# Coordination: a novel view[1]
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**Abstract**: In this paper, based on data of coordination of unlike categories, I argue for a novel analysis on coordination where the merger of the coordinator and the internal conjunct, i.e., the [& Conj2] complex, inherits its categorial feature from Conj2, while the external Conj1 has its own label. These two labels may or may not be the same, an independent state of affair. Thus, a coordinate structure can only be labeled under feature identity, otherwise it is unlabeled. This explains extraction patterns under basic syntactic conditions/mechanisms such as minimal search and (anti)locality. Also, in this novel analysis, the [& Conj2] complex is an adjunct to Conj1, which may explain how a coordinate structure satisfies external restrictions on the syntactic position it occupies. The analysis provides potential new angles for investigation of other related phenomena, e.g., across-the-board movement, parasitic gaps and gapping.

**Keywords**: Coordination of unlike categories, coordinate structures, labeling, extraction, (anti)locality, external restrictions, adjunct

## 1. Introduction

In the traditional &P analysis (1a), coordinate structures (hereafter, CS) are category-specific projections. It is also standard to assume that the conjuncts are of an identical syntactic category, i.e., the Coordination-of-Likes condition (Williams 1978, Sag et al 1985, Bowers 1993, Beavers & Sag 2004, Chaves 2006, etc.). I will refer to this condition and/or corresponding data as CL. Accepting CL, two categorially distinct conjuncts result in ungrammaticality (1b).

Apparently, coordination-of-unlikes (CUL) data such as (2) are problematic for any CL-based system. In the literature, they are handled mainly in two ways: either the entire CS receives a uniform label (Munn 1993; Johannessen 1998; Patejuk 2015; Zhang 2023; a.o.), or parallel categories surface as CUL via special mechanisms, e.g., Weisser's (2020) morphological operations, Bruening & Al Khalaf (2020) or Saab & Zdrojewski's (2021) conjunction reduction or ellipsis, Bruening and Al Khalaf's (2020) super-categories and empty heads.

(1) a. $[_{\&P} [_X \text{Conj1}] \& [_X \text{Conj2}]]$    vs.    b. *$[_{\&P} [_X \text{Conj1}] \& [_Y \text{Conj2}]]$
(2) a. Pat is $[_{DP}$ a Republican] and $[_{AP}$ proud of it].        (adapted from Sag et al. 1985: 117)
    b. You can depend on $[_{DP}$ my assistant] and $[_{CP}$ that he will be on time].
                                                        (adapted from Sag et al. 1985: 165)

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c. John devoured [DP only pork] and [PP only at home].       (adapted from Grosu 1985: 232)

d. Pat remembered [DP the appointment] and [CP that it was important to be on time].

(adapted from Zhang 2010)

e. Many in DC behave [NP this way] or [AdvP worse].

(adapted from Patejuk and Przepiorkowski 2023)

However, Przepiórkowski (2022) and Patejuk and Przepiorkowski (2023) show that those proposals deriving CUL data such as (2) from CL structures encounter many empirical and theoretical problems, and convincingly argue that CUL cases are genuine coordination of unlike categories. The questions then boil down to the exact derivational procedures and conditions that build and constrain CS.

In this paper, I will use CUL data as grounds to argue (i) that coordinators syntactically behave in a root-like way in that they are syntactically underspecific for categorial features (thus unable to label/categorize) and unselective for syntactic contexts, and (ii) that CL should be abandoned to achieve a unform account for various coordination data.

Based on this, I develop and defend an analysis where, as demonstrated by (3)[3], the syntactic object formed by the merger of a coordinator & and the internal conjunct, i.e., the [& Conj2] complex, inherits its categorial feature/label $C\mathcal{F}2$ from Conj2 due to the root-likeness of the coordinator with respect to labeling. Crucially, the external conjunct, i.e., Conj1, has its own label $C\mathcal{F}1$ which may or may not be identical to $C\mathcal{F}2$ of Conj2 - an independent state of affair - because there is no CL.

(3) X [CS [$_{C\mathcal{F}1}$ Conj1] [$_{C\mathcal{F}2}$ & Conj2]]

The [& Conj2] complex is an adjunct to Conj1. Thus, for any selectional requirements on the syntactic position of CS (Przepiórkowski 2022, Patejuk and Przepiorkowski 2023), Conj1, but not Conj2, must satisfy them – a disjunctive manner. But, as for functional restrictions such as clause typing (Cheng 1997), they must be globally, i.e., conjunctively, fulfilled.

The crucial properties of CS under this analysis are (i) that the [& Conj2] complex inherits the label $C\mathcal{F}2$ from Conj2 and extends the projection of Conj2, forming a phase under the contextual view to phases (Bošković 2014), (ii) that Conj1 has its own label/category $C\mathcal{F}1$ that may or may not be the same as $C\mathcal{F}2$, and (iii) that the merger of Conj1 and [& Conj2] is a XP-YP (phrase-phrase) merger. Therefore, the entire CS can only be labeled under feature-sharing/identity, i.e., when $C\mathcal{F}1 = C\mathcal{F}2 = C\mathcal{F}$; otherwise, when $C\mathcal{F}1 \neq C\mathcal{F}2$, the CS cannot be (immediately) labeled. This is illustrated by (4).

(4) X [$_{C\mathcal{F}1=C\mathcal{F}2=C\mathcal{F} \text{ or } ?}$ [$_{C\mathcal{F}1}$ Conj1] [$_{\text{phase-}C\mathcal{F}2}$ & Conj2]]

There are three major consequences/contributions of this analysis.

First, the analysis explains how CS are internally constrained, due to the syntactic root-likeness of coordinators. Therefore, the grammaticality of extraction (out) of conjuncts, i.e., (counter)examples of the Coordinate Structure Constraint (CSC; Ross 1967, Grosu 1973,

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[3] Note that CS in any bracket expressions is not a label. It is only a notation to mark the coordinate structure.

Goldsmith 1985, Lakoff 1986; etc.), can be derived by interactions between the role of the coordinator in labeling and general mechanisms/conditions such as minimal search and (anti)locality (Bošković 2005, 2014, 2016a).

Second, the analysis provides insights for how CS observe external restrictions (Przepiórkowski 2022, Patejuk and Przepiorkowski 2023). This is a result of the status of the [& Conj2] complex as an adjunct to Conj1. Hence, only Conj1 must always satisfy external selectional requirements, while Conj2 is neglected for this purpose. The phenomenon that sometimes a subcategorization-violating Conj2 in CS causes ungrammaticality is due to independent reasons. However, for functional restrictions, both Conj1 and Conj2 must always satisfy them.

Lastly, the analysis provides a new angle for CS-related phenomena such as across-the-board (ATB) movement, parasitic gaps and gapping. Following the analysis in this paper, internal and external restrictions work together to determine properties of these constructions. The analysis provides precise characterization of the generative processes of these constructions and the constraints on them; it thus also has explicit predictions for their behaviors.

The analysis strongly promotes the minimalist view that it is the interactions between lexical properties, functional elements and basic syntactic conditions/mechanisms that derive the superficially diverse phenomena in natural languages.

## 2.   The root-likeness of coordinators in syntax

In this section, I discuss the two basic syntactic properties of coordinators and how they affect the syntax of coordinate structures (CS).

It will be argued that coordinators may syntactically behave in a root-like way in the sense that they are underspecific for categorial features and unselective for their syntactic contexts. Hence, coordinators cannot label, resulting in a labeling problem within CS.

The underlying reason for such properties of coordinators and CS is that there is a mismatch between (lexico)semantics and syntax of coordinators.

Before going into discussions, it is necessary to justify that CUL data should be treated as coordination of genuinely distinct categories, rather than CL structures surfacing as CUL via special mechanisms. This is convincingly argued for by Przepiórkowski (2022) and Patejuk and Przepiorkowski (P & P) (2023), against works such as Bruening and Al Khalaf (B & AK) (2020).

B & AK (2020) propose that superficial CUL data may be derived from CL structures by three mechanisms, i.e., conjunction reduction (CR), super-categories (SCs) and empty heads (EMs). The latter two mechanisms will be our focus here.

In B & AK's (2020) system, two supercategories, Pred (based on PredP of Bowers 1993) and Mod (based on ModP of Rubin 2003), subsume traditional categories of predicative phrases and those of modifiers, respectively. In (6a), the supercategory Pred contains NP and AP; in (6b), Mod contains AdvP and PP. The identity of SCs licenses the coordination in both cases.

(6) from Sag et al. (1985)
a. Pat is [$_{Pred:\{NP, AP\}}$ [$_{Pred:NP}$ a Republican] and [$_{Pred:AP}$ proud of it]].

b. We walked [_Mod:{AdvP, PP}_ [_Mod:AdvP_ slowly] and [_Mod:PP_ with great care]].

The two empty heads (EHs), i.e., ∅_N (active in syntax) and ∅_Adv (active in lexicon), transform the subcategorization-violating conjunct which is linearly farther from the selecting head into the category of the properly subcategorized, linearly closer conjunct. See (7). For example, the verb *depend* selects an *on*-PP as in (8a-b), but (8c) is grammatical. A phonetically and semantically vacuous nominal head converts the internal CP conjunct into an NP.

(7) a. H [Conj1 & ∅ Conj2]   (H Conj1 acceptable but not H Conj2 not; ∅ changes category)
    b. [∅ Conj1 & Conj2] H       (Conj2 H acceptable but not Conj1 H; ∅ changes category)
(8) from (Sag et al. 1985: 165)
    a. You can depend on my assistant.
    b. *You can depend (on) that he will be on time.
    c. You can depend on [_CS_ [_NP_ my assistant] and [_NP_ ∅_N_ [_CP_ that he will be on time]]].

Both mechanisms face some severe theoretical and empirical problems. Here, I only mention those that involve data which will be re-analyzed/re-interpreted in this paper.
For coordination of semantically specified arguments such as (9), the coordinated categories - some typical for modifiers (e.g., PP, AdvP) - are all arguments, because their absence results in ungrammaticality. Hence, it is completely unclear whether or not, and how the computational system can distinguish between the two SCs Pred and Mod. The EHs mechanism cannot apply here because there is no subcategorization violation. For cases to which EHs can apply, such as (10), another mechanism mentioned by B & AK (2020), CR, is unlikely to be in play, given the presence of *both ... and ...*, *not only ... but ...* and the grammaticality of pseudoclefts as in (11).

(9) from P & P (2023)
    a. … not all of us treat our animals [[_PP_ with respect] and [_AdvP_ humanly]]!
    b. … information … worded [[_AdvP_ clearly] and [_PP_ in a straightforward manner]].
    c. Do you treat the four museums [[_AdvP_ individually ] or [_PP_ as a collective]]?
    d. Many in DC behave [[_NP_ this way] or [_AdvP_ worse]].
(10) from P & P (2023)
a. This boycott would show not only [_NP_ unity] but [_CP_ that there is a price to pay for killing us].
b.… a stance which conveyed both [_NP_ power] and [_CP_ that he was at ease].
c. I understand [_NP_ those concerns] and [_CP_ that they are sincerely held].
d. That meant either [_NP_ a pardon] or [_CP_ that her appeal would be expedited].
(11) Not only [_NP_ our great unity in the face of oppression] but also [_CP_ that there is a price to pay] is what this boycott would show. (from P & P (2023); cf. (10a))

However, P & P (2023) further argue that the EH analysis loses its effects for data such as (11) where a change in the order of conjuncts does not alter the grammaticality, as in (12a-b); see (13a-d) for more examples. This contradicts with predictions from their mechanism (7)[4].

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[4] Note that P & P (2023) argue that the awkwardness of cases such as (13d) is due to the unbalanced weights of the two conjuncts. This can be seen in contrast with (12), where the two conjuncts are roughly of the same weight.

(12) adapted from Sag et al. (1985) and P & P (2023)

a. This boycott would show not only [NP our great unity in the face of oppression] but also [CP that there is a price to pay].

b. This boycott would show not only [CP that there is a price to pay] but also [NP our great unity in the face of oppression].

(13) a. I didn't remember until it was too late [[NP John's inability to get along with Pat] and [CP that he had no background in logic]]. (from P & P 2023)

b. I didn't remember until it was too late [[CP that John had no background in logic] and [NP his inability to get along with Pat]]. (from P & P 2023)

c. Pat remembered [[NP the appointment] and [CP that it was important to be on time]]. (Sag et al. 1985: 165)

d. ??Pat remembered [[CP that it was important to be on time] and [NP his resume]]. (B & AK 2020: 19)

Moreover, the EH strategy gives an overgeneralization that an NP-CP coordination will always be grammatical as arguments of a predicate that selects an NP, as long as the order of conjuncts is correct as in (7). However, verbs such as *withdraw* and *strengthen* select for an NP but not a CP as in (14a-b), but they cannot combine with an NP-CP coordination, as shown by (14c).

(14) from P & P (2023)

a. {He withdrew / This strengthens} {this claim / the claim that Homer is a genius}.

b. *{He withdrew / This strengthens} that Homer is a genius.

c. *{He withdrew / This strengthens} this claim and that Homer is a genius.

These, along with many other empirical data and theoretical arguments from P & P (2023) and genuine CUL examples from languages such as Polish and Estonian (Przepiórkowski 2022), convincingly show that CUL data are coordination of genuinely unlike categories.

Once this position about CUL cases is established, we can now inspect the syntactic properties of coordinators and CS without any bias rooted in CL.

The first property I call for the readers' attention is that coordinators can be syntactically underspecific: they have no categorial features, as also argued for by some other authors, e.g., Zhang (2010, 2023).

In the classic &P analysis (1a, repeated below)[5], the relation among Conj1, & and Conj2 is identical to the standard Spec-Head-Comp relation – there is no syntax-semantics mismatch in that the head both semantically selects and syntactically projects.

It is clear that a coordinator must connect conjunct(s). However, complement-taking and categorial specification in syntax are independent properties (Zhang 2023). Whether coordinators form and/or project an independent syntactic category or not, the fundamental

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5 Works such as Dik 1968, Sag et al 1985, Moltmann 1992, Bayer 1996, Zhang (2010. 2023), etc., based on the asymmetries between the two conjuncts in terms of binding, pronominalization and licensing negative polarity items, denies the flat-structure proposal for CS (Chomsky 1965, Dik 1968, Goodall 1987, Phillips 2003, Takano 2004, Wurmbrand 2008, a.o.) and treats them as binary-branching (specifier-head-complement) structures. Without repeating arguments, I follow them in this respect.

question behind the traditional view, has been under debate. Here, I argue that they do not, and that instead coordinators should be treated as non-categorial elements in syntax.

(1) a. [$_{\&P}$ [$_{CF_1}$ Conj1] [$_{\&'}$ & [$_{CF_2}$ Conj2]]]

My first argument is that, if & is a head with a unique label and if the [& Conj2] complex is an X'-level projection, it should be crystal clear that this complex is of the category of &, reminiscent of a common V' object as in (15a). However, empirically, it is a cross-linguistic pattern that native speakers are unclear about the category of the standing-alone [& Conj2] complex as in (16) – they are unlike the V' object with respect to labeling/categorization. For the [Conj1 &] complex, speakers' judgements are similar.

(15) a. [$_{V'}$ eat apples]      b. Subj [$_{VP}$ <Subj> V Comp]      c. [$_{<F, F>}$ Spec Head]
(16) a. *[$_?$ books and], ?[$_?$ and toys]      vs. [$_{NP}$ books and toys]
        b. *[$_?$ wan      he], ?[$_?$ he      chi]   vs. [$_{NP/VP}$ wan    he   chi] (Mandarin Chinese)
              playing   and    and   eating            playing and eating
        c. *[$_?$ los    libros    y], ?[$_?$ y    el      bolígrafo] vs. [$_{NP}$ los libros y el bolígrafo] (Spanish)
             the-PL book-PL and    and   the-SG   pen-SG      'the books and the pen'

Furthermore, the Subj-V/Spec-Head complex is standardly assumed to be labeled by moving the subject/specifier out (15b) (Moro 2000, Chomsky 2013, Rizzi 2016, etc.), or via feature-sharing (15c) (Rizzi 1997, Chomsky 2013, etc.). However, Conj1 in CS usually cannot move, and there is no evidence for feature-sharing (in English). If the [& Conj2] complex is a labeled X'-level object, the entire CS cannot be labeled anyway – there is no available mechanism as those for a Subj-V or Spec-Head complex (15b/c).
Moreover, for completed CSs, native speakers are clear that they are of the category of conjuncts[6] (NP in 16a, NP/VP in 16b and NP in 16c). This also speaks against the view that coordinators form/project a category and that they head and label &P.
The traditional &P analysis simply assumes that a [& Conj2] complex forms a &' projection. But, here, it is exactly the questions of whether or not coordinators from a basic syntactic category and whether or not they can label CS that are unclear. Hence, these ground-level assumptions in the &P analysis (or any category-specific analysis for CS) result in a circulatory argumentation, which should be abandoned.

My second argument relates to a continuum of semantics-syntax-phonology interplay of conjunction words in general.
Apart from structurally linking two expressions, conjunction words may express certain relation between them, e.g., addition (*and*), alternation (*or*), contrast (*but*, *yet*), condition (*if*), causation (*so*, *because*), etc.

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6 The completed CS in (16) are of the same category of the first conjunct, which seems to support Zhang's (2023) analysis that a coordinate structure is always labeled by its external conjunct. However, this is the consequence of the conjuncts being of the same category, an independently determined matter. It does not prove that it is the external conjunct which labels the CS. The labeling process in my analysis is different from that of Zhang (2023), and such cases result from the categorial-identity of the two conjuncts, capturing this point. When CUL data and relevant tests for my analysis are taken into consideration, this difference plays a crucial role.

In English, the semantically simplest conjunction word *and* is syntactically most flexible - it can connect various categories. In contrast, *if* and *but* may connect adjectives, DPs, etc., while *because* (apart from *of*-PP) and *yet* connect only clauses. Also, some conjunction words, e.g., *so*, *or*, *and*, can co-occur with complementizers or Spec of CP such as *whether*, while others such as *yet*, *because*, *if* may be incompatible with them, as in (17). (Some of) the latter group may be overt realization of a functional category.

Another contrast concerning the differential syntactic status of conjunction words is that some of them, such as *and*, *or*, *but*, may precede others like *yet*, *because*, but not vice versa; see (18).

(17) *and that/whether*, *or that/whether*, *but that/whether*, …, *\*yet that*, *\*because that*, *\*if that/whether*

(18) a. *and yet*, *and because*, *??or yet*, *or because*, *\*but yet*, *but because*

    b. *\*yet and*, *\*because and*, *\*yet or*, *\*because or*, *\*yet but*, *\*because but*

Note further that *and* can often be omitted or phonologically null, while conjunctions words expressing contrast, causation, etc. can never or only rarely be omitted. In data such as (19), all intermediate *and*s can be omitted, and the last *and* may be null, depending on the exhausitivity of conjuncts. This contrasts with the phenomenon that the highest copy (and perhaps all copies) of conjunction words that expresses contrast, causation, etc., can never/rarely be omitted, as in (20), in line with omission of lower copies of *wh*-phrases in English as in (21)[7].

(19) from Zhang (2023)

    a. I met someone young, happy, eager to go to college, (*and) tired of wasting time, …

    b. I met someone young, happy, eager to go to college, *(and) tired of wasting time.

(20) a. I knew him *(because) he was the top student, ??(because) he attended the conference, (because) we had the conference dinner together.

    b. I understand his circumstance, *(yet/but) I do not forgive him, ??(yet/but) I will only stay away from him.

(21) *I saw he bought what.    vs.    I saw what he bought <what>.

Therefore, there is a continuum (22) for the semantics-syntax-phonology interactions of conjunction words: the richer their semantic contents are, the less syntactic flexibility (in terms of what categories they can connect, their compatibility with overt complementizers and Spec,CP elements, etc.) and phonological optionality they enjoy.

(22)
$$\text{contentive semantics} \xrightarrow[\text{phonology: obligatory} \to \text{optional}]{\text{syntactic flexibility: low} \to \text{high}} \text{vacuous semantics}$$

On the left-side extreme are conjunction words such as *because*, *yet* which can only introduce clauses, incompatible with complementizers or Spec,CP elements, and which can never/rarely be omitted. On the right-end is *and*. The "addition" relation it contributes to the connected

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expressions is the simplest among all conjunction words, which almost reduces to a structural link between conjuncts, provided naturally by the structure-building operation MERGE. Thus, concerning syntactic flexibility, a reflection of the continuum (22) in syntactic specification can be (23) that entails categorial status. Due to their low syntactic specification, some conjunction words are syntactically flexible – able to connect various categories and co-occur with other functional elements (e.g., overt complementizers), etc.

(23) root(-like) elements $\xrightarrow{\text{syntactic specification: low} \rightarrow \text{high}}$ functional categories (C, T, ...)

From this perspective, it is likely that coordinators such as *and*, *or*, *but* are non-categorial at all because they are close to the right-side edge of the continuum (22) but the left-end of (23): they have simple semantics, low syntactic specification, hence high syntactic flexibility and phonological optionality.

One may still be reluctant to admit that coordinators do not form an independent category, and be lost about how we can analyze CS based on this view – after all, coordinators and CS show syntactic behaviors distinct from other categories and constructions.

Here comes my last argument - treating coordinators as forming/projecting a dedicated syntactic category is the human way of thinking/analyzing, not necessarily how the derivation/computation in the faculty of language works!

Linguists classify coordinators as a unique category because they display distinct behaviours and (usually) do not allow new members. It also seems natural to expect that a CS has a unified label/category, because the coordinator & is the core (structural) linker. Hence, we have &P analysis and Zhang's (2023) Conj1-labels-CS account (discussed later), etc.

But syntax, a computational system, conducts structure-building according to lexical properties and general conditions/mechanisms. It does not care whether or not the CS has a unified label, i.e., it tolerates the possibilities that there are two labels within a CS and that the entire CS is unlabeled. It is not necessarily the case that there is only one uniform category/label for a CS. In the derivation/computation, it is the interactions between the coordinator and the conjunct(s) that result in the phenomena we see – it may be (more often) the case that some elements are just syntactically underspecific – as roots have been assumed to do (Harris 1996; Acquaviva 2009; a.o.). As mentioned above, the traditional &P view faces problems; I will later show that a non-categorial analysis better captures empirical data and that it is theoretically more elegant and consistent with minimalism.

I therefore support the view that coordinators (*and*, *or*, *but*, etc.) have no categorial features and that they do not form/project an independent category[8].

The second property of coordinators is that they are unselective for syntactic contexts. In CUL data such as (2) and (9-13), basically any categories can be coordinated, though which two exact categories are available in a specific CUL construction may vary[9].

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8  See Zhang (2010, 2023) for more on this position.
9  This is another matter – external constraints on the syntactic position of a CS constrain which categories can be coordinated and what properties the CS must have (Przepiórkowski 2022; Patejuk and Przepiorkowski 2023). I return to this question in Section 4.

The underlying issue is a potential mismatch between (lexico)semantics and syntax of coordinators: their lexicosemantic property may require that a coordinator connects some conjunct(s), but it may not necessarily syntactically project/label the structure.

Taking this view, a coordinator itself, when combined with its internal conjunct, may not label. The labeling procedure within a CS is thus the crux.

To sum up this section, coordinators behave in a root-like[10] way in syntax in the sense of their syntactic underspecification and unselectiveness. They cannot label. This is due to a semantics-syntax mismatch, and will lead to my proposals in the next section.

## 3. Proposals and predictions

Given the above discussions, our position to some fundamental issues about coordinators and coordinate structures (CS) has been established. Specifically, coordinators are syntactically unspecified for categorial features; they do not form and project an independent syntactic category. They are also unselective for their contexts – there is no CL. Moreover, CUL data are coordination of genuinely distinct categories.

Now, based on these, I make two proposals about CS as in (24).

(24)
Proposal 1 (Abandonment of CL): The coordination-of-likes condition (CL), which basically functions as an output condition on coordination in the literature, is abandoned[11].
Proposal 2 (Feature inheritance for [& Conj2]): When a coordinator & merges with its internal conjunct (Conj2), the resulted object [& Conj2] inherits the label of Conj2.

Now, the proposals (24) depict the analysis (25) for coordination.

(25) X [$_{CS}$ [$_{C\mathcal{F}_1}$ Conj1] [$_{C\mathcal{F}_2}$ & Conj2]]

The coordinator & behaves as a "fuzzy" root: with no categorial feature, it cannot label/categorize. The [& Conj2] complex inherits its label $C\mathcal{F}2$ from Conj2 and then merges

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10 Jarry Chuang (p.c.) notes as a potential problem that treating coordinators as root(-like) blurs the boundary between morphology and syntax. Under a one-engine framework such as Distributed Morphology where words are also built by syntax, there is no serious boundary between them and this distinction is used only for convenience of description and theorizing. What I want to say is more subtle: there are not only roots, but also items reminiscent of roots in some respect(s). Coordinators are exactly what I consider to be an instance: they may lack categorial features and the ability to categorize just like roots; however, they do not need a categorizer (n, v, etc.) for categorization, but a conjunct. They are also morphologically complete, disallowing any further modification.
11 There is a weaker version: CL may not be an output condition in some CSs. This is suggested by Prof. Zhang Qingwen based on the fact that some coordinators can only connect conjuncts identical category, e.g., *he* 'and' in Mandarin Chinese. I maintain the strongest claim formulated here for the following reasons. On the one hand, it is not the case that coordination by *he* can apply to only one category – it can form NP-NP, AdjP-AdjP and VP-VP coordination, etc. On the other hand, if a coordinator can only connect certain category XP, CL necessarily appear as the superficial phenomenon, while if the coordination can apply to different categories, as in the case of *he*, why the two conjuncts in every specific CS must be categorially identical is unclear – saying that there is a CL requirement is circulatory; it is not explanatory. As will be shown later, the best possible explanation is still that external constraints restrict the categories available in a coordination by *he*. In any event, CL is only a description of one empirical pattern. I also thank Yuqiao Du (The Chinese University of HongKong) for discussion.

with Conj1 due to the lexicosemantic property of &[12]. Conj1 has its label *Cℱ1* that may or may not be identical with *Cℱ2*, an independent state of affair[13].

The second proposal sets my analysis for CS, i.e., (25), to a path different from any others in the literature (e.g., Bošković 2020; Fortuny, 2024; Zhang 2010, 2023; etc.). I leave aside comparisons between the present analysis to that of Bošković (2020), Fortuny (2024), etc., noting merely that they are insufficient for CUL cases because CL is their core ingredient.

But it is important to note that my analysis is minimally different from Zhang's (2023) proposal where the [& Conj2] complex is unlabeled and where the entire CS is labeled by Conj1. Here, as a first step, I argue that my proposal is theoretically superior to Zhang (2023).

In Zhang's (2023) analysis, two levels of structure-building necessarily take place for CS: the complementation level where Conj2 merges with &, and the categorization level where the product of the first level, i.e., the [& Conj2] complex, merges with Conj1 to categorize the CS. Crucially, the category-less coordinator &, when merging with Conj2 of the label *Cℱ2*, does not get this label, as in (26). The entire process is as (27).

(26) [? & [$_{Cℱ2}$ Conj2]]
(27) ... X [$_{Cℱ1}$ [$_{Cℱ1}$ Conj1] [$_{? \to Cℱ1}$ & [$_{Cℱ2}$ Conj2]]]

Zhang's (2023) proposal is analogous to labeling of a root-categorizer merger. When a root merges with its categorizer as in (28 = Zhang (2023): p. 7, ex. 15), it is labeled immediately.



(28)

On the one hand, there is little difference between (26) and (28) with respect to labeling: the coordinator &, being root-like, merges with a labeled object. Categorization within a larger syntactic domain (Marantz 2001) is available, and this is a natural thing in bottom-up structure-building procedures. Allowing (26) to be labeled by Conj2 also meets the earliness requirement for labeling (Bošković 2016a; etc.).

On the other hand, my analysis (25) is empirically more solid than Zhang (2023).

Native speakers do not judge CUL data such as (2) as the entire CS bearing the category of Conj1 or Conj2 – two categories/labels necessarily occur: what is coordinated is DP and AP in (2a), PP and CP in (2b), etc. However, the category/label of the entire CS is not so clear as to be a DP or AP in (2a), and a PP or CP in (2b). Moreover, Zhang's (2023) analysis predicts that since [& Conj2] is unlabeled, this complex cannot standalone. But such cases actually exist, as

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12 The relation between the coordinator (or the [& Conj2] complex) and Conj1 is obscure in that on the one hand, they must combine, while on the other hand, they are to some degree (and/or in some circumstances) syntactically independent. Simply accepting this to be a property of CSs, I will not go further on this issue (but see Section 6 for a brief discussion).

13 Shijia Wang notes that in some cases of nominal coordination, such as *apples and water*, the entire CS receives a generic reading, despite the fact that apple is a count noun. She therefore suggested that any CS may after all receive a unified syntactic label and semantic type. While I do not object that at interfaces a unified semantic type and interpretation may be achieve for such cases, I still hold that a unified syntactic label is not possible for CUL data, as argued above and as extraction data strongly suggest (see Section 4).

in (29)[14]. The current analysis allows such cases because they receive their labels directly from Conj2. Later, we will see more empirical evidence supporting the analysis in this paper.

(2) adapted from Sag et al. (1985), Grosu (1985), Zhang (2010), P & P (2023)
    a. Pat is [$_{DP}$ a Republican] and [$_{AP}$ proud of it].
    b. You can depend on [$_{DP}$ my assistant] and [$_{CP}$ that he will be on time].
    c. John devoured [$_{DP}$ only pork] and [$_{PP}$ only at home].
    d. Pat remembered [$_{DP}$ the appointment] and [$_{CP}$ that it was important to be on time].
    e. Many in DC behave [$_{NP}$ this way] or [$_{AdvP}$ worse].
(29) -Robin ate fish. -And rice!                    (adapted from Zhang 2023)

So, proposals on CS in the literature, including Zhang (2010, 2023), face the dilemma that on the one hand, coordinators themselves seem not able to label the [& Conj2] complex and the entire CS, while on the other hand, the assumption that Conj1 labels CS counters intuitive judgements. Ideally, if a coordinator does not have a categorial feature, the resulted object should immediately inherit a label from the complement, i.e., Conj2, upon their merger.

Let us now turn to the consequences of the novel analysis (25).
It immediately predicts two things. First, the coordinator & extends the projection of Conj2, so [& Conj2] is rigidly a phase under a contextual view (Bošković 2014). Second, when Conj1 and [& Conj2] merge together, only if $C\mathcal{F}1 = C\mathcal{F}2 = C\mathcal{F}$ can the structure be labeled via feature-sharing/identity, otherwise an unlabelable XP-YP (phrase-phrase) merger occurs[15], as in (30). Therefore, extraction patterns are determined by the two labels within the CS, i.e., $C\mathcal{F}1$ and $C\mathcal{F}2$, a natural test ground for the present analysis.

(30) X [$_{C\mathcal{F}1=C\mathcal{F}2=C\mathcal{F} \text{ or } ?}$ [$_{C\mathcal{F}1}$ Conj1] [$_{\text{phase-}C\mathcal{F}2}$ & Conj2]]

In the next section, we inspect how well this novel analysis can cover empirical data and explain puzzles about external restrictions on CS.


## 4. Extraction patterns, external restrictions and extensions of the analysis
### 4.1 Extraction data as a test ground
The current theory entails rich predictions for patterns of extraction from CS.
We start with examining the two patterns predicted by the theory.

### 4.1.1 Case One (CL): $C\mathcal{F}1 = C\mathcal{F}2 = C\mathcal{F}$
The coordinate structure (CS) is labeled as $C\mathcal{F}$ under feature identity, extending the [& Conj2] phase; this is illustrated by (31). The CS can be extracted in entirety, in virtue of minimal search.

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14 I thank Jarry Chuang in pointing out the issue that cases such as (29) are different from ungrammatical ones e.g., *and book*, where there is no (syntactic or pragmatic) antecedent Conj1 in the CS. The reason why sometimes a [& Conj2] can stand alone remains as a question. The analysis in this paper can be foreseen to be compatible with an account for this question, but Zhang's (2023) analysis already denies the well-formedness of such data from their syntactic status, an undesirable situation.
15 I thank Jarry Chuang very much for comments on this issue, which turned out to play a crucial role in my analysis and to be extendable to many other questions about coordinate structures.

If a proper goal feature $\mathcal{GF}$ is present, an CS-internal item may be moved.

(31) X [$_{\text{CS phase-}CF}$ [$_{CF}$ Conj1] [$_{\text{phase-}CF}$ & Conj2]]

In Bošković (2016b), unlabeled projections cannot be distinguished from labeled ones. When the movement of an item $\alpha$ targets a projection XP as its landing site, the unlabeled projection below XP, as marked by ? in (32), gives rise to a violation of the antilocality condition that movement targeting XP must cross a projection distinct from XP itself.

(32) *$\alpha_i$ [$_{\text{XP}}$ … [$_?$ $t_i$ …]]

The situation in (31) represents another possible case of antilocality violation: the [& Conj2] complex is a phase of the label $CF$, and the CS is, too. Thus, if something extracts from Conj1, it must move firstly to the CS edge. However, if something were to extract from [& Conj2], it firstly moves to the edge of the [& Conj2] phase, then to the edge of CS phase. Since both have the same label $CF$, extraction from [& Conj2] violates antilocality (Bošković 2016b).

The predictions are borne out in typical data such as (33).
The CS is topicalized in (33a-b). Minimal search targets the CS in entirety in virtue of a uniform label DP. Here, CS behave as linear/flat structure in virtue of label identity.
For extraction from Conj1 (33c), the *wh*-phrase passes the CS phase edge, undergoing regular *wh*-movement (Chomsky 1998, Bošković 2008, a.o.) all the way to the final landing site.

(33) a. [$_{\text{CS-DP}}$ [$_{\text{Conj1-DP}}$ John] [$_{\text{DP-phase}}$ and Mary]], I saw.
　　b. [$_{\text{CS-DP}}$ [$_{\text{DP}}$ Sunrise], [$_{\text{DP}}$ work] [$_{\text{DP}}$ and sleep]], my day simply is.
　　c. … the drug which$_i$ athletes [$t_i$ [$_{\text{CS-VP phase}}$ [$_{\text{Conj1-VP}}$ take $t_i$] [$_{\text{VP phase}}$ and become quite strong]]].
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　(Bošković 2020)

The sentence (34a) has ambiguous structures (34ai) or (34aii), where Conj1 may or may not contain the DP *friends of*. When the DP *friends of* is not in Conj1 (34i), the people seen are friends of both *John* and this *who* in question (Reading 1). When it does (34ii), the people seen are *John* and friends of this *who* in question, mutually irrelevant (Reading 2)[16].
What we see is that in either case, the *wh*-word cannot be extracted along.

(34) a. *Who did you see friends of and John?
　　ai. *Who$_i$ did you see friends of [$_{\text{CS-DP, }wh}$ [$_{\text{Conj1-DP, }wh}$ $t_i$] [$_{\text{DP-phase}}$ and John]]]?　(Reading 1)
　　aii. *Who$_i$ did you see [$_{\text{CS-DP, }wh}$ [$_{\text{Conj1-DP, }wh}$ friends of $t_i$] [$_{\text{DP-phase}}$ and John]]?　(Reading 2)

Assuming that the *wh*-feature obligatorily percolates onto the CS[17], the *wh*-word itself cannot

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16 My informants confirm that with such cases, they are not clear whether it refers to John's friends or not. They also consider cases like (34i) to be semantically less confusing.
17 Essentially following Fortuny (2024); see arguments therein. This may be a natural side-product of the feature sharing/identity between the *wh*-word as Conj1 and in the [& Conj2] complex. The same analysis can be applied to extraction of a conjunct itself, such as data below from Fortuny (2024).
i.　　　*How was Emma [$t_i$ and sleepy]?
ii.　　　*How was Emma [tired and $t_i$]?

be targeted by minimal search, hence (34a) is ungrammatical. Note that (anti)locality is not responsible for the ungrammaticality of (34ii), because if *who* could be targeted by minimal search, the sentence would be good - *who* will move firstly to the edge of the CS phase, and then successively to the final landing site, no (anti)locality violations.

Now, (34) stands in contrast with (33c) where the *wh*-feature of *which* does not percolate onto the CS. Cases of preposition stranding/pied-piping are similar. A potential perspective is that since the *wh*-word is selected as the complement by the verb, its features are "confined" there.

A piece of supportive evidence is that the CS in entirety may be extracted as in (35), the awkwardness due to a lack of means to distinguish between two interpretations, not a syntactic reason. After linearalization, structures (34ai-aii) (with the two readings, respectively) cannot be distinguished. One resorts to prosodic means. So, Reading 2 requires phonological adjacency of *who* and *and John*, while to convey Reading 1, *friends of who* and *and John* are broken apart. From this perspective, (34) is bad not only because the *wh*-word cannot be reached by minimal search in both structures (34i-ii), but also because movement of the entire CS followed by a partial deletion (accepting the copy theory of movement and rescue-by-PF-deletion mechanism; see Chomsky 1993, 1995, Bošković 2011, etc.) sabotages the phonological means of ambiguity elimination for (34i); this is illustrated by (36).
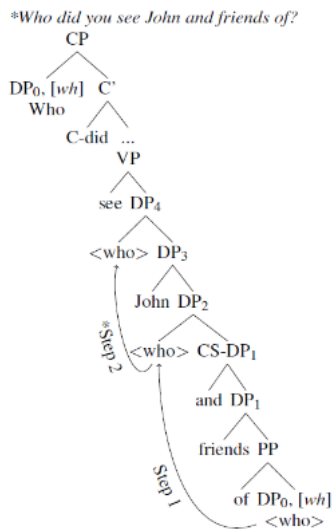
Note that cases like (37a) are not uncommon; their contrast with (37b) again confirms that when $C\mathcal{F}1 = C\mathcal{F}2 = C\mathcal{F}$, the CS can only move in entirety.

(35) i. ??[CS-DP Who and John] did you see friends of?
    ii. ??[CS-DP Friends of who and John] did you see?
(36) *[Who ~~and John~~] did you see friends of [~~who~~ and John]?
(37) a. [CS Clean the table and wash the dishes], John did.
    b. *The table and wash the dishes, John did/cleaned.

For (38a), extraction from [& Conj2], *who* firstly moves to the edge of DP$_1$ phase (Step 1)[18]. When *John* merges in and extends the projection into DP$_3$, its movement to the CS-DP$_3$ phase edge (Step 2) is within the same phrase. This violates the antilocality condition that at least one projection must be crossed (Bošković 2005, 2014, 2016a; a.o.); see (38b) and (38c).

(38) a. *Who$_i$ did you see John and friends of t?
    b. *[CP Who$_i$ … see [CS-DP3 edge t$_i$ [CS-DP3 phase John [edge t$_i$ [DP1-phase and friends of ti]]]]]?

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18 I am adding the indexes here to illustrate the expansions of the DP during the derivation. It is the same single projection all the time, so both steps of movement of *who* are within one phrase.

*Who did you see John and friends of?

CP

DP₀, [wh] — C'
Who

C-did ...
VP

see DP₄

<who> DP₃

John DP₂

*Step 2  <who> CS-DP₁

and DP₁

friends PP

Step 1  of DP₀, [wh]
<who>

c.

All predictions of the analysis to coordination are borne out. We move to the other case.

### 4.1.2 Case Two (CUL): $\mathcal{CF}1 \neq \mathcal{CF}2$

When $\mathcal{CF}1 \neq \mathcal{CF}2$, the CS, an XP-YP merger, cannot be labeled.

The current analysis predicts that syntactically, an item within the unlabeled CS may move out only if it crosses a labeled projection other than the target projection. Recall that Conj1 and Conj2 (hence the [& Conj2] complex) have their own labels. Thus, in (39), Conj1 and [& Conj2] do not block extraction (out) of each other that targets XP, if the above condition is satisfied. However, extraction of the unlabeled CS itself is strictly banned in syntax (Bošković 2018). So, still, grammaticality of extraction is determined by general mechanisms/conditions.

(39) [$_{XP}$ ... [$_{CS-?}$ [$_{\mathcal{CF}1}$ Conj1] [$_{phase-\mathcal{CF}2}$ & Conj2]]]

In (40a), the *wh*-phrase undergoes regular *wh*-movement. It passes across the unlabeled CS – at the point of this movement, there is no label on CS, as indicated by the ? notation. For those who accept the sentence, the movement is licit because it crosses a higher phrase. For those who reject it, it is bad due to an antilocality violation that happens when a higher phase, e.g., $v$, merges in and the *wh*-phrase lands at the edge – movement did not cross an entire labeled phrase, i.e., $v$P, since the unlabeled CS cannot be distinguished from it. See (38a') for illustration.

(40) from Zhang (2023)

a. [What kind of herbs]$_i$ can you [$_{CS-?}$ [$_{Conj1-VP}$ eat t$_i$] [$_{phase-NegP}$ and not get cancer]]?
b. ... [t$_i$ [$_{vP}$ $v$ [$_{CS-?}$ [$_{Conj1-VP}$ eat t$_i$] [$_{phase-NegP}$ and not get cancer]]]]?

In (41a), the *wh*-phrase moves firstly to the NegP phase edge[19], delabeling it. It then moves

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19 The syntactic status of the negator affects the analysis. Here, I follow the NegP treatment for English (but it may not be heading a phrase in other languages). This determines which case ($\mathcal{CF}1 = \mathcal{CF}2$ or $\mathcal{CF}1 \neq \mathcal{CF}2$) such sentences belong to, but the mechanisms are ready to explain them.
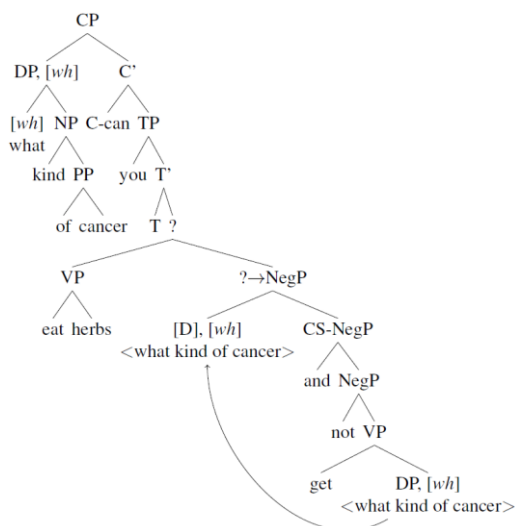
As another matter, Shiyang Fu notes that for extraction, there may be conditions on the (discourse) relation between conjuncts and the discourse properties of the *wh*-phrase. For example, if how instead of what is extracted, (40) becomes better than (41):

i.　　　How$_i$ can you eat t$_i$ and not get cancer?

across the unlabeled CS and successively to the final landing site [Spec,CP]. See (41b) for illustration. This sentence may be found grammatical or not, for the same reasons as above.

(41) a. [What kind of cancer]$_i$ can you eat herbs and not get t$_i$?
     b.

```
                        CP
                   /         \
              DP, [wh]         C'
             /    \          /    \
        [wh]  NP  C-can       TP
        what   /  \          /   \
           kind   PP      you    T'
                 /  \           /   \
              of cancer       T     ?
                             /        \
                           VP          ?→NegP
                          /  \        /        \
                    eat herbs   [D], [wh]      CS-NegP
                              <what kind of cancer>   /    \
                                                  and    NegP
                                                        /    \
                                                     not     VP
                                                            /    \
                                                          get    DP, [wh]
                                                              <what kind of cancer>
```

Case Two is closely related to how a CS satisfies external restrictions on its syntactic position, a question raised by Przepiórkowski (2022) and Patejuk and Przepiorkowski (P & P) (2023). This is because, superficially, we see conjunctive or disjunctive satisfaction of such restrictions, i.e., only Conj1 or Conj2, or both conjuncts must satisfy these restrictions. This affects the grammaticality of a specific CS. In this sense, licit examples of Case Two are restricted in some way not clear yet, which further constrains how elements within a CS may move.

In the subsection below, we discuss this question and the nature of relevant data.


### 4.2 External constraints on the syntactic position of CS, the adjunct nature of GCP

In this subsection, I view possible patterns of satisfaction of external restrictions (ERs) by CS. I will argue that Conj1 must always satisfy selectional ERs from a higher (verb) head, otherwise the CS is ungrammatical. This is due to the nature of the [& Conj2] complex, what I call the genuine coordination part (GCP): it is an adjunct to Conj1. So, in what seems to be conjunctive cases of fulfilling selectional ERs, only Conj1 is doing the work, a disjunctive manner.

I will also show that other functional ERs on the syntactic position of a CS, e.g., clause typing (Cheng 1997), information structure, seem to require a different satisfaction mode, i.e., both conjuncts must satisfy them – a conjunctive mode.

Based on these, I will argue that other than the syntactic conditions predicted in subsection 4.2, there are further constraints on Case Two ($\mathcal{CF}1 \neq \mathcal{CF}2$) extraction, due to the global/conjunctive satisfaction of functional ERs.

This interestingly provides some perspectives for other coordination-related phenomena, such as across-the-board (ATB) movement, parasitic gaps and gapping.

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ii.         *How$_i$ can you eat this kind of herb and not get cancer t$_i$?
Also, there are works that suggest that certain semantic relation (cause-effect) may hold for an element to be extracted from CS. I leave these issues for future work under the framework provided in this paper.

As extensively illustrated by (42), a CS must satisfy the ERs imposed on its syntactic position by a higher head/object. The verb *convey* can select either an NP/DP or a CP (42a'-a''); thus, it tolerates the coordination of these two categories (42a-ā)[20]. The same applies to verbs that select for manner or durative arguments as in (42b'-c). On the other hand, the verbs *strengthen* and *withdraw* select only an NP/DP but not a CP as shown by (42d'-d''); an NP like *claim* in turn may take a CP as its complement as in (42d'''). However, in (42d) and (42d̄), the coordination of an NP/DP and a CP as the object of *strengthen*/*withdraw* is ungrammatical.

(42) from P & P (2023)

   a'. … a stance which conveyed power.    a''. … a stance which conveyed that he was at ease.

   a. … a stance which conveyed [$_{CS}$ both power and that he was at ease].

   ā. ??… a stance which conveyed [$_{CS}$ that he was at ease and power].

   b'. … treat the four museums individually.      b''. … treat the four museums as a collective.

   b. Do you treat the four museums {[$_{CS}$ individually or as a collective] / [$_{CS}$ as a collective or individually]}?

   c'. … my stay in Vienna lasted forever.    c''. …    my stay in Vienna lasted no time at all.

   c. I feel like my stay in Vienna lasted both {[$_{CS}$ forever and no time at all] / [$_{CS}$ no time at all and forever]}.

   d' {This strengthens / He withdrew} this claim.

   d''. *{This strengthens / He withdrew} that Homer is a genius.

   d'''. {This strengthens / He withdrew} the claim that Homer is a genius.

   d. *{This strengthens / He withdrew} [$_{CS}$ the claim and that Homer is a genius].

   d̄. *{This strengthens / He withdrew} [$_{CS}$ that Homer is a genius and the claim].

These cases reflect two patterns of satisfaction of selectional ERs, as in (43). In Pattern A, the head can select for two categories *CF1* and *CF2*; as a result, a coordination of *CF1* and *CF2* in either order can function as the object/complement of this head. In Pattern B, the head selects only for *CF1*, but coordination of *CF1* and *CF2* in either order is ungrammatical. These two patterns seem to suggest that a CS must satisfy ERs in a conjunctively manner, i.e., both of its conjuncts need satisfy the restrictions in question.

(43) Pattern A:    $H_{1,2}$      *CF1* & *CF2* or *CF2* & *CF1*      √
     Pattern B:    $H_{1,×2}$    *CF1* & *CF2* or *CF2* & *CF1*      *

There are two other logically possible patterns as illustrated by (44). Pattern D is of no value to explore, it is theoretically and empirically solid (as far as I know) to be non-existent. What is puzzling for a theory of satisfaction of ERs within a CS is Pattern C: when the head H selects only for *CF1* but not *CF2*, we find cases where a coordination of *CF1* and *CF2* may be ungrammatical or grammatical; the order of conjuncts matters here. For instance, the verb *devour* must select for an NP/DP but not a PP (45a'-a''). However, their coordination may be grammatical (45a) or not (45ā). See (45b-b̄) for more examples.

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20  The awkwardness of (42ā) is due to the unrelatedness of the two conjuncts and their comparative weights; see P & P (2023) for discussions on cases with the same issue.

(44) Pattern C: H$_{1,\times2}$       *CF1* & *CF2* or *CF2* & *CF1*      √ or *

      Pattern D: H$_{\times1,\times2}$      *CF1* & *CF2* or *CF2* & *CF1*       *

(45) a'. John devoured (only) pork.      a''. *John devoured (only) at home.

     a. John devoured [$_{CS}$ only pork and only at home]. (Grosu 1985, adapted by Zhang 2023)

     ā. ?*John devoured [$_{CS}$ only at home and only pork]. (Zhang 2023)

     b'. You can depend on my assistant.     b''. *You can depend on that he will be on time.

     b. You can depend on [$_{CS}$ my assistant and that he will be on time].

     b̄. *You can depend on [$_{CS}$ that he will be on time and my assistant].

Given ERs, the lack of required object(s) or feature(s) in a specific syntactic position results in ungrammaticality. But the remaining questions, as raised by Przepiórkowski (2022) and Patejuk and Przepiorkowski (2023), are: (i) how does a CS satisfy the ERs in question, conjunctively or disjunctively? (ii) under what condition must the CS do so conjunctively, and what is the condition for it to do so disjunctively? They actually inquire about the correspondence between syntactic positions in a CS and the types of ER they satisfy.

Under the current analysis, every Case Two (*CF1* ≠ *CF2*) CS is an unlabeled XP-YP (phrase-phrase) merger; minimal search must look into the CS. So, theoretically, since the two conjuncts are at the same hierarchical level, either may serve to satisfy the ERs in question – a disjunctive manner. But cases such as (42d), (45ā) and (45b̄) obviously disagree with this position.

Here, I argue that Conj2 escapes from selectional ERs – only Conj1 must always satisfy them. The first important thing about data and patterns (42-45) is that they contain no grammatical cases where Conj1 does not observe the selectional ERs[21]. Second, inspecting Pattern C in (44) more carefully, *CF2* & *CF1* is always bad, while *CF1* & *CF2* may or may not.
These facts reflect that (i) for a CS to be grammatical, it is necessary that Conj1 satisfies the selectional ERs, (ii) Conj2 seems to also affect the grammaticality. This suggests a difference between the two conjuncts – Conj1 is more prominent when it comes to satisfying selectional ERs from a verb. If this is correct, what is the underlying reason? Does Conj2 really play a role?

I argue that this is because the [& Conj2] complex is an adjunct to Conj1. In linguistic theory, the argument-adjunct asymmetry is a syntax-semantics mixed definition – the argument(s) of a predicate must be present in certain position(s) of the syntactic structure, while an adjunct, optionally adding some information, can delete without affecting syntactic well-formedness.
Under the current analysis for CS, i.e., (25) repeated below, one syntactic object behaves exactly in this way – the [& Conj2] complex. It provides additional information and can delete without changing syntactic well-formedness[22], as data in and beyond this paper can show.

(25) X [$_{CS}$ [$_{CF1}$ Conj1] [$_{GCP-CF2}$ & Conj2]]

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21 To the best of my knowledge, there are no such examples.

22 The implicit view here is that adjuncts should be defined strictly in a syntactic way, i.e., they are syntactically optional objects, without considering the changes of meaning resulted from its deletion. The argument that a CS is not an adjunct because it changes the sentence's meaning is not valid. Syntactic structures are built before interpretation; for every sentence, if the meaning conveyed by an adjunct is necessary for the speaker, then it cannot be deleted. Drawing the change of meaning would allow no way for defining adjunct-hood.

For this reason, within CS, I call the object [& Conj2] the genuine coordination part (GCP); GCP is an adjunct to Conj1 when it conforms to the above view on adjunct.

Of course, one see that sometimes Conj2 may also be an argument for the predicate, but given the fact that only Conj1 must satisfy ERs from a verb, it can be the case that the [& Conj2] complex is neglected all together for this purpose. If this is correct, the superficial phenomenon in some data that Conj1 and Conj2 both observe ERs is a delusion – only Conj1 is in play[23].

For illustration, I refer to the part excluding the [& Conj2] complex as main chunk (MC). Under the interpretation of the current analysis, in both CL and CUL data, e.g., (46)[24], the GCP is an adjunct to the Conj1 within MC, and the GCP is neglected for fulfilling selectional ERs of the verb. This is why we see the three possible patterns in (42-45).

(46) from Fortuny (2024), Sag et al. (1985), Grosu (1985), Zhang (2010) and P & P (2023)

    a. [MC Sophia ate [Conj1 two apples]] [GCP and four carrots].

    b. [MC Sophia often [Conj1 goes into the shop]] [GCP and buys red wine].

    c. [MC Pat is [Conj1 a Republican]] [GCP and proud of it].

    d. [MC You can depend [Conj1 on my assistant]] [GCP and that he will be on time].

    e. [MC John devoured [Conj1 only pork]] [GCP and only at home].

    f. [MC Pat remembered [Conj1 the appointment]] [GCP and that it was important to be on time].

    g. [MC Many in DC behave [Conj1 this way]] [GCP or worse].

The analysis is compatible with predicates that select for manner or durative arguments, some examples including (47). Most of them simply fall within Pattern A in (43) - both conjuncts are eligible to satisfy selectional ERs from the predicate - but, again, only Conj1 is doing the work.

(47) adapted Patejuk and Przepiorkowski (2023)

    a. Do you treat the four museums {[Conj1 individually] [GCP or as a collective] / [Conj1 as a collective] [GCP or individually]}?

    b. … information … worded [Conj1 clearly] [GCP and in a straightforward manner].

    c. I feel like my stay in Vienna lasted both {[Conj1 forever] [GCP and no time at all] / [Conj1 no time at all] [GCP and forever]}.

    d. A chronic disease lasts [Conj1 for months] [GCP or longer].

Why, then, does Conj2 influence grammaticality in sentences such as (42d)?

This is independently because the selectional requirement from the noun, i.e., taking a complement CP, cannot be satisfied by the GCP, an adjunct. Again, Conj2 is not playing any

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[23] Prof. Zhang Qingwen suggests an interesting contrast, (i) vs. (ii), in Mandarin Chinese. If *jian* (which expresses that the person in question carries another identity that follows *jian*, apart from the identity preceding it) is a coordinator here, this may be an example that the coordinator itself may require Conj2 to be of a specific property. Since this has hardly been investigated in the literature, I leave this for future work.

(i)        Zhao    yi-ge   mishu   he  (yi-ge)  daziyuan.
            Recruit one-CL secretary and   one-CL   typist
            '(They are) recruiting a secretary and a typist.'

(ii)    Zhao    yi-ge   mishu   jian  (*yi-ge)  daziyuan.
            Recruit one-CL secretary JIAN   one-CL   typist
            '(They are) recruiting a secretary who will also work as a typist.'

[24] Sentence such as (46c) may involve coordination of two small clauses, i.e., *Pat a Republican and Pat proud of it*, which is pointed out by Prof. Zhang Qingwen and Shijia Wang.

role in satisfaction of selectional ERs on the entire CS – only Conj1 is doing the work.

So far, only selectional requirements from a higher verb have been considered. There are other types of ERs, as reflected by data in (48). Such ERs from functional heads, e.g., clause typing (Cheng 1997), seem must be globally/conjunctively satisfied. In (48a), the verb *wonder* selects for interrogative CPs. However, we see that the Conj1-disjunctive satisfaction of selectional ERs does not apply to functional[25] ERs - both conjuncts must be interrogative in (48a'). Other cases, e.g., (48b), provide the same indication.

(48) from Bošković (2020a)

a. I wonder [interrogative what Betsy purchased] and [interrogative Sally advertised].

a'. *I wonder [interrogative what Betsy purchased] and [declarative Sally advertised it]. (adapted)

b. [interrogative Should John buy a car] and [interrogative might Peter sell a house]?

b'. *[interrogative Should John buy a car] and [declarative Peter might sell a house]? (adapted)

An explanation for the conjunctive satisfaction of functional ERs and its contrast with the disjunctive fulfilment of selectional ERs are beyond the scope of this papers; I will not go any further about it. In the next subsection, I discuss what influence it creates for Case Two (CUL) of extraction patterns and argue that the number/availability of Case Two are constrained.


### *4.3 Returning to Case Two (CUL; CF1 ≠ CF2) and extending the discussion*

Now, let us re-consider Case Two extraction where $CF1 \neq CF2$ and what the contrasts between the satisfaction of selectional ERs and functional ERs bear on the situation.

From the present analysis for CS and the contrasts between satisfaction of selectional and functional ERs, two things are immediately predictable.

First, functional ERs on CS are not (very) productive on creating CUL constructions (hence Case Two extraction), because it requires a conjunctive/global fulfilment.

Second, selectional ERs from a verb may create CUL data, but this is constrained to the degree that the number of category that most verbs select is limited – usually, only one category, or two categories are tolerated for selection; see data throughout (42-47).

Now, crucially, extraction is motivated by a functional need: it may be due to requirements from the interrogative C head (to check the relevant [*wh*] feature), and information-structure-related requirements (e.g., topicalization, focalization), etc. However, as functional ERs, they must be conjunctively/globally satisfied, i.e., both conjuncts must satisfy them.

Therefore, when extracting from a single conjunct, the data are generally bad; see (49) for illustrations of this applying to CUL data (2).

All of them are unacceptable, but some are slightly better than others.

(49) from Sag et al. (1985), Grosu (1985), Zhang (2010) and P & P (2023)

    a. ?*What$_i$ is Pat t$_i$ and proud of it? / *What$_i$ is Pat a Republican and proud of t$_i$?

    b. *Who$_i$ can you depend on t$_i$ and that he will be on time? / *Who$_i$ can you depend on my

---

25 This may also be information-structure-related requirements, e.g., topicalization and focalization, as pointed out by Przepiorkowski (2022) and P & P (2023).

assistant and that $t_i$ will be on time?

    c. ?*What$_i$ did John devour $t_i$ and only at home? / *(Only) where$_i$ did John devour only pork and $t_i$?

    d. ?*What$_i$ did Pat remember $t_i$ and that it was important to be on time. / *What$_i$ did Pat remember the appointment and that $t_i$ was important?

    e. ?*Which way$_i$ do many in DC behave $t_i$ or worse? / *How$_i$ do many in DC behave this way or $t_i$?

However, when a *wh*-item is extracted from each conjunct, i.e., when we apply across-the-board (ATB) movement, the constructions become better. Compare (49) with (50) below:

(50) a. ?*What$_i$ is Pat $t_i$ and proud of $t_i$?           (adapted from Sag et al. 1985: 117)

    b. ?*Who$_i$ can you depend on $t_i$ and that $t_i$ will be on time?

                                    (adapted from Sag et al. 1985: 117)

    c. ?*What$_i$ did Pat remember $t_i$ and that $t_i$ was important?     (adapted from Zhang 2010)

The fundamental questions about ATB-movement are (51).

(51) fundamental questions about ATB-movement

  i. Is there only one base-generated extracted item (e.g., a *wh*-word), or two?

  ii. If there is only one base-generated item, what is its base-position and how does it move?

  iii. Alternatively, if there are two base-generated extracted items, which one moves and why, and how does the other item becomes invisible in the surface form?

Why do we see the contrasts between (49) and (50)? Apparently, given the above discussions, this is because ATB movement satisfies functional ERs in a conjunctive manner.

So, without comparisons to contributions on ATB movement in the literature, I argue in favor of the position that there are two base-generated *wh*-items in ATB movement. The move-able one (under syntactic conditions given in section 4.1 and 4.2) moves to Spec,CP, while the other one, immobile under those syntactic conditions, is deleted under identity[26].

Adopting the copy theory of movement (Chomsky 1993, 1995; etc.) and the analysis for CS in this paper, ATB cases such as (52a) cannot have structures like (52a'/a'') where there is only one base-generated *wh*-word. This is for the following reasons.

Suppose that the *wh*-word is base-generated as the object of one verb, *hates* or *likes*, i.e., (52a') and (52a'') respectively, the selection requirement of the other verb cannot be satisfied.

In (52a'), the *wh*-word is base-generated as the object of *hates*. It moves firstly to the IP$_2$ phase edge, then to the edge of CS phase, violating antilocality. In (52a''), *who* is initially merged as the object of *likes*. It moves firstly to the edge of CS phase, then all the way to matrix [Spec, CP]. However, the requirement of the other verb in both (52a') and (52a'') cannot be satisfied - the *wh*-word, on its way to the final landing site, cannot land in the complement position of the other verb. Both derivations do not work.

(52) a. Who did you say that Lulu likes and Tubby hates? (Zhang 2023)

    a'. *Who did you say that [$_{edge}$ ~~who~~ [$_{CS\text{-}IP\ phase}$ [$_{Conj1\text{-}IP1}$ Lulu likes _ ] [$_{edge}$ ~~who~~ [$_{Conj2\text{-}IP2\ phase}$

---

26 For the present purpose, the nature of this deletion is left aside here.

and Tubby hates ~~who~~]]]]?

a''. *Who did you say that [edge ~~who~~ [CS-IP phase [Conj1-IP Lulu likes ~~who~~ ] [Conj2-IP phase and Tubby hates _ ]]]?

Second, in contrast with (52a'-a''), if (52a) have the structures (53a) or (53b), it is clear that only one *wh*-word may move[27]. In (53a), the moved *wh*-word, based-generated in Conj2, gives rise to antilocality violation: it moves twice within the CS. On contrary, in (53b), movement of the *who* in Conj1, not the other *who* in Conj2, is licit. Other cases can be analyzed in the same way. For the sentence (54a), only the derivation (54a'') is grammatical.

(53) a. *Who did you say that [edge <who> [CS-IP phase [Conj1-IP1 Lulu likes ~~who~~] [edge <who> [Conj2-IP2 phase and Tubby hates <who>]]]]?

b. Who did you say that [edge <who> [CS-IP phase [Conj1-IP1 Lulu likes <who>] [Conj2-IP2 phase and Tubby hates ~~who~~]?

(54) a. Who did you see friends of and enemies of? (from Bošković 2020a)

a' *Who did you see [edge who [CS-DP phase [Conj1-DP friends of ~~who~~] [edge <who> [Conj2-DP phase and enemies of <who>]]?

a''. Who did you see [edge <who> [CS-DP phase [Conj1-DP friends of <who>] [Conj2-DP phase and enemies of ~~who~~]]]?

From this perspective, the functional ERs are satisfied in a conjunctive manner – both conjuncts contain a *wh*-word, in response to the interrogative matrix C. But, only one *wh*-word can move under the syntactic conditions for extraction out of CS. This is in line with the property of interrogative C head in English that movement of one *wh*-feature suffices for relevant checking.

This is to say, ATB movement must meet conditions from two sides. One, the functional ER which motivates the extraction and which requires a *wh*-word in each conjunct. Two, the syntactic conditions which restrict the construction to the effect that only one *wh*-word actually moves. Note that these conditions do not say anything about the category and complexity of extracted item(s). Thus, ATB movement can apply to various categories (Postal 1993) with different complexities; see (55). On the other hand, failure in fulfilling either of them will result in ill-formedness. In (56a), the ER that both conjuncts must contain a *wh*-word is not satisfied; in, (56b) both the global satisfaction of ER and syntactic conditions for extraction are violated.

(55) from Postal (1993)

a. [How sick]$_i$ did John look t$_i$ and (Betty) say he actually felt t$_i$?

b. Sick$_i$ though Frank was t$_i$ and Greg certainly looked t$_i$, neither visited a physician.

c. [What kind of zombie]$_i$ did Tom turn into t$_i$ and Mchael subsequently study t$_i$?

(56) from Fortuny (2024)

a. *Who$_i$ will you buy [Conj1-DP a picture of t$_i$] [DP phase and [Conj2 a portrait of Watson]]?

b. *Who$_i$ will you buy [Conj1-DP a picture of Crick] [DP phase and [Conj2 a portrait of t$_i$]]?

---

27  I distinguish the moved *wh*-word from the unmoved one by using angle brackets for the former but strikethrough for the latter because it ultimately becomes invisible in the surface structure.

The analysis in this paper thus explicitly states the constraints on ATB movement.

It is promising that constraints on ATB movement stated in the literature, e.g., Citko (2005), Kasai (2004) where there must be a syntactic parallelism or morphological case identity for elements that undergo ATB movement, may be derived from the analysis in this paper.

The analysis can also be extended to other phenomena.

For instance, taking gapping to be heterogenous phenomena, the present analysis has the following advantages, also areas for much future work: (i) it clearly describes and predicts the behaviors of gapping constructions derived by ATB movement (Johnson 1994, 2004), (ii) it makes it easier to compare gapping-by-ATB cases with others produced by mechanisms such as VP-ellipsis/deletion (Coppock 2001, Toosarvandan 2013, etc.), empty verb (Tang 1998), non-canonical gapping that delete various elements around the verb (Jackendoff 1971, a.o.), a combination of gapping and other operations (Johnson 2014), etc., (iii) it makes it possible to further evaluate the thesis that gapping operates on the output of movement (Neijt 1979, Sag 1980, Jayaseelan 1990, Pesetsky 1982, a.o.)[28].

Talking about ATB movement, one also cannot help thinking about parasitic gaps (P-gaps)[29], their connection suggested by Williams (1990). Here, I briefly comment on what insights the analysis for CS in this paper may provide for them.

P-gaps are limited to NPs/DPs (Aoun and Clark 1985, Cinque, 1990; a.o.). Also, the P-gap may be filled by a pronoun without changing grammaticality. Compare (57) with (49).

(57) cited and adapted from Postal (1993)
    a. [Which book]$_i$ did Lulu review before reading \_\_$_{pg}$/it?
    b. The book which$_i$ his criticizing caused \_\_$_{pg}$/it to become famous.
    c. *[How long]$_i$ does John drink before lecturing \_\_$_{pg}$?

Now, recall that the derivation for ATB movement is restricted (see data (53-54)) – (i) there must be two base-generated copies of the extracted item, given the conjunctive satisfaction of functional ER, and (ii) only one of them can move, given (anti)locality conditions for movement. For the P-gap sentence (57a), it is possible that there is only one base-generated *wh*-phrase.

In (58a), the *wh*-phrase, base-generated as [Comp,V], undergoes licit *wh*-movement. In (58b), it is base-generated in the P-gap, but the unlabeled status of the VP-PP complex does not prevent it from moving to [Spec, CP], given the framework of this paper (subsection 4.1 and 4.2). Alternatively, if there are two base-generated *wh*-phrases, either may move to the final landing site. The unmoved one marked by strikethroughs because it is invisible in the surface structure. This is illustrated by (58c-d).

(58) a. [Which book]$_i$ did Lulu [$_?$ [$_{VP}$ review t$_i$] [$_{PP}$ before reading \_\_$_{pg}$/it]?

    b. [Which book]$_i$ did Lulu [$_?$ [$_{VP}$ review it] [$_{PP}$ before reading t$_i$]]?

    c. [Which book]$_i$ did Lulu [$_?$ [$_{VP}$ review t$_i$] [$_{PP}$ [before reading ~~which book~~]]?

    d. [Which book]$_i$ did Lulu [$_?$ [$_{VP}$ review ~~which book~~] [$_{PP}$ before reading t$_i$]]?

The above facts thus reflect that for P-gaps, there are no such constraints on ATB movement. The analysis for CS in this paper thus provides a potential new angle to tear apart these two superficially similar constructions. Due to limited space, I will not go further here.

Till now, the analysis for major phenomena and questions about CS have been presented. In the next section, I will briefly touch on another remaining issue about CS.

## 5. Remaining issues: agreement and detachment with/to the main chunk

Cross-linguistically, coordinate structures (CS) create interesting agreement patterns, an issue not well addressed in the literature. As Przepiorkowski (2022) pointed out, this is an important issue for a general theory of ERs satisfaction by CS and the relation between Agree and case-assignment; see discussions in references therein.

CS can also heavily affect cross-reference of $\varphi$-features on the verb in some languages. One of the intriguing phenomena involves (the alternation between) resolved agreement (RA) and single conjunct agreement (SCA).

For example, in Homshetsi, an endangered Armenian dialect spoken in Turkey, CS as preverbal subject can opt between RA and SCA. In (59), RA results always in a highest-person[30] and plural number cross-reference on the verb. These facts, i.e., that in RA, person-hierarchy is in paly and that number features are calculated in total, may be explained in syntax, given feature-sharing and percolation. See (59d) for this pattern.

(59) a. yes u   tun  ert-oğ-uk.          b. tun u    yes  ert-oğ-uk.        c. tun   u   an ert-oğ-ek.
      I   and you go-FUT-1PL               you and  I    go-FUT-1PL           you and he go-FUT-2PL
      'I and you will go.'                  'You and I will go.'               'You and he will go.'
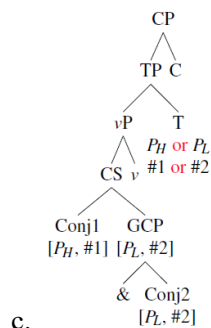
d.
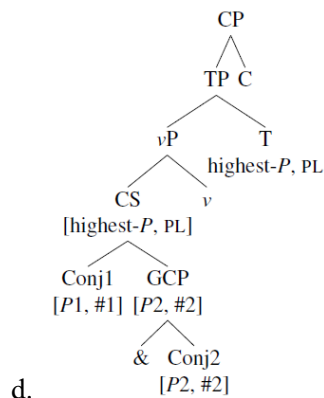


However, in (60a), the high-low (H & L) CS in terms of person feature can undergo first conjunct agreement (FCA) or last conjunct agreement (LCA). Features from Conj1 and Conj2 are equally prominent for cross-reference – there are no competition between person features and no calculation of total number. But in (60b), the low-high (L & H) construction can only resort to LCA. Here, somehow, person and number features of Conj2 are more prominent. See
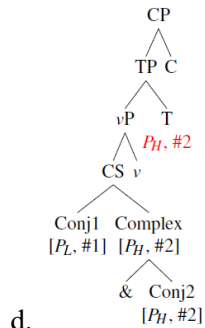
---

30  Person hierarchy in Homshetsi: $1 \rightarrow 2 \rightarrow 3$.

(60c) and (60d) for the patterns here.

(60) a. yes   u tun   eng-a-Φ / r          b. Tun u   yes   eng-a-Φ / *r
     I   and you fall-PAST-1SG / 2SG          you and I     fall-PAST-1SG / *2SG
     'I and you fell.'                         'I and you fell.'

c.

```
              CP
             /  \
           TP    C
          /  \
        vP    T
       /  \   P_H or P_L
     CS   v   #1 or #2
    /  \
  Conj1  GCP
 [P_H, #1] [P_L, #2]
         /  \
        &   Conj2
           [P_L, #2]
```

d.

```
              CP
             /  \
           TP    C
          /  \
        vP    T
       /  \   P_H, #2
     CS   v
    /  \
  Conj1  Complex
 [P_L, #1] [P_H, #2]
         /  \
        &   Conj2
           [P_H, #2]
```

Furthermore, for CS as postverbal subject, only FCA is available, as in (61a-b). Features on Conj1 are prominent for agreement; see (61c).

(61) a. Eng-a-Φ / *v      yes   u   an.        b. Eng-a-v / Φ          an   u   yes
     go-PAST-1SG / *3SG I     and he             go-PAST-3SG / *1SG he and   I
     'Go, I and he did.'                          'Go, he and I did.'

c.

```
              CP
             /  \
           TP    C
          /  \
        vP    T
       /  \   [P1, #1]
     CS   v
    /  \
  Conj1  Complex
 [P1, #1] [P2, #2]
         /  \
        &   Conj2
           [P2, #2]
```
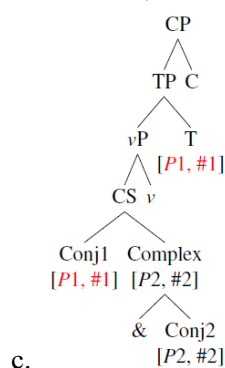
To mention one more similar phenomenon, in English, what I call the genuine coordination part (GCP) in a CS, i.e., the [& Conj2] complex, (sometimes) seems to be detached from the main chunk (MC) in that its internal elements do not participate in some grammatical relation[31].

If it is the CS subject as a whole that undergoes agreement, only *do* should be allowed, but native speakers report both *do* and *does* being licit[32]. The *and* case (62) contrasts with some other cases (63).

(62) a. Which book do/?does [Conj1 Peter] [GCP and [Conj2 John]] like but Susan hate?

---

31 Such cases abound in daily uses; for more examples, see (i) and (ii) which from a stand-up comedy show. They also raise interesting questions for case assignment to subject position. Of course, this may be products of language contact, but they clearly demonstrate that (English) syntax allows them. All these cases from different languages may boil down a broader issue of how CS satisfy requirements/constraints on the subject position.
(i)        The teachers is beating them.
(ii)       Me and Jesus was tight.
32 Such cases are highly confusing even for native speakers. For the informants I consulted, they consider do to be making most grammatical correctness, with does somewhat strange but not unacceptable.

(adapted from Zhang 2023)

(63) from Chomsky (2021)

    a. The boy and the girl are/*is in the room.

    b. John or Bill is in the room.

    c. John or the men *is/*are in the room.

Recall that Conj2 in (*and*-)CS is neglected for selectional ERs but not for functional ERs. If we take subject-verb agreement as an ER of selectional-functional dual status, both conjuncts should participate into this relation from the functional perspective, but Conj2 may escape from it, from the selectional perspective. So, the entire CS is rendered undetermined for such ERs. Crucially, syntax may well not be the sole forces here: sentences such as (63c) are impossible, and sentences such as (63a-b) have only one agreement possibility.

Hence, if we were to handle such phenomena purely in syntax, it is completely mysterious how features of the same type interact and whether features of different types influence each other. On the other hand, they may better be handled in a post-syntax way, given the above discussion. Of course, it may well be the case that some of the data undergo agreement in syntax, while other do it at interfaces. For example, (59) and (60a) vs. (60b) and (61) form an interesting pair.

For the purpose of this paper, I am only raising them as obscure issues for future work.

## 6. Conclusions

Accepting data of coordination of unlike categories to be genuine, this paper mainly makes three contributions to our understanding and analysis to coordinate structures (CSs).

First, a novel derivational model for CS where coordinators syntactically behave in a root-like way is proposed. The syntactic underspecification of coordinators for categorial features and their syntactic unselectiveness for categories that can enter into coordination result in a special labeling pattern within each CS and the fact that almost any categories can be coordinated.

A CS may be labeled if Conj1 and Conj2 independently have the same label, but cannot, if they bear distinct labels. The labels of Conj1 and Conj2 determine whether it is syntactically possible to extract from CS.

Second, the paper contributes to how CS are constrained and how they satisfy any restrictions. Specifically, every CS is constrained both externally and internally. Following the insights from Przepiórkowski (2022) and Patejuk and Przepiorkowski (2023), the position occupied by a CS must satisfy external restrictions (ERs) imposed by a higher syntactic head/object in terms of selection, information structure, etc.

This paper argues (i) that selectional ERs need only be satisfied by Conj1, while functional ones must be conjunctively fulfilled, and (ii) that internally, due to the root-likeness of coordinators, labeling patterns in CS are constrained. External and internal restrictions thus together determine patterns of extraction from CS.

Third, the paper promotes the syntactic treatment for the [& Conj2] complex as adjunct. It is argued that its adjunct status results in the facts that Conj2 may not satisfy selectional ERs while Conj1 must always do so, and that both Conj1 and Conj2 must obey functional ERs.

The analysis is briefly extended to some other CS-related phenomena, e.g., ATB movement, parasitic gaps and gapping. Some remaining issues, especially agreement patterns for CS-subject, have been raised for future study.

To the extent reached by now, all predictions of the present analysis are borne out, explaining properties of CS and various relevant data under very basic syntactic conditions and/or mechanisms. It also provides potential insights to those long-standing issues.

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