant elements can be taken to have inherent quantificational force that requires a QR-like movement, which is not possible out of a coordination.

- an element participating in derivational coordination formation must be mobile, which means that it undergoes regular movement prior to sideward merger

The last property holds for sideward movement in general: sideward movement in general (this also holds for parasitic gap and across-the-board-movement constructions) is not possible from a base position.

The discussion in the appendix has also revealed two potential typological gaps:

- there are no languages that allow wh&wh coordinations but not DCCs, which means that the availability of the former implies the availability of the latter.
- It is not possible to have regular movement of different elements from a single ConjP without these elements undergoing derivationally formed coordination, i.e. movement of different elements out of a coordination requires another coordination.

The last point led to the conclusion that there must be a reason for derivational coordination formation, which in turn led to a suggestion regarding the reason why an indeterminate system is a prerequisite for wh&wh coordination: indeterminate licensing provides motivation for derivational coordination formation. Finally, the requirement to merge an element participating in derivational coordination formation with the coordinator as soon as possible (cf. (36)), which is responsible for the strict ordering requirement, was suggested to be an interpretative mechanism based on the fact that in pragmatically motivated cases strict ordering does not hold.

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## ABBREVIATIONS

ACC	accusative	GEN	genitive
CG	Citko and Gračanin-Yuksek (2013)	IO	indirect object
DAT	dative	MWF	multiple wh-fronting
DCC	distributed coordination construction	NOM	nominative
DO	direct object	PRF	perfect
		SC	Serbo-Croatian

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