

# Deducing the Coordinand Constraint

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Assuming Grosu's (1973) decomposition of Ross's (1967) Coordinate Structure Constraint into the Conjunct Constraint and the Element Constraint, this article searches for a principled account for the Conjunct Constraint, rebaptized as the Coordinand Constraint. It defends the proposal that different families of effects of the Coordinand Constraint are related to different factors: (a) the lexical information provided by a coordinator, (b) the economy of syntactic displacement operations, and (c) an interface condition prohibiting self-coordination. These three factors are not primitive, but derive from Chomsky's (1991) Least Effort Principle. Therefore, the Coordinand Constraint is deduced, ultimately, from the Least Effort Principle.

*Keywords:* Coordinate Structure Constraint, Conjunct (Coordinand) Constraint, locality conditions, coordination, categorial features, Least Effort Principle

## 1 Delimiting the Object of Inquiry

A coordination is commonly defined as follows:

- (1) The term *coordination* refers to a linguistic operation that combines two or more constituents, typically of the same semantic and syntactic type, into a larger unit of that semantic and syntactic type, by means of one or more linking elements. (Zamparelli 2019:135)

The linking elements and the combined constituents are called, respectively, *coordinators* and *coordinands*. The larger unit that results from this combination is called *coordinate structure*, *coordinate phrase* (abbreviated *CoordP*), or simply *coordination*. Coordinators can be conjunctive (like *and* in English), disjunctive (like *or*), and adversative (like *but*). Accordingly, we identify three different types of coordinate structures: conjunctive, disjunctive, and adversative.<sup>1</sup> Coordi-

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<sup>1</sup> For a classification of coordinate structures and a survey of the crosslinguistic variation concerning coordination, see Haspelmath 2007.

nands are more precisely called *conjuncts* in conjunctive coordinate structures and *disjuncts* in disjunctive coordinate structures.<sup>2</sup>

This article begins a novel research line on a particular restriction that affects coordinate structures: Ross's celebrated Coordinate Structure Constraint (Ross 1967:89), understood as in (2).

(2) *Coordinate Structure Constraint (CSC)*

In a coordinate structure, no coordinand may be moved, nor may any element contained in a coordinand be moved out of that coordinand.

Examples (3) and (4) illustrate the CSC in conjunctive, disjunctive, and adversative coordinations. In (3a–f), the extraction of the first or the second coordinand yields an ungrammatical sequence, as does the subextraction of an element contained in the first or the second coordinand in (4a–f). Silent (base-generated) copies are written with overstrikes.

- (3) a. \*How was Emma [~~h~~ow **and** sleepy]?  
 b. \*How was Emma [tired **and** ~~h~~ow]?  
 c. \*How was Emma [~~h~~ow **or** sleepy]?  
 d. \*How was Emma [tired **or** ~~h~~ow]?  
 e. \*How was Emma [~~h~~ow **but** tired]?  
 f. \*How was Emma [excited **but** ~~h~~ow]?  
 (4) a. \*Who will you buy [a picture of ~~w~~h~~o~~ **and** [a portrait of Watson]?  
 b. \*Who will you buy [a picture of Crick] **and** [a portrait of ~~w~~h~~o~~?  
 c. \*Who will you buy [a picture of ~~w~~h~~o~~ **or** [a portrait of Watson]?  
 d. \*Who will you buy [a picture of Crick] **or** [a portrait of ~~w~~h~~o~~?  
 e. \*Who will you buy [a picture of ~~w~~h~~o~~ **but** [a portrait of Watson]?  
 f. \*Who will you buy [a picture of Crick] **but** [a portrait of ~~w~~h~~o~~?

As defended by Grosu (1973), the CSC is not a unified principle; instead, it must be decomposed into two principles that must be independently investigated (see especially Zhang 2010, Oda 2019): the Coordinand Constraint and the Element Constraint.

(5) *Coordinand Constraint (CC)*

No coordinand may be moved.

(6) *Element Constraint (EC)*

No element may be moved out of a coordinand.

<sup>2</sup> Nonetheless, it is very common in the literature to use the term *conjunct* to refer to any type of combined constituent of a coordinate structure—strictly speaking, to any type of coordinand. I systematically avoid this use, which is confusing (De Vries 2006:239), since the term *conjunct* is ambiguously used both as a hyponym and as a hypernym. For the sake of coherence, I introduce the term *coordinand* in Ross's (1967) definition of the Coordinate Structure Constraint (2) as well as in Grosu's (1973) definition of what he called the *Conjunct Constraint*, which I rebaptize as the *Coordinand Constraint* (5).

The examples in (3) and (4) illustrate the CC and the EC, respectively; that is, they illustrate the two negative statements coordinated in the CSC (2).

The CSC has been regarded as “the most problem-free syntactic constraint ever discovered” (Postal 1998:52). In favor of this claim, it must be said that the CSC is one of the few generative principles that is widely accepted in typological studies (see Haspelmath 2007), and it is even a syntactic criterion commonly used to decide whether a given construction involves sentential coordination or subordination.

More precisely, it is fair to state that, although the CC is remarkably robust crosslinguistically (but see Agbayani, Golston, and Henderer 2011, Oda 2017), there exist apparently important counterexamples to the EC, some of which were noted by Ross as soon as he formulated the CSC, an issue that was brilliantly investigated in Goldsmith’s (1985) and Lakoff’s (1986) seminal works; such counterexamples typically involve across-the-board movement (7) and asymmetric coordinations (8).<sup>3</sup>

(7) Which book [does Mark like ~~which book~~] and/or/but [Sue hate ~~which book~~]?

(8) a. How much can you drink ~~how much~~ and not end up with a hangover the next morning?

(Goldsmith 1985:135)

b. What kind of herbs can you eat ~~what kind of herbs~~ and not get cancer?

(Lakoff 1986:156)

c. Who did he pick up the phone and call ~~who~~?

(Lakoff 1986:156)

d. What thesis did he want to try and finish ~~what thesis~~?

(Zwart 2005:1)

e. What troops did he want to go and address ~~what troops~~?

(Zwart 2005:1)

Researchers commonly attempt to derive the CC from syntactic general principles; for instance, Sag (1982) and Pesetsky (1982) defend the view that the CC derives from the A-over-A Principle, and Pollard and Sag (1994:172) account for the CC by appealing to their Trace Principle (“Every trace must be subcategorized by a substantive head”).<sup>4</sup> As for the EC, the predominant view, since the appearance of Lakoff 1986, has been that it is not a syntactic primitive but a by-product of interpretive extralinguistic constraints formulated as “principles of cognitive organization” (Lakoff 1986:154) or inference processes involved in the establishment of coherence relationships (Kehler 2002).<sup>5</sup>

<sup>3</sup> See De Vries 2017 for a comprehensive overview of the literature on across-the-board dependencies and Weisser 2015 for a thorough study on asymmetric coordination.

<sup>4</sup> See Zhang 2010:81–83 and the discussion concerning pattern 1 of section 2.2.2 below for a critical review of the idea that the CC effects derive from the A-over-A Principle.

<sup>5</sup> But see Zwart 2005 and Weisser 2015, among others, for two independent syntactic accounts of the EC.

That the CSC, as an empirical generalization, is a by-product of a conjunction of general conditions of the computational system and external conditions imposed by the external systems should be a welcome conclusion for linguistic theory, and especially for the Minimalist Program, given that there is no place within this framework for primitive principles that are specific to particular constructions (such as coordinate ones). If constructions are epiphenomenal, the properties we attribute to them cannot be primitives of the language faculty, but should emerge from general properties or interface conditions (Chomsky 2004). Needless to say, we are far from understanding not only the pervasiveness of the CSC effects in prototypical case studies, but also the apparent counterexamples to this constraint under restricted circumstances (see the examples in (7) and (8)).

The study presented here is concerned precisely with investigating the CC. It develops a novel account of this constraint that does not capitalize on extralinguistic factors; rather, it capitalizes strictly on syntax-semantics interface conditions (see especially Zhang 2010 for a Minimalist analysis of the CC). The EC as well as its apparent counterexamples are left aside.

The remainder of this article is organized as follows. Section 2 argues for the central thesis: the CC can be deduced from Chomsky's (1991) Least Effort Principle once the CC is decomposed into three different factors: (a) the lexical information provided by a coordinator, (b) the economy of syntactic displacement operations, and (c) an interface condition prohibiting self-coordination, a particular instance of vacuous syntactic operation. Section 3 emphasizes the novelty of the proposal by comparing it with a selection of previous accounts. Finally, the online appendix ([https://doi.org/10.1162/ling\\_a\\_00468](https://doi.org/10.1162/ling_a_00468)) investigates certain potential complications that offer interesting challenges for the proposed account and more generally for the understanding of coordination.

## 2 The Coordinand Constraint Effects

Section 2.1 proposes a categorematic definition of coordinator (10) that requires coordinands and the resulting coordinate structure to be categorially identical. As will become clear, it will be crucial to define categorial identity in terms of featural identity, and more precisely, in terms of identity of (generalized) categorial features (12). Subsequently, section 2.2 develops a particular derivation of the CC effects based on the categorematic definition of coordinator but also on an economy condition on movement operations (the Integrity Condition on Coordinate Structures (50)) and an interface condition (the Prohibition against Self-Coordination (71)). Section 2.3 derives these three factors from Chomsky's (1991) Least Effort Principle, so that the CC is ultimately deduced from Chomsky's "overarching" principle.

### 2.1 A Categorematic Definition of Coordinator

The standard definition of coordination introduced in (1) expresses a requirement that can be considered a fundamental property of coordination.

#### (9) *Parallelism Requirement*

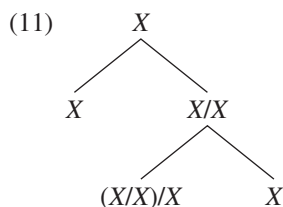
The coordinands and the resulting coordinate structure are of the same syntactic and semantic type.

One can conceive multiple ways to formally encode the Parallelism Requirement between a coordinate structure and its coordinands. A possible approach consists in assuming that coordinators can be formally treated as functions that select the coordinands as their arguments. But there is an important difference between coordinators and other linguistic categories that are typically analyzed as functions, such as verbs, prepositions, or determiners: coordinators in general do not select arguments of a particular grammatical type or category. Coordinators do not require their arguments to be, for instance, nominal, verbal, or sentential. Instead, the requirement coordinators impose on coordinands is that they be of the same type or category  $X$ , as mentioned; moreover, the category that coordinators project (i.e., the category of the coordinate phrase) is also of type or category  $X$ .

These considerations lead to the possibility of providing a categorematic definition of coordinator that can be very naturally expressed using the formalism of Categorical Grammar. Let  $X$  stand for an arbitrary syntactic category; then a coordinator (Coord) is defined as follows:<sup>6</sup>

$$(10) \text{Coord} := (X/X)/X$$

Coord is thus interpreted as a function that selects an argument  $\beta$  of category  $X$ —called the second or internal coordinand—and yields as output the function  $X/X$ , which selects a new argument  $\alpha$  of category  $X$ —called the first or external coordinand—and yields as output a coordinate phrase of category  $X$ . In brief, Coord, or the coordinating head, selects two arguments, the coordinands  $\alpha$  and  $\beta$ , which are of the same category  $X$  as the resulting coordinate structure. This can be represented graphically by the following tree diagram:<sup>7</sup>



The analysis I am developing is especially concerned with finding out why a syntactic probe cannot target a coordinand (see section 2.2). In order to investigate probe-goal relationships, it will be convenient to treat categories not as syntactic atoms but as clusters of grammatical features.

<sup>6</sup> This definition is slightly simplified from Steedman 1985:540n19. Although Steedman suggests this categorematic definition in his footnote 19, he follows in all respects a syncategorematic definition of coordination based directly on Gazdar's (1981) proposal. See Carpenter 1997:secs. 6.1–6.2, where Steedman's categorematic definition of Coord is adopted and investigated in more detail.

<sup>7</sup> This formalism provides a transparent notation for function-combining operations that determines which category is the function and which the argument. I follow Steedman's (1985) proposal regarding the usage of the slash “/”: it is not intended to be a forward slash entailing that the argument follows the function, as opposed to a backward slash “\” requiring that the argument precede the function; instead, directionality or constituency order derives from other syntactic factors and does not need to be encoded in the definition of categories. In Steedman's article, directionality is specified by two different rules of functional application, the Forward and Backward Rules, or by introducing a related directional category, as with postmodifiers.

More precisely, I will be especially interested in determining the categorial feature of a given syntactic constituent, understood as follows:

(12) *Definition of generalized categorial feature*

$\mathcal{F}$  is a categorial feature of a syntactic constituent  $\alpha$  if and only if it determines the syntactic distribution of  $\alpha$ .

This definition is not the historical definition of categorial feature originated in the Extended Standard Theory; rather, it is—as stated—a generalization of it intended to capture the existence of a much larger set of syntactic categories. As is well-known, categorial features were originally considered to be [N] and [V]. The feature [+N] is the traditional substantive and the feature [+V] the traditional predicative. Accordingly, nouns, verbs, adjectives, and pre- and postpositions were defined by the following matrices of these two binary categorial features:

- (13) a. N = [+N, -V]  
 b. V = [-N, +V]  
 c. A = [+N, +V]  
 d. P = [-N, -V]

Lexical items selected from the lexicon with a particular specification for these categorial features were assumed to project such a specification to the phrase marker they headed. Accordingly, terminals and phrases with different categorial specifications would display different syntactic distributions that would correlate with different interpretive possibilities. However, given that the inventory of syntactic categories (terminals and projections) is currently much larger than suggested in (13), I will work with the definition of generalized categorial feature provided in (12). Note also that my conception of categorial feature differs from the traditional one. I will not attempt to characterize different syntactic categories in terms of a small set of binary and more primitive categorial features; instead, I will investigate which particular features determine the syntactic distribution of constituents. This point will become clear immediately.

According to (12), a syntactic constituent can appear in a given syntactic position if it carries the appropriate categorial feature. Typically, a syntactic constituent can appear in an argument position of a particular head depending on its categorial features. For instance, a transitive verb like *eat* selects a DP (14a) as complement (but not a PP), whereas a locative verb like *live* selects a PP as complement (14b), and a verb like *think* selects a CP as complement (14c). Consequently, I will consider [D], [P], and [C] to be categorial features. Since an IP appears in the complement position of a selecting C head, I will also include [I] in the class of categorial features. Since VPs (14d) and AdjPs (14e) can appear in complement positions of selecting I heads, I add [V] and [Adj] to the class of categorial features as well.

- (14) a. [<sub>V'</sub> [<sub>V</sub> eat] [<sub>DP</sub> two apples]]  
 b. [<sub>V'</sub> [<sub>V</sub> live] [<sub>PP</sub> in Rome]]  
 c. [<sub>V'</sub> [<sub>V</sub> think] [<sub>CP</sub> that I am leaving]]  
 d. [<sub>I'</sub> [<sub>I</sub> is] [<sub>VP</sub> going into the shop]]  
 e. [<sub>I'</sub> [<sub>I</sub> is] [<sub>AdjP</sub> really unpleasant]]

Let us thus assume, preliminarily, that the set of categorial features contains at least [D], [P], [C], [I], [V], and [Adj]. In section 2.2, I will enlarge this set by adding more categorial features. In the online appendix, I will observe that not all grammatical features are categorial features.

In English, one can coordinate different kinds of maximal projections, such as DPs, VPs, AdjPs, PPs, and (object) CPs (15). In each case, the coordinands share the relevant categorial feature with each other (and with the resulting coordinate structure).<sup>8</sup>

- (15) a. Sophia ate [<sub>DP</sub> [<sub>DP</sub> two apples] and [<sub>DP</sub> four carrots]].  
 b. Sophia often [<sub>VP</sub> [<sub>VP</sub> goes into the shop] and [<sub>VP</sub> buys red wine]].  
 c. Sophia is [<sub>AdjP</sub> [<sub>AdjP</sub> really unpleasant] and [<sub>AdjP</sub> somewhat selfish]].  
 d. Sophia wants to live [<sub>PP</sub> [<sub>PP</sub> in Rome] and [<sub>PP</sub> in Palermo]].  
 e. Sophia thinks [<sub>CP</sub> [<sub>CP</sub> that I am coming] and [<sub>CP</sub> that you are staying at home]].

Similarly, one can apparently coordinate different kinds of heads or minimal projections, such as Ds, Vs, Adjs, Advs, Ps, and Cs (16), and perhaps even certain types of intermediate projections (17). Again the coordinands (and the resulting coordinate structure) share categorial features.

- (16) a. Sophia ate [<sub>D</sub> [<sub>D</sub> two] or [<sub>D</sub> three]] carrots.  
 b. Sophia [<sub>V</sub> [<sub>V</sub> peeled] and [<sub>V</sub> washed]] the potatoes.  
 c. Sophia is [<sub>Adj</sub> [<sub>Adj</sub> happy] and [<sub>Adj</sub> excited]] with her new life.  
 d. Sophia is [<sub>P</sub> [<sub>P</sub> under] or [<sub>P</sub> beside]] the bed.  
 e. [<sub>C</sub> [<sub>C</sub> Can] and [<sub>C</sub> will]] Sophia do the right thing?
- (17) a. My friends all [<sub>V'</sub> [<sub>V'</sub> like football] and [<sub>V'</sub> hate basketball]].  
 b. Who [<sub>C'</sub> [<sub>C'</sub> has Sophia invited] and [<sub>C'</sub> does Bill want to see]]?

It is customary to assume, implicitly or explicitly, that in order to be coordinated, categories must share not only categorial features but also bar-level features (see Borsley 1994:233): minimal categories can be coordinated with minimal categories only, intermediate categories with intermediate categories only, and maximal categories with maximal categories only. I will consider bar-level features to be [projected] and [maximal], following Muysken's (1982) system: a minimal category is [−projected, −maximal], an intermediate category is [+projected, −maximal], and a maximal category is [+projected, +maximal].

As a result, the category *X* of the coordinations contained in (15)–(17), as well as of their respective coordinands, can be characterized by the feature matrices in (18)–(20), which are equivalent to the standard phrase marker labels used in (15)–(17).

<sup>8</sup> As is well-known, some languages display coordinators with c-selection restrictions (Payne 1985:5); for instance, in Japanese *to* selects nominals, *si* selects finite clauses, and *te* selects nonfinite verbs and adjectives (Zhang 2010:46–47). Naturally, the definitions of coordinators in these languages must be consistent with this observation, by taking into consideration their specific c-selection requirements.

- (18) a.  $X \equiv [+D; +\text{projected}, +\text{maximal}] \equiv \text{DP}$   
 b.  $X \equiv [+V; +\text{projected}, +\text{maximal}] \equiv \text{VP}$   
 c.  $X \equiv [+Adj; +\text{projected}, +\text{maximal}] \equiv \text{AdjP}$   
 d.  $X \equiv [+P; +\text{projected}, +\text{maximal}] \equiv \text{PP}$   
 e.  $X \equiv [+C; +\text{projected}, +\text{maximal}] \equiv \text{CP}$
- (19) a.  $X \equiv [+D; -\text{projected}, -\text{maximal}] \equiv \text{D}$   
 b.  $X \equiv [+V; -\text{projected}, -\text{maximal}] \equiv \text{V}$   
 c.  $X \equiv [+Adj; -\text{projected}, -\text{maximal}] \equiv \text{Adj}$   
 d.  $X \equiv [+P; -\text{projected}, -\text{maximal}] \equiv \text{P}$   
 e.  $X \equiv [+C; -\text{projected}, -\text{maximal}] \equiv \text{C}$
- (20) a.  $X \equiv [+V; +\text{projected}, -\text{maximal}] \equiv \text{V}'$   
 b.  $X \equiv [+C; +\text{projected}, -\text{maximal}] \equiv \text{C}'$

With these considerations in mind, I propose the following feature-based definition of categorial identity, where  $\mathcal{CF}(\alpha)$  and  $\mathcal{BF}(\alpha)$  refer respectively to the set of categorial features and bar-level features of  $\alpha$ .

(21) *Definition of categorial identity*

Two syntactic constituents  $\alpha$  and  $\beta$  belong to the same category  $X$  if and only if  $\mathcal{CF}(\alpha) = \mathcal{CF}(\beta)$  and  $\mathcal{BF}(\alpha) = \mathcal{BF}(\beta)$ .

Note that the definition of Coord (10) states that Coord selects two arguments of the same category. But this categorematic definition of Coord does not state in what terms two constituents are categorially identical. I provide a definition of categorial identity in (21), where categories are viewed as clusters of categorial features and bar-level features.

Finally, if two constituents  $\alpha$  and  $\beta$  can be coordinated if and only if they are categorially identical (by the definition of Coord (10)), and if they are categorially identical if and only if they have the same specification for bar-level features and categorial features (by definition (21)), then, by transitivity, we arrive at the following condition:

(22) *Coordinability Condition*

Two syntactic constituents  $\alpha$  and  $\beta$  can be coordinated if and only if  $\mathcal{CF}(\alpha) = \mathcal{CF}(\beta)$  and  $\mathcal{BF}(\alpha) = \mathcal{BF}(\beta)$ .

Therefore, the Coordinability Condition is a consequence of the categorematic definition of Coord (10) and the feature-based definition of categorial identity (21).

## 2.2 A Threefold Decomposition of the Coordinand Constraint

So far, I have conceived coordination as a grammatical operation that combines syntactic constituents of the same semantic and syntactic type into a larger unit of the same semantic and syntactic type (see the definition (9) of the Parallelism Requirement). This standard conception of coordination has been formally expressed as a categorematic definition of Coord (see (10)), which requires



coordinands and the coordinate structure to be categorially identical. Categorical identity is defined in terms of identity of categorial and bar-level features (21), which leads to the Coordinability Condition (22).

The objective of this section is to investigate the CC effects in relation to the categorematic definition of coordination (10) and the definition of categorial identity (21). I will argue that the CC effects can be deduced from the definition of Coord (10) (and the definition of categorial identity (21)) plus two other factors: a syntactic economy condition and an interface condition. This leads to a threefold decomposition of the CC.

At this point, it is important to investigate formally the mechanics of syntactic displacement in relation to the categorematic definition of Coord and the featured-based Coordinability Condition (22). With this purpose, I adopt Chomsky's Minimalist approach to internal Merge (see particularly Chomsky 2000). In brief, I will say that a syntactic probe—that is, a functional head  $\mathcal{H}$ —searches for a suitable goal  $\mathcal{G}$  carrying a particular feature  $\mathcal{F}$ ; once  $\mathcal{H}$  and  $\mathcal{G}$  enter into an Agree relationship with respect to  $\mathcal{F}$ ,  $\mathcal{G}$  can be remerged to the specifier of  $\mathcal{HP}$ .

Recall that categorial features determine the distribution of those categories that bear them, by definition (12) of categorial feature. Therefore, I emphasize, if  $\mathcal{G}$  agrees with  $\mathcal{H}$  with respect to  $\mathcal{F}$  and is consequently remerged in Spec, $\mathcal{HP}$ , then  $\mathcal{F}$  is a categorial feature of  $\mathcal{G}$ , because it determines its syntactic distribution; in this case,  $\mathcal{G}$  is a [+ $\mathcal{F}$ ] category. For clarity, I state the following remark:

(23) *Remark on probe-goal relations*

Grammatical features involved in internal Merge operations are categorial features.

With this perspective on syntactic displacement and the categorematic definition of Coord in mind, in the following sections I investigate the effects of extracting syntactic constituents out of a coordinate structure. More precisely, I investigate why a single coordinand cannot be extracted out of a coordinate structure in narrow syntax (case 1) and why extracting both coordinands out of a coordinate structure in narrow syntax is not permitted (case 2).

*2.2.1 Case 1: Why a Single Coordinand Cannot Be Syntactically Extracted from a Coordinate Structure* Assume that the coordinand  $\alpha$ , but not the coordinand  $\beta$ , of a given coordinate structure carries a categorial feature  $\mathcal{F}$  that triggers an Agree relationship of  $\alpha$  with a probe  $\mathcal{H}$  outside the coordinate structure. Then we have (24), in which case  $\mathcal{CF}(\alpha) \neq \mathcal{CF}(\beta)$ .

$$(24) \mathcal{F} \in \mathcal{CF}(\alpha) \wedge \mathcal{F} \notin \mathcal{CF}(\beta)$$

Accordingly, by definition (21) of categorial identity,  $\alpha$  and  $\beta$  are categorially distinct. As I will say,  $\alpha$ , but not  $\beta$ , is a [+ $\mathcal{F}$ ] category.

This situation is incompatible with the categorematic definition of Coord provided in (10), since  $\alpha$  and  $\beta$  are different categories and no category can be projected to the resulting coordinate structure.

Therefore, the definition of Coord does not permit the situation where only one coordinand leaves the coordinate structure as a result of Agree and internal Merge operations, while the other coordinand remains in its base position within the coordinate structure.

Typical CC violations indeed display the extraction of a single coordinand that differs categorially from the coordinand that remains within the coordinate structure. In this regard, consider the following five illustrations.

2.2.1.1 Illustration 1: A Single Coordinand Cannot Be *Wh*-Moved In (25a), the coordinand *who* undergoes *wh*-movement, unlike the coordinand *a girl*. As shown in (25b), *who* is a [+wh] phrase that is coordinated in its base position with the DP *a girl*, which lacks the categorial *wh*-feature. Assuming Rizzi's cartographic work on the left periphery (Rizzi 1997 et seq.), the [+wh] phrase *who* should move to Spec,ForceP because it bears the criterial feature [wh]; it would agree with Force and move to Spec,ForceP to satisfy the so-called *Wh*-Criterion. However, the [-wh] phrase *a girl* should remain within the coordinate structure. Crucially, the constituents *who* and *a girl* are of different syntactic categories: the former but not the latter is a [+wh] phrase. This situation is incompatible with the definition of Coord (10): the coordinands are of different categories and no category can be projected to the coordinate structure, as indicated in (25b) with a question mark subscripted to the bracket opening the ill-formed coordinate structure.

- (25) a. \*Who did John kiss and/or a girl?  
 b. [<sub>ForceP</sub> [Who]<sub>[+wh]</sub> [<sub>Force<sup>0</sup></sub> did] [<sub>IP</sub> John kiss [<sub>?</sub> [who]<sub>[+wh]</sub> and/or [a girl]<sub>[-wh]</sub>]]]?

2.2.1.2 Illustration 2: A Single Coordinand Cannot Be Focalized or Dislocated Focalization and clitic left-dislocation of a single coordinand are also grammatically impossible in, for instance, a language like Catalan (see (26a) and (26c)). As represented in (26b), a [+focus] phrase (interpreted as a contrastive focus) is coordinated in its base position with a DP that lacks the categorial [focus] feature; and as represented in (26d), a [+topic] phrase is coordinated in its base position with a DP that lacks the categorial [topic] feature. Again adopting Rizzi's cartographic approach, the [+focus] constituent should move to Spec,FocP, because it carries the [+focus] feature, and the [+topic] constituent should move to Spec,TopP, because it carries the [+topic] feature. The focal constituent then agrees with the Focus head and moves to Spec,FocP to satisfy the Focus Criterion (26a), whereas the topical constituent agrees with the Topic head and moves to Spec,TopP to satisfy the Topic Criterion (26c). Again, these constructions contain ill-formed coordinations according to the categorematic definition of Coord (10): in both cases, the coordinands are categorially different and no category can be projected to the coordinate structure (as indicated with a subscripted question mark).

- (26) *A single coordinand cannot be focalized*  
 a. \*LES PASTANAGUES, sembra i/o les mongetes.  
     the carrots grows and/or the beans  
 b. [<sub>FocP</sub> [Les pastanagues]<sub>[+focus]</sub> Foc<sup>0</sup> [<sub>IP</sub> sembra [<sub>?</sub> [Les pastanagues]<sub>[+focus]</sub> i/o [les mongetes]<sub>[-focus]</sub>]]].

*A single coordinand cannot be left-dislocated*

- c. \*Les pastanagues<sub>i</sub>, les<sub>i</sub> sembra i/o les mongetes.  
     the carrots them grows and/or the beans  
     'The carrots, he/she grows them and/or the beans.'

- d. [<sub>TopP</sub> [Les pastanagues]<sub>[+topic]</sub> Top<sup>0</sup> [<sub>IP</sub> les sembra [<sub>?</sub> [les pastanagues]<sub>[+topic]</sub> i/o [les mongetes]<sub>[-topic]</sub>]]].

A single coordinand cannot be syntactically extracted from an adversative coordination either, for the same reason: the extracted coordinand has a different categorial specification than the coordinand that remains within the coordinate structure. The coordinands are thus categorially distinct and no category can be projected for the coordinate structure.

(27) *Wh-movement of a single coordinand in adversative coordinations*

- a. \*How was Peter but tired?  
 b. [<sub>ForceP</sub> [How]<sub>[+wh]</sub> [<sub>Force<sup>0</sup></sub> was] [<sub>IP</sub> Peter [<sub>?</sub> [how]<sub>[+wh]</sub> but [tired]<sub>[-wh]</sub>]]]?

(28) *Focalization of a single coordinand in adversative coordinations in Catalan*

- a. \*EXCITAT estava però cansat.  
 excited was but tired.  
 ‘EXCITED, he was but tired.’  
 b. [<sub>FocP</sub> [Excitat]<sub>[+focus]</sub> Foc<sup>0</sup> [<sub>IP</sub> estava [<sub>?</sub> [excitat]<sub>[+focus]</sub> però [cansat]<sub>[-focus]</sub>]]].

(29) *Clitic left-dislocation of a single coordinand in adversative coordinations in Catalan*

- a. \*Excitat<sub>i</sub>, ho<sub>i</sub> estava però cansat.  
 excited CL was but tired  
 ‘Excited, he was but tired.’  
 b. [<sub>TopP</sub> [Excitat]<sub>[+topic]</sub> Top<sup>0</sup> [<sub>IP</sub> ho estava [<sub>?</sub> [excitat]<sub>[+topic]</sub> però [cansat]<sub>[-topic]</sub>]]].

I emphasize that I assume, along with Rizzi’s work on the left periphery (see Rizzi 1997 et seq.), that constituents interpreted as focal or topical are endowed with a [focus] or a [topic] feature, respectively. In Rizzi’s (1997:287) words, “There are thus Focus and Topic Criteria, which are reminiscent of the Wh and Neg Criteria (Rizzi 1991, Haegeman 1995).” This assumption, which seems to be necessary on independent grounds, given that [+topic] phrases, [+focus] phrases, and [+wh] phrases have distinctive syntactic distributions, is consistent with Rizzi’s (1997) cartographic approach to  $\bar{A}$ -movement, where these syntactic phrases are argued to occupy specifier positions of semantically devoted functional projections.

2.2.1.3 Illustration 3: A Single Coordinand Cannot Be Pied-Piped The Parallelism Requirement (9), or more precisely the feature-based definition of categorial identity (21), does not extend to elements inside the coordinands. For instance, in (30) DP<sub>A</sub> and DP<sub>B</sub> can be coordinated although the former contains a DP and the latter a CP (constructions (30), (31), (33), and (34) were brought to my attention by an anonymous reviewer).

- (30) [[<sub>DP<sub>A</sub></sub> The belief in [<sub>DP</sub> resurrection]] and [<sub>DP<sub>B</sub></sub> the desire [<sub>CP</sub> to preserve one’s life]]] are sometimes at odds.

But now observe the following ill-formed interrogative clause and its corresponding representation:

- (31) a. \*The photo of which applicant did you compare and his CV?

- b. \* $[_{\text{ForceP}} [_{\text{DP}_A} \text{The photo of which applicant}] [_{\text{Force}^0} \text{did}] [_{\text{IP}} \text{you compare } [\{[_{\text{DP}_A} \text{the photo of which applicant}] \text{ and } [_{\text{DP}_B} \text{his CV}]\}]]]$ ?

The sequence in (31a) illustrates that the *whP* (in this case, *which applicant*) cannot pied-pipe an entire coordinand (*the photo of which applicant*) out of a coordinate structure. If pied-piping consists in the percolation of a *wh*-feature up to the constituent that moves, then (31a) is ungrammatical because it contains the coordination of two coordinands that are categorially distinct, as indicated in (32): on the one hand, *the photo of which applicant* bears a categorial [D] feature, as a result of the projection of the D head, but it also possesses a [wh] categorial feature as a result of feature percolation; on the other hand, the second coordinand, *his CV*, is a [D] phrase that lacks a *wh*-feature.

- (32) a. [the photo of which applicant]  $\equiv$  [+D, +wh; +projection, +maximal]  
 b. [his CV]  $\equiv$  [+D, -wh; +projection, +maximal]

Given that [wh]  $\in$   $\mathcal{CF}$  ([the photo of which applicant]) and that [wh]  $\notin$   $\mathcal{CF}$  ([his CV]), the constituents [the photo of which applicant] and [his CV] are categorially distinct, by the definition (21) of categorial identity, and cannot be coordinated, by the categorematic definition of Coord (10).

An interesting issue is whether feature percolation is optional or mandatory. Observe, in this regard, that it is possible to account for (33) by assuming that the *wh*-feature may either percolate up to the external DP or not; in the first case the whole DP moves (33a), whereas in the second case only *which girl* moves (33b).

- (33) a.  $[_{[+wh]P} \text{A portrait of which girl}] \text{ did you see } \{[_{[+wh]P} \text{a portrait of which girl}]\}$ ?  
 b.  $[_{[+wh]P} \text{Which girl}] \text{ did you see } [_{[-wh]P} \text{a portrait of } \{[_{[+wh]P} \text{which girl}]\}]$ ?

However, if feature percolation is optional and does not take place in (33b), then (34) is erroneously predicted to be grammatical, because it contains a (well-formed) coordination of two [-wh] phrases.

- (34) a. Which king did you buy that painting and a portrait of?  
 b. \* $[_{[+wh]P} \text{Which king}] \text{ did you buy } [_{[-wh]P} [_{[-wh]P} \text{that painting}]] \text{ and } [_{[-wh]P} \text{a portrait of } \{[_{[+wh]P} \text{which king}]\}]$ ?

Therefore, assuming that feature percolation is optional makes incorrect predictions.

Alternatively, one may consider that the [+wh] feature percolates up to the external DP *a portrait of which girl* in (33a) but also in (33b); if so, then the external DP is syntactically attracted by the relevant probe in both (33a) and (33b). If the same constituent is moved in both constructions, then the apparent differences can be accounted for in terms of spell-out options, that is, in terms of what fragment of what copy is overt (or covert). In (33a) the entire derived copy is phonologically overt and the entire base-generated copy is phonologically covert, whereas in (33b) *which girl* is pronounced in the derived copy and *a portrait of* in the base copy.

- (35) a.  $[_{[+wh]P} \text{a portrait of Which girl}] \text{ did you see } [_{[+wh]P} \text{a portrait of which girl}]$ ?  
 b.  $[_{[+wh]P} \text{A portrait of which girl}] \text{ did you see } \{[_{[+wh]P} \text{a portrait of which girl}]\}$ ?

If *wh*-feature percolation is mandatory, then (34a) is expected to be ungrammatical because it contains an ill-formed coordination of a [-*wh*]P and a [+*wh*]P.

- (36) \*<sub>?</sub> [<sub>[-wh]P</sub> that painting] and [<sub>[+wh]P</sub> a portrait of [<sub>[+wh]P</sub> ~~which king~~]]

There is independent reason to think that this sort of discontinuous spell-out of chains is possible. Crucially, the present analysis of (33) is reminiscent of Radford's (2004:194) analysis of the following *wh*-movement operations:

- (37) a. What hope could there be of finding survivors?  
b. What proof have you found that he was implicated?

In (37), there is no pied-piping, and no *wh*-feature percolation, because the *wh*-phrases consist of a projecting *wh*-determiner (*what*) that selects a [-*wh*] NP complement (*hope of finding survivors* and *proof that he was implicated*). Apparently, *what hope* and *what proof* undergo *wh*-movement and leave the PP *of finding survivors* and the CP *that he was implicated*, respectively, stranded in situ. But, as Radford observes, this analysis is problematic, because *what hope* and *what proof* are not syntactic constituents and thus should not be the target of syntactic operations, such as *wh*-movement. The copy theory can be used to construct a better analysis, as proposed by Radford: if the whPs *what hope of finding survivors* and *what proof that he was implicated* move as a whole and leave literally identical copies in their base positions, then we expect phonological deletion operations to target different fragments of each copy; more precisely, it is possible that the whole derived copy is pronounced and the whole base-generated copy phonologically deleted (38), but also that different fragments of different copies are phonologically null, leading to a discontinuous spell-out of the  $\bar{A}$ -chain (39).

- (38) a. [<sub>[+wh]P</sub> What hope of finding survivors] could there be [<sub>[+wh]P</sub> ~~what hope of finding survivors~~]?  
b. [<sub>[+wh]P</sub> What proof that he was implicated] have you found [<sub>[+wh]P</sub> ~~what proof that he was implicated~~]?  
(39) a. [<sub>[+wh]P</sub> What hope ~~of finding survivors~~] could there be [<sub>[+wh]P</sub> ~~what hope~~ of finding survivors]?  
b. [<sub>[+wh]P</sub> What proof ~~that he was implicated~~] have you found [<sub>[+wh]P</sub> ~~what proof~~ that he was implicated]?

In the analysis of illustrations 1–3, it is not extraction per se that rules out the extraction of a single coordinand; rather, it is the Parallelism Requirement, expressed in terms of categorial identity (21). The source for the ungrammaticality of the constructions under discussion is not part of syntactic movement theory, but part of coordination theory. I explore this thesis in more detail in relation to illustrations 4 and 5.

2.2.1.4 Illustration 4: An In-Situ *Wh*-Phrase Cannot Be Coordinated with a [-*wh*] DP Consider multiple questions with partial *wh*-in-situ in a language like English. Expression (40a) is grammatical because a [+*wh*] Force<sup>0</sup> in English can (overtly) attract only one whP. Force<sup>0</sup> attracts *who* to

Spec,ForceP, whereas *what* stays in situ, because *who* asymmetrically c-commands *what* and is thus syntactically closer to the probe Force<sup>0</sup> than *what*.<sup>9</sup>

- (40) a. Who said that John bought what?  
 b. [<sub>ForceP</sub> [<sub>whP</sub> Who] Force<sup>0</sup> [<sub>whP-who</sub>] [said that John bought [<sub>whP</sub> what]]]?]

But crucially, expressions (41) and (42) are ungrammatical although there is no (overt) movement of the coordinand *what*; they are ungrammatical not because *what* overtly moves (it does not), but because *what* and *beer* are categorially different: the former is a [+wh] phrase and the latter a [-wh] phrase.<sup>10</sup>

- (41) a. \*Who bought what and beer?  
 b. \*[[<sub>ForceP</sub> [<sub>[+wh]P</sub> Who] Force<sup>0</sup> [<sub>whP-who</sub>] bought [?? [<sub>[+wh]P</sub> what] and [<sub>[-wh]P</sub> beer]]]?]  
 (42) a. \*Who bought beer and what?  
 b. \*[[<sub>ForceP</sub> [<sub>[+wh]P</sub> Who] Force<sup>0</sup> [<sub>whP-who</sub>] bought [?? [<sub>[-wh]P</sub> beer] and [<sub>[+wh]P</sub> what]]]?]

2.2.1.5 Illustration 5: A Coordinand Cannot Pied-Pipe a Coordinate Structure A whP contained within the complement (43a) or the specifier (43b) of a DP can pied-pipe such a DP to the specifier position of a [+wh] Force<sup>0</sup>.

- (43) a. The photo of which applicant do you think is lost?  
 b. Which girl's gift do you think is lost?

More precisely, in (43a) the *wh*-feature of *which applicant* percolates all the way up to the DP, crossing the NP headed by *photo* and the PP headed by *of*; as a result, the whole DP, endowed with a [+wh] categorial feature, moves to Spec,ForceP. (For the sake of clarity, in (44) maximal

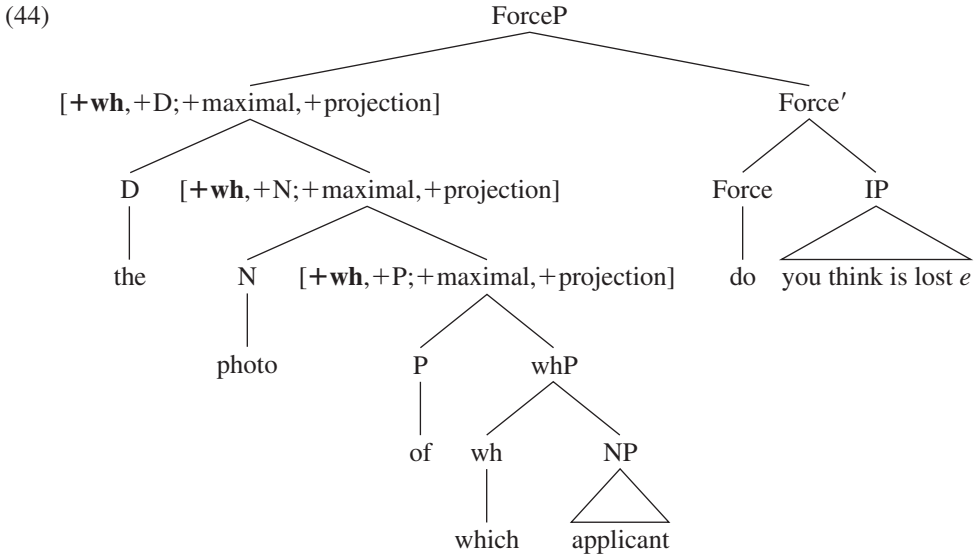
<sup>9</sup> The metrics for movement operations in terms of c-command are considered in more detail in section 2.2.2; see especially the discussion of the definition of the Minimal Link Condition (54).

<sup>10</sup> An anonymous reviewer brings to my attention the constructions with partial *wh*-in-situ in (i), which are considered to be ungrammatical. A possible way to account for their ungrammaticality may capitalize on the idea that the *wh*-feature percolates up to the external DP when the *wh*-phrase moves overtly, but crucially not when the *wh*-phrase remains in situ in a multiple question in English. Accordingly, *a portrait of which king* and *a container for what* in (i) would be [-wh]Ps. Indeed, feature percolation is a reasonable hypothesis when there is (overt) pied-piping, but it is unclear why we should assume that the *wh*-feature of an in-situ *wh*-phrase percolates up to a higher node. If feature percolation does not take place when the *wh*-phrase remains in situ, then the expressions in (i) must be analyzed as in (ii).

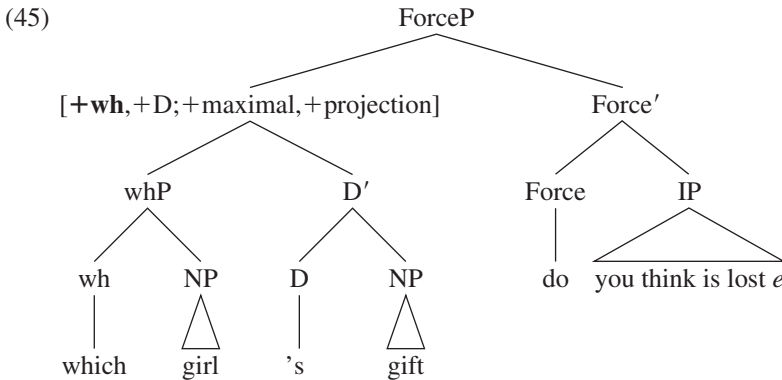
- (i) a. \*Who bought that painting and a portrait of which king?  
 b. \*Who bought what and a container for what?  
 (ii) a. \*[[<sub>[+wh]P</sub> Who] Force<sup>0</sup> [<sub>[-wh]P-who</sub>] bought [<sub>[-wh]P</sub> [<sub>[-wh]P</sub> that painting] and a [<sub>[-wh]P</sub> portrait of which king]]]?]  
 b. \*[[<sub>[+wh]P</sub> Who] Force<sup>0</sup> [<sub>[-wh]P-who</sub>] bought [?? [<sub>[+wh]P</sub> what] and [<sub>[-wh]P</sub> a container for what]]]?]

Given this reanalysis, expression (iib) contains a coordination of categorially distinct constituents and is thus expected to be ungrammatical; however, (iia) contains a coordination of two categorially identical constituents and is still ungrammatical. Therefore, the alleged ungrammaticality of (iib) must derive from constraints other than the Coordinability Condition. Note, in this regard, that simple questions and multiple questions in English are interpreted differently: multiple questions such as *Who bought a portrait of which king?* admit a pair-list reading that is unavailable in a simple question such as *Who bought that painting?* Perhaps this interpretive difference creates difficulties in finding an appropriate context for (iia). Admittedly, this suggestion, as well as the acceptability judgments behind constructions such as (ia–b), deserves closer inspection.

projections with percolated features are decomposed into feature matrices and percolated features appear in boldface; the *e* symbol indicates the base-generated copy of the pied-piped constituent.)



And in (43b) the *wh*-feature of *which girl*, the specifier of the DP headed by *'s*, percolates up to the DP; as a consequence, the whole **[+wh]** DP undergoes *wh*-movement to Spec,ForceP.



Therefore, a whP contained in a complement of a DP or in the specifier of a DP can pied-pipe such a DP. This is in contrast with the following observation: a **[+wh]** coordinand placed within the complement or the specifier of a coordinate structure does not have the ability to pied-pipe the coordinate structure in its entirety (this observation and the constructions in (46) are due to an anonymous reviewer).

- (46) a. \* $[_{ForceP} [? [Which\ girl]_{[+wh]} \text{ and } [Samuel]_{[-wh]}] [_{Force^0} \text{ do}] \text{ you think are } [_{VP} \text{ lost } \{[which\ girl] \text{ and } [Samuel]\}]]?$



- b. \*<sub>[ForceP [? [Samuel]<sub>[-wh]</sub> and [which girl]<sub>[+wh]</sub>] [<sub>Force<sup>0</sup></sub> do] you think are [<sub>VP</sub> lost ~~[[Samuel] and [which girl]]~~]]?</sub>

According to the current proposal, it is not necessary to resort to constraints on pied-piping or feature percolation to filter out the structures in (46); they are ungrammatical because they contain ill-formed coordinations of categorially distinct coordinands: *which girl*, a [+wh]P, and *Samuel*, a [-wh]P.

In sum, I account for the ungrammaticality of extracting a single coordinand in narrow syntax on the basis of the definition of Coord (10) and the feature-based definition of categorial identity (21). The types of constructions just illustrated are ungrammatical because they contain ill-formed coordinations. It is not possible to coordinate one constituent with a positive value of a categorial feature and another with a negative value of the same categorial feature. In the circumstance just described, no category or label can be projected for the coordinate structure; whether the coordinate phrase has either the positive or the negative value of the relevant categorial feature cannot be determined. This reasoning applies as well to partial *wh*-movement and to pied-piping—that is, to structures that inherit a particular feature, crucially a *wh*-feature, by percolation and not by strict projection.<sup>11</sup>

*2.2.2 Case 2: Why Both Coordinands Cannot Be Syntactically Extracted from a Coordinate Structure* As for the impossibility of extracting both coordinands out of a coordinate structure, there are two relevant subcases: the coordinands  $\alpha$  and  $\beta$  each carry a different categorial feature,  $\mathcal{F}_i, \mathcal{F}_j$  (subcase I), or  $\alpha$  and  $\beta$  share all relevant categorial features (subcase II). I discuss these two situations in turn.

<sup>11</sup> Agbayani and Golston (2010a,b, 2016) and Agbayani, Golston, and Henderer (2011) defend the view that hyperbaton in languages like Classical Greek, Latin, and Colloquial Russian involves postsyntactic movement, because it targets prosodic constituents but not syntactic constituents and obeys prosodic constraints but ignores syntactic constraints such as the CC and the Left-Branch Constraint. For instance, they argue that in the Latin example (i) the fronted material is not a syntactic but a prosodic constituent, which appears to the left of its prosodic phrase, and crucially that the coordinand *sapientiae* is extracted out of the coordinate structure in (ii). Examples are borrowed from Agbayani, Golston, and Henderer 2011:234.

(i) (in eodem)<sub>o</sub> occiderint ~~in eodem~~ castello  
 in same died castle  
 ‘died in the same castle’  
 (Caesar, *Bello Gallico* 37)

(ii) sapientiae laudem ~~sapientiae~~ et eloquentiae  
 wisdom reputation and eloquence  
 ‘a reputation for wisdom and eloquence’  
 (Cicero, *De Oratore* 2.363)

If prosodic movement operations take place postsyntactically, they are expected to be able to extract a coordinand out of a coordinate structure (ii) because they have no effect on the syntactic application of the categorial definition of Coord, which takes place in narrow syntax and thus before postsyntactic operations. This may open up a possible explanation for at least some of the exceptions to the CC observed in the literature (see, e.g., Johannessen 1998, Oda 2019); this possibility deserves further attention.



2.2.2.1 Subcase I Let the coordinands  $\alpha$  and  $\beta$  of a given coordinate structure each carry a different categorial feature,  $\mathcal{F}_i$ ,  $\mathcal{F}_j$ .  $\mathcal{F}_i$  and  $\mathcal{F}_j$  might enter into an Agree relationship with two probes outside the coordinate structure:  $\mathcal{F}_i$  with the head  $\mathcal{H}_i$  and  $\mathcal{F}_j$  with the head  $\mathcal{H}_j$ . In this situation,  $\alpha$  and  $\beta$  are categorially distinct, by the feature-based definition of categorial identity (21), because each has a different set  $\mathcal{CF}$  of categorial features. As in case 1, two categorially distinct constituents are not valid arguments of Coord.

The ungrammatical Catalan construction (47), where the external coordinand is left-dislocated and the internal one is focalized, illustrates this hypothetical situation. Note that it is possible to focalize one phrase and topicalize another phrase in the same sentence when these phrases are not coordinands (48).<sup>12</sup>

- (47) \*[Les pastanagues]<sub>[+topic]</sub>, [LES MONGETES]<sub>[+focus]</sub>, les sembra i.  
 the carrots the beans CL grows and  
 ‘The carrots, THE BEANS, he/she grows.’

- (48) [Les verdures]<sub>[+topic]</sub>, [EN PERE]<sub>[+focus]</sub>, les sembra.  
 the vegetables ART Pere CL grows  
 ‘The vegetables, PERE grows.’

In (47), the ill-formed coordination contains the base-generated copy of a [+topic] DP (*les pastanagues* ‘the carrots’) and the base-generated copy of a [+focus] DP (*les mongetes* ‘the beans’). Accordingly, the [+topic] DP should move to Spec,TopP and the [+focus] DP to Spec,FocP. Since the coordinands carry different categorial features, they are different syntactic categories; as a consequence, they are not valid arguments for Coord and no category can be projected to the coordinate structure (it cannot be decided whether the coordinate structure is either a [+topic] DP or a [+focus] DP).

- (49) [<sub>TopP</sub> [Les pastanagues]<sub>[+topic]</sub> Top<sup>0</sup> [<sub>FocP</sub> [LES MONGETES]<sub>[+focus]</sub> Foc<sup>0</sup> [<sub>IP</sub> les sembra [<sub>?</sub> [~~les pastanagues~~]<sub>[+topic]</sub> i [~~les mongetes~~]<sub>[+focus]</sub>]]]].

2.2.2.2 Subcase II Let the coordinands  $\alpha$  and  $\beta$  of a given coordinate structure share all categorial features (as well as all bar-level features), in which case they are categorially identical, by definition (21) of categorial identity. Assume them to be of category  $X$ . More particularly, consider that they both carry a categorial feature  $\mathcal{F}$  that might enter into an Agree relationship with a probe  $\mathcal{H}$ . But in this case recall that, as a result of the definition of Coord (10), the same category  $X$  is projected to the coordinate structure, which also carries the categorial feature  $\mathcal{F}$  under consid-

<sup>12</sup> As Rizzi (1997:290–291) observes, “[A] focus and one or more topics can be combined in the same structure. In that case, the focal constituent can be both preceded and followed by topics (*A Gianni, QUESTO, domani, gli dovrete dire* ‘To Gianni, THIS, tomorrow, you should tell him’).”

eration. We will observe that, under this circumstance, the entire coordinate structure is identified as the sole possible goal, agrees with  $\mathcal{H}$  with respect to  $\mathcal{F}$ , and moves to  $\text{Spec}, \mathcal{HP}$ . I formulate the preeminence of the coordinate structure over its coordinands with respect to movement in the following terms:

(50) *Integrity Condition on Coordinate Structures*

Assume that  $X$  is a well-formed coordinate structure of the same category as its coordinands  $\alpha$  and  $\beta$  and let the coordinate structure  $X$ , as well as  $\alpha$  and  $\beta$ , carry a categorial feature  $\mathcal{F}$ . Then a probe  $\mathcal{H}$  searching for a  $[+\mathcal{F}]$  category can target the coordinate structure  $X$ , but not any  $[+\mathcal{F}]$  category contained within  $X$ .

The Integrity Condition on Coordinate Structures is on a par with the Coordinability Condition (22). As I will illustrate, the former is the source for the impossibility of extracting coordinands when they are categorially identical, whereas the latter is the source for the impossibility of extracting coordinands when they are categorially distinct. The Coordinability Condition can be considered to be part of the lexical meaning of a coordinator: a coordinator selects two arguments of the same category  $X$  and projects a larger unit of category  $X$  as well. And the Integrity Condition on Coordinate Structures as formulated in (50) is a construction-specific syntactic constraint. Accordingly, the Coordinand Constraint derives in part from the lexical definition of coordinator and in part from a construction-specific constraint; however, as I will defend, there is reason to think that the Integrity Condition of Coordinate Structures is not a primitive, but can be related to more general syntactic economy conditions.

To illustrate the Integrity Condition on Coordinate Structures and motivate it on the basis of more general economy factors, I will take into consideration the impossibility of patterns 1, 2, and 3.

*Pattern 1. The coordinands  $\alpha$  and  $\beta$  cannot each move to a different specifier of  $\mathcal{HP}$ .* Russian allows multiple *wh*-movement in general (51a), but not out of a coordinate structure (51b): movement of coordinands is not available when they are both *wh*-phrases.

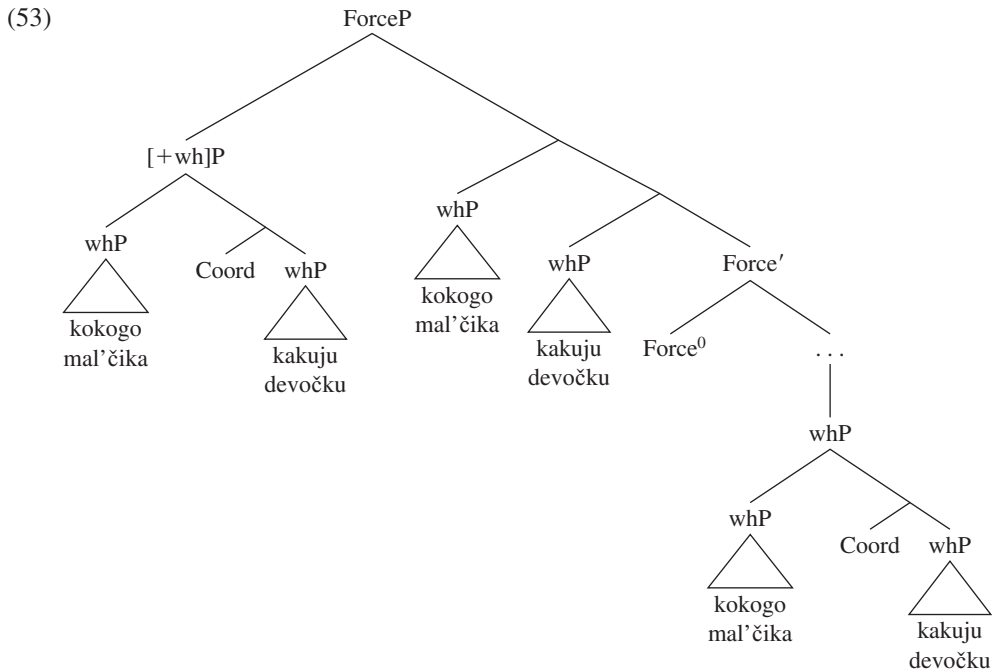
- (51) a. Kto čto kogda skazal?  
 who what when said  
 ‘Who said what when?’  
 (Rudin 1988:446)
- b. \*[Kokogo mal’čika]<sub>i</sub> [kakuju devočku]<sub>j</sub>; ty l’ubiš’ [<sub>i</sub> e<sub>i</sub> i e<sub>j</sub>]<sub>j</sub>?  
 which boy which girl you love and  
 (Zhang 2010:66)

In (51b), the two moved coordinands are categorially identical to the extent that they both bear a *wh*-feature; moreover, there is reason to think that there is enough space for the two coordinands to be interpreted as *wh*-phrases separately, since Russian in general provides a different specifier for each *wh*-phrase in the CP area (51a). According to the Integrity Condition on Coordinate Structures, the key factor in the ungrammaticality of (51a) is that the coordinate structure *kokogo*

*mal'čika i kakuju devočku* 'which boy and which girl' carries the *wh*-feature and thus must be *wh*-moved in its entirety (52).

- (52) [<sub>whP</sub> [<sub>whP</sub> Kokogo mal'čika]<sub>i</sub> i [<sub>whP</sub> kakuju devočku]<sub>j</sub>]<sub>k</sub> ty l'ubiš' e<sub>k</sub>?  
 'Which boy and which girl do you love?'

Let us thus consider the contrast between the ungrammatical sequence (51b) and the grammatical sequence (52) in more detail. As noted, these two constructions present three constituents sharing a *wh*-feature: the two coordinated *wh*-phrases (*kokogo mal'čika* and *kakuju devočku*) and the resulting coordinate structure *kokogo mal'čika i kakuju devočku*, which indeed contains the two coordinated *wh*-phrases. A priori, the three constituents all seem valid goals and might all undergo *wh*-movement. But what we observe is that the only legitimate option is to move the coordinate structure in its entirety (52); moving the two parallel coordinands separately to different specifiers, leaving the coordinator *i* stranded, is not possible (51b), nor is moving the coordinate structure in its entirety as well as the two categorially identical coordinands (53).



The unavailability of patterns (51b) (where arguably the two categorially identical coordinands are subextracted to multiple specifiers of the same projection in Russian) and (53) (where both the coordinate structure and the two coordinands are moved to multiple specifiers of the same projections) is accounted for by the Integrity Condition on Coordinate Structures. I will now entertain the possibility of relating this construction-specific constraint to more general economy conditions.

One possibility is that the preeminence of a coordinate structure over its coordinands, stated by the Integrity Condition on Coordinate Structures, could be a consequence of the Minimal Link Condition (Chomsky 1995), which can be adapted to the current technical proposal as follows:<sup>13</sup>

(54) *Minimal Link Condition (MLC)*

A probe  $\mathcal{H}$  searching for a suitable goal carrying  $\mathcal{F}$  attracts  $X$ , endowed with  $\mathcal{F}$ , only if there is no  $X'$ , also endowed with  $\mathcal{F}$ , closer to  $\mathcal{H}$  than  $X$ .

However, the *closer to* structural relation must be broadened if one attempts to apply the MLC to account for the impossibility of extracting categorially identical coordinands. The notion of *closer to* commonly assumed in the application of the MLC capitalizes on c-command (see Chomsky 1995:299) and is thus irrelevant to present concerns, since the node resulting from coordinating two constituents does not c-command its coordinands. Nonetheless, intuitively, the coordinate structure is hierarchically closer to the relevant probe than its coordinands because it dominates them. Therefore, one might suggest the following more general definition of the *closer to* structural relationship:

(55)  $X$  is *closer to*  $\mathcal{H}$  than  $X'$  if and only if  $X$  asymmetrically c-commands  $X'$  or  $X$  dominates  $X'$ .

Defining *closer to* in terms of (asymmetric) c-command permits us to account for standard cases of relativized minimality; and, a priori, also defining *closer to* in terms of dominance may permit us to account for the impossibility of extracting categorially identical coordinands out of a coordination. Syntactic distance is defined as a disjunction of two conditions, one based on c-command and the other on dominance.

But incorporating dominance into the metrics of probe-goal relations implies that the definition of the MLC we arrive at subsumes Chomsky's (1964) A-over-A Principle (56).

(56) *A-over-A Principle*

If a rule ambiguously refers to a category  $A$  in a structure of the form

[... [A ... [A ...

then the rule must apply to the higher, more inclusive, node  $A$ . (Chomsky 1973:235)

Indeed, the account I suggest here for the impossibility of extracting categorially identical coordinands is equivalent to the A-over-A Principle: if a goal searches for a category  $A$  in a structure of the form [... [A ... [A ... , then it must target the higher, more inclusive, constituent of category  $A$ .

However, the status of the A-over-A Principle has always been doubtful, even since Chomsky's (1964) formulation and especially since Ross's (1967) thorough examination; indeed, this

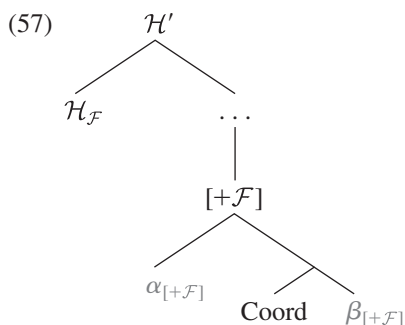
<sup>13</sup> Chomsky's (1995:311) MLC definition is as follows: "K attracts  $\alpha$  only if there is no  $\beta$ ,  $\beta$  closer to K than  $\alpha$ , such that K attracts  $\beta$ ."

principle is commonly considered to be descriptively inadequate (see Zhang 2010 for a summary) and currently plays no role in the investigation of movement operations.<sup>14</sup>

In sum, for the MLC to account for the preeminence of a coordinate structure over its coordinands with respect to movement, it is necessary to take dominance into consideration, since c-command is irrelevant, in such a way that the revised MLC subsumes the A-over-A Principle. Thus, it is necessary to base the current account of the unextractability of categorially identical coordinands particularly on the A-over-A Principle. However, given that this principle plays no role in contemporary research and seems empirically dubious, I must set aside the thesis that the Integrity Condition on Coordinate Structures is a consequence of the A-over-A Principle, or of the MLC once the *closer to* relationship is properly defined to include dominance.

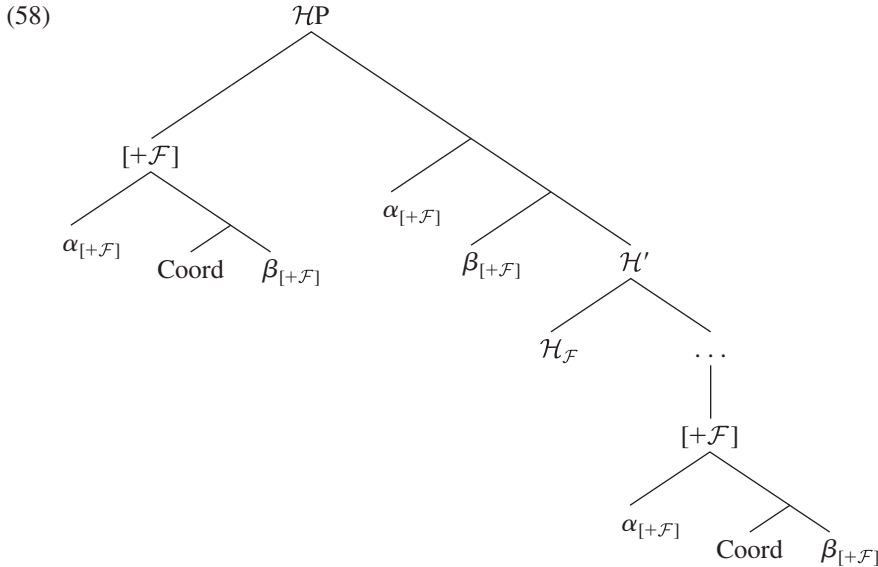
At this point, I will argue that the Integrity Condition on Coordinate Structures is related to more general economy conditions on Agree/Attract operations to the extent that it both restricts the number of categorially identical goals that are actually available to a given probe and avoids a certain type of redundant syntactic derivation.

The Integrity Condition on Coordinate Structures restricts the number of categorially identical goals that are available to a given probe to the extent that a probe  $\mathcal{H}$  searching for a goal carrying  $\mathcal{F}$  attracts the coordinate phrase if it carries  $\mathcal{F}$ , but does not consider any of the phrases categorially identical coordinands. The categorially identical coordinands of the coordinate phrase are not actual candidates for probe-goal relations with  $\mathcal{H}$ ; they are invisible to it (I represent them in gray in (57)). The coordinate phrase is the single candidate. As a result, it is not possible to move the coordinands and leave the coordinator stranded; the only possibility is to extract the coordinate structure in its entirety.



<sup>14</sup> It is fair to note that Ross (1967:158–162) claimed that what I call the CC derives from the A-over-A Principle, but not what I call the EC; on this basis, he concluded that the CSC is a necessary constraint of the metatheory (p. 161). However, he assumed (p. 158) that *what sofa* and *some table* are both NPs, as well as the coordination *what sofa and some table*. This analysis contradicts current categorial analyses of these expressions: *what sofa* and *some table* are analyzed as a [+wh]P and a [-wh]DP, respectively. This situation forces one to appeal to the Parallelism Requirement, or more precisely to the Coordinability Condition.

The Integrity Condition on Coordinate Structures avoids redundant derivations where both the categorially identical coordinands and the coordinate structure would move to different specifiers of  $\mathcal{H}P$ . Intuitively, these hypothetical (and clearly unattested) derivations are redundant because each coordinand moves twice although just one categorial feature  $\mathcal{F}$  is involved: probed by the searching  $\mathcal{H}$ , each coordinand moves to its own Spec, $\mathcal{H}P$ ; then the two coordinands move again, this time as part of the coordinate phrase attracted by the same searching probe  $\mathcal{H}$ .



The Integrity Condition on Coordinate Structures can then be understood as a construction-specific instantiation of more general economy considerations relative to Attract operations.

Observe, finally, that the Integrity Condition on Coordinate Structures accounts for the observation that coordinands cannot undergo A-movement.

- (59) a. \*Peter often and/or Mary goes out for dinner.  
 b. \*Peter seemed to and/or Mary enjoy the movie.

Assume that nonempty DPs must value their initially unvalued case feature [uC] with respect to an appropriate probe, in order to satisfy (a version of) Vergnaud's Case Filter (see Vergnaud 2008). Then, [uC] features are categorial features of DPs to the extent that they determine the syntactic distribution of DPs: typically, a [+finite] T head attracts a nonempty DP with a [uC] (here, *Mia*) to its specifier and assigns it a nominative value (60).

- (60) a. [<sub>TP</sub> Mia<sub>[+nom]</sub> T<sub>[+fin]</sub> [often Mia<sub>[uC]</sub> goes out for dinner]].  
 b. [<sub>TP</sub> Mia<sub>[+nom]</sub> T<sub>[+fin]</sub> [<sub>VP</sub> seemed [to Mia<sub>[uC]</sub> enjoy the movie]]].

If [uC]<sub>s</sub> are categorial features of DPs, then the coordination of two DPs each with a [uC] becomes a DP with a [uC]. Therefore, by the Integrity Condition on Coordinate Structures, a [+fin] T at-

tracts the coordination in its entirety (61) and assigns it a nominative value that percolates down to each coordinand.

- (61) a. [<sub>TP</sub> [Mia<sub>[+nom]</sub> and Mary<sub>[+nom]</sub>]<sub>[+nom]</sub> T<sub>[+fin]</sub> [often [~~Mia<sub>[uC]</sub> and/or Mary<sub>[uC]</sub>~~]<sub>[uC]</sub> go out for dinner]].  
 b. [<sub>TP</sub> [Mia<sub>[+nom]</sub> and Mary<sub>[+nom]</sub>]<sub>[+nom]</sub> T<sub>[+fin]</sub> [<sub>VP</sub> seemed [to [~~Mia<sub>[uC]</sub> and/or Mary<sub>[uC]</sub>~~]<sub>[uC]</sub> enjoy the movie]]].

Note that if a single coordinand were raised to Spec,TP, then there would be two nonempty DPs with a [uC]: the in-situ coordinand and the coordinate structure (62).

- (62) a. [<sub>TP</sub> Mia<sub>[+nom]</sub> T<sub>[+fin]</sub> [often [Mia<sub>[uC]</sub> and/or Mary<sub>[uC]</sub>]<sub>[uC]</sub> goes out for dinner]].  
 b. [<sub>TP</sub> Mia<sub>[+nom]</sub> T<sub>[+fin]</sub> [<sub>VP</sub> seemed [to [Mia<sub>[uC]</sub> and/or Mary<sub>[uC]</sub>]<sub>[uC]</sub> enjoy the movie]]].

Hence, the Integrity Condition on Coordinate Structures ensures that the Case Filter is not violated by DP coordinations.

*Pattern 2. The coordinands  $\alpha$  and  $\beta$  cannot form interwoven dependencies.* Observe that the coordinands  $\alpha$  and  $\beta$  of a CoordP<sub>B</sub> cannot move by sideward movement to the coordinated positions of a c-commanding CoordP<sub>A</sub>, leaving the coordinator of CoordP<sub>B</sub> stranded.<sup>15</sup> For instance, in (63) the coordinands *which nurse* and *which hostess* cannot move from the CoordP<sub>B</sub> into the c-commanding CoordP<sub>A</sub>, nor can the topic phrases *Greek* and *economy*.

- (63) a. \*[<sub>ForceP</sub> [<sub>CoordP<sub>A</sub></sub> Which nurse and which hostess] [<sub>Force'</sub> [<sub>Force<sup>0</sup></sub> did] [<sub>IP</sub> they date [<sub>CoordP<sub>B</sub></sub> ~~which nurse and which hostess~~]]]], respectively?  
 b. \*[<sub>TopP</sub> [<sub>CoordP<sub>A</sub></sub> Greek and economy] [<sub>Top'</sub> Top<sup>0</sup> [<sub>IP</sub> they teach [<sub>CoordP<sub>B</sub></sub> ~~Greek and economy~~]]]], respectively.

Instead, it is the base-generated CoordP that must be fronted as a whole, via *wh*-movement in (64a) or via topic movement in (64b).

- (64) a. [<sub>ForceP</sub> [<sub>CoordP</sub> Which nurse and which hostess] [<sub>Force'</sub> [<sub>Force<sup>0</sup></sub> did] [<sub>IP</sub> they date [<sub>CoordP</sub> ~~which nurse and which hostess~~]]]], respectively?  
 b. [<sub>TopP</sub> [<sub>CoordP</sub> Greek and economy] [<sub>Top'</sub> Top<sup>0</sup> [<sub>IP</sub> they teach [<sub>CoordP</sub> ~~Greek and economy~~]]]], respectively.

The basic question concerning the proposal I am developing is what factor permits (64) and prohibits (63). As I will argue in what follows, the Integrity Condition on Coordinate Structures defined in (50) can account for this grammaticality contrast.

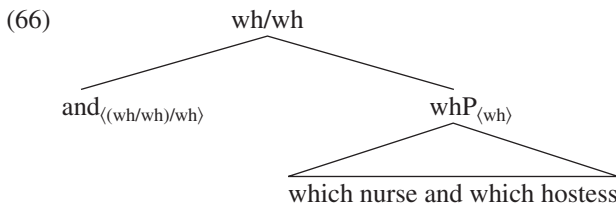
<sup>15</sup> Regarding sideward movement, see Bobaljik and Brown 1997, Nunes and Uriagereka 2000, Hornstein 2001, Nunes 2001, Kayne 2002, Boeckx 2003, Hornstein and Kiguchi 2003, Agbayani and Zoerner 2004, Boeckx and Hornstein 2005, and Zhang 2010.

Consider, on the one hand, the generation of (63), which illustrates the inability of coordinands to form interwoven dependencies. According to the definition of Coord (10), the coordinator head  $and_A$  of the  $c$ -commanding  $CoordP_A$  bears the category  $X/(X/X)$ . This enables it to act as a syntactic probe, searching for two suitable categorially identical goals carrying the same categorial feature  $\mathcal{F}$ . This feature is a *wh*-feature in (63a) and a topic feature in (63b). Observe now that the coordinands of the lower  $CoordP_B$  bear the relevant feature, as does the  $CoordP_B$  itself. However, as a consequence of the Integrity Condition on Coordinate Structures, the coordinands of the  $CoordP_B$  cannot move, whence the ungrammaticality of (63).

Note also that moving the  $CoordP_B$  in its entirety by sideward movement to a coordinate position of  $CoordP_A$  would provide only one of the two arguments required by the head  $and_A$ .

- (65) \* $[_{ForceP} [ \_\_\_ And_A [_{CoordP_B} \textit{which nurse and which hostess}]] [_{Force'} [_{Force^0} \textit{did}]] [_{IP} \textit{they date} [_{CoordP_B} \textit{which nurse and which hostess}]]]]$ , respectively?

The structure where  $CoordP_B$  lands would contain a coordinator requiring two categorially identical coordinands, but only one coordinand would be present (*which nurse and which hostess*); it would thus be an incomplete or unsaturated structure of category *wh/wh* (66).



On the other hand, in the generation of the well-formed constructions in (64), no sideward movement of coordinands needs to be invoked. Instead, the  $CoordP$  moves from the complement position of a verb to a specifier of a projection in the left periphery. More precisely, the heads  $Force^0$  and  $Top^0$  search for a suitable goal in (64a) and (64b), respectively;  $Force^0$  finds the coordinate structure *which nurse and which hostess* and attracts it to  $Spec,ForceP$ , whereas  $Top^0$  finds the coordinate structure *Greek and economy* and attracts it to  $Spec,TopP$ .

*Pattern 3. A syntactic constituent cannot form an across-the-board dependency with coordinated positions.* Apparently, across-the-board (ATB) rules associate a syntactic constituent to a gap within all coordinands of a coordinate structure; accordingly, the constituent *which students* can form a dependency with a gap within the two coordinands in (67). Nonetheless, ATB rules cannot associate a syntactic constituent to all coordinated positions of a coordinate structure (68) (Sag 1982, Gazdar et al. 1985).

- (67)  $[Which\ students]_i$  did you say  $[_{CoordP} [Peter\ likes\ e_i]$  and  $[Mary\ hates\ e_i]]?$   
 (68) a. \* $[Which\ students]_i$  did Peter meet  $[_{CoordP} e_i$  and  $e_i]$ ?  
 b. \* $[The\ Pre-Raphaelites]_i$ , we found  $[_{CoordP} e_i$  and  $e_i]$ .

Note that the same constituent is reconstructed in the gaps of the two coordinated positions in the ungrammatical constructions (68a–b), whereby the coordinate phrases consist in coordinating



a constituent to itself. For instance, the coordination *which students and which students* carries a [wh] categorial feature and is formed by coordinating the *wh*-phrase *which student* to itself. Accordingly, given the Integrity Condition on Coordinate Structures, it is the coordinate structure *which student and which student*, a whP, that should move to Spec,ForceP after agreeing with Force<sup>0</sup>. But the output of this movement operation is unacceptable as well.

- (69) \*<sub>[ForceP [whP Which students and which students] [Force' [Force<sup>0</sup> did] [IP Peter meet <sub>[whP which students and which students]]]]?</sub></sub>

At this point, it is important to note that, when a constituent is coordinated to itself and neither this constituent nor the resulting coordinate structure moves, the resulting string is still ungrammatical (70).

- (70) a. \*I met the student and the student.  
 b. \*I'm looking for my bag and for my bag.  
 c. \*Peter lives in a small city and in a small city.

The fact that constructions (69) and (70a–b) are not acceptable shows that the ungrammaticality of (68a–b) is not related to movement constraints such as the Integrity Condition on Coordinate Structures; rather, it is related to the following general constraint on coordination:

(71) *Prohibition against Self-Coordination*

A syntactic constituent cannot be coordinated to itself; that is, it cannot appear in more than one position of a coordinate structure.

All the strings under consideration are problematic for the same reason: they involve a vacuous coordination of a syntactic constituent to itself. Each of the constituents *which students*, *the Pre-Raphaelites*, *the student*, *my bag*, and *in a small city* is coordinated to itself in (68a–b) and (70a–c).

Note that coordinating a constituent to itself is also problematic in disjunctive (72) and adversative (73)–(75) coordinations.

- (72) a. \*I met [the student or the student].  
 b. \*I'm looking [for my bag or for my bag].  
 c. \*Peter lives [in a small city or in a small city].
- (73) a. I didn't meet [the student but {\*the student / the professor}].  
 b. I'm not looking [for my bag but {\*for my bag / for my coat}].  
 c. Peter doesn't live [in a small city but {\*in a small city / in a large city}].
- (74) He was [excited but {\*excited / tired}].

It is important to observe that the following examples do not involve coordinations of a constituent to itself:

- (75) a. A dog and/or another dog met.  
 b. I like reading novels and/but only novels.

(76) Mark Twain and Samuel Clemens are/\*is the same person.

In (75), the coordinations involve two different constituents, made up of different lexical items: *a dog* and *another dog*, and *novels* and *only novels*. In (76), again, we observe a coordination of two different constituents: two different proper names, *Mark Twain* and *Samuel Clemens*. A different issue is that these proper names, which are formally different, have the same extension, as (76) itself states.

More precisely, self-coordinations involve coordinations of different occurrences of the same constituent. In general, a constituent may be selected at different times, or at different steps, in a syntactic derivation. Each time it is selected, the constituent becomes a different occurrence, which may have different properties in the conceptual-intentional (CI) system. Expression (77a) contains two occurrences of the complex noun *New York*. Similarly, (77b) contains two occurrences of the plural NP *dogs*, one interpreted as an external argument and the other as an internal argument, and (77c) contains two occurrences of the singular NP *tree*.<sup>16</sup>

- (77) a. New York City is in New York State.  
 (Chomsky 1975:109–110)  
 b. Dogs always chase dogs.  
 c. Tarzan swung from tree to tree.

Although in general we find different occurrences of a constituent in different base positions (77), we do not find different occurrences of a constituent specifically in different coordinated positions ((70), (72), (74)), because, as stated in (71), a constituent cannot be readily merged in different coordinate positions of a given coordinate structure.

Coordinating a constituent to itself is a vacuous syntactic operation that makes no obvious semantic contribution. Such a coordination seems entirely redundant from a semantic viewpoint both in conjunctions and in disjunctions. Similarly, the (reflexive) adversative coordination of a constituent to itself is interpretively vacuous: if adversative coordination expresses a contrast between coordinands and if coordinands are the same constituent, there can be no contrast. Accordingly, it is not possible to coordinate the AdjP *excited* adversatively to itself in (74), or the DP *the student* adversatively to itself in (73a).

In this sense, the Prohibition against Self-Coordination is a syntax-semantics interface condition, quite similar in nature to the Prohibition against Vacuous Quantification (Chomsky 1982, 1991, Kratzer 1995).

(78) *Prohibition against Vacuous Quantification*

For every occurrence of a variable  $x$  there must be a quantifier  $Q$  that binds  $x$ , and for every quantifier  $Q$  there must be a variable  $x$  such that  $Q$  binds  $x$ .

<sup>16</sup> See Chomsky 1975, 1995 regarding the need for a notation to distinguish among occurrences of a constituent, as well as Fortuny and Corominas-Murtra 2009 and Fortuny 2018. In the latter works, a constituent becomes an  $n$ -occurrence when it enters the syntactic computation at step  $n$ .

Natural languages do not have pleonastic expressions such as *Peter and Peter came late*, interpreted, redundantly, as ‘There is a single individual denoted by *Peter* who came late’, or *I wake up at noon or at noon*, interpreted exactly as ‘I wake up at noon’, or *I feel tired but tired*, interpreted vacuously as ‘I feel tired’, just as they do not have expressions such as *Who John saw Bill*, interpreted as ‘John saw Bill’, and *Every some person left*, interpreted as ‘Some person left’ (Chomsky 1991:438). Reflexive coordinations are semantically as superfluous as operators binding no variable.

### 2.3 Deducing the Threefold Decomposition of the Coordinand Constraint from the Least Effort Principle

This article decomposes the CC into three factors: the categorematic definition of Coord (10), the Integrity Condition on Coordinate Structures (50), and the Prohibition against Self-Coordination (71).

First, the categorematic definition of Coord requires the coordinate structure and its coordinands to be categorially identical, that is, to carry the same categorial features. Syntactic extraction of a single coordinand that is categorially different from the coordinand that remains within the coordinate structure is not possible because it presupposes the coordination of categorially distinct constituents, such as a [+wh] phrase and a [–wh] phrase, a [+topic] phrase and a [–topic] phrase, or a [+focus] phrase and a [–focus] phrase (case 1). Syntactic extraction of two categorially distinct coordinands to specifier positions of different projections is prohibited for the same reason (case 2, subcase I).

Second, when a coordinate structure is well-formed and carries the same category as its coordinands, the Integrity Condition on Coordinate Structure applies: the coordinate structure, but not its categorially identical coordinands, can be targeted by a searching syntactic probe. This prohibits the extraction of multiple categorially identical coordinands to multiple specifier positions of a given head (case 2, subcase II, pattern 1) and the extraction of a DP out of a DP coordination to an A-position.

Third, the Prohibition against Self-Coordination does not permit a constituent to be merged in more than one coordinated position; consequently, the prerequisite for forming an ATB dependency with coordinated positions is not fulfilled (case 2, subcase II, pattern 3).

This reasoning leads to a decomposition of the CC into three factors that are independently motivated. The categorematic definition of Coord, or an equivalent statement, is necessary to characterize the lexicosyntactic contribution of Coord, its relation to the coordinands, and the syntactic makeup of coordinate structures. The Integrity Condition on Coordinate Structures is a construction-specific instantiation of more general economy considerations on movement operations that (a) restrict the number of categorially identical goals visible to a particular probe and (b) avoid certain redundant derivations. And the Prohibition against Self-Coordination is a syntax-semantics interface condition that bans a particular case of semantically vacuous operation, namely, the coordination of a constituent to itself.

The novelty of the present investigation of CC effects is that it clarifies how these effects are related to several components of the language faculty. The CC reflects how different factors

belonging to different components interact with each other. Some effects of the CC are related to the categorematic definition of Coord (or the Parallelism Requirement), others to the Integrity Condition on Coordinate Structures (or to the more general conditions on internal Merge behind them), and others to the Prohibition against Self-Coordination.

Therefore, each of these factors has a very specific task: only the categorematic definition of Coord accounts for the impossibility of extracting a single coordinand; only the Integrity Condition on Coordinate Structures accounts for the impossibility of extracting both coordinands when they are categorially identical; and only the Prohibition against Self-Coordination accounts for the inability of a syntactic constituent to form an ATB dependency with coordinated positions.

I would like to conclude this investigation by observing that the proposed decomposition of the CC effects based on the three factors just discussed can be deduced from what Chomsky (1991:437) calls “least effort,” a principle considered to be specific to the language faculty. Adhering to Chomsky’s original considerations, I define this principle as follows:

(79) *Least Effort Principle*

Grammatical derivations contain no vacuous or superfluous steps.

This “overarching” linguistic principle states that grammatical operations do not apply vacuously; there are no vacuous or superfluous rule applications. Grammatical operations take place as a last resort—that is, only when they are required, only when they make a difference. The Least Effort Principle, an economy principle relative to derivations, has an “analogous principle for representations,” Full Interpretation (Chomsky 1991:437), understood as follows:

(80) *Full Interpretation*

Grammatical representations contain no vacuous or superfluous symbols.

I will show that ill-formed instances of coordinand extractions involve instances of vacuous or superfluous coordinations and thus contravene the Least Effort Principle (and Full Interpretation).

First, the extraction of a single coordinand—for instance, a single *wh*-phrase—presupposes a vacuous derivational step: given the categorematic definition of Coord, two constituents of category *X* are coordinated to yield a new constituent of category *X*; if two categorially distinct constituents, such as a [+wh] phrase and a [–wh] phrase, were selected as the arguments of Coord, then no category would be yielded as output. It could not be decided whether or not the coordination would be [+wh]. Coordinations of categorially distinct constituents are incomplete structures, with no categorial specification; as a result, they cannot be properly interpreted in the C-I system.<sup>17</sup>

Second, given a well-formed coordinate structure of category *X* carrying a categorial feature  $\mathcal{F}$ , whose coordinands are of category *X* and carry  $\mathcal{F}$  as well, the Integrity Condition on Coordinate Structures permits extraction of the coordinate structure in its entirety and prohibits extraction of the categorially identical coordinands. As argued above, this condition bans moving

<sup>17</sup> This agrees with Chomsky’s view (see especially Chomsky 2013, also Rizzi 2015) that labeling must be complete at the interfaces.

the coordinate structure in its entirety (coordinands included) and each coordinand independently to multiple specifiers of the same projection, as represented in (53). Such a derivation would be superfluous to the extent that a coordinand moves twice due to the same probe: once on its own and once as part of the coordinate structure. The Least Effort Principle bans this type of redundant or superfluous derivation, where a constituent and a subconstituent of the same category move due to the same probing feature.

Third, the grammatical operation that would coordinate a syntactic constituent to itself is vacuous. The Prohibition against Self-Coordination avoids derivations that have no effect in the C-I system and is thus analogous to the Prohibition against Vacuous Quantification, as noted above. This type of vacuous derivation, with no effect in the C-I system, is filtered out by the Least Effort Principle.

Therefore, the CC effects can be deduced, ultimately, from a very general linguistic principle: the Least Effort Principle.

I emphasize that in the end, the value of decomposing the CC in terms of the three factors just mentioned lies in their heuristic nature. The CC, which states that “no coordinand can be moved,” does not manifest any obvious connection to general linguistic principles, but the three factors presented in section 2.2 are conspicuously related to Chomsky’s overarching principle: grammatical operations are not superfluous or vacuous. The three factors into which I have decomposed the CC are construction-specific, but they clearly instantiate the demands of the overarching requirement of avoiding superfluous grammatical operations, which is not construction-specific. They seem necessary mediators: only if we resort to them can we appreciate how the CC reduces to the Least Effort Principle.<sup>18</sup>

### 3 Discussion

Now that the proposed deduction of the CC effects has been developed, it may be useful to compare it with a selection of alternative accounts defended by other researchers (see Zhang 2010:sec. 4.1.2 for a more comprehensive review of CC accounts).

It must be acknowledged that the idea that the Parallelism Requirement (9) plays an important role in understanding the CC effects can already be found in Schachter 1977. Schachter proposes that his Coordinate Constituent Constraint, which is similar to the Parallelism Requirement, accounts for the Coordinate Structure Constraint.<sup>19</sup> Three important differences between Schach-

<sup>18</sup> Decomposing the CC in terms of construction-specific factors is not necessarily a shortcoming of my proposal. I am concerned with coordination (and not, for instance, with subordination, verbal predication, or binding) and thus need to be specific about the contribution of coordinators as well as the function and interpretation of coordinate structures. A different issue is whether or not those factors that are specific about a particular domain, such as coordination, can be connected to general linguistic principles.

<sup>19</sup> Schachter (1977:90) defines his Coordinate Constituent Constraint as follows: “The constituents of a coordinate construction must belong to the same syntactic category and have the same semantic function.” Note that this constraint is not equivalent to the Parallelism Requirement, since it refers only to the coordinate structure’s constituents, not to the coordinate structure itself.

ter's proposal and mine are these: (a) Schachter attempts to derive both the CC and the Element Constraint from the Coordinate Constituent Constraint, whereas my proposal is concerned with the CC only;<sup>20</sup> (b) Schachter addresses the impossibility of extracting one coordinand only, but he does not consider the impossibility of extracting multiple *wh*-phrases out of a coordinate structure in a language like Russian (see the discussion above about the ungrammatical string (51b)); (c) unlike Schachter, I capitalize on a featural definition of categorial identity.<sup>21</sup>

Schachter's "account" of what I call the CC effects is not sufficiently developed; crucially, in relation to the ungrammatical string *\*What sofa will he put the chair between some table and?* Schachter states the following:

[T]he constituents of the 'coordinate construction' *some table and* would, presumably, have to be *some table* plus *(and) ∅*. Obviously these constituents neither belong to the same category nor have the same semantic function. The construction thus disobeys the CCC [Coordinate Constituent Constraint], and its ungrammaticalness can be explained on this basis. (Schachter 1977:95)

Unfortunately, Schachter does not spell out the obvious differences in syntactic category or semantic function between *some table* and *(and) ∅* that he has in mind. Nor does he mention any of their syntactic and semantic similarities; note in this regard that the presumed categories appear in the same syntactic position and are selected by the same categories. Clearly, Schachter's discussion of the CC is superficial; he is primarily concerned with the Element Constraint.

Napoli's (1993) approach to the CC is also based on the idea that the CC is a result of the Parallelism Requirement. In her proposal, it is not possible in general to coordinate a full DP and a gap left by the extraction of a further coordinand, because the gap and the coordinand in some sense would not be parallel. This intuition echoes Schachter's (1977) assumption that *some table* and *(and) ∅* are syntactically and semantically alike. But again, multiple *wh*-movement becomes ungrammatical in expressions such as (51b), although the two categories left within the coordinate structure after the extraction of both *wh*-phrases are arguably parallel, since they are both gaps. Recall that, in the approach proposed here, moving categorially identical coordinands is not possible because the resulting coordinate structure is identified by the Integrity Condition on Coordinate Structures as the only suitable goal.

In sum, the impossibility of patterns like (51b) casts doubt on the idea that the CC can be derived simply from the Parallelism Requirement. Such a requirement is necessary, but not sufficient. Other factors need to be incorporated: the Integrity Condition on Coordinate Structures and the Prohibition against Self-Coordination.

A different account is suggested by Sag (1982) and Pesetsky (1982): that the CC effects derive from the A-over-A Principle. In brief, if the coordinands and the coordinate phrase are analyzed as NPs in (24a), then the A-over-A Principle claims that a syntactic rule can apply only

<sup>20</sup> Schachter (1977) does not use the expressions *Coordinand Constraint* and *Element Constraint*, which were coined by Grosu (1973), four years before the publication of Schachter's article.

<sup>21</sup> Schachter (1977) capitalizes on certain "superficial" category distinctions, such as relative clause and nonrelativized sentence, and certain semantic functions, such as properties and relations.

to the higher NP (i.e., to the coordinate phrase); extraction of lower NPs (i.e., of coordinands) is prevented. However, as observed in section 2.2.2, the A-over-A Principle does not seem to be empirically valid (see Zhang 2010:81–84) and currently plays no role in the investigation of the locality of movement. Moreover, it is crucial that a *wh*-phrase like *who* and a DP like *a girl* are not fully identical categories given that their distribution differs (as does their semantics): the former, but not the latter, carries a categorial *wh*-feature; the former, but not the latter, undergoes *wh*-movement.

This entails that typical illustrations of the CC effects, such as those analyzed in section 2.2.1, involve coordinations of categorially distinct constituents, in which case the A-over-A Principle is irrelevant. It is the Parallelism Requirement—or more precisely, the Coordinability Condition—that must apply.

Finally, in her attempt to explain the CC effects, Zhang (2010) argues that the external and the internal coordinand cannot move for different reasons: the external coordinand cannot move because it loses its categorial features after transferring them to Coord (p. 87), and the internal coordinand cannot move because Coord, “like certain other head elements, may not have silent complements” (p. 86). It is crucial for Zhang’s analysis that it is only the external coordinand that transfers its categorial features to Coord and that the external and the internal coordinands need not be categorially identical. However, it is not tenable to build an explanation of the CC effects on the idea that coordinands need not be categorially identical, since there are reasons to be skeptical about this hypothesis, as shown by Bruening and Khalaf (2020) and discussed in the online appendix of this article.

The proposal developed here is both novel and broad. I have analyzed the impossibility of extracting a single coordinand not only with respect to *wh*-movement, but also with respect to topic movement (clitic left-dislocation), focus movement, and A-movement; and I have analyzed the impossibility of extracting multiple *wh*-phrases out of a coordination in languages like Russian, which in general allow multiple *wh*-movement. Moreover, my investigation has taken into consideration the impossibility of coordinating a [+wh] phrase and a [–wh] phrase in partial *wh*-movement, and the inability of a *wh*-phrase to pied-pipe either a single coordinand or the whole coordinate structure.

The discussion of what grammatical features count as categorial features also has important implications that go beyond the study of the CC, since it makes predictions about what feature mismatches are lethal for coordinate structures. The online appendix discusses three families of phenomena that are relevant for clarifying the Parallelism Requirement in general, as an essential component of virtually any analysis of coordination, and in particular for clarifying my account of the CC effects, which expresses the Parallelism Requirement in terms of a categorematic definition of Coord (10) and conceives categorial identity between two constituents in terms of coincidence of their categorial and bar-level features (21). In the remainder of the article, I summarize the basic ideas contained in the online appendix.

First, I review certain familiar cases of acceptable coordinations in predicative (81a) and argument (81b) positions whose coordinands nonetheless seem to be categorially distinct (Schachter 1977, Sag et al. 1985).



- (81) a. He spoke [[<sub>AdvP</sub> fluently] or [<sub>PP</sub> with ease]].  
 b. You can depend on [[<sub>NP</sub> my assistant] and [<sub>CP</sub> that he will be on time]].

I observe that these categorial mismatches may be only apparent. Crucially, I account for (81a) on the basis of left-peripheral deletion and for (81b) on the basis of unpronounced N heads, following Bruening and Al Khalaf (2020). Therefore, construction (81a) involves the coordination of two CPs with the deletion of *he spoke* in the second conjunct, and (81b) the coordination of two NPs with a null N heading the second conjunct. In relation to left-peripheral deletion, I also investigate why the construction *\*Who did you meet and a friend of?* is ungrammatical: why extracting *who* in both conjuncts and subsequently deleting *who did you meet* in the second conjunct is grammatically impossible.

Second, I discuss certain grammatical features of nominal expressions that are not categorial features (of nominal expressions): number, gender, person, and case. Typically, having different values for number and gender does not correspond to different distributional patterns of DPs. Accordingly, number and gender are not categorial features of DPs; and therefore, DPs with different number and gender specifications can be coordinated. Similar considerations lead to the conclusion that person features are not categorial features of pronouns. Case inflection mismatches pose a particularly interesting case study for my proposal; I investigate Finnish patterns, as presented by Kiparsky (2001) and further discussed by Kalin and Weisser (2019) and Weisser (2020), and argue that apparent mismatches involve morphological case, but not syntactic case. Whereas syntactic case distinctions correspond to categorial features, morphological case distinctions do not. My proposal is compatible with Weisser's (2020:43) generalization that syntactic case is "evenly distributed amongst all of the conjuncts in nominal conjunction."

Third, I analyze the possibility of coordinating an echo *wh*-phrase with a [-wh] DP, as in *You bought a car and what?* I argue in detail that echo *wh*-constituents can be coordinated with [-wh] DPs because echo *wh*-constituents are negatively specified for the [wh] categorial feature. Echo and nonecho constituents are categorially identical and thus can be coordinated. I also discuss certain coordinations that apparently contain a declarative and an interrogative clause, such as *John left last month, and who has seen him since?* I argue that, although in general it is not possible to coordinate clauses belonging to different types (cf. *\*Close the door!, and why are you here?*), a declarative clause can be coordinated with an interrogative clause when the latter is interpreted not as a question but as an assertion; in particular, the second coordinand *who has seen him since?* is not uttered to request information from an addressee but is closely equivalent to *No one has seen him since.*

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