Coordinators and Modification Markers as Categoryless Functional Elements

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Abstract

A coordinate construction is built by two basic levels of combination: a categoryless functional head is combined with a conjunct, and the result is combined with a categorizer, which is the other conjunct. The first combination is seen in all structures headed by a functional element, and the latter is seen in the categorization of a root. The same two levels of combination are also seen in a modification construction. A categoryless functional head is realized by a coordinator or a modification marker. The positions of the low and high conjunct are also those of a modifier and the modified element, respectively. Thus, neither a coordinate construction nor a modification construction has a construction-specific structural representation or functional head. This means that no coordinate construction is built by any construction-specific operation and there is no stipulated Adjunction operation. The categoryless functional head can also be found in compounds, which can also be categoryless, like single roots.

1. Introduction

This paper is first about the syntactic relations between conjuncts of a coordinate construction, the ways to build the construction, and the syntactic status of the components of the construction: coordinators and conjuncts.[1] Likewise, it shows the parallel syntax of modification constructions. The paper argues that coordinators and modification markers are functional elements; however, they are different from other functional elements because they have no syntactic category features. This paper also argues that in a coordinate construction, one conjunct is the complement of the coordinator, and the formed cluster must be merged with another conjunct, and the whole coordinate complex is categorized by the latter conjunct. The latter merger is also found in the categorization of roots. Therefore, there are two basic layers of merger in building a coordinate construction: complementation and categorization. This paper further argues that the same two layers of merger are seen in a modification construction, where the structural position of a coordinator can be taken by a modification marker, which is visible in languages such as Mandarin but not in languages such as English. An overt or covert modification marker is merged with a modifier, the formed cluster is merged with the modified element, and the whole construction is categorized by the modified element. Therefore, neither a coordinate construction nor a modification construction is built by any construction-specific operation, and neither has a construction-specific syntactic representation.

The paper is also about the occurrence of coordinators and modification markers in compounds, extending my analysis of these two kinds of functional elements to the organization of roots in compounds.

In §2, I discuss the asymmetrical relation between conjuncts, and in §3, I show the parallel syntactic relation between a modifier and the modified element. In §4, I explore the shared properties of coordinators and modification markers, proposing a unified syntactic analysis. In §5, I discuss compound-internal coordinators and modification markers. §6 concludes the paper.

2. The syntactic relations between conjuncts

In this section, the issue how conjuncts are integrated into a structure is addressed. I focus on the most basic construction, the one that has only two conjuncts (see Zhang 2023 for an extension of the analysis to coordinate constructions that have three or more conjuncts). I argue that there are two levels of merger: complementation and categorization. The mergers are motivated by the properties of coordinators. I first give critical comments on major previous analyses (§2.1), and then argue for the two kinds of merger sequentially (§2.2 and §2.3).

2.1 Previous analyses

The first previous analysis of coordination is a symmetrical sister analysis. In Dik (1968: 25), a coordinate construction is defined as "a construction consisting of two or more members which are equivalent as to grammatical function, and bound together at the same level of structural hierarchy by means of a linking device". In this viewpoint, conjuncts are symmetrical sisters, and thus the structure of *Asia and Africa* is (1) (also Blümel 1914: 193, 205; Bloomfield 1933: 185; Gleitman 1965: 276; Chomsky 1965: 12-3, 196 n.7; Jackendoff 1977: 51). In Neeleman, Philip, Tanaka, and van de Koot (2022), conjuncts are also in a symmetrical relation (called "mutual adjunction"), although the coordinator is not a sister to all conjuncts (see our §4.1).

(1)

    Asia   and   Africa

However, at least three facts show a possible asymmetry between conjuncts, challenging the symmetrical analysis. First, binding facts show that the first conjunct can asymmetrically c-command the second one in nominal coordinate constructions (Moltmann 1992). For instance, in (2a), the first conjunct *every man* can bind *his* in the second conjunct. However, in (2b), the second conjunct *every man* cannot bind *his* in the first conjunct. Thus, the two conjuncts are not structurally symmetrical.

(2)   a.   Every man$_i$ and his$_i$ dog left.
        b.   *   His$_i$ dog and every man$_i$ left.

However, following Progovac (1998), Neeleman *et al* (2022: §3.3) state that this variable binding does not show any asymmetry between conjuncts, if the binding in (2a) can be accounted for by the LF raising of the quantifier out of the coordinate structure. To answer the question why such a raising does not rescue (2b) if the conjuncts are symmetrical, they claim that "a pronoun cannot be bound by a quantifier that appears to its right on the surface". However, in examples like (3) (Culicover and Jackendoff 1997: 204), a pronoun is bound by a right element.[2] Also, see den Dikken (2018: 88) for more arguments against the precedence analysis of binding.

(3)   If you come up with a few more nice stories about him$_i$, every senator$_i$ will change his vote in your favor.

Also, in (4a), the R-expression *John* in the first conjunct may be co-referential with the second conjunct; but in (4b), where the order of the conjuncts is reversed, this co-referential relation disappears (Munn 1992). Since an R-expression cannot be c-commanded by a co-referential expression, the contrast in (4) again shows that the first conjunct asymmetrically c-commands the second one in nominal coordinate constructions. See more similar asymmetries in Zhang (2010: 11-13).

(4)   a.   John$_i$'s dog and he$_i$ went for a walk.
        b.   *   He$_i$ and John$_i$'s dog went for a walk.

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[2] One anonymous reviewer does not think (3) is acceptable; however, all of my informants agree with Culicover & Jackendoff's (1997) judgment.

Second, if the first conjunct is negative, it can license a negative polarity item in the second conjunct, but not vice versa, as seen in the acceptability contrast in (5) and (6) (cf. Progovac 1998). Since the licensing needs an asymmetrical c-command relation, the contrast in these examples indicates that the first conjunct c-commands the second one, but not vice versa.

(5)   a.   No cat or any dog has entered this building.

       b.   *   Any cat or no dog has entered this building.

(6)   a.   I met [no professors or anyone else].   (Hoeksema 2000: 124)

       b.   *   I met [any professors or no one else].

Third, in a coordinate construction in English, if the two conjuncts are of different categories, it is always the one that is next to X that satisfies the c-selection of X, and the category of the other conjunct does not have to. This has been discussed in Zhang (2010: 50-54) and confirmed by Bruening's (2023) experimental investigation. A preposition c-selects a DP, but not a declarative CP (Pesetsky 1991: 5), as seen in (7b). In (7a) (Sag, Gazdar, Wasow, and Weisler 1985: 165), the first conjunct, but not the second one, satisfies the c-selection of *on*. In (7c), the first conjunct, a CP, does not satisfy the c-selection of *on*, and the example is not acceptable. If one thinks that the CP in (7a) is headed by a null noun and thus the two conjuncts are both nominals (cf. Neeleman *et al* 2022: §3.2), one still cannot explain why the assumed null noun cannot rescue other unacceptable examples in (7).

(7)   a.   You can depend on [DP my assistance] and [CP that he will be on time].

       b.   *   You can depend on [CP that he will be on time].

       c.   *   You can depend on [CP that he will be on time] and [DP my assistance].

In addition to the selection of a preposition, the selection of a transitive verb also shows the categorial decisiveness of a single conjunct in English. The verb *devour* c-selects a DP, instead of a PP. In the acceptable (8a) (adapted from Grosu 1985: 232), the first conjunct *only pork* is a DP, satisfying the c-selection of the verb, and the second conjunct *only at home* is a PP. In the unacceptable (8b), the first conjunct is a PP and the second one is a DP. Thus, two conjuncts can be categorially asymmetrical and it is the conjunct next to the verb that satisfies the c-selection of the verb.[3]

(8)   a.   John devoured [DP only pork] and [PP only at home].

       b.   ?*   John devoured [PP only at home] and [DP only pork].

The above discussion shows that it is not true that "[a] coordination of α and β is admissible at a given place in sentence structure if and only if each of α and β is individually admissible at that place with the same function." (Huddleston and Pullum, 2006: 201), or that "each conjunct must satisfy all functional constraints on the coordinate structure" (Przepiórkowski 2022: (67)).

Theoretically, a binary-branching structure is more economical than structures with greater numbers of branches (Yngve 1960: 453; Collins 1997: 77; 2022); and thus, a binary-branching structure is preferred to (1).

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[3] As pointed out by an anonymous reviewer, the word *only* is necessary in (8a), but this focus marker does not play any role in syntactic category (Herburger 2000: 87). Thus, the example indeed shows that conjuncts can be of different categories. Also, we explore the possible category relations between conjuncts in syntax, and do not expect that conjuncts must be semantically parallel to each other, although the conjuncts in (8a) are both focused. Moreover, although the two conjuncts in (ia) are of the same semantic type ($<e,t>$), type $<e,t>$ elements cannot occur in a subject position, as seen in (ib). Thus, the unacceptability of such an example does not affect the generalization that the category of the coordinate structure is identical to that of a single conjunct.

(i)   a.   Pat is either stupid or a liar.   b.   *   Stupid or a liar entered the building.

Furthermore, we also do not expect combinations of conjuncts of different categories are always possible. See Borsley (2005: 464) for impossible examples.

The second previous analysis of coordination is a Spec-Comp analysis. Thiersch (1985), Munn (1987), Kayne (1994), Zoerner (1995), Johannessen (1998), and Zhang (2010) assume that two conjuncts are Spec and complement of a coordinator, respectively. In this structure, one conjunct asymmetrically c-commands the other conjunct. Although this analysis avoids the empirical problems of the symmetrical analysis, it still has problems. One problem is that since the assumed head has no syntactic category, not being able to provide the category features to the whole structure, Zoerner (1995: 20; 1999: 324) and Zhang (2010) assume that there is a feature percolation from a Spec to the whole complex. Although the Spec-Head dependency of other formal features has been recognized, e.g., phi-feature agreement, stipulating a Spec-Head dependency of the syntactic categorial features is ad hoc. Unvalued categorial features are never licensed by copying of such features from one element to another.

Another problem is that the head of this structure is a construction-specific functional category. Removing or reducing construction-specific syntax is one goal of generative syntax.

Den Dikken (2006) proposes a richer complementation structure, where the combination of *and* and the last conjunct is the complement of a silent coordinator. But the two problems mentioned above remain in his structure.
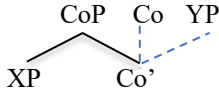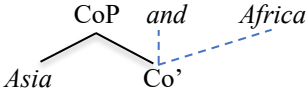
The third previous analysis of coordination is an adjunction analysis. Munn (1992, 1993) proposes that BP (Boolean Phrase), which contains the second conjunct and a coordinator, adjoins to the first conjunct, as seen in (9) (also Cormack and Smith 2005). In this analysis, if the second conjunct is a clause, an operator moves to SpecBP (see Kayne 1994: 59 for a comment).

(9)   [DP [DP *Asia*] [BP *and Africa*]]

This analysis still has a construction-specific functional category, BP. Moreover, this projection is intrinsically an adjunct, unlike the projection of any other categories. Later, we will show that the empirical similarity between one conjunct and a modifier can be captured by a theoretically improved approach.

The fourth previous analysis of coordination is a multidominance analysis. Goodall (1987), Muadz (1991), Moltmann (1992), and de Vries (2005) all propose their versions of multidominance structure for coordinate constructions. Decades ago, in a different context, Emonds (1970: 83, 200; 1972: 50) introduced the concept that two or more constituents can occupy one phrase-structure position in "deep structure", and the positions of the constituents integrated in this way may be assigned arbitrarily (Emonds 1972: 61 n. 20; I thank Robert Freidin for the reference). The multidominance analyses of coordination seem to develop this idea. Both Moltmann and de Vries give critical comments on Goodall (1987) and Muadz (1991). In the following, I briefly introduce de Vries's structure only.

De Vries (2005) assumes that a coordinator heads a CoP, and the first conjunct does not c-command the second conjunct. Nevertheless, he correctly states that a coordinator has no category and two conjuncts can be categorially different. He gives the structure in (10a), where the Co element *and* and the second conjunct YP are "behind" the first conjunct XP. I illustrate the structure with the example *Asia and Africa* in (10b). In this analysis, the elements linked by the dotted lines have a "behindance" relation to the rest part of the structure.

(10)   a.   b.

There are more versions of multidominance structures proposed in the literature. Their basic ideas are the same. The analysis has the construction-specific CoP. Also, deriving such structures needs a special mode of merger, designed for coordination only. Linearization of such structures is necessarily more complicated than that of two-dimensional structures. Advocates of the multidominance analyses have sought to formalize the theory-internally necessary operations; but if their empirical goals can be met by simpler two-dimensional approaches, we see no point in pursuing the complicated and construction-specific approach.

The fifth previous analysis of coordination is a sister movement analysis. In Chomsky (2013: 46), a coordinate construction is derived by three basic steps: the two conjuncts are merged, the resultant structure is merged with a coordinator, and finally, the first conjunct moves to the left of the coordinator, as illustrated in (11).

(11)
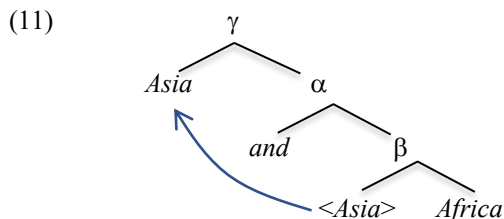
In (11), after the merger of *Asia* and *Africa*, one of them must move out for β to be labeled. If *Asia* moves, β receives the label from *Africa*. Now, since *and* and the construction it heads (i.e., α) are not available as a label, γ receives the label from *Asia*. A similar analysis is proposed in Weisser (2015: 190, 194) for asymmetrical coordination (Culicover and Jackendoff 1997), and a more elaborated version of this analysis is seen in Chomsky (2021: 33). One problem of the analysis is that in (11), the combination of the two conjuncts must be selected by a coordinator, and a coordinator must select such a combination. These are construction-specific operations. Another problem is that according to Chomsky's (2013 *et seq*.) labeling theory, if two sisters share formal features, the label of their combination should be the shared features, without moving either of the sisters; but in (11), one sister must move, even if it shares features with the other sister. This analysis of coordination predicts either that *and Asia Africa should be well-formed or that two conjuncts must always have different features. Neither is true.

2.2   The merger of a coordinator and one of the conjuncts

To avoid the problems of the previous analyses, in this section, I argue for the functional element status of coordinators, showing how they take one conjunct as their complement, and then, in the next subsection, I explain how to integrate the other conjunct into the structure.

First, a functional element has no theta relation with any other element in a structure, and thus it is neither substantive nor predicative (Chomsky 2019: 52); this is also true of a coordinator.

Moreover, a functional head must be transitive, i.e., it must be merged with a complement, and this is also true of a coordinator: it must be merged with one conjunct first. This means that conjuncts are not structurally symmetrical: the one that is the complement of a coordinator is c-commanded by the other conjunct. This asymmetry captures the binding and NPI licensing facts reported in 2.1. Therefore, in a coordinate construction, one of the conjuncts is syntactically lower than the other. This conjunct is the complement of the coordinator (also called an internal conjunct).

Furthermore, in a head-complement cluster, the complement cannot decide the category of the cluster; similarly, the category of the internal conjunct cannot decide the category of the whole coordinate structure. This asymmetry captures the categorial fact seen in (7) and (8) in 2.1.

I claim that various coordinators (*and, or, but*) realize a functional head position Junct (J). These different coordinators may have different semantic features. As stated above, a functional element must take another element as its complement. How to represent this general property of all functional elements? One can assume that a functional head has an unvalued α feature, and its complement values this feature. One anonymous reviewer asks: "What kinds of features can an element bear if it lacks category?" My answer is that if it is a functional element, it has this unvalued α feature, at least; otherwise, it (i.e., a root) has its lexical semantic features, as generally assumed.

I call the combination of J and its complement a J-set. The merger of J and its complement is the first step in forming a coordinate construction. We discuss the next step below.

2.3   The merger of a J-set with the other conjunct

In this section, we answer the question why a coordinate construction must have more than one conjunct syntactically. My claim is that J has no syntactic category, and this property forces a J-set to be merged with another element, the external conjunct in a coordinate construction.

One issue needs to be clarified: the property of complement-taking (all functional heads have this property) is different from the property of carrying syntactic category features.

It is well-known that a root, which is a syntactic element bearing conceptual content, does not have syntactic category features. Roots also do not take complements. On the other hand, some syntactic elements, e.g., the noun *cup*, the adjective *flat*, and adverbs in general, do have category features but they do not take a complement. Therefore, having syntactic categorial features and taking a complement do not correlate to each other.

Many familiar functional elements not only introduce their complement into a structure, but also provide a category to the resultant combination, e.g., T, C, D, A, etc. In the previous subection, I have argued that coordinators are functional elements. I argued for the functional element status of coordinators without considering the issue whether they have syntactic category features. I now introduce the fact that although coordinators (i.e., J elements) share the complement-taking property with other functional elements, they also share properties with roots.

First, neither a root nor a J element has a syntactic category. The occurrence of a coordinator in a coordinate construction cannot decide the category of the whole construction. A coordinate construction can be an NP, VP, or AP, etc., where *and* does not play any role in deciding the category of the combination (i.e., the J-set). In Chomsky (2013: 46), a coordinator does not label a structure, but "it must still be visible for determining the structure. In Chomsky (2021: 33), "&" is treated like other atoms of computation such as INFL, but he does not elaborate on this "&". In my J-theory, since J has no syntactic category features (also see Zoerner 1995: 19; de Vries 2005: 91), a J-set is not categorized and has no label.

Second, both a root and a J-set need a categorizer. No root can take part in syntactic computations without being categorized; a root must be categorized by combining with a category-defining element. Since a J-set has no category, it must be categorized. The highest conjunct (called the external conjunct) functions as a categorizer. It is obvious that the category of a coordinate complex is identical to that of at least one conjunct. Chomsky (2013: 46) states that if the whole coordinate construction is γ, and "if the coordinated expressions are APs, then γ is an AP, etc." In (7a) and (8a), the category of the first conjunct categorizes the J-set, allowing the whole coordinate complex to satisfy the c-selection of the complex by a higher element (i.e., P in (7a) and V in (8a)). I therefore claim that in such constructions, the first conjunct categorizes the J-set. Then, the structure of *Asia and Africa* is (12), where the first conjunct *Asia* categorizes the J-set. *Asia* is a DP and thus the whole structure is a DP.

(12)
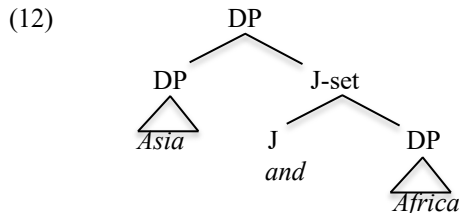
The requirement of a categorizer explains why the combination of a coordinator and one conjunct must be merged with another conjunct in syntax.

Third, neither a root nor a J-set is required to occur for any element. For a coordinate construction, the presence of the external conjunct satisfies the c-selection of the syntactic context (see (7) and (8)), and therefore, the presence of the rest part (i.e., the J-set) is not syntactically required. This has been pointed out by Zhang (2010: 61): "[n]o syntactic position is found to be taken by coordinate complexes exclusively. For example, verbs such as *compare* select plural nominals, and the selected element can be either a coordinate complex or a simplex plural nominal." Therefore, a J-set is syntactically optional. This optionality entails a dependency asymmetry: to take part in a syntactic computation, a J-set must be merged with a categorizer, but no element selects for a J-set. If an element can be merged with a J-set, it can also be merged with a categorized element. A root is in a similar situation. No element needs a root, but for a root to take part in a syntactic operation, it needs a categorizer. It is the lack of a category feature in J that causes a J-set to be optional to a categorized element.

I conclude that J is a categoryless functional element.

In this proposed analysis, because J must take a complement and because it must be categorized by another element, to build a coordinate construction, two levels of merger are necessary: the merger of J and

its complement, and the merger of a J-set and its categorizer. In the first merger, J is the head, but in the second merger, J or the J-set is not the head. In both mergers, the two sisters are asymmetrical to each other. The first merge is seen in the syntax of functional elements and the second merger is seen in the syntax of roots. Therefore, neither operation is ad hoc, or stipulated for coordinate constructions only.

This analysis of the relations between conjuncts is superior to other available analyses reviewed in 2.1, which do not capture the categoryless property of coordinators. In this analysis, the external conjunct is a categorizer, instead of a Spec element, as assumed in the Spec-Complement analysis. Unlike a categorizer, a Spec element does not project its categorial features.

Recall that in the theory of Chomsky (2013: 46), the coordinate construction *Asia and Africa* should have the structure in (13).

(13)   [$_\gamma$ Asia [$_\alpha$ and [$_\beta$ <Asia> Africa]]

Our proposed (12) is different from Chomsky's (13) in two major aspects: the two conjuncts show up in their base-positions and thus the level of the merger marked by β does not exist, and the categoryless α is identified as a J-set. In both analyses, however, one conjunct decides the label, and the sister of this conjunct, α in (13) or J-set in (12), is unable to label a structure.

Summarizing, a coordinate structure is built by two necessary levels of merger: complementation and categorization. They both are necessary because a coordinator is a categoryless functional element.

3. Syntactic similarities between coordinate and modification constructions

In this section, I show that the same two levels of merger in the building of a coordinate construction are also found in the building of a modification construction. I argue that the syntax of a modifier is similar to the syntax of a J-set in a coordinate structure. Zhang (2022b, 2023) presents several shared structural properties of the two constructions. I introduce three of them in this section.

3.1 The categorial decisiveness of one of the two elements

We have seen in (7) and (8) that if the two conjuncts of a coordinate construction are different in their categories, the external conjunct alone, rather than the internal conjunct, can decide the category of the whole structure. Similarly, in a modification construction, it is the modified element, rather than the modifying element, that decides the category of the whole structure. Modifiers are invisible to the labelling algorithm (Safir 2022: 2). In my analysis, this is because modifiers are the complement of a (silent) modification marker, which is also a J element. Therefore, in both constructions, one element alone satisfies the c-selection of the complex by a higher element. This element (i.e., the external conjunct or the modified element) is the categorizer of the J-set.

3.2 Syntactic optionality

When a modifier modifies an element, e.g., an adjective modifies a noun or an adverb modifies a verb, it is syntactically optional. If a modifier is the complement of J, and its combination with J is a J-set, a J-set is syntactically optional. The combination of an internal conjunct and a coordinator, i.e., a J-set, is also syntactically optional (see the third point in §2.3). Thus, a J-set is syntactically optional, although it enriches the whole construction semantically.

Note that syntactic arguments and modifiers do not always match semantic ones (e.g., McNally 2016). One example is the clause-final adverb in English middles (e.g., *Bread cuts #(easily)*). According to Condoravdi (1989), middles involve structured generic event quantification. The adverb there supplies the quantificational scope, whereas the rest of the clause supplies the restriction on the null generic quantifier. Thus, the adverb is semantically obligatory. Larson (2018) extends Condoravdi's analysis to some other adverb constructions. Similarly, although one of the two conjuncts is syntactically optional, its properties can be visible to the semantics of the whole construction. De Vries (2005: 100) states that "as for c-command relations – a second conjunct is invisible for the context, in contrast to the first." The notion "invisible" here should be restricted to category features only. For example, "quantifier raising out of a coordinate structure is possible only if the raised quantifier binds a variable in each conjunct" (Neeleman

et al 2022: 21). A variable is absent in the second conjunct in (14a), but present in (14b) and (14c). Quantifier Raising is impossible in (14a).

(14)   a.   A (different) student likes every professor but hates some TAs.
            *'[Every professor]$_1$ is such that a different student like **him**$_1$ but hates some TAs.'

       b.   A (different) student likes every professor but hates some of **his**$_1$ TAs.
            'For [every professor]$_1$ there is a different student that likes him$_1$ but hates some of his$_1$ TAs.'

       c.   A (different) student likes every professor$_1$ but wants **him**$_1$ to fire some TAs.
            'For [every professor]$_1$ there is a different student that likes him$_1$ but wants him$_1$ to fire some TAs.'

In such cases, it is the interfaces between semantics and syntax that play a role.

3.3 Stackability

Different from arguments, both modifiers and conjuncts can be stacked. The number of modifiers can be unlimited syntactically. For example, one can say *I met a young, happy, diligent, ..., and smart boy*. More modifiers can be added to this construction. Conjuncts can also be stacked, as seen in the unbound unstructured coordination construction (Chomsky 2013: 45), such as (15).

(15)   a.   John is tall, happy, hungry, bored with TV, etc.

       b.   I met someone young, happy, eager to go to college, tired of wasting time, …

In both (15a) and (15b), more conjuncts can be added; also, among the multiple conjuncts, no one is syntactically dependent on another. But since merger is binary, an early merged conjunct appears at a lower position than a later merged one.

The above three shared properties between modification and coordinate constructions lead us to claim that like an internal conjunct, a modifier is also introduced by a J element. However, this J element is null in languages such as English, but is a modification marker in languages such as Mandarin Chinese, to be introduced in the next section. Then, the syntactic position of a modifier is the same as that of an internal conjunct, and the syntactic position of the modified element is the same as that of an external conjunct.

4.   Coordinators and modification markers as J elements

In §2.2 and §2.3, I have claimed that a coordinator realizes J, which is a functional head element without any categorial features. In this section, I first review a few previous analyses of the syntax of coordinators (§4.1), and then present the shared syntactic properties of coordinators and modification markers, to show that they both are J elements (§4.2).

4.1 Previous analyses

Theory A: no status or adjunct. Some scholars think that coordinators have no syntactic status. Blümel (1914: 52) even declares "Strictly speaking, ... such words should be excluded from dictionaries" (see Lang 1984: 67 for a review). Goodall (1987: 32) states that coordinators are inserted at PF when the structure of a coordinate complex is linearized. Similarly, Moltmann (1992: 25, 28) states that "the coordinator is treated formally as an adjunct to the following conjunct" and "'coordinator' does not denote a syntactic function." However, if an element has no syntactic status or plays the role of an adjunct, its occurrence with one conjunct should not require the occurrence another conjunct. Also, like other head elements, coordinators may c-select conjuncts (Zhang 2010), and exhibit other properties of head elements (Bošković 2020; contra Li 2022).

Theory B: functional element with a construction-specific category. Coordinators have been assumed to realize a functional head, with various names, e.g., & in Zoerner (1995), B (Boolean) in Munn (1993), and Co in Johannessen (1998) and de Vries (2005). As stated in §2.1, there are problems with this analysis.

For example, the functional head is construction-specific. In the BP Adjunction analysis, B heads a projection that functions as an adjunct only, unlike any other projections.

Theory C: a vacuous functional head. Neeleman *et al* (2022: §5) state that a coordinator is not the head of the structure of a coordinate construction; instead, it is a functor that selects the conjunct to its right, in a language such as English. They assume that the properties of the complement of a coordinator are fully projected to the coordinator. Thus, the assumed functor does not project any functional category. The theory can be illustrated in (16).

(16)

YP   XP

    and   XP
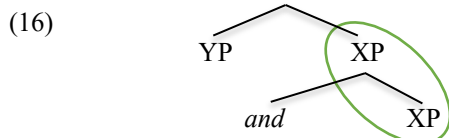
One can see that this assumption is not empirically different from Theory A reviewed above. They share the same problems.

Our J element analysis of coordinators (§2) avoids the problems of the three analyses.

4.2 Shared properties of coordinators and modification markers

In this section, we show the similarities between coordinators and modification markers. English does not have modification markers, but some other languages do (Rubin 1994, 2003). The Mandarin modification marker *de* occurs between elements of various categories that have a modification relation. In the examples in (17), *de* is next to the underlined modifier (Zhang 2010: 95-96; we do not discuss *de* in non-modification constructions):[4]

(17)   a.   Lùlù <u>mòmò-**de**</u>   líkāi-le.   ***Manner Adv***
            Lulu silently-MOD leave-PRF
            'Lulu left silently.'

       b.   Lùlù <u>yī-jù huà yě bù shuō-**de**</u>   kàn-zhe tiānkōng.   ***Adverbial clause***
            Lulu one-CL word also not say-MOD look-PRG sky
            'LuLu looked at the sky without saying a word.'

       c.   Nà-gè <u>cōngmíng-**de**</u> nánhái líkāi-le.   ***Adjective***
            that-CL smart-MOD boy leave-PRF
            'That smart boy left.'

       d.   Lùlù yǒu <u>zǐ-sè-**de**</u>   xiàngliàn.   ***NP***
            Lulu have purple-color-MOD necklace
            'Lulu has a purple necklace.'

       e.   Nà-gè <u>líkāi-**de**</u>   nánhái shuāidǎo-le.   ***Relative clause***
            that-CL leave-MOD boy fall-PRF
            'The boy who had left fell.'

       f.   Lùlù zǒujìn-le jǐ-jiā   <u>yán mǎlù-**de**</u>   shāngdiàn.   ***PP***
            Lulu enter-PRF several-CL along road-MOD shop
            'Yani entered several shops along the road.'

       g.   Lùlù zhǎodào-le <u>qítā-**de**</u>   tóngxué.   ***Scope-taking Adj***
            Lulu find-PRF other-MOD classmate
            'Lulu found the other classmates.'

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[4] Abbreviations: CL: classifier; MOD: modification; PRF: perfective; SFX: suffix.

In (17a, b), the modified element is a verbal expression, but in the rest of the examples of (17), the modified element is a nominal.[5] Paul (2017: 9-10) claims that the *de* with a modifier of a VP and that with a modifier of an NP are different syntactically, and thus unlike the former, the latter projects a DP. In other words, *de* may have categorial features. However, none of her arguments is convincing. First, she claims that *de* is excluded for a monosyllabic modifier of a verbal expression but no such constraint applies to the modifier of a nominal. But one can see that the monosyllabic modifier *zhēn* 'real' occurs with *de* in both the verbal modification construction in (18a) and the nominal modification construction in (18b).

(18) a. Lùlù zhēn-de   líkāi-le.
          Lulu really-MOD leave-PRF
          'Lulu really left.'

      b. Zhè shì zhēn-de zuànshí.
          this be real-MOD diamond
          'This is a real diamond.'

Second, she claims that although many different categories can modify an NP, "there exists no choice for XP besides adverbs when the modifiee is a VP or a clause". But (17b) has a clausal modifier for the VP. Third, she claims that an adverb such as *xiǎnrán* 'obviously' can precede either a negative or affirmative vP, but an adverb such as *rènzhēn* 'diligently' may not precede a negative vP, and therefore, the following question arises: "how to determine the exact categorial identity of the modifiee". However, one can see that the former type of adverb is speaker-oriented, and thus is base-generated above the vP domain. Thus, its position with respect to negation is free. But the latter type of adverb, a manner type, is base-generated below negation, and thus it cannot precede a negative vP. Semantically, it is impossible for a manner to scope over negation. Fourth, she claims that "an adverb such as *rènzhēn-de*, being a manner adverb, is excluded from the sentence-initial position to the left of the subject, another difference with the sentential adverb *xiǎnrán*de (#-*de*)." But a manner modifier can be moved to the sentence-initial position, as shown in (19). Therefore, the alleged contrasts between the uses of *de* in the two types of modifiers do not support the claim that the modification marker *de* has categorial features.

(19) Yī-bù-yī-bù-de,   Lùlù pá-dào-le   dòng-kǒu.[6]
      one-step-one-step-MOD Lulu crawl-to-PRF cave-entrance
      'Step by step, Lulu crawled to the entrance of the cave.'

There are seven shared properties of coordinators and modification markers. First, like other functional elements, neither has a theta relation with another element.

Second, like other functional elements, both are a closed set.

Third, both must be associated with at least two elements: one links a modifier to a modified element, and the other links one conjunct to another conjunct.

Fourth, neither has any category features. *And* does not project any categorial features (see §2.3), nor does the modification marker *de* in Mandarin (Li 2008). In (17), *de* occurs in various categorial contexts.

Based on the third and the fourth shared properties above, Li (2008) finds that the syntactic behaviors of the modification marker **de** and **and** are almost identical (also see Zhang 2010: 97).

Fifth, like many functional heads, both can be PF null in a language or in certain constructions of a language. J is always null in modification constructions in English. We have seen null coordinator constructions in (15). In Mandarin, a null modification marker in seen in examples like (20) (also see Tang

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[5] In Larson (2018), *de* with a modifier in Mandarin is analyzed as a case concordializer, which requires case but can receive it only by agreement. However, as pointed out by Li (2022: 174; also see Huang *et al.* 2009: 36), many modifiers do not contain any nominal, e.g., *congming-de* 'intelligent' in (17c). Thus, the case concordializer analysis is challenged.

[6] The combination of a modifier with *de* is a J-set, which has no categorial features and thus should be unable to move. However, in the movement of a conjunct, the enclitic coordinator -*to* moves together with the hosting conjunct, in Japanese. See Zhang (2023: §4.2.1) and the references therein. Similarly, in examples like (19), the enclitic *de* moves together with the modifier, which is its morphological host.

1979: 147), although, as pointed out by an anonymous reviewer, the occurrence of such a null form is restricted (note that calling the null form a null J or null *de* makes no empirical difference in this case).

(20) <u>Hútú   rén</u> cái zuò zhè-zhǒng shì.
confused person only do   this-kind   thing
'Only confused people do this kind of thing.'

Sixth, both occur in a linker position, which is between the two associated elements, regardless the order of the two elements (see Nichols 1986; Zhang 2022b, 2023). The Mandarin modification marker *de* may precede or follow a modifier of a verbal expression, as seen in (21a) and (21b), respectively (also see Li 2022).

(21) a. Ālán xiào-dé   hěn kāixīn.[7]
Alan laugh-MOD very heartily

b. Ālán hěn kāixīn-de   xiào-le.
Alan very heartily-MOD laugh-PRF
Both a and b: 'Alan laughed heartily.'

In some languages, the form variation of a linker is exhibited in the phonological forms (Chung 1991: 97), but in Mandarin, it is exhibited in the written forms of *de*. The linker that precedes a nominal Head, as in (17c, d, e, f, g) and (18b), is 的; the one that precedes a verbal Head, as in (17a, b), (18a), (19), and (21b), is 地, and the one that follows the Head, as in (21a), is 得. These different written forms in Mandarin correlate with different phonological forms in some dialects (e.g., in Cantonese, the three forms are *ge*, *gam*, and *dak*, respectively; Zhu 1980: 162).

De is an enclitic consistently (cf. C. Huang 1987), like the Japanese conjunction *-to*. It thus cannot occur at the left-edge of a prosodic word. If a modification marker introduces a modifier to the modified element, it forms a constituent with the modified element; and thus, in both (21a) and (21b), *de* forms a syntactic constituent with *hen kaixin* 'very heartily'. The syntactic constituency boundary matches the prosodic boundary in (21b), as shown in (22a), but not in (21a), as shown in (22b).

(22) a.   b.
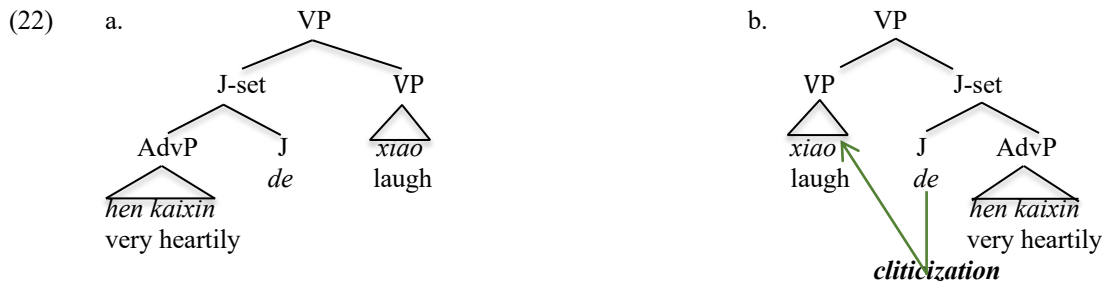
Seventh, if there are three or more elements and only one coordinator or modification marker occurs, it must be next to the final element. The constraint on coordinators is seen in (23), and the same constraint on the modification marker *de* in Mandarin is seen in (24).

(23) a.   Asia, Africa, **and** Europe
b.   *Asia, **and** Africa, Europe

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[7] Multiple modifiers may occur preverbally, but at most one modifier may occur post-verbally. This is captured by Huang's (1982, 1984: 54) constraint that "a verb in Chinese may be followed by at most one constituent, though it may be preceded by an indefinite number of constituents (including subject and adverbial modifiers)."

(24)   a.   Ālán dú-le   yī-běn   <u>hěn cháng, hěn nán,   hěn wúliáo-**de**</u> shū.
                Alan read-PRF one-CL very long   very difficult very boring-MOD book
                'Alan read a long, difficult and boring book.'

        b. *   Ālán dú-le   yī-běn   hěn-cháng, hěn nán-**de**,   hěn wúliáo shū.
                Alan read-PRF one-CL very long   very difficult-MOD very boring book

Other than the above shared properties of coordinators and modification markers, not surprisingly, the two kinds of linkers may also share the same form in some languages. The Classical Chinese linker *er* is used as a conjunction in (25a), but a modification marker in (25b). The same linker also has multiple uses in several Formosan languages (Tsai and Wu 2012). The linker *ru'* is a conjunction in (26a) and a modification marker to introduce a purpose expression in (26b) (Tsai and Wu 2012: 167; AV is agent voice, PV is patient voice, LK is linker).

(25)   a.   Wén shàn **ér**   bù shàn jiē yǐ   gào   qí shàng.
                hear good and not good all with report it lord
                'When you hear good and bad things, you should report both to the lord.'

        b.   Zǐlù shuàiěr **ér**   duì.
                Zilu carelessly MOD answer
                'Zilu answered carelessly'   [Classical Chinese]

(26)   a.   S<um>'an eu' bauwak 'i'   Tapas [**ru'** hab-un=nia'].
                breed<AV> ACC wild.hog NOM Tapas   LK kill-PV=3SG.OBL
                'Tapas bred hogs and then killed them.'

        b.   S<um>'an [**ru'** pahab] cu' bauwak 'i'   Tapas.
                breed<AV> LK kill   ACC wild.hog NOM Tapas
                'Tapas bred hogs to kill.'   [Mayrinax]

The meaning instability of the formative *er* in Classical Chinese and *ru'* in Mayrinax follows Carlson's (2000) generalization that functional elements often present mismatches in form and interpretation that lexical elements do not.

      Summarizing, in this section, I have argued against three previous analysis of coordinators, which claim that coordinators have no syntactic status, or are functional heads only for coordinate constructions, or are vacuous functional heads. I have also argued that both coordinators and modification markers are realizations of J, again reaching a unified analysis of coordinate and modification constructions. Of course, the functional element J may be specified with various features in different constructions, similar to C, which is specified with various features for finite, nonfinite, relative clauses, and so on.

      I have argued that both coordination and modification constructions are derived by two levels of merger: complementation and categorization. The syntactic unification comes from the perspective of category, optionality, and stackability (§3), among other perspectives (see Zhang 2022b, 2023), and from the shared properties of coordinators and modification markers (this section).[8] This unified analysis of the two constructions is compatible to Bošković's (2020) unified analysis of conjunct and adverbial island effects (Ross 1967). Our two levels of merger for modification also leads to a unification of operations to build modification constructions and non-modification constructions (also see Safir 2022 for a similar unification from other perspectives). Also, not only a head element but also a phrase (phrasal conjunct or modified element) can be a categorizer.[9]

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[8] To give a unified analysis of ATB gaps and parasitic gaps, Williams (1987) claims that there is a function head COORD, which covers relevant syntactic relations. However, his COORD is not a categoryless element and it also covers non-coordinate and non-modification relations.

[9] Some scholars (e.g., Marantz 1997) assume that roots are categorized by specialized functional heads such as n or v, but some other scholars assume that roots are categorized by their functional superstructure, without any dedicated categorizing head (e.g., Borer 2005; Adger 2013). The categorization of a J-set is compatible with the latter theory.

5. Coordinators and modification markers in compounds

In this section, I argue that when a coordinator or a modification marker occurs with roots, it is also a J-element.

The notion compound is understood as an expression that contains at least two roots. Root is recognized as a syntactic atom bearing conceptual content without a syntactic category.

In a compound, the semantic relations between roots are parallel to those between phrases, as seen in (27a) through (27d) (although the last type is included in many grammar books, e.g., Zhu 1982: 32, it is not included in Scalise and Antonietta 2009).[10]

(27)	a.	modification	kōng-xí	xǐ-jù
			sky-attack	*happy-drama*
			'air raid'	'comedy'
	b.	coordination	kāi-guān	xīn-kǔ
			open-close	*pungent-bitter*
			'switch'	'hard-working'
	c.	internal argument-taking	sī-jī	shāng-xīn
			control-machine	*hurt-heart*
			'driver'	'sad'
	d.	external argument-taking	dì-zhèn	yǎn-hóng
			earth-quake	*eye-red*
			'earth-quake'	'jealous'

In this section, I first show that like a single root, a compound can also be categoryless (§5.1), and then show that for the coordinate and modification relations in roots, they also allow coordinators and modification markers to occur in certain cases, parallel to the similar relations between categorized elements (words or phrases) (§5.2).

5.1 The categorylessness of root clusters

Unlike a categorized element, neither of the two roots in a compound can decide the category of the whole compound, as seen in (28) (Zhang 2007).

(28)	a.	zhè-zhāng zhuōzi-de <u>dà-xiǎo</u>	[A-like √ +A-like √] → N
		this-CL table-MOD big-small	
		'the size of this table'	
	b.	yī-gè hěn <u>bǎo-shǒu</u>-de rén	[V-like √ + V-like √] → A
		one-CL very keep-defend-MOD person	
		'a very conservative person'	

The combination of two roots can also be underspecified with its category:

(29)	a.	Ālán xiǎng **zuǒ-yòu** Bǎoyù.	***Verb***
		Alan want left-right Baoyu	
		'Alan wants to control Baoyu.'	
	b.	Ālán rang Bǎoyù **zuǒ-yòu** bù shì rén.	***Adv***
		Alan make Baoyu left-right not be person	
		'Alan put Baoyu in a very difficult position.'	

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[10] The combination of a verb and a result expression, as in (i), is derived by verb-incorporation (Zhang 2022a). Such a combination is exclusively verbal and cannot follow *tā-de* 'his'. We do not discuss such expressions.

(i)	a.	nòng-huài	b.	chī-nì
		make-ruined		*eat-bored*
		'damage'		'tired of eating something'

(30)   a.   Ālán zài **yǎn-chū**.   ***Verb***
Alan PRG perform-exit
'Alan is performing a show.'

           b.   Ālán de   **yǎn-chū**   hěn bang.   ***Noun***
Alan MOD perform-exit very good
'Alan's performance is good.'

Thus, like a single root, the combination of multiple roots also has no categorial features.

5.2 Coordinators and modification markers in root clusters

Nóbrega and Panagiotidis (2020: 226) mention that a conjunction may occur between two roots (*bed and breakfast*). We list more examples in (31). The Mandarin examples in (32) are proper names in Taiwan.

(31)   to-and-fro, spic and span, surf-and-turf, bread and butter

(32)   a.   Bǎo-**ér**-bǎo   b.   Fù-**ér**-měi
           burger-and-full   *rich-and-beautiful*
           'a restaurant name'   'a restaurant name'

We note that in Mandarin, a modification marker may also occur between two roots of a compound:

(33)   a.   Ài-**zhī**-wèi   b.   Lǜ-**de**   yàozào
           love-MOD-taste   *green-MOD medicine-soap*
           'a food brand name in Taiwan'   'the name of a kind of green herbal soap'

The word *er* can be used as either a conjunction or a modification marker, as seen in (25) above. The two uses of the formative are kept in compounds. It is used as a modification marker in (34), but a conjunction in (35).

(34)   a.   Guǎng-**ér**-gào-zhī
           wide-MOD-announce-it
           'broadly announce'

           b.   Nǐ kě   qiānwàn bù yào   tìng-**ér**-zǒu-xiǎn!
           you rather ever   not should chest.up-MOD-walk-danger
           'You should never take a risk.'

(35)   a.   qǔ-**ér**-dài-zhī   b.   jiǔ-**ér**-jiǔ-zhī
           take-and-replace   *long-and-long-SFX*
           'replace'   'after a long time'

Theoretically, it is problematic for a canonical functional projection (e.g., the assumed &P or ModP in the literature) to occur in a cluster that has not been categorized. But there is no problem for a categoryless functional element to occur between roots. In the previous sections, we have identified coordinators and modification markers as J elements, which are categoryless functional elements. I propose that when such a functional element occurs in a compound, it not only takes one root as its complement, but also takes another root as its Spec, and then the whole compound is categorized by a (null) categorizer, similar to the categorization of a single root.

(36)
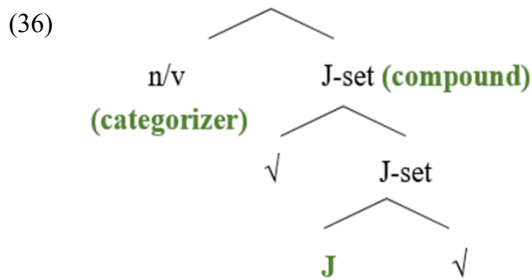
In Chomsky (2002: 133-134), the element that the head first merges with is called complement and another element that the head merges with is called specifier; and "[so] the whole notion of complement and specifier disappears except as a terminological convenience: you have the things that you merge first, the things that you merge second, and so on." To build a compound that has two roots, it is possible for J to take the two roots as its complement and Specifier, respectively. If there are more than two roots in a compound, a J may have multiple Specs, before the whole root cluster is categorized (cf. Zhang 2007).

In this analysis, no root in a compound must be categorized independently. This captures the contrasts between roots and categorized elements. We conclude that exactly because a J element, which can be a coordinator or a modification marker, is a categoryless functional element, it may occur in a compound, before the root cluster is categorized.

Bruening (2018) argues that there is no Lexical Integrity, which separates words from phrases, and Collins and Kayne (2023) argue that there is no morphological component in UG. Our research further shows that as in phrases, categoryless functional elements can also occur in compounds.

6. Conclusions

In this paper, I have discussed the syntactic relation between conjuncts and the syntactic status of coordinators, and the syntactic relation between modifiers and their modified elements and the syntactic status of modification markers. The following major conclusions have been reached: there is no coordinate construction-specific functional head (e.g., Co, Conj, &, Boolean), structural representation, or syntactic operation; and there is no modification construction-specific functional head (e.g., Rubin's 2003 Mod). The syntax of coordination and that of modification can be unified: they both use the categoryless functional element J. J is realized by a coordinator or a modification marker. These two kinds of functional elements share systematic formal properties. Moreover, both coordinate and modification constructions are built via two basic layers of merger (i.e., J takes either a modifier or a low conjunct as its complement; and the result is merged with a categorizer, which is either the modified element or the other conjunct), as shown in (37). A J-set can either follow or precede its categorizer, XP, as shown in (37a) and (37b), respectively (see Zhang 2022b, 2023).

(37)   a.   b.
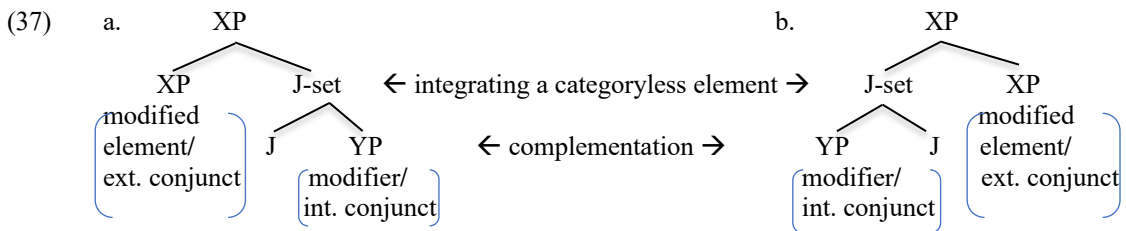
The proposed J theory is also applied to the syntactic formation of compounds. The major contributions of this paper include the recognition of a categoryless functional element and the unification of the syntax of coordination and modification.

The former contribution leads us to see that a functional head does not have to keep the lexical category feature of its complement (cf. Grimshaw's 1991 extended projection). This conclusion has been

reached in Kayne (1994) and Pietraszko (2019), among others, from different empirical considerations (e.g., D can be merged with CP, in addition to DP). J does not have the category of its complement.

The latter contribution leads us to rethink the relation between the syntactic representations of argument-taking relation and other syntactic relations. The two kinds of representations can be distinguished by the absence and presence of the categoryless J, respectively. J introduces a non-argument element to X. It is the feature makeup of a functional head, rather than any special type of representation (e.g., adjunction), that explains the differences between the argument-taking relation and non-argument taking relation in syntax.

References

Adger, David. 2013. *A Syntax of Substance*. MIT Press, Cambridge, Ma. https://doi.org/10.7551/mitpress/9780262018616.001.0001.

Bloomfield, Leonard. 1933. *Language*. Holt, Rinehart & Winston, New York.

Blümel, Rudolf. 1914. *Einführung in die Syntax*. C. Winter, Heidelberg.

Borer, Hagit. 2005. *In Name Only*. Oxford University Press, Oxford. https://doi.org/10.1093/acprof:oso/9780199263905.001.0001.

Borsley, Robert D. 2005. Against ConjP. *Lingua* 115 4: 461–482. https://doi.org/10.1016/j.lingua.2003.09.011.

Bošković, Željko. 2020. On the Coordinate Structure Constraint and the Adjunct Condition. In *Syntactic Architecture and its Consequences II: Between Syntax and Morphology*, edited by András Bárány, Theresa Biberauer, Jamie Douglas and Sten Vikner, pp. 227–258. Language Science Press, Berlin. https://doi.org/10.5281/zenodo.4280649.

Bruening, Benjamin. 2018. The lexicalist hypothesis: Both wrong and superfluous. *Language* 94 1: 1–42. https://doi.org/10.1353/lan.2018.0000.

Bruening, Benjamin. 2023. Selectional violation in coordination (a response to Patejuk and Przepiórkowski 2023). *Linguistic Inquiry*. https://doi.org/10.1162/ling_a_00506.

Carlson, Greg. 2000. "Mismatches" of Form and Interpretation. *University of Rochester Working Papers in the Language Sciences*, Vol. Spring 2000, no. 1: 97 – 106. https://doi.org/10.1007/1-4020-4485-2_1.

Chomsky, Noam. 1965. *Aspects of the Theory of Syntax*. MIT Press, Cambridge, MA. https://www.jstor.org/stable/j.ctt17kk81z.

Chomsky, Noam. 2002. *On Nature and Language*. Cambridge University Press, Cambridge. https://doi.org/10.1017/CBO9780511613876.

Chomsky, Noam. 2013. Problems of projection. *Lingua* 130: 33–49. https://doi.org/10.1016/j.lingua.2012.12.003

Chomsky, Noam. 2019. UCLA Lectures. Invited lectures at the Department of Linguistics, University of California, Los Angeles, 29–30 April, 1–2 May 2019. https://linguistics.ucla.edu/noam-chomsky/. (manuscript available with some changes and an introduction by Robert Freidin. https://ling.auf.net/lingbuzz/005485)

Chomsky, Noam. 2021. Minimalism: Where are we now, and where can we hope to go. *Gengo Kenkyu* 160: 1–40. https://www.ls-japan.org/modules/documents/LSJpapers/journals/160_chomsky.pdf.

Chung, Sandra. 1991. Functional heads and proper government in Chamorro. *Lingua* 85: 85–134. https://doi.org/10.1016/0024-3841(91)90019-2.

Collins, Chris. 1997. *Local Economy*. MIT Press, Cambridge, MA. https://doi.org/10.1017/S0022226799227843.

Collins, Chris. 2022. The complexity of trees, Universal Grammar and economy conditions. *Biolinguistics* 16, Article e9573. https://doi.org/10.5964/bioling.9573.

Collins, Chris and Richard Kayne. 2023. Towards a theory of morphology as syntax. *Studies in Chinese Linguistics* 44 1: 1-32. https://doi.org/10.2478/scl-2023-0001.

Condoravdi, Cleo. 1989. The middle: Where semantics and morphology meet. In *MIT Working Papers in Linguistics* 11. 18–30.

Cormack, Annabel and Neil Smith. 2005. What is coordination? *Lingua* 115: 385–418. https://doi.org/10.1016/j.lingua.2003.09.008.

Culicover, Peter and Ray Jackendoff. 1997. Semantic subordination despite syntactic coordination. *Linguistic Inquiry* 28 2: 195–217. https://www.jstor.org/stable/4178974.

Dik, Simon. 1968. *Coordination: Its Implications for the Theory of General Linguistics*. North-Holland publishing company, Amsterdam.

den Dikken, Marcel. 2006. *Either*-float and the syntax of co-or-dination. *Natural Language & Linguistic Theory* 24: 689–749. https://doi.org/10.1007/s11049-005-2503-0.

den Dikken, Marcel. 2018. *Dependency and Directionality*. Cambridge University Press. https://doi.org/10.1017/9781316822821.

Emonds, Joseph. 1970. *Root and Structure-Preserving Transformations*. PhD thesis, MIT, Cambridge, Ma. http://hdl.handle.net/1721.1/12969.

Emonds, Joseph. 1972. A reformulation of certain syntactic transformations. In *Goals of Linguistic Theory*, edited by Stanley Peters, pp. 21–62. Prentice Hall.

Gleitman, Lila. 1965. Coordinating conjunctions in English. *Language* 41.2: 260–293. https://doi.org/10.2307/411878.

Goodall, Grant. 1987. *Parallel Structures in Syntax: Coordination, Causatives and Restructuring*. Cambridge University Press, Cambridge.

Grimshaw, Jane. 1991. Extended projections. Ms., Brandeis University, Waltham, MA.

Grosu, Alexander. 1985. Subcategorization and parallelism. *Theoretical Linguistics* 12 2: 231–240. https://doi.org/10.1515/thli.1985.12.2-3.231.

Herburger, Elena. 2000. *What Counts*. MIT Press, Cambridge, MA. https://doi.org/10.7551/mitpress/7201.001.0001.

Hoeksema, Jack. 2000. Negative polarity items: Triggering, scope, and c-command. In *Negation and Polarity: Syntactic and Semantic Perspectives*, edited by Laurence R. Horn and Kato, Yasuhiko, 115–146. Oxford University Press, Oxford. https://doi.org/10.1093/oso/9780198238744.003.0005.

Huddleston, Rodney and Geoffrey Pullum. 2006. Coordination and subordination. In *The Handbook of English Linguistics*, edited by Bas Aarts and April McMahon, pp. 198–219. Blackwell. https://doi.org/10.1002/9780470753002.ch9.

Huang, C-T. James. 1982. *Logical Relations in Chinese and the Theory of Grammar*. PhD thesis, MIT, Cambridge, Ma. http://hdl.handle.net/1721.1/15215.

Huang, C-T. James. 1984. Phrase structure, lexical integrity, and Chinese compounds. *Journal of the Chinese Language Teachers Association* 19 2: 53–78.

Huang, C.-T. James, Yen-Hui Audrey Li, and Yafei Li. 2009. *The Syntax of Chinese*. Cambridge University Press, Cambridge. https://doi.org/10.1017/CBO9781139166935.

Huang, Chu-Ren 1987. *Mandarin Chinese NP de: A Comparative Study of Current Grammatical Theories*. PhD thesis, Cornell University. https://www.proquest.com/dissertations-theses/mandarin-chinese-np-de-comparative-study-current/docview/303471563/se-2.

Jackendoff, Ray. 1977. *X Syntax: A Study of Phrase Structure*. MIT Press, Cambridge, Ma.

Johannessen, Janne Bondi. 1998. *Coordination*. Oxford University Press, Oxford.

Kayne, Richard. 1994. *The Antisymmetry of Syntax*. MIT Press, Cambridge, Ma.

Lang, Ewald. 1984. *The Semantics of Coordination*. John Benjamins, Amsterdam. https://doi.org/10.1075/slcs.9.

Larson, Richard K. 2018. AP-*de* (地) adverbs in Mandarin. *Studies in Chinese Linguistics* 39 1: 1–28. https://doi.org/10.2478/scl-2018-0001.

Li, Yafei. 2022. *Universal Grammar and Iconicity*. Cambridge University Press, Cambridge. https://doi.org/10.1017/9781108885935.

Li, Y.-H. Audrey. 2008. Phrase structure and categorial labelling: *de* as a head? *Dangdai Yuyanxue* [Contemporary Linguistics] 10 2: 97–108.

Marantz, Alec. 1997. No escape from syntax: Don't try morphological analysis in the privacy of your own lexicon. *U. Penn. Working Papers in Linguistics* 4.2: 201–225.

McNally, Louise. 2016. Modification. In *The Cambridge Handbook of Formal Semantics*, edited by Maria Aloni and Paul Dekker, pp. 442–466. Cambridge University Press, Cambridge. https://doi.org/10.1017/CBO9781139236157.016.

Moltmann, Friederike. 1992. *Coordination and Comparatives*. PhD thesis, MIT (e-version). http://hdl.handle.net/1721.1/12896.

Muadz, Husni. 1991. *Coordinate Structure: A Planar Representation*. PhD thesis, University of Arizona. http://hdl.handle.net/10150/185527.

Munn, Alan. 1987. Coordinate structure and X-bar theory. *McGill Working Papers in Linguistics* 4.1: 121–140.

Munn, Alan. 1992. A null operator analysis of ATB gaps. *The Linguistic Review* 9: 1–26. https://doi.org/10.1515/tlir.1992.9.1.1.

Munn, Alan. 1993. *Topics in the Syntax and Semantics of Coordinate Structures*. PhD thesis, University of Maryland, College Park. https://www.proquest.com/dissertations-theses/topics-syntax-semantics-coordinate-structures/docview/304060232/se-2.

Neeleman, Ad, Joy Philip, Misako Tanaka, and Hans van de Koot. 2022. Subordination and binary branching. *Syntax* 26: 41–84. https://doi.org/10.1111/synt.12244.

Nichols, Johanna. 1986. Head-marking and dependent-marking grammar. *Language* 62 1: 56–119. https://doi.org/10.1353/lan.1986.0014.

Nóbrega, Vitor and Phoevos Panagiotidis. 2020. Headedness and exocentric compounding. *Word Structure* 13 2: 211–249. https://doi.org/10.3366/word.2020.0168.

Paul, Waltraud. 2017. The insubordinate subordinator *de* in Mandarin Chinese: Second take. In 《汉语 "的" 的研究》 (Studies of the particle de in Chinese) [Frontiers in Chinese Linguistics Series], edited by Sze-Wing Tang, pp. 3–30. Peking University Press, Beijing.

Pesetsky, David. 1991. Zero Syntax. vol. 2: Infinitives. Material intended for "Zero Syntax" but not included in the final publication. http://lingphil.mit.edu/papers/pesetsk/infins.pdf, accessible on Aug. 11, 2022.

Pietraszko, Asia. 2019. Obligatory CP nominalization in Ndebele. *Syntax* 22 1: 66–111. https://doi.org/10.1111/synt.12167.

Progovac, Ljiljana. 1998. Structure for coordination. *Glot International* 3 7: 3–6.

Przepiórkowski, Adam. 2022. Coordination of unlike grammatical cases. *Language* 98 3: 592–634. https://doi.org/10.1353/lan.0.0272.

Ross, John Robert 1967. *Constraints on Variables in Syntax*, PhD thesis, MIT, Cambridge, Ma. https://hdl.handle.net/1721.1/15166.

Rubin, Edward. 1994. *Modification: A Syntactic Analysis and Its Consequences*. PhD thesis, Cornell University, Ithaca, N.Y. https://www.proquest.com/dissertations-theses/modification-syntactic-analysis-consequences/docview/304107215/se-2.

Rubin, Edward. 2003. Determining pair-merge. *Linguistic Inquiry* 34 4: 660–668. https://doi.org/10.1162/ling.2003.34.4.660.

Safir, Ken. 2022. Just Pair-merge: Are adjuncts syntactically defined by operations or representations? Ms. Rutgers University.

Sag, Ivan, Gerald Gazdar, Thomas Wasow, and Steven Weisler 1985. Coordination and how to distinguish categories. *Natural Language and Linguistic Theory* 3: 117–171. https://doi.org/10.1007/BF00133839.

Scalise, Sergio and Antonietta Biscno. 2009. The classification of compounds. In *The Oxford Handbook of Compounding*, edited by Lieber, Rochelle and Stekarner, Pavol, pp. 34–53. Oxford University Press, Oxford. https://doi.org/10.1093/oxfordhb/9780199695720.013.0003.

Tang, Ting-Chi. 1979. *Guoyu yufa yanjiu lunji* [Studies in Chinese Syntax]. Student Book Co., Taipei

Thiersch, Craig. 1985. VP and scrambling in the German Mittelfeld. Ms., University of Tilburg.

Tsai, Wei-Tien Dylan and Chun-Ming Wu. 2012. Conjunctive reduction revisited: Evidence from Mayrinax Atayal and Southern Paiwan. *Oceanic Linguistics* 51 1: 160–181. https://doi.org/10.1353/ol.2012.0005.

de Vries, Mark. 2005. Coordination and syntactic hierarchy. *Studia Linguistica* 59.1: 83 – 105. https://doi.org/10.1111/j.1467-9582.2005.00121.x.

Weisser, Philipp. 2015. *Derived Coordination*. De Gruyter, Berlin. https://doi.org/10.1515/9783110443578.

Williams, Edwin. 1987. The ATB theory of parasitic gaps. *The Linguistic Review* 6 3: 265–279. https://doi.org/10.1515/tlir.1987.6.3.265.

Yngve, Victor H. 1960. A model and a hypothesis for language structure. *Proceedings of the American Philosophical Society* 104: 444–466. https://www.jstor.org/stable/985230.

Zhang, Niina Ning. 2007. Root merger in Chinese compounds. *Studia Linguistica* 61 2: 170–184. https://doi.org/10.1111/j.1467-9582.2007.00131.x.

Zhang, Niina Ning. 2010. *Coordination in Syntax*. Cambridge University Press, Cambridge. https://doi.org/10.1017/CBO9780511770746.

Zhang, Niina Ning. 2022a. Defective incorporating verbs in Mandarin. *Language and Linguistics* 23 2: 329-348. https://doi.org/10.1075/lali.00108.zha.

Zhang, Niina Ning. 2022b. Could there be other functional elements? Workshop on Foundations of Extended Projections, Tromsø, October 27–28.

Zhang, Ning. 2023. *Coordinate Structures*. Elements in Generative Syntax. Cambridge University Press, Cambridge.

Zhu, Dexi. 1980. Beijing-hua, Guangzhou-hua, Shuiwen-hua he Fuzhou-hua li de DE zi [DE in Beijing, Guangzhou, Shuiwen, and Fuzhou dialects], *Fangyan* 1980 3: 161–165.

Zhu, Dexi. 1982. *Yufa Jiangyi* [Lectures on grammar], Shangwu Press, Beijing.

Zoerner, Ed. 1995. *Coordination: The Syntax of andP*. PhD thesis, University of California, Irvine.

Zoerner, Ed. 1999. One coordinator for all. *Linguistic Analysis* 29 3/4: 322–341.