More on Coordination

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Abstract
I argue against the assumption that all coordinate structures are derived from full CPs. First, if the assumption is tenable, it follows that the more conjunctions are used, the more underlying sentences are needed. This leads to unnecessary expansion of elements in Numeration. Second, it forces us to postulate unnatural underlying sentences. Third, each conjunction has its own subcategorization frame.

Keywords: conjunction, Coordinate Structure Constraint, full CP assumption

1. Introduction

Every language has coordinate structures (CSs). Thus, any linguistic theory must deal with the phenomena concerning CSs. The theory should tell us what category conjunctions themselves belong to and what categories they can coordinate. If the theory assumes the framework of generative grammar, it should account for Coordinate Structure Constraint (CSC) proposed by Ross (1986).

Johannessen (1998) provides a clear answer for each question. Conjunctions are functional heads and they can coordinate only full CPs. The former statement implies that CSs are hierarchical ones, that is, the specifier asymmetrically c-commands the complement like other categories such as I, V, and N in accordance with X-bar theory. As for CSC, she claims that the data concerning CSC should be accounted for not by extraction but by deletion. This means that extraction (or deletion) out of CSs is, in principle, possible, and it follows that when the sentence is not acceptable, some semantic restrictions work to rule it out.

In section 2, a brief summary of Johannessen (1998) is given. I point out several problems caused by the assumptions of Johannessen (1998) in section 3. In section 4, syntactic tests for drawing a line between "pure CSs" and CSs that can be derived by deletion are introduced. Section 5 is devoted to concluding remarks.

2. The Analysis of Coordinate Structures by Johannessen (1998)

Let us look at how a coordinate sentence is derived. Our target sentence is (1).

(1)   John loves Mary and Nancy.

Traditionally, *Mary* and *Nancy* are connected directly with *and*, and the whole noun phrase becomes the complement of the verb *loves*. Johannessen (1998) cannot derive the sentence (1) in such a way, however, because of her crucial assumption that the input categories to coordinate-alpha are full CPs. Two full sentences are necessary to derive the above sentence. One is *John loves Mary*, and the other is *John loves Nancy*. "Coordinate-alpha can coordinate any category with any other category at any stage in the syntactic derivation (Johannessen 1998:176)." In this case, *Mary* is attached to the specifier of the conjunction phrase (CoP), while *Nancy* to the complement of CoP.
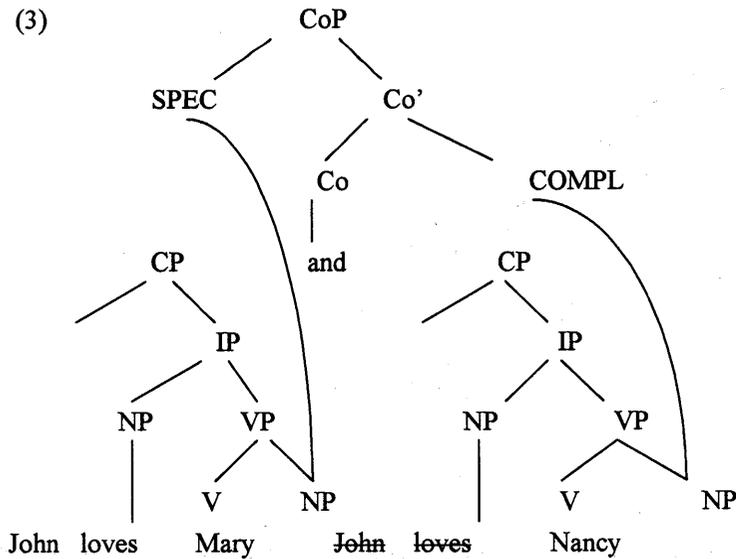
Next, Forward Deletion (FWD) is applied to remove "the extra elements." The conditions of FWD are as follows:

(2)   the conditions of FWD
   a.   content-identity: the contents of the elided material must be identical—but not with respect to phonological and morphosyntactic make-up—to that of the antecedent
   b.   context-identity: the antecedent of ellipsis site E stands in the same hierarchical relation to its conjunct (root CP) as E
   c.   locality: the antecedent of an ellipsis site must be identified by the most local conjunct
   d.   the head condition: an ellipsis site may not be c-commanded by an overt head in its domain (=conjunct)
   e.   the major constituent condition: a deletion site may not span a string which extends to a subpart of a major constituent
                                       (ibid.:178-179)

(3)

```
                          CoP
                         /    \
                    SPEC       Co'
                      \       /    \
                       \    Co      COMPL
                        \   |          \
                  CP      and    CP      \
                 /  \           /  \       \
                    IP             IP       \
                   /  \           /  \       \
                 NP    VP       NP    VP      \
                 |    /  \      |    /  \      \
                 |   V    NP    |   V    NP    \
              John loves  Mary  John loves  Nancy
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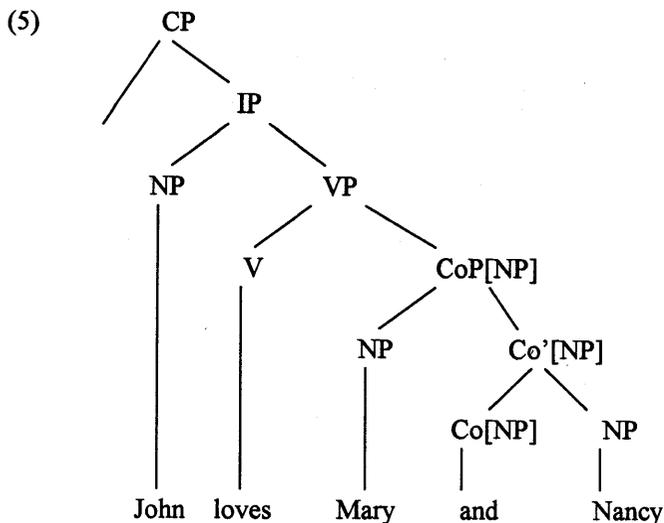
At this moment, the whole phrase structure violates X-bar theory. Thus, another operation called *Operation Share* is needed in order for the partially deleted structure to fit into X-bar schemata.

(4) Operation Share:
   If material above/or below CoP attachment is deleted in one of the input CPs in accordance with FWD and BWD, the remaining material can be shared. The two CPs are rearranged into one CP by removing deleted material and inserting the CoP in the attachment position. The resulting structure must not violate X-bar theory.

   (ibid.:186)

Following the above operation, we get our target sentence.

(5)

```
                    CP
                  /    \
                 /      IP
                /     /    \
               /    NP      VP
              /     |      /   \
             /      |     V    CoP[NP]
            /       |     |    /      \
           /        |     |   NP      Co'[NP]
          /         |     |   |      /      \
         /          |     |   |   Co[NP]    NP
        /           |     |   |     |       |
      John        loves  Mary  and    Nancy
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Incidentally, it should be noted that FWD is applied to derive Gapping constructions like (6).

(6) [John drinks wine [and [his son ~~drinks~~ coca cola.]]]

In order to account for phenomena concerning CSs, there is another deletion rule called Backward Deletion (BWD). The conditions of BWD are stated in (7).

(7) the conditions of BWD
     a.   an ellipsis site must be right-peripheral in its conjunct
     b.   the licencing string must be right-peripheral in its conjunct   (ibid.:179)

BWD plays a role to derive Right Node Raising constructions such as (8).

(8) [John looked at ~~today's copy of the Times~~
     [and [Mary read today's copy of the Times.]]]   (ibid.:179)

Now, let me show you how Johannessen (1998) accounts for the examples of CSC violation and makes the sentences violating CSC acceptable. There are four types of the examples we must account for.

(9) Per vasket klaer [t og Ola].
     Per washed clothes and Ola.
     'Per washed clothes, and Ola.'   (ibid.: 216)
(10) *What do you like [apples and t]?

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(11) *What do you [drink wine and eat t]?   (ibid.: 214)

(12) a.   What kind of cancer can you [eat herbs and not get t]?

      b.   What kind of herbs can you [eat t and not get cancer]?   (ibid.: 217)

(13) Coordinate Structure Constraint: In a coordinate structure, no conjunct may be moved, nor may any element contained in a conjunct be moved out of that conjunct.

                                                   (ibid.: 215)

The sentences (9) and (10) are the examples of the first part of the violation of CSC. The whole conjunct is extracted. The sentences (11) and (12) are the examples of the second part of the violation of CSC. The part of the conjunct is extracted.

First of all, let us take a look at the derivation of (12b). The underlying sentences are built up and by coordinate-alpha, we get to the following stage.

(14) [What kind of herbs can you eat] and [can you not get cancer]?   (ibid.: 229)

FWD is applied to (14) in order to get rid of *can you* of the second conjunct and then Operation Share mends the tree. Now we reach the sentence (12b).

The sentence (12a) is derived in the same way as in the case of (12b). At the first stage, we build up the two underlying sentences and connect them by Coordinate-alpha.

(15) [Can you eat herbs] and [what kind of cancer can you not get]?   (ibid.: 230)

FWD is applied to (15) to remove *can you* of the second conjunct and Operation Share rearranges the tree. The resulting structure is (16).

(16) [What kind of cancer can you eat] and [not get]?   (ibid.: 231)

Bear in mind this derivation process from (15) to (16). The attachment node of coordinate-alpha is C', so after Operation Share, *what kind of cancer* is in the front position of the sentence.

The sentence (11) is derived in the same way as (12a, b), but the sentence is obviously ungrammatical. What is the difference? The answer is that in the case of (12a, b) "a link can be established between the conjuncts which can be described in terms of cause, consequence, despiteness, or time (ibid.: 233)", while such a link can not be established in the case of (11).

Now let us turn to the examples of the first part of the violation. Johannessen (1998) analyzes the Norwegian sentence (9) as the case of FWD.

(17) [Per vasket klaer] og [Ola ~~vasket klaer~~]].   (ibid.:226)

As for (10), Johannessen (1998) speaks less. Basically, she seems to consider the ungrammaticality of (10) to be caused by the same semantic constraints as in the case of (11). "The same semantic constraints also would make it impossible to allow extraction of whole conjuncts (ibid.: 235).

3. Problems

There are two types of problems in Johannessen (1998). One is about the derivation process, and the other is about the crucial assumption that the input categories to coordinate-alpha are full CPs. Since FWD and BWD are not properly restricted, they can generate un-grammatical sentences.

Now let us start with the following sentences.

(18) a. What did John kick?

    b. Did Mary kick the wall?

By coordinate-alpha we can coordinate (18a) and (18b) and get the structure (19).

(19) [What did John kick] and [did Mary kick the wall]?

There are three ways of applying FWD to (19). The first one is to delete *did*. The second one is to delete *kick*. The last one is to delete both *did* and *kick*. The resulting sentences are shown in (20), respectively.

(20) a. *[What did John kick] and [Mary kick the wall]?

    b. *[What did John kick] and [did Mary the wall]?

    c. *[What did John kick] and [Mary the wall]?

When we change the order of the underlying sentences, we get the following tree.

(21) [Did Mary kick the wall] and [what did John kick]?

There are three possibilities of deletion here, as in the case of (19): *did, kick*, and both. And the sentences we reach after the application of FWD and Operation Share are as follows:

(22) a. *[What [did Mary kick the wall] and [John kick]]?

    b. *[What [did Mary kick the wall] and [did John]]?

c.   *[What [did Mary kick the wall] and [John]]?[1]

According to Johannessen (1998), the reason why the above sentences are unacceptable would be related to some semantic constraints, but it appears to me that they are syntactically ungrammatical.

Another ungrammatical example that is generated in the framework of Johannessen (1998) is found in Gleitman (1969:84).

(23) *He ate and or but he slept too.

The sentence (23) is very hard to understand, but let us look at how it can be generated. The underlying sentences are in (24).

(24) a.   He ate and he slept too.
     b.   He ate but he slept too.

By coordinate-alpha, (24a) and (24b) are coordinated, and we get the sentence (25).

(25) [He ate and he slept too] or [he ate but he slept too].

Applying FWD to *he ate* in the second conjunct, and BWD to *he slept too* in the first conjunct, and then Operation Share, we get to the sentence (23).

The sentences in (20), (22) and (25) can be generated, if the derivation process Johannessen (1998) assumes is on the right track. The above ungrammatical data indicate that it is necessary to restrict FWD and BWD more severely.

The other type of problem is about the crucial assumption that the input categories to coordinate-alpha are full CPs. The first argument against the assumption in question is conceptual one. If the assumption is true, then it naturally follows that the more conjuncts are used, the more underlying structures are needed.

(26) John and Mary kissed Bill.
(27) a.   John kissed Bill.
     b.   Mary kissed Bill.

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[1] The same ungrammatical sentences are presented in McCawley (1988:527).
   (i) a. *What did Tom order spaghetti, and Jane [t]?
      b. *Who ordered spaghetti, and Jane lasagna?
      c. *What did Tom order [t] and Jane lasagna?

(28) the Numeration = { John, Mary, kissed, kissed, Bill, Bill }[2]

(29) John and Mary kissed Bill and Nancy.

(30) a. John kissed Bill.
    b. Mary kissed Bill.
    c. John kissed Nancy.
    d. Mary kissed Nancy.

(31) the Numeration = { John, John, Mary, Mary, kissed, kissed, kissed, kissed, Bill, Bill, Nancy, Nancy }

(32) John, Mary and Tom kissed Bill and Nancy.

(33) a. John kissed Bill.
    b. Mary kissed Bill.
    c. John kissed Nancy..
    d. Mary kissed Nancy.
    e. Tom kissed Bill.
    f. Tom kissed Nancy.

(34) the Numeration = { John, John, Mary, Mary, Tom, Tom, kissed, kissed, kissed, kissed, kissed, kissed, Bill, Bill, Nancy, Nancy }

A theory that includes the device coordinating elements directly is much simpler and more economical than the theory that assumes only full CPs as the input categories to coordination.

The second argument against the full CP assumption is related to idioms which contain *and* as one of their elements. The typical examples are as follows:

(35) a. He plays the same song over and over.
    b. Time and again political parties have failed to tackle this issue.
    c. Now and then he'd join in when we were playing video games.
    d. Dozens of doctors and nurses have been working day and night for weeks.

(*Collins Cobuild English Dictionary* 1995)

If every CS is derived from two underlying full CPs, the first part and the second part of the above idioms should have been separated. For example, (35a) is derived from the following underlying structure.

(36) *[He plays the same song over] and [he plays the same song over].

---

[2] It should be noted that functional elements such as T and AGR are omitted from the Numeration. It should be also noticed that the simplest examples are selected. Imagine the number of elements of the Numeration when the example is the following sentence.
(i) The handsome man and his fiancé might have been taking heroin and opium.

The above data also indicate that there exist CSs that are not derived from the underlying full CP in English.[3]

The third argument against the assumption in question is concerned with comparative syntax. *And* in English can coordinate almost all categories.[4]

(37) a.　[I'm fifty] and [I'm happy]. (S)

　　b.　You must [take the course] and [pass the examination]. (VP)

　　c.　John plays [the piano] and [the violin]. (NP)

　　d.　His voice was [clear] and [very forceful]. (AP)

　　e.　We found the marbles [by the window] and [under the table]. (PP)

　　f.　I have [washed] and [dried] the dishes. (V)

　　g.　They made [salmon] and [cucumber] sandwiches. (N)

　　h.　I saw a [black] and [white] cat. (A)

　　i.　They live [in] and [around] New York. (P)　　　　Kajita (2000:301)

On the other hand, there are a variety of words or particles functioning as conjunctions in other languages. The most familiar conjunction in Japanese is *to*.[5]

(38) [Hiroko] to 　[Yuko] wa 　tomodachi da
　　　　　　and　　　NOM. friend　　　is
　　'Hiroko and Yuko are friends.'

Unlike *and* in English, *to* in Japanese cannot coordinate sentences.

(39) *[Hiroko wa 　butsurigakusya da] to 　[Yuko wa 　　uchu-hikoushi da]
　　　　　　NOM. physician 　　is 　and 　　　NOM. astronaut 　　is
　　'Hiroko is a physician and Yuko is an astronaut.'

Ni and *ya* in Japanese are other examples that can connect nouns but not sentences.[6]

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[3] Johannessen (1998:228) states: "I have to stress that at pre-LF level, the sentences do not have an interpretation. The components are therefore simply syntactic construals generated by the transformational component." If this is tenable, there should be some regularity in building trees. In this respect, I think that the position of *over* in (36) violates this regularity.

[4] *Roget's International Thesaurus* (1977:22) includes only *and* and *also* as the items of the column "Addition." This means that the word *and* has the remarkable ability to connect words and phrase, for there is no other counterpart.

[5] Kuno (1973:112) and Watanabe (1971: 226) refer to it as a coordinating particle, while Johannessen (1998) considers it to be a kind of conjunction.

[6] This is pointed out in Kuno (1973:112).

(40) a.　[Hiroko] ni　[Yuko] ga　kita.

　　　b.　[Hiroko] ya　[Yuko] ga　kita.

　　　　　　　　　and　　　NOM. came

　　　　　'Hiroko and Yuko came.'

(41) a.　*[Hiroko ga kita] ni [Yuko ga kita]

　　　b.　*[Hiroko ga kita] ya [Yuko ga kita]

　　　　　'Hiroko came and Yuko came.'

If we follow the full CP assumption, the underlying structure of (40a) before deletion rules is (41b). The derivation is allowed if deletion rules are applied, but if they are not applied, the sentence should be ruled out as shown in (41a). In other words, in the case of (41a) the application of deletion rules is obligatory. Where is this obligatoriness guaranteed? In the framework of Chomsky (1995), there is no room except in the lexicon. If this reasoning is on the right track, the ungrammaticality of (41a) is reduced to the lexical property of the conjunction.

In the case of *to*, *ni* and *ya* in Japanese, NPs are allowed to be in their conjunct positions, while they can not connect sentences. The conjunction *but* in English behaves in the opposite way, that is, it can take sentences as its conjuncts but can not take NPs.

(42) a.　On this farm, they keep [[cows] and [sheep]], but [only a few chickens].

　　　b.　*On this farm, they keep cows but sheep, and only a few chickens.

　　　　　　　　　　　　　　　　　　　　　　　　　　　(Quirk *et al* 1985:952-953)

These data also show that it is necessary to encode the lexical property of the conjunction in more detail. Thus, this means that not all CSs are generated from the underlying full CPs.

4. Syntactic Tests

In the previous section, I have shown that it is necessary to restrict FWD and BWD more severely and not all CSs are generated from full CPs. If it is true that not all CSs are derived from full CPs, we need some criteria to draw a line between "pure CSs" and CSs that are derived by reducing sentences. One of the criteria I provide here is not a brand-new one. Rather, it is a traditional definition.

(43) A + conjunction + B = B + conjunction + A　　　　　　　(Quirk *et al*. 1985:920)

The above definition means that "the relation between the two linguistic units [can] be reversed without a change of meaning (ibid.)." They go on to say that "[t]his is no more than

a half-truth (ibid.)." I think, however, that the definition (43) is very useful for drawing a clear line between "pure coordination" and the rest.

Another criterion I propose is as follows:

(44) There should be no comma before the coordinate conjunction.

The following examples clearly show that (44) is valid.

(45) a. *John will put the chair between some table, and some sofa.
    b. *The book is both useful, and amusing.

The expressions *between* A *and* B and *both* A *and* B are considered to be the typical coordinate expressions. This is the reason why the examples in (45) are ungrammatical when a comma is laid immediately before *and*.

According to the above criteria (43) and (44), let us consider what kind of examples are pure CSs. As shown in (37), *and* can connect various categories but these criteria help us to understand which structures we can regard as CSs.

Quirk *et al.* (1985:916) present as candidates for coordinated elements clauses, predicates, predications, noun phrases, noun heads, premodifier, postmodifier, determiners, numerals, genitives possessive pronouns, verbs, verb phrases, adjectives, adjective phrases, adverbs, adverb phrases, prepositions, prepositional phrases, adverbials, subordinators, interrogative words, and relative pronouns. Here let us take a look at some of them.

(46) predicates[7]
    a. Peter ate the fruit and drank the beer.   (ibid.:948)
    b. Peter drank the beer and ate the fruit.
    c. Peter ate the fruit, and drank the beer.
(47) predications
    a. You must take the course and pass the examination.   (ibid.:949)
    b. ?You must pass the examination and take the course.
    c. ?You must take the course, and pass the examination.
(48) noun phrases
    a. John plays the piano and the violin.   (=37c)
    b. John plays the violin and the piano.
    c. ??John plays the piano, and the violin.

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[7] I ignore clauses, since whether the sequence of clauses can be reversed depends on the context. (See Quirk *et al* (1985:930))

(49) noun heads

    a.   his wife and child   (ibid.:960)

    b.   his child and wife

    c.   *his wife, and child

(50) premodifier (or adjectives)

    a.   He specializes in selling old and valuable books.   (ibid.)

    b.   ?He specializes in selling valuable and old books.[8]

    c.   ??He specializes in selling old, and valuable books.

(51) genitives

    a.   John and Mary's children   (ibid.:964)

    b.   Mary and John's children

    c. *John, and Mary's chidren

(52) verbs

    a.   I have washed and dried the dishes.   (ibid.:967)

    b.   ??I have dried and washed the dishes.

    c.   I have washed, and dried the dishes.

(53) adverbs

    a.   The piston moved up and down with increasing speed.   (ibid.:968)

    b.   ?The piston moved down and up with increasing speed.[9]

    c.   ??The piston moved up, and down with increasing speed.

(54) prepositional phrases

    a.   We found the marbles by the window and under the table.   (=37e)

    b.   We found the marbles under the table and by the window.

    c.   ?We found the marbles by the window, and under the table.

(55) prepositions

    a.   They live in and around New York.   (=37i)

    b.   ?They live around and in New York.[10]

    c. ??They live in, and around New York.

The results are set out in the following table.

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[8] The order of conjoined words can be influenced by a tendency for the longer word to come second. (See Quirk *et al.* (1985:971)) So the sentence (50b) sounds a bit strange.

[9] See footnote 8.

[10] See footnote 8.

	(43)	(44)
noun heads (49)	ok	*
genitives (51)	ok	*
noun phrases (48)	ok	??
premodifiers (50) (or adjectives)	?	??
adverbs (53)	?	??
prepositions (55)	?	??
prepositional phrases (54)	ok	?
predicates (46)	ok	ok
predications (47)	?	?
verbs (52)	??	ok

When (43) is ok and (44) is marked with *, the sequence can be regarded as a CS. If we consider the degraded judgments of (50), (53) and (55) about the criterion (43) to be affected by the tendency mentioned in footnote 8, the six examples above the thick line in the table can be CSs. The above results show that heads are coordinated directly except in the case of verbs, and when heads are coordinated with *and*, the construction gets to form a CS. They also show that when elements within a noun phrase are connected with *and*, they can be regarded as a CS. The following example where prepositional phrase are coordinated within a noun phrase helps us to understand that the judgment is right.

(56) a.   I want to buy Elsa Graham's books on reptiles and on amphibians.

     b.   I want to buy Elsa Graham's books on amphibians and on reptiles.

     c.   ??I want to buy Elsa Graham's books on reptiles, and on amphibians.

(56c) is worse than (54c). The sentences in (56) exhibit the characteristic of a CS, and that implies that it is not generated from underlying sentences by deletion rules.

5. Concluding Remarks

In this paper I have argued against Johannessen (1998). I have pointed out that the deletion rules assumed in Johannessen (1998) are so strong that they generate ungrammatical sentences and that not all CSs are derived from underlying full CPs.

As for CSC, Johannessen (1998) argues that it is not the restriction on extraction, but the restriction on deletion and ultimately the ungrammaticality can be related to some semantic constraints. In my opinion, at least the violation of the first part of CSC is closely related to

the lexical property of conjunction, that is, its function is to connect elements.   (See Mukaiyama (1999)) The following contrast clearly shows the point.

(57) a.   Who saw John and who?   (Huang 1995:156)

     b.   *Who did Mary see John and?

The reason why (57b) is ungrammatical is that the lexical property of the conjunction is not satisfied.

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