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The Structure of Coordination

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1. Introduction

The analysis of coordination (and especially the structure of coordination) is a matter of dispute within syntactic theory. Prior to the 1980s, coordination was largely ignored by the syntactic field. Syntacticians have yet to reach a consensus with regard to the structure and properties of coordination. It's rather remarkable that an element as basic to language as coordination (in English, coordination can be signaled by "and," "or," and "but") has been largely ignored within linguistics except by semanticists. The most extensive analyses put forth at this point are those of José Camacho (1997, 2003) and Janne Bondi Johannessen (1998).

In this paper, I have limited my focus to the structure of the coordination of NPs in English using the conjunction *and.* The terminology involved in discussions of coordination requires clarification. I will use "conjunct" to refer to the entity being conjoined. For example, in a NP such as *Bert and Ernie, Bert* is the first conjunct, and *Ernie* is the second conjunct. I will use "conjunction" to refer to either the lexical item signaling a coordinate structure (such as *and*), or to refer to the entire phrase (i.e. *Bert and Ernie* is a conjunction).

I consider here proposals of structure by Goodall (1987), Johannessen (1999) and Camacho (1997, 2003). Although I do not adopt Camacho's analysis[1], I do make use of his basic tree structure. None of the proposals put forth at this time are entirely sufficient or satisfactory, though I do conclude that Camacho's structure is the most satisfactory. The continued investigation of this under-examined area of grammar is necessary in order to clarify and conclusively define what the properties of coordination are.

[1] Due to time constraints, I was not able to fully consider Camacho's work.

2. Overview

In *Syntactic Structures* (1957), Chomsky makes the distinction between the conjunction of like constituents and the conjunction of differing constituents. Chomsky made the observation that generally, only constituents of "like" syntactic categories or properties could be coordinated. For example, verbs may be coordinated as in (1a) but a verb and noun may not, as in (1b-c).

1a) John peeled and ate a grape.

1b) *John peeled and grape.

1c) *John peeled and a grape.

Indeed, upon reading (1B), the reader may even wonder if "grape" has become a verb.

Chomsky's observation about the coordination of like categories is generally known as the "Law of the Coordination of Likes" (LCL), which was reformulated in more specific detail by Pullum & Zwicky (1986) as "Wasow's Generalization."

Wasow's Generalization is as follows:

> If a coordinate structure occurs in some position in a syntactic representation, each of its conjuncts must have syntactic feature values that would allow it individually to occur in that position and those feature values must be the same for each conjunct.

Wasow's Generalization is comprised of two parts. The first qualification, that "the conjunct each must have syntactic feature values that would allow it to occur individually in that position" is illustrated by (2a-c), where each conjunct in (2a) is allowed to occur individually in the subject position, as in (2b-c):

2a) The oranges and apples are fresh.

2b) The oranges are fresh.

2c) The apples are fresh.

The second qualification, that the "feature values must be the same for each conjunct" can be illustrated by (3a-b), from Camacho 2003: 5:

3a) *The men and to the women left the room.

3b)* To the women left the room.

3c) The men and the women left the room.

Sentence (3a) is ungrammatical because the feature values of the conjuncts do not match; noun phrases cannot be coordinated with prepositional phrases (in contrast to (3c)). Sentence (3b) is ungrammatical because a prepositional phrase cannot occur as the subject.

Consider the following sentences from Goodall (1987: 17):

4a) Louise and George rode bicycles.

4b) Mary reads and writes in French.

4c) The old man fed the birds and the squirrels.

4d) Tom and Jan eat bread and apples.

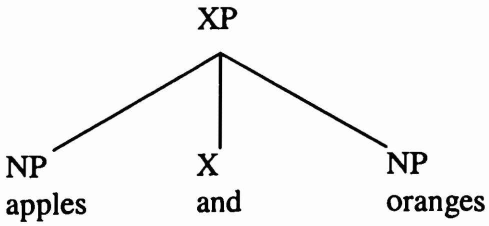
When one observes a set of sentences such as (4a-d), restrictions like the LCL or Wasow's Generalization seem to make a lot of sense. The set of sentences (4a-d) is the most common type of coordination found in languages. When one attempts to describe conjunction behavior, an explanation such as Wasow's Generalization is a predictable result.

2.1 Goodall (1987)

Goodall (1987) is always quoted in the literature when discussing coordination, in large part because he was the first to attempt to incorporate an analysis of coordination into the rest of a grammar (Camacho 1997: 2). Goodall proposes that coordination is a "union of phrase markers." ("Phrase markers" essentially means a collection of statements about the phrase structure of a sentence, i.e. the tree along with the information you know about that tree.) He says to think of coordination "in tree terms as a 'pasting together,' one on top of the other, of two trees, with any identical nodes merging together" (Goodall 1987:20).

Goodall also proposes a tree structure that is ternary, as most linguists assumed the structure of coordination to be (if they considered the structure at all).

For an NP such as (5a), Goodall's tree would look like the following, with *and* as the head, and each NP as a complement.



2.1.1 Problems with ternary trees

Though the ternary tree may at first seem like a good solution, it is unclear how a ternary tree would be a viable solution for coordination beyond that of two conjuncts. It would be unsatisfactory to have an ever-branching node (as would be necessary to deal with coordinated NPs such as those in (5b-d)). Possible representations of trees are given below.

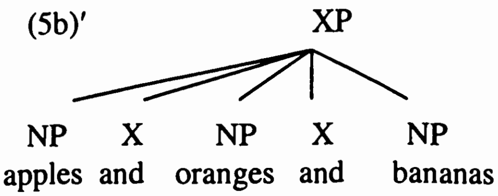
5a) apples and oranges

5b) apples and oranges and bananas

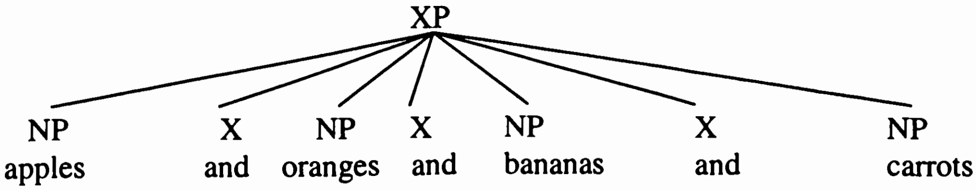
5c) apples and oranges and bananas and carrots

5d) apples, oranges and bananas

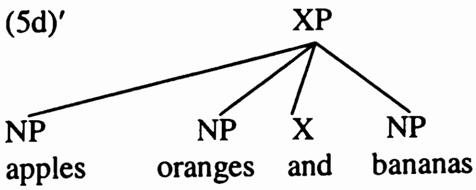
(5b)′



(5c)′



(5d)′



Another problem with ternary trees is that they do not fit the X-bar schema. The current pattern of an X-bar should not dictate the theory to come. However, many have provided arguments for why the X-bar schema is preferable.

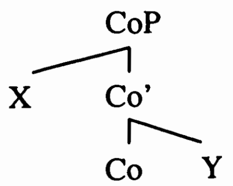
One of the advantages of the X-bar schema is that recursion is handled quite well. An XP can be replicated indefinitely, using a consistent structure (just as one can coordinate NPs as long as one wishes to do so). Furthermore, if the tree structure does not fit the X-bar schema, it complicates the application of relevant X-bar concepts, such as c-command, spec-head agreement and feature-checking.

2.2 Johannessen (1998)

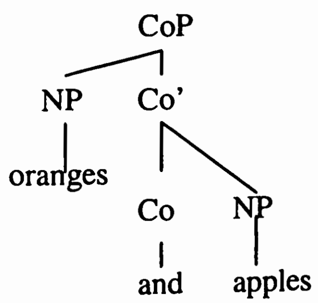
Johannessen (1998) has put forth an analysis of coordination within the X-bar schema and in part, within the minimalist program. Her analysis has been greatly discussed since its publication because of both the "boldness" of her arguments and the questions her unusual analysis raises (Åfarli 2000). Johannessen (1998) focuses primarily on two kinds of coordination "not previously discussed to any great extent in the literature," namely, unbalanced coordination

(UC) and extraordinary balanced coordination (EBC) (1). (The type of coordination that *has* been widely discussed is ordinary balanced coordination (OBC).)

In light of her preoccupation with unusual coordinations of the UC and EBC variety, Johannessen proposes an X-bar tree structure for a coordinate phrase as follows:



In this representation, one conjunct (X) is the specifier of the CoP and the other conjunct (Y) is the complement to the Co head. So, for example, (5a) would be represented as follows:



Johannessen asserts that X and Y can be "true variables" which can stand for any categories (such as N, I', VP, etc.) and furthermore, that X and Y can be categories of any bar-level (X°, X' or X^{max}) (Johannessen (1998):110).

Consider the following sentence, as pointed out by Camacho (1997), from Sag, Gazdar, Wasow and Weisler (1985):

6) Marie is [$_{NP}$ a Democrat] and [$_{AP}$ proud of it.]

Sentences such as (6) contradict Wasow's Generalization, but it is still considered grammatical. Johannessen (1998) devotes a great deal of attention to coordinate structures which violate Wasow's Generalization but which are still considered grammatical.

2.2.1 Problems with Johannessen's Analysis

Consider the following:

7a) oranges and apples

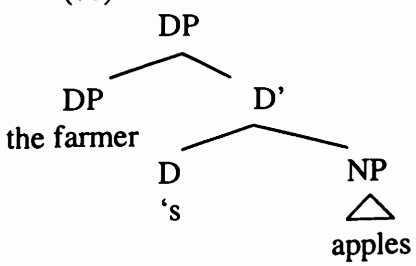
7b) apples and oranges

7c) the farmer's apples

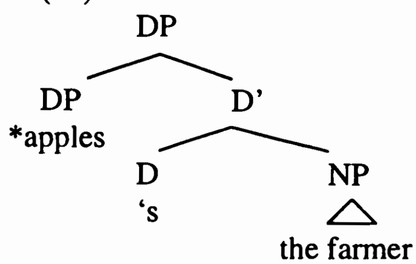
7d) *apples's the farmer

The NPs (or DPs[2]) in (7a-b) are equivalent for all intents and purposes. It makes no sense to have *apples* as the specifier in one instance and *oranges* in the other. The positions of specifier and complement within the X-bar schema are *not* equivalent as illustrated by (7c-d).

(7c)′



(7d)′



I propose that NPs have *parallel relationships* to a conjunction head. (In other words, the conjuncts should have equivalent status within the X-bar schema. Conjuncts should either be specifiers or complements, but not both.)

Another criticism of Johannessen's structure is that it was created to accommodate unusual types of coordination, instead of the more common.[3] And while it works well for the

[2] If one adopts the DP Hypothesis, then the structure of NPs can be reworked as projections of a functional head, the determiner. Hence, the Determiner Phrase (Abney 1987).

[3] Johannessen asserts that UC and EBC are actually the most prevalent forms of coordination, as well as the simplest. On the other hand, Camacho (and many others before him) assert a focus on OBC as the "normative" form of coordination. It has occurred to me that this disparity may be due in part to a measure of ethnocentrism. Namely, Johannessen, a native speaker of Norwegian, makes use of a great number of Norwegian examples, where UC and EBC certainly appear to be the most prevalent. On the other hand, Camacho, a native speaker of Spanish (a predominantly OBC language) makes the case for his arguments from Spanish examples.

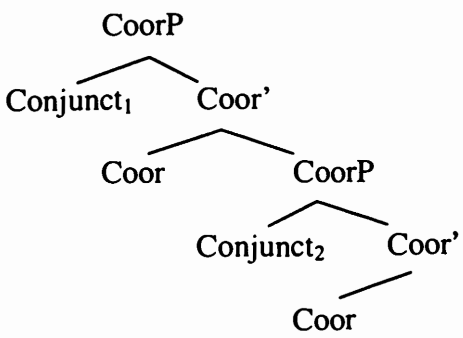
uncommon (i.e. UC and EBC), her analysis requires a separate lexical entry in order to deal with OBC, which as Åfarli points out, "amounts to sheer stipulation" (2000). Camacho (2003) raised a similar criticism with regard to Johannessen's deletion rules for OBC.

3. Properties and Structure of Coordination

In each syntacticians' investigation into possible structure solutions for coordination, new (and often unexpected) properties arise, complicating the analyses. The structure proposal put forth by Camacho is the most satisfactory, though not entirely so. I also raise arguments for the existence of conjunctions as heads.

3.1 The Structure Proposal (Camacho 1997, 1999, 2003)

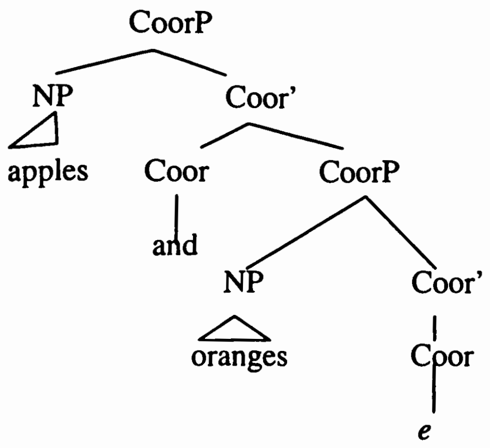
Camacho proposes a tree like the following, with the conjuncts in specifier positions and the conjunction as a head.



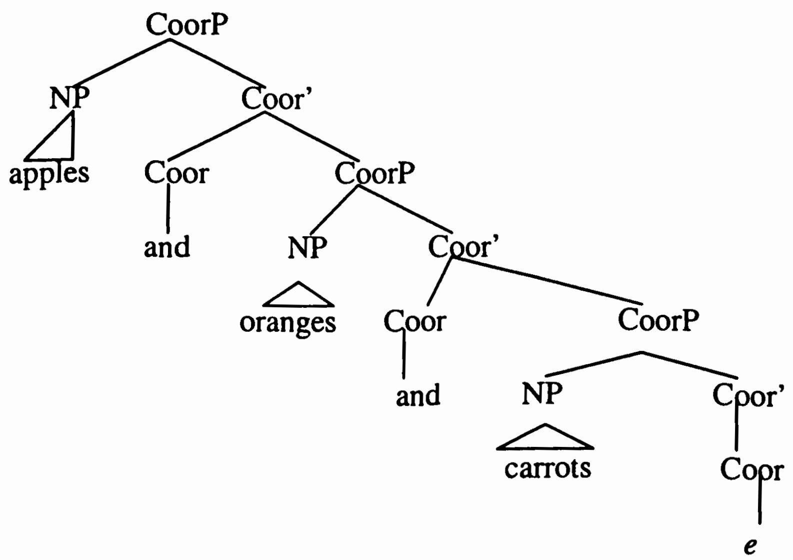
Camacho's proposal is the most satisfactory for a number of reasons:

First of all, it preserves the X-bar schema, and provides for easy and logical replication. Phrases like (5a-d) are easily represented. ((5a, 5b, 5d) are shown.)

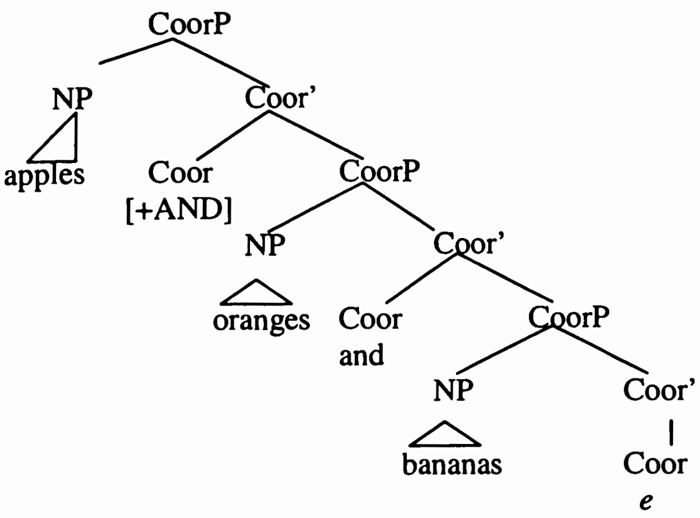
(5a)′ apples and oranges



(5b)′ apples and oranges and bananas



(5d)′ apples, oranges and bananas



Secondly, the conjuncts are in parallel relationships to a conjunction head. When the order of the conjuncts is switched (as in 7a-b), each conjunct is still in the same relationship with a conjunction head.

Another benefit of Camacho's tree is precisely that conjunctions are heads. Up until now, I have been assuming the existence of a coordinate phrase without providing much argument for its existence. Within X-bar theory, justification for a head must be provided in order assume an XP, since heads project into phrases. Johannessen (1998) has devoted an entire chapter to why conjunctions should be considered heads. She argues her case largely on the basis of work in Hudson (1987), Zwicky (1985), and Svenonius (1992), who discuss the properties (both theoretic and "pretheoretic") required to be a head. (See section 3.2 for details.)

The fourth positive attribute to Camacho's tree is that it has a structural asymmetry about it. That is, the first conjunct c-commands the second. Munn (1993) argues why such a c-command relationship is necessary from examples such as the following.

8a) Every man$_i$ and his$_i$ dog went to mow a meadow.

8b)*His$_i$ dog and every man$_i$ went to mow a meadow.

Recall that in Binding Theory, an item *x* is considered bound by *y* when *x* is coindexed with *y* and *x* c-commands *y*. The representation of possessive pronouns is a matter of debate in GB theory. (If this were a different paper, I would argue that possessive pronouns are very similar to possessive *'s* and have genitive case.)

In (8a), *every man* is bound to *his*, requiring that the structure of the coordinate phrase allow for a c-command relationship. In contrast, it is not possible for the second conjunct to c-command the first, as in (8b).

3.2 Conjunctions as Heads

One argument that the conjunction is a head can be made via a process of elimination. "In a conjunction phrase, there is only one element which can never be anything but X^0, and that is the conjunction. The conjuncts can be single words, but they can also be maximal projections" (Johannessen (1998): 92).

Another interesting piece of evidence for conjunctions as heads (and hence, the need for a unique coordinate phrase) is the fact that in some speakers' minds, there are semantic differences between a coordinate phrase of XPs and an XP by itself. Johannessen (1998: 96) gives the following examples:

9a) *The boys loved the pupil and the teacher, respectively.

9b) [Anthony and Peter] loved the pupil and the teacher, respectively.

Johannessen argues that in (9a-b), the presence of the adverb *respectively* (for some speakers) can only occur with a coordinate phrase.

A convincing piece of evidence[4] that there are substantial differences between a coordinate phrase of XPs and the XP itself are those such as (10a-b):

10a) [John]$_{NOM}$ and [me]$_{ACC}$ went to the store.

[4] I am grateful to Kristin Denham for suggesting this example.

10b) $[\text{Me}]_{ACC}$ and $[\text{John}]_{NOM?ACC?}$ went to the store.

10c) *$[\text{Me}]_{ACC}$ went to the store.

10d) *$[\text{John}]_{NOM}$ and $[\text{me}]_{ACC}$ and $[\text{his}]_{GEN}$ went to the store.

Without base-generating a coordinate phrase such as that in (10a), there a variety of explanations possible. One is that the speaker is using a UC construction, an explanation that is (understandably) propounded by Johannessen. Johannessen defines UC as a coordination in which one order of conjuncts is allowed (while the other is not) where one conjunct has a different grammatical property than the other (1998: 8).

Another explanation is that [John and me] (or [Me and John]) actually forms a unit which receives case, so that $[\text{John and me}]_{NOM}$ is the subject of the sentence and gets its "proper" case from the *environment*. However, this is not a satisfactory solution, since it would then allow NPs marked for any case to occur in a nominative-marked position so long as the NPs were part of a coordinate phrase. Aberrations such as (10d) would then be allowed.

Johannessen explains sentences such as (10b) as EBC constructions, which are when a "coordinated structure has different grammatical features from a simplex structure in the same surroundings" (1998:60). In these instances, case seems to be assigned from a head outside the coordinate phrase. (Johannessen argues that [John] in a sentence such as (10b) has accusative case, since [him] would work as a replacement whereas [he] would not.)

3.2 Generating coordinate structures

Previously, I thought conjunctions would probably be base-generated as coordinate structures, as opposed to being created by the action of "deletion" or "reduction" rules. Most analyses of coordination have included "deletion," "reduction" or in the case of Goodall (1987) "merge" rules in order to generate coordinate structures. Although the idea of deletion strikes me as illogical and inefficient, the proposals put forth by linguists such as Camacho and Johannessen require deletion rules in order to work within GB theory or the minimalist program. In the end, deletion or reduction rules are necessary in order to explain coordination within the theoretic context of X-bar theory.

However, venturing into non-formalist territory, I would still like to point out that when the user of a language creates a conjunction of NPs, the user *may* conceive of the conjoined NPs as a *unit*, even if the conjoined NPs are not a lexicalized item.

4. Conclusion and Summary

The studies to date leave us with more questions than answers. The structure proposed in Camacho (1997, 2003) is desirable because 1) it fits the X-bar schema and so is easily replicable, thus accounting for multiple coordination, 2) each conjunct is in a spec-head relationship with a conjunction, 3) conjunctions are heads, and 4) it maintains a structural asymmetry necessary for a c-command relationship between conjuncts. However, the analysis and critical insight provided by Johannessen (1998) as to the nature and complexity of coordinate structures are of equal importance to the future analysis of coordination. If any consensus is to be reached in the linguistics community, more cross-linguistic investigation into this most basic of language operations is imperative.

Works Cited

Abney, Steven (1987) *The English Noun Phrase in Its Sentential Aspects.* Unpublished Dissertation, MIT, Cambridge.

Åfarli, Tor A. (2000) "Coordination (Review of: Johannessen, Janne Bondi)." *Journal of Linguistics* 36, 448-449.

Camacho, José (2003) *The Structure of Coordination : Conjunction and Agreement Phenomena in Spanish and Other Languages.* Pre-publication manuscript courtesy of the author. Since published, Boston : Kluwer Academic Publishers.

Camacho, José (1999) "How similar are conjuncts? Against Asymmetric Conjunction." *Formal Perspectives on Romance Linguistics.* Authier, J.-Marc, Barbara E. Bullock, Lisa A. Reed (eds.). Philadelphia: John Benjamins Publishing Co. (73-88).

Camacho, José (1997) *The Structure of NP Conjunction.* Ph.D. Dissertation, University of Southern California, Los Angeles. (accessed first 24 pages thru ProQuest)

Chomsky, Noam (1957) *Syntactic Structures.* The Hague: Mouton & Co. (35-7).

Goodall, Grant (1987) "Coordination." *Parallel Structures in Syntax.* New York: Cambridge University Press.

Hudson, R.A. (1987) "Zwicky on heads." *Journal of Linguistics* 23, 109-32.

Johannessen, Janne Bondi (1998) *Coordination.* New York: Oxford University Press.

Munn, Alan (1993) *Topics in the Syntax and Semantics of Coordinate Structures.* Ph.D. Thesis, University of Maryland.

Pullum, Geoffrey and Arnold Zwicky (1986) "Phonological Resolution of Syntactic Feature Conflict." *Language* 62, 751-773.

Sag, Ivan, Gerald Gazdar, Thomas Wasow and Steven Weisler (1985) "Coordination and How to Distinguish Categories." *Natural Language and Linguistic Theory* 3, 117-171.

Svenonius, P. (1992) "The Extended Projection of N: Identifying the Head of the Noun Phrase." *Working Papers in Scandinavian Syntax* 49, 95-121.

Zwicky, A. (1985) "Heads." *Journal of Linguistics* 21, 1-30.

Works Consulted

Dik, Simon C. (1968) *Coordination. Its implications for the theory of general linguistics,* Amsterdam: North-Holland Publishing Co.

Goodall, Grant (1992) "Coordination." *Oxford International Encyclopedia of Linguistics.* New York: Oxford University Press.

Haegaman, Liliane (1994) *Introduction to Government and Binding Theory.* Cambridge: Blackwell Publishers.

Lakoff, George and Stanley Peters (1966) "Phrasal Conjunction and Symmetric Predicates." in Reibel, David and Sanford Schane (eds.) (1969) *Modern Studies in English. Readings in Transformational Grammar,* Englewood Cliffs: Prentice-Hall, Inc.

Munn, Alan (1999) "First Conjunct Agreement: Against a Clausal Analysis." *Linguistic Inquiry* 30, 643-668.

Trask, R.L. (1993) *A Dictionary of Grammatical Terms in Linguistics.* London: Routledge.