

An analysis of coordinate compounding

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Abstract

This paper deals with the analysis of coordinate compound expressions into the phrases that are compounded and the elements that join them together. We call these, respectively, members and connectives. Coordinate compounds are understood as **conjunctions** or as **disjunctions**, depending on the connective that links its members. We begin by considering **unmixed** coordinate compounds, in which disjunctions do not appear as members of conjunctions and conjunctions do not appear as members of disjunctions. Two major classes of unmixed coordinate compounds are distinguished, depending on whether connectives appear in them. Following traditional grammar, coordinate compounds with one or more connectives joining its members are called **syndetons**; the others are called **asyndetons**. Asyndetons, unlike syndetons, cannot have coordinate compounds as members. We account for this property by proposing that asyndetons are not constituents of the phrases that contain them. On the other hand, since syndetons can have syndetons as members, their degree of ambiguity grows exponentially with the number of noncompound members (called **ultimate members**) in them. We develop several principles which account for why this potential for ambiguity is not generally a problem in language use. We also analyze the use of punctuation in the written expression of unmixed coordinate compounds. The last part of this paper is concerned with **mixed coordinate compounds**, in which a conjunction has a disjunction as a member, or vice versa. We examine the roles of syntax and punctuation in disambiguating these inherently ambiguous expressions, and analyze the semantic and pragmatic factors that play a major role in the disambiguation process.

Unmixed Coordinate Compound Expressions

Coordinate compounding is a syntactic device found in all natural languages.¹ A coordinate compound expression is made up of two or more elements of the same type or sequence of types,² which following Bloomfield (1933:195), we call **members**.³ We do not require that a coordinate compound expression itself be a constituent. However, if it is, then it is of the same type as its members, and each member may be considered to be a head of the expression (Gazdar *et al.* 1985: 174ff). Coordinate compounds are understood as **conjunctions** or as **disjunctions** of their members. Associated with particular members may be coordinating particles such as *and* and *or*, which we call **connectives**.⁴ The role of connectives is to specify, among other things, whether the

coordinate compounds of which they are a part are to be understood as disjunctions or as conjunctions. We say that two coordinate compounds are of the **same coordination type** if they are both conjunctions or both disjunctions; otherwise they are of the **opposite coordination type**. We recursively define a **mixed coordinate compound** as a coordinate compound which has a member of the opposite coordination type or which has a member which is a mixed coordinate compound. We define an **unmixed coordinate compound** as a coordinate compound which is not a mixed coordinate compound. In this section we analyze the structure and interpretation of unmixed coordinate compounds.

In 1 and 2, we provide somewhat, but not unduly, complicated examples of unmixed coordinate compounds in English. These examples are drawn from the American Printing House for the Blind (APHB) corpus;⁵ the first containing six and the second seven coordinate compound expressions, some nested inside others. The coordinate compound expressions they contain are listed immediately following each example.

1. Then all the chronicles and achievements of man fall humbly into perspective: all our economic competition, our strife for mates, our hunger and love and grief and war are akin to the seeking, mating, striving and suffering that hide under these fallen leaves or trees, or in the waters, or on the boughs. (APHB 324 42)
 - a. chronicles and achievements
 - b. hunger and love and grief and war
 - c. our economic competition, our strife for mates, our (1b)
 - d. leaves or trees
 - e. under these fallen (1d), or in the waters, or on the boughs
 - f. seeking, mating, striving and suffering
2. Enriched with minerals and vitamins, the purified soybean meal is colored, flavored, pressed, shaped and cut into bits that look and taste like bacon chips or strips, pork sausage, ground beef, sliced ham or chicken and are cheaper and just as nourishing as the real thing. (APHB 35 327)
 - a. minerals and vitamins
 - b. chips or strips
 - c. look and taste
 - d. bacon (2b), pork sausage, ground beef, sliced ham or chicken
 - e. cheaper and just as nourishing as the real thing
 - f. (2c) like (2d) and are (2e)
 - g. colored, flavored, pressed, shaped and cut into bits that (2f)

Patterning of Connectives in Unmixed Coordinate Compounds

To refer to the patterning of connectives in compounds, we make a slight adjustment in the terminology of traditional grammar (cf. Quirk *et al.* 1972: 550), as follows. First, we call a compound like (1a,b,d,e) and (2a,b,c,e,f) in which the same connective appears between each pair of members a **full syndeton**. In (3) through (5), we give other examples containing full syndetons from the APHB corpus (the coordinate compounds are italicized).

3. It's great to see millions on this earth who had nothing but a record of *sadness and poverty and misery and hunger and disease* have the chance to go up. (APHB 418 174)
4. Cursing and sweating against the roiling current, the crew *sailed and poled and towed* a 55-foot keelboat and two large pirogues up the river. (APHB 418 961)
5. He is not quite *journalist or carnival barker or orator or interlocutor or master of ceremonies or trained seal*. (APHB 70 1121)

Second, we call a compound like (1f) and (2d,g) in which a connective appears between the final pair, and no connective appears between the remaining pairs, a **partial syndeton**. Other example of partial syndetons are given in (6) and (7).

6. It provides him with a swift, streamlined method of getting a hearing in Tax Court without legal fees in any federal *income, gift or estate* tax dispute involving \$1000 or less for any one year. (APHB 445 61)
7. Courts often need the precise time and nature of death to settle *manslaughter charges, inheritance claims, insurance proceeds, tax problems, and the disposition of jointly held money and property*. (APHB 211 1056)

We refer to full and partial syndetons collectively as **syndetons**. Finally, we call a compound like (1c) with no connective between any pair of members an **asyndeton**. Other asyndetons are contained in examples (8) through (10).

8. Josephine, in one brief breath I will concentrate *the hopes, the doubts, the anxious fears* of six weary months. Josephine, I am a British sailor, and I love you! (from W.S. Gilbert and A. Sullivan, *H.M.S. Pinafore*, dialog following "A British tar")
9. In the afternoons we had three hours of field work, *stretching hose up stairs, up fire escapes, up aerial ladders; crawling past 55-gallon drums filled with burning wood scraps in the heat room; crawling through controlled smoke conditions, breathing the first whiffs of the poison that we would soon get to know as a doctor knows death; chopping through floors and doors with eight-pound axes; forcing locks with Halligan tools, ripping down ceilings with six-foot-hooks; lowering ourselves down the outside of a five-story building with a rope and a life belt, jumping three stories into a net; carrying victims, searching in smoky rooms for a dummy well hidden by a diabolical instructor, bandaging forelimbs, splinting legs*.⁶ (APHB 484 1061)
10. *The thistle, the nettle, the burdock, the belladonna* / Have a future.⁷

As Quirk *et al.* (1972: 550) point out, asyndetons are conventionally understood as conjunctions. In particular note that the verb in (10) shows plural agreement with its asyndeton subject, as we would expect if the latter is interpreted as a conjunction. However, I found two compounds in the APHB corpus and two compounds in another document that can be analyzed as containing disjunctive asyndetons; see "Factoring

Ambiguities Involving Coordinate Compounds" and "Member Nesting of Conjunctive Asyndetons is Impossible" for discussion.

The foregoing description of the patterning of connectives in coordinate compounds in English is exhaustive. Other patterns, such as those exhibited in (11) and (12) involve the nesting of coordinate compounds, as shown in "Other Types of Member Nesting".

11. The thistle, the nettle, the burdock, the belladonna
Have a future. Theirs are *wastelands*
And rusty railroad tracks, the sky, silence.
Who shall I be for men many generations later?
When, after the noise of languages, the award goes to silence?
I was to be redeemed by the gift of arranging words
But must be prepared for an earth without grammar,
For *the thistle, the nettle, the burdock, the belladonna*
And a small wind above them, a sleepy cloud, silence.
(Czeslaw Milosz, "The Thistle, The Nettle", translated from the Polish by Czeslaw Milosz and Robert Hass, *The New Yorker*, April 30, 1990)
12. Of course, an employer has a right to refuse to hire a man if he doesn't like *the color of his tie, or his diction, his shifty eyes, or his having taken the Fifth Amendment.* (APHB 84 620)

Discontinuous Coordinate Compounds

The members of a coordinate compound may be interrupted by other constituents, as in examples (13) through (15).⁸

13. We're *sober* men *and true* / *And attentive to our duty.* (from *H.M.S. Pinafore*, lyrics of "We sail the ocean blue")
14. *Red* am I? *And round - and rosy!* (from *H.M.S. Pinafore*, dialogue following "I'm called Little Buttercup")
15. *No golden rank* can he impart, / *No wealth of house or land,* / *No fortune save his trusty heart,* / *And honest, brown right hand!* (from *H.M.S. Pinafore*, lyrics of "The hours creep on apace")

The discontinuity may be obligatory, as in examples (16) and (17).

16. A day *or two* ago I thought I'd take a ride (from the lyrics of *Jingle Bells*) (cf. *One or two* days ago I thought I'd take a ride)
17. Let rise in a warm place (80° F) about *an hour and a quarter.* (from Laurel Robertson, *The Laurel's Kitchen Bread Book*, New York: Random House, 1984, p. 191) (cf. Let rise in a warm place (80° F) about *one and a quarter hours.*)

Indeed a subconstituent of a member can, under certain circumstances, appear outside of that member, as in example (18).

18. An innocent young coed has psychic powers but has to *prove it*, or die, *to a witch who thinks she's better*. (from a TV movie description in the *Chicago Tribune*, April 5, 1987; citation provided by Geoffrey Huck)

We do not consider the problem of discontinuity of coordinate compound structures further here.

Factoring Ambiguities Involving Coordinate Compounds

Much of the structural ambiguity found in coordinate compounds involves the question of the **factoring** of the members (Wells 1947). For example in (1), the string *fallen leaves or trees* can be analyzed as containing the disjunction of *leaves* with *trees*, as shown in (1e), with the word *fallen* factored out as a common modifier of the members of the coordinate compound; or as containing the disjunction of *fallen leaves* and *trees*, in which the word *fallen* occurs as part of the coordinate compound, as a modifier of the first member only. The second interpretation, though grammatical, is much less natural than the first, given that the places under fallen trees provide much better hiding places than those under trees which are not fallen.

In general, it appears that when there is a choice of considering a particular piece of a phrase as a factor which is associated with each member of a coordinate compound or as part of a particular member, *ceteris paribus* its analysis as a common factor is preferred. We refer to this principle as the **maximum factorization principle**. Example (1) provides additional support for the maximum factorization principle, since it also contains the string *these fallen leaves or trees*, which can be analyzed as the disjunction of the members *these fallen leaves* with *trees*, which is even less natural than the second analysis of *fallen leaves or trees* just discussed. Moreover, it also contains the phrase (19), which can also be analyzed as containing the coordinate compounds in (19a-e), each of which has fewer common factors than the most natural one, (1a).

19. all the chronicles and achievements of man
- a. chronicles and achievements of man
 - b. the chronicles and achievements
 - c. the chronicles and achievements of man
 - d. all the chronicles and achievements
 - e. all the chronicles and achievements of man

A more complex situation involving a factoring ambiguity arises in (2). That example contains the string *sliced ham or chicken*, which is analyzed in (2d) as containing two members of a larger disjunction which has five members in all. However, it can also be analyzed as containing the disjunction of the two members *ham* with *chicken*, with the word *sliced* factored out as a modifier of that disjunction. In this case, however, the entire string *sliced ham or chicken* would then occur as the final member of an asyndeton whose other members would be as shown in (20). This asyndeton, by the convention mentioned in "Patterning of Connectives in Unmixed Coordinate Compounds", would be interpreted as a conjunction, and as a consequence the soybean

meal under discussion would be understood as looking and tasting like one of four different combinations in (20a-d).

20. bacon (chips or strips), pork sausage, ground beef, sliced (ham or chicken)⁹
 - a. bacon chips, pork sausage, ground beef and sliced ham
 - b. bacon chips, pork sausage, ground beef and sliced chicken
 - c. bacon strips, pork sausage, ground beef and sliced ham
 - d. bacon strips, pork sausage, ground beef and sliced chicken

This is a highly unnatural interpretation! There is, however, a simple structural reason for its unlikelihood, namely that when a coordinate compound may be analyzed either as a syndeton or as an asyndeton, its analysis as a syndeton is preferred. This principle, which we call the **prefer syndetons principle**, takes precedence over the maximal factorization principle.

Finally, we examine the coordinate compounds in (21) and (22) whose factorization provides one bit of evidence for the existence of disjunctive asyndetons.

21. This invention, through the use of appropriately located pick-ups, would activate an *electric typewriter, computer*, or any other device through thought processes alone. (APHB 220 665)
22. Not one word about these national awards given by the President in the White House was used in *the New York Times, the Washington Post, Newsweek*, or on NBC or CBS network news. (APHB 466 330)

In (21), the word *an* can only be interpreted as a common factor of an asyndeton consisting of the two highlighted members in that example, since it cannot cooccur with the potential third member *any other device*. This compound is clearly understood as a disjunction, presumably because of its occurrence as a nested submember¹⁰ of a larger disjunction. Similarly in (22), the word *in* can only be analyzed as a common factor of the three-member asyndeton highlighted in that example, since the potential fourth member has its own preposition. The coordinate compound of which that asyndeton is a nested submember is analyzable as a disjunction of two prepositional phrases, which presumably accounts for the disjunctive interpretation of the nested asyndeton.

The only alternative to the analyses just presented of the structure of the coordinate compounds in (21) and (22) is to suppose that both are ungrammatical: that the word *a* is required before the member *computer* in (21) and that the word *in* required before the members *the Washington Post* and *Newsweek* in (22).

Submember Nesting of Coordinate Compounds

Both examples (1) and (2) exhibit the nesting of coordinate compound expressions within others. For example, the compound expression (1d) is contained within the larger compound expression (1e). However, the contained compound expressions in these examples are not themselves members of the containing compound expressions, but

instead are proper constituents of members of the containing expressions. We refer to this type of nesting of coordinate compound structures as **submember nesting**. Comprehension difficulty increases relatively slowly with degree of submember nesting; for example, (2) exhibits third degree nesting of submembers but is not thereby particularly hard to understand.¹¹ This is not to say that constructions exhibiting submember nesting may not be difficult to understand for other reasons; for example, the coordinate compound in (23) is nearly incomprehensible.

23. the leaves, leaf buds, and internodes of this plant used in preparing a beverage after curing *by immediate withering and firing or by firing after fermenting and oxidizing or after partial oxidizing* (from *Webster's Seventh Collegiate Dictionary*, definition of *tea*)

After several readings, I determined that the intended interpretation of this definition is based on a structure in which the compound *fermenting and oxidizing* is nested as a submember of the compound *after fermenting and oxidizing or after partial oxidizing*, which in turn is nested as a submember of the compound as a whole. Part of the difficulty in interpreting this example is that it is subject to an entirely different analysis in which the main compound begins two words to the left of the beginning of the compound in (23), and has *after partial oxidizing* as its second member.

We also do not consider the problem of submember nesting further here.

Member Nesting of Unmixed Coordinate Compounds

Syndetons and perhaps also disjunctive asyndetons can themselves occur as members of coordinate compounds of any type. We call this kind of nesting of coordinate compounds **member nesting**. We also say that the connective associated with the compound that contains nested members has **scope** over the connectives that are associated with the nested members. Alternatively, we say that the connectives that are associated with the nested member have **priority** over the connective associated with the containing compound. We discuss the various types of member nesting, starting with member nesting of full syndetons within full syndetons.

Member Nesting of Full Syndetons Within Full Syndetons

The coordinate compound in (24) can be interpreted in accordance with the eleven structures schematized in (24a-l). In these schemata, the nested full syndetons are enclosed in parentheses. Schemata corresponding to natural interpretations are prefixed with an exclamation mark and those corresponding to unnatural ones are prefixed with a question mark.

24. That's our job and that's the job of *Brezhnev and Kosygin and Mao Tse-tung and Chou En-lai*. (APHB 418 100)
- a. !W and X and Y and Z
 - b. !(W and X) and (Y and Z)

- c. ?(W and X) and Y and Z
- d. ?(W and X and Y) and Z
- e. ?W and (X and Y) and Z
- f. ?W and X and (Y and Z)
- g. ?W and (X and Y and Z)
- h. ?(W and X) and Y) and Z
- i. ?(W and (X and Y)) and Z
- j. ?W and (X and Y) and Z)
- k. ?W and (X and (Y and Z))

Given that Brezhnev and Kosygin were Russian leaders and that Mao Tse-tung and Chou En-lai Chinese leaders, the structures in (24a-b) are bases of natural interpretations of the compound as a whole. None of the other structures are bases of natural interpretations, but all of them are possible.

Given a full syndeton with n ultimate members, the number A of distinct interpretations it has is given by the recurrence relation in (25).¹²

25. $A(n) = 1$, for $1 \leq n \leq 2$
 $A(n) = A(n-1) + 2 \sum_{i=2}^{n-1} [A(i) A(n-i)]$ for $n > 2$

In Figure 1, we give the values of $A(n)$ for the range $3 \leq n \leq 12$. As can be seen from this figure, $A(n)$ grows exponentially with n . Clearly, some severe practical limits on the possibilities of member nesting must be imposed.

n	$A(n)$
3	3
4	11
5	45
6	197
7	903
8	4,279
9	20,973
10	103,049
11	518,859
12	2,646,723

Figure 1. Number of Structurally Distinct Full Syndetons With 3 to 12 Ultimate Members

Most full syndetons, such as (3-5) are interpreted in the manner of (24a), with no member nesting. A full syndeton with four ultimate members may sometimes be interpreted as in (24b), in which it is analyzed as having two coordinate compound members, each with two members. A phrase which naturally receives such an interpretation is the movie title *Bob and Carol and Ted and Alice*. Rarely, one member, usually the first or the last, is a coordinate compound, all of whose members are

ultimate members. The interpretations in (24c-g), are of this type. Full syndetons with more than one degree of member nesting, as in (24h-k) are very rarely, if ever, attested.

We summarize these limitations on member nesting in the form of three principles of language use. First, the **prefer no member nesting principle** asserts that, all things being equal, structures with no member nesting are preferred to structures with member nesting. Second, the **avoid multiple member nesting principle** asserts that structures with more than one degree of member nesting generally are not used.¹³ Finally, the **prefer parallelism of internal structure principle**, states that structures in which the nested members have the same number of members are preferred to structures in which they have different numbers of members.

A full syndeton with four ultimate members which has a natural interpretation in accordance with (24d), in violation of the prefer parallelism of internal structure principle, occurs in (26).

26. You smell the shop before you see it; it's a lovely smell, I can't articulate it easily, but it combines *must and dust and age, and walls and floors of wood*. (APHB 215 149)

A natural way of construing the intent of the comma following *age* is that it groups the phrase *must and dust and age* as a nested member of a syndeton, whose second member is *walls and floors of wood*, which exhibits submember nesting, with *of wood* a common factor of *walls and floors*, as if the third occurrence of *and* were replaced by *with*. See "Selective Use of Punctuation Before Connectives Indicates Member Nesting" for further discussion of the role of punctuation in indicating member nesting.

Next, the example in (27) contains a full syndeton with three ultimate members, in which the punctuation suggests an analysis into two members, the first of which also has two members.¹⁴

27. It enhances *stocks and broths, and soups of fish, poultry, meat, lentils and beans*; also tomato and other vegetable soups. (APHB 375 232)

This example is also interesting because of the question of how the material following the semicolon is associated with the material preceding it. Presumably, the compound *also tomato and other vegetable soups* is the second member of an asyndeton whose candidate first members are the entire full syndeton just analyzed, and the last member of that syndeton, namely *soups of fish, poultry, meat, lentils and beans*. The punctuation would suggest that the first member of the asyndeton is the first of these candidates, namely the entire full syndeton preceding the semicolon. Indeed, the example must have that interpretation, since as we show in "Member Nesting of Conjunctive Asyndetons is Impossible", conjunctive asyndetons cannot serve as members of larger coordinate compounds.

Another compound in which a full syndeton may naturally be analyzed into members with syndetons as members occurs in (28). Natural interpretations of this compound are schematized in (28a-d).

28. Then Dr. White and his faculty and students could *assemble and throw rocks at each other and play with matches and burn things down*. (APHB 219 551)
- a. *(W and X) and (Y and Z)* (=24b)
 - b. *(W and X) and Y and Z* (=24c)
 - c. *W and X and (Y and Z)* (=24f)
 - d. *W and X and Y and Z* (=24a)

In the compound in (28), the various occurrences of *and* may be understood asymmetrically (and hence not as logical conjunctions), just as in (29).

29. *I leaped to my feet and ran out of the room.*

In particular, if the activity of throwing rocks at each other is understood as depending on assembling first, and if the activity of burning things down depends on playing with matches first, then the interpretation of the compound in (28a) is appropriate. If only one of these dependencies is understood as holding, then one of the interpretations of the compound in (28b-c) is appropriate. Finally, if neither dependency is understood as holding (so that *and* is interpreted symmetrically), then the interpretation of the compound in (28d) is appropriate. Note that in none of these interpretations is the degree of member nesting greater than one.

Because of the avoid multiple member nesting principle, it is very difficult to interpret the compound in (28) with second degree member nesting. However, it is not impossible to do so. Such an interpretation could be based on the assumption that burning things down depends on playing with matches, and that both of these activities, together with throwing rocks at each other depend on assembling, as in (28e).

28. e. *?W and (X and (Y and Z))* (=24k)

Next, consider the full syndeton with three ultimate members in (30).

30. *His sisters and his cousins, whom he reckons up by dozens, and his aunts!* (from *H.M.S. Pinafore*, lyrics of "Now give three cheers")

Depending on whether the relative clause *whom he reckons up by dozens* is construed as modifying *his sisters and his cousins*, or just *his cousins*, the syndeton either does or does not manifest member nesting. Textual evidence shows that the latter is the case, for when Sir Joseph is betrothed to his cousin Hebe, she sings:

31. Then goodbye to *your sisters, and your cousins, and your aunts*, / Especially your cousins, / Whom you reckon up by dozens, (from *H.M.S. Pinafore*, lyrics of "Oh joy, oh rapture unforeseen!")

The only example I found of a full syndeton with more than four ultimate members that clearly exhibits member nesting is given in (32). The role of the punctuation in the compound in determining its natural interpretation is discussed in "Use of Punctuation in Unmixed Coordinate Compounds".

32. *I took the whole thing and threw it in his face, and I jumped over the counter, and there was a fork and I used that to stab him in the face.* (APHB 35 1399)
a. *(V and W) and X and (Y and Z)*

I have found no examples of a disjunction occurring as a member of another disjunction in a full syndeton, an observation which suggests the existence of an **avoid member nesting of disjunctions within disjunctions principle**. For further discussion, see "Other Types of Member Nesting" and "Nonselective Use of Punctuation in Long Mixed Coordinate Compounds".

Member Nesting of Conjunctive Asyndetons is Impossible

If all the connectives are omitted from the coordinate compound expression in (24), as in (33), then only one interpretation is possible, namely as a conjunctive asyndeton with four members. No member nesting is possible.

33. *Brezhnev, Kosygin, Mao Tse-tung, Chou En-lai*

In fact, conjunctive asyndetons cannot occur as members of coordinate compounds, for if they could, then disjunctive partial syndetons could be analyzed as coordinate compounds that contain conjunctive asyndetons as members. In particular, the partial syndeton in (2d) could be analyzed as a disjunction of two members, the first member being the asyndeton in (34), and the second member being *chicken*.

34. *bacon chips or strips, pork sausage, ground beef, sliced ham*

Then, since the first member would be interpreted as a conjunction, the compound as a whole would be interpreted as presenting a choice between chicken and all of the ingredients in the list in (34). But this is not just an unlikely interpretation of (2d), it is an impossible one. Consequently, conjunctive asyndetons cannot be members of coordinate compounds at all, a conclusion which we call the **no member nesting of conjunctive asyndetons principle**. The no member nesting of conjunctive asyndetons principle, unlike the others we have considered, appears to be a principle of grammar, rather than one of use.

Disjunctive asyndetons, on the other hand, can appear as nested members of a coordinate compound as in (35)-(36).

35. Fresh fruit juices (limit 4 oz per day); *black coffee, plain or herbal teas*; soft drinks with sugar substitutes; club soda, preferably salt-free; cocoa made with

skim milk or nonfat dried milk and water (sugar substitute added if desired); clear broth. (from *Guidelines for Low-Cholesterol, Low-Triglyceride Diets: Foods to Use*, Warner-Lambert Company, 1987)

36. Fried snack foods like potato chips; chocolate; candies in general; *jams, jellies, syrups*; whole-milk puddings; ice cream and milk sherbets; hydrogenated peanut butter. (from *Guidelines for Low-Cholesterol, Low-Triglyceride Diets: Foods to Avoid*, Warner-Lambert Company, 1987)

Throughout the documents from which these examples are cited, semicolons are used to separate members of asyndetons whenever any member contains a comma. Clearly both citations in their entirety are asyndetons, and the boldfaced portions are members. Those members, in turn, are asyndetons. However, in both cases, the nested asyndetons are interpreted as disjunctions, for in each case, one is being presented with choices.

We are still lacking an explanation, however, for why partial conjunctive syndetons, as in (7), cannot be analyzed as having a disjunctive asyndeton as a member. The reason, presumably, is that disjunctive asyndetons can only appear in contexts in which a choice is indicated, and no such indication is provided in such cases.¹⁵ The extreme rarity of disjunctive asyndetons in naturally occurring English texts suggests that for practical purposes the possibility of member nesting of disjunctive asyndetons can be ignored. This suggestion is strengthened by the observation that if the passages in (35) and (36) are analyzed simply as conjunctive asyndetons with no member nesting, no significant difference in interpretation of those passages results. In "A Partial Formal Account of the Structure of Coordinate Compounds", we therefore ignore the possibility of member nesting of disjunctive asyndetons and presume that no member of asyndetons of any type is permitted.

Other Types of Member Nesting

If all but the final *and* are omitted from the compound in (24), as in (37), the result has three possible interpretations, as schematized in (37a-c).¹⁶ In these schemata, an italicized *and* is used to represent the interpretation of the missing connective of a conjunctive asyndeton.

37. Brezhnev, Kosygin, Mao Tse-tung and Chou En-lai
a. !W and X and Y and Z
b. ?W *and* X *and* (Y and Z)
c. ?W *and* (X and Y and Z)

Of these, only the interpretation corresponding to the full syndeton in (37a) occurs naturally. The other two treat (37) as an asyndeton, with a syndeton as a final member. Consequently, the prefer syndetons principle renders the interpretation corresponding to (37a) as the preferred one.

I found several examples containing coordinate compounds with member nesting of full syndetons within partial syndetons, of partial syndetons within full or partial syndetons,

and of full or partial syndetons within asyndetons, including (38-39), and (12), repeated here as (40).

38. Prepare the hamburgers as above and serve heaped with mushrooms sautéed in butter and seasoned with *salt and pepper, chopped chives and chopped parsley*. (APHB 519 3706)
- !(*W and X*) and *Y and Z*
 - ?*W and (X and Y and Z)*
 - ?(*W and X*) **and** (*Y and Z*)
39. Translated into every civilized language, *The Travels of Marco Polo* became an indispensable book for *explorers and geographers, historians and mapmakers* and the delight of all who travel or dream of doing so. (APHB 27 83)
- !*W and (X and Y and Z)*
 - !(*W and X*) and *Y and Z*
 - ?(*W and X*) **and** (*Y and Z*)
40. Of course, an employer has a right to refuse to hire a man if he doesn't like *the color of his tie, or his diction, his shifty eyes, or his having taken the Fifth Amendment*. (APHB 84 620)
- !(*W or X*) or *Y or Z*
 - !*W or (X or Y or Z)*
 - ?(*W or X*) **and** (*Y or Z*)
 - ?(*W or X*) **or** (*Y or Z*)¹⁷

In "Structural Properties of Nondisambiguated Mixed Coordinate Compounds", we show how the compound in (38) receives a single natural interpretation, whereas the compounds in (39) and (40) are not disambiguated in natural use. Note also that the natural interpretation of (40a) both involve member nesting of disjunctions within disjunctions.¹⁸

I have found no coordinate compound with four ultimate members and two connectives like the one just discussed, in which its interpretation as an asyndeton is the clearly preferred one. However, the coordinate compound with six ultimate members in (41) is naturally interpreted in an analogous way as shown in (41a).

41. But behind the red façade of *war and politics, adultery and divorce, murder and suicide* were millions of orderly homes, devoted marriages, men and women kindly and affectionate, troubled and happy with children. (APHB 324 156)
- !(*U and V*) **and** (*W and X*) **and** (*Y and Z*)
 - ?(*U and V*) and *W and (X and Y and Z)*

In the interpretation of this compound, the prefer syndetons principle is apparently outweighed by the prefer parallelism of internal structure principle, which is increasingly potent as the number of nested members increases.¹⁹ Example (42) contains a coordinate compound with eight members, which is understood in virtue of its pattern of connectives and of the prefer parallelism of internal structure principle as a four-member asyndeton, each of whose members is a two-member syndeton.

42. The pilgrims are a microcosm of Hindu India: *farmer and savant, rich and poor, astrologer and merchant, the widowed and the infirm, who grasp iron chains on the river's ledges for safety.* (APHB 35 1776)
- a. !(*S and T*) **and** (*U and V*) **and** (*W and X*) **and** (*Y and Z*)
- b. ?(*S and T*) **and** (*U and V*) **and** (*W and X and Y and Z*)

We conclude this discussion of member nesting with the two coordinate compounds highlighted in the Czeslaw poem quoted in (11), repeated here as (43) and (44).

43. *wastelands / And rusty railroad tracks, the sky, silence*
- a. !(*W and X*) **and** *Y and Z*
44. *the thistle, the nettle, the burdock, the belladonna / And a small wind above them, a sleepy cloud, silence*
- a. !(*T and U and V and W and X*) **and** *Y and Z*

Both of these compounds can only be interpreted as asyndetons, with syndetons occurring as their first members. The first of these nested syndetons has two members, the second five. The compound in (44) also occurs as a submember of a larger asyndeton, whose first member is *for an earth without grammar*.

Use of Punctuation in Unmixed Coordinate Compounds

Punctuation marks, chiefly the comma and occasionally the semicolon, are used in at least four different ways to indicate the structure of unmixed coordinate compounds.

Punctuation Separates Members of Asyndetons and Partial Syndetons

First, commas (occasionally semicolons, especially when a member itself contains a comma, as in (9)) are used simply to separate members when no connective appears between them as in the asyndetons in (1c), and (8)-(10); and in the partial syndetons in (1f), (6), (7), (39), (41) and (42).

Punctuation with Every Connective in Full Syndetons Indicates No Member Nesting

Second, when a punctuation mark appears before every connective in a full syndeton, as in (1e), (7), and (45) through (47), it indicates that no member nesting is intended.²⁰

45. *My mother took me to the front door, and I went right on through, and in five minutes I was out playing in a big ash pile.* (APHB 35 1418)
46. *You knew then, and you went ahead, and your whole heart was in your work.* (APHB 311 163)
47. But he took the pay he was offered, and either *put a few more coins on his belt, or bought some horses, or went along to the nearest boliche* - a type of bar-cum-store selling wine from the barrel, and simple items he needed. (APHB 324 661)

Punctuation before every member of a full syndeton contrasts with its absence in those positions in that the latter is consistent with member nesting, as in (24) and (28).

Selective Use of Punctuation before Connectives Indicates Member Nesting

In certain compounds, commas (occasionally, semicolons) precede certain connectives and not others, as in (26), (27), and (32). In such compounds we say that the punctuation is used **selectively**. Otherwise, we say that the punctuation is used **nonselectively**. Selective use of punctuation generally indicates that the unpunctuated sequences of ultimate members and connectives that immediately precede and follow a punctuated connective constitute members of a compound of which the punctuated connective is a connective, i.e. that selective use of commas **indicates member nesting**. In such structures, any connective occurring in one of the unpunctuated sequences is associated with a nested member of that compound, so that the punctuated connective has scope over the connectives that are associated with the nested members.

Use of Punctuation to Indicate a Paraphrase Relation between Members

Fourth, a comma or semicolon preceding the connective *or* may be used to indicate that the following member is to be understood as a paraphrase of the preceding member, as in (48) through (50). The connective *or* means 'that is' in these constructions.

48. What is the *value, or rental price?* (APHB 352 569)
49. The house is big -- *almost half an acre, or about ten times the size of a suburban house.* (APHB 75 1627)
50. He had been marked for death by a fellow prisoner, Vito Genovese, the most feared *capo, or boss,* of the entire Cosa Nostra. (APHB 315 16)

When the following member is not the final constituent of the sentence in which it appears, that member is followed by another comma, as in (50). In contrast, when the comma that precedes *or* does not have this function, a comma does not necessarily follow the following member when it is nonfinal; an example in which no such comma appears is given in (51).

51. *To kill, to steal, to lie, or to covet another person's possessions* still leads to varying degrees of misery for the victim and the perpetrator. (APHB 467 463)

Limitations on Using Punctuation to Indicate Degree of Member Nesting

If we follow the convention that semicolons may be used selectively in the manner described for commas in "Selective Use of Punctuation Before Connectives Indicates Member Nesting", so that any sequence of members, connectives and associated commas preceding or following a semicolon constitutes a nested member, then second degree member nesting can be explicitly indicated, as shown schematically in (52).

52. *W C X, C Y; C Z* is understood as *(W C X) C Y) C Z*

I have found no example of the use of this or any comparable convention in the APHB corpus. However, comparable conventions are used in certain carefully prepared documents; see "Member Nesting of Conjunctive Asyndetons is Impossible" for discussion. However, there is no orthographic convention for indicating greater than second degree member nesting in English, while in spoken English, at most one degree of member nesting can be explicitly signaled by intonation (Langendoen 1987).

Mixed Coordinate Compound Expressions

In "Unmixed Coordinate Compound Expressions", the notions of mixed and unmixed coordinate compounds are defined, and the structure and interpretation of unmixed coordinate compounds are analyzed. Here, we analyze the structure and interpretation of mixed coordinate compounds. The simplest of these compounds have three ultimate members and one occurrence each of the connectives *and* and *or*. These compounds have two possible interpretations, one as a conjunction with a disjunction as a nested member, and one as a disjunction with a conjunction as a nested member. From our definitions of **scope** in "Member Nesting of Unmixed Coordinate Compounds", we say in the former case that *and* has **scope** over *or*, and in the latter case that *or* has scope over *and*. Alternatively, from our definition of **priority**, we may say in the former case that *or* has **priority** over *and*, and in the latter case that *and* has priority over *or*.

I found no mixed coordinate compound in the APHB corpus with a connective between each adjacent pair of ultimate members that had more than four ultimate members. The longest mixed coordinate compound containing a partial syndeton as a nested member that I found had twelve ultimate members.

A few occurrences of mixed coordinate compounds in the corpus are disambiguated syntactically, and many others are disambiguated by selective use of punctuation marks. However, the majority are structurally ambiguous and most of these have only one natural interpretation, based on semantic and pragmatic principles of interpretation. In (53)-(54), we give two examples from the same text in the APHB corpus that contain mixed coordinate compounds that receive opposite structural interpretations. As before, each example is followed by a list of the possible schematic interpretations of the compound occurring in it, the natural interpretations being prefixed with an exclamation mark and the unnatural ones with a question mark.

53. You may *cut them in half and core them or leave them whole*. (APHB 519 2504)
 - a. !*(X and Y) or Z*
 - b. ?*X and (Y or Z)*
54. *Peel the plums and halve them or slice them*. (APHB 519 2565)
 - a. !*X and (Y or Z)*
 - b. ?*(X and Y) or Z*

In the following sections, we discuss the disambiguation of mixed coordinate compounds by means of syntax, punctuation, and the use of semantic and pragmatic principles of interpretation.

Syntactic Disambiguation of Mixed Coordinate Compounds

There are relatively few purely syntactic contexts in which mixed coordinate compounds are disambiguated.

Plural Contexts

A class of such contexts are those requiring plural elements, for example, following the preposition *between*, which governs a plural noun phrase or a conjunction of noun phrases. Thus a mixed coordinate compound of noun phrases governed by *between*, cannot be analyzed as a disjunction if at least one of its members is singular. The four examples of this sort that I found in the APHB corpus occur in (55)-(58). Following each group of examples which contain compounds of the same schematic type, I list the possible interpretive schemata that may be associated with them. Those that are ruled out by the syntactic context are prefixed by an asterisk.

- 55. The drop varied between *1/2 and 1/4 or 1/8*. (APHB 136 1092)
- 56. I wouldn't be able to distinguish between *this phenomenon and the rain falling or a volcano erupting*. (APHB 90 3821)
- 57. Offered a choice between *Canberra, and, say Leeds or Manchester*, who would hesitate?²¹ (APHB 86 560)
 - a. !*X and (Y or Z)*
 - b. **(X and Y) or Z*
- 58. There are no positive links between *diet or exercise and heart disease*, either. (APHB 430 1019)
 - a. !*(X or Y) and Z*
 - b. **X or (Y and Z)*

On the other hand, I found one example of a mixed coordinate compound, in (59), which is not syntactically disambiguated by its occurrence as a governee of *between*; all of its ultimate members are plural noun phrases.

- 59. As always, it is important to distinguish between *tasters or experimenters and chronic inhalant abusers*. (APHB 435 268)
 - a. !*(X or Y) and Z*
 - b. ?*X or (Y and Z)*

Other plural contexts are those provided by the adverb *together* and certain uses of verbs like *combine* and *mix*. The three examples I found of this type occur in (60)-(62).²²

- 60. Grind together the *sole or halibut, shrimp and scallions*. (APHB 375 2026)

61. Combine the *beef broth or bouillon, wine and tomato sauce* in a large saucepan. (APHB 375 1467)
- a. !(*W or X*) and *Y and Z*
 - b. **W or (X and Y and Z)*
62. Make another by mixing *water and salt, sugar, or baking soda*. (APHB 290 2052)
- a. !*W and (X or Y or Z)*
 - b. **(W and X) or Y or Z*

However, the plural context in (63) does not disambiguate the mixed coordinate compound it contains, since both its possible interpretations are plural.²³

63. Recall what happens when you mix two such colors as *red and yellow or red and blue*. (APHB 163 1934)
- a. !(*W and X*) or (*Y and Z*)
 - b. ?*W and (X or Y) and Z*

Choice Contexts

Other syntactic contexts that can disambiguate mixed coordinate compounds are those in which a disjunctive choice is required. For example, the particle *either* takes a disjunction as its complement, and as a consequence, the compound in (64) is syntactically disambiguated.²⁴

64. The residents she had *either known and discarded or never been interested in*. (APHB 264 5598)
- a. !(*X and Y*) or *Z*
 - b. **X and (Y or Z)*

On the other hand, the three mixed coordinate compounds that appear in (65)-(67) are not structurally disambiguated and (67) is not disambiguated at all.

65. Mister Moses is about an African village that must *either quit its ancestral home to accommodate the new dam or stay and get drowned*. (APHB 317 858)
66. Puddings can be *either hearty or light and elegant* desserts. (APHB 519 981)
- a. !*X or (Y and Z)*
 - b. ?*(X or Y) and Z*
67. Besides most of these occult documents were *either pagan or heretical and therefore thoroughly evil*. (APHB 452 133)
- a. !*X or (Y and Z)*
 - b. !*(X or Y) and Z*

A context similar to the one provided by *either* is provided by the complementizer *whether*. The one example of its type that I found occurs in (68).

68. It didn't matter whether they were *Adam and Eve, Joseph and Mary, or anybody*.²⁵ (APHB 111 1461)
- a. !(*V and W*) or (*X and Y*) or *Z*
 - b. *(*V and W*) and *X* and (*Y or Z*)

Finally, in (69), a choice is implied by the way the question preceding the compound is formulated.

69. What do you want, *gin and tonic or whisky and rum*? (APHB 52 5595)
- a. !(*W and X*) or (*Y and Z*)
 - b. **W* and (*X or Y*) and *Z*

Syntactic Properties of the Ultimate Members as Clues to Interpretation

Syntactic properties of the ultimate members sometimes gives clues as to the intended interpretation of mixed coordinate compounds, as in the examples in (70)-(71).

70. You'd have sold him out to *me or Royce and Benson*. (APHB 385 4242)
- a. !*X* or (*Y and Z*)
 - b. ?(*X or Y*) and *Z*
71. Would they want me to call them *aunt and uncle, or by their first names*? (APHB 281 398)
- a. !(*X and Y*) or *Z*
 - b. ?*X* and (*Y or Z*)

The presumed intended interpretation of (70) is as a disjunction. Under this interpretation, the two proper names are grouped together as members of a nested member of the disjunction, whose other member is a personal pronoun. This arrangement is not required by the syntax of English, but is suggested by the lexical categorizations of the ultimate members. Similarly, the intended interpretation of (71) as a disjunction is indicated not only by the punctuation,²⁶ but also by the fact that the members of the nested member are of a different grammatical subcategory from that of the final member.

However, such syntactic clues are not decisive. An example in which the intended interpretation goes against the clue provided by subcategorization is given in (72).

72. Sybil never found him *alone and quiet or in a mood to talk*. (APHB 381 3796)
- a. !*X* and (*Y or Z*)
 - b. ?(*X and Y*) or *Z*

The coordinate compound in this example is naturally interpreted as a conjunction, despite the fact that the first two ultimate members are both adjective phrases and the final member is a prepositional phrase.

Disambiguation by Selective Use of Punctuation Marks

If punctuation marks are used selectively in mixed coordinate compounds as in unmixed ones (cf. "Selective Use of Punctuation Before Connectives Indicates Member Nesting"), then some potential ambiguities are resolved. We begin by considering the use of punctuation marks in mixed coordinate compounds with three ultimate members. Of the 126 compounds of this type that I found in the APHB corpus, 42 (33%) contain at least one punctuation mark immediately preceding a connective.²⁷ Commas can be used selectively in mixed coordinate compounds in two partly contradictory ways: first, to indicate member nesting; and second, to indicate paraphrase relationships between members or to set off the second member of a disjunction.

Use of Punctuation to Indicate Member Nesting

In mixed coordinate compounds, commas can be used selectively to indicate, at least in part, the member nesting associated with its intended interpretation. Of the 42 mixed coordinate compounds with three ultimate members in which punctuation is used, 27 (64%) use punctuation selectively in this way. In (73)-(76), I schematize the four ways in which a mixed coordinate structure with three ultimate members can be disambiguated by selective use of a comma to indicate member nesting. Following each schema, I provide the total number of examples of that type, and two illustrative selections. The remaining examples are listed in "Selective Use of Punctuation in Compounds with Three Ultimate Members".

73. *X or Y, and Z* is understood as *(X or Y) and Z* (4 examples)
 - a. Add *fish stock or water, and salt*. (APHB 375 2037)
 - b. *The metal is silver or I'll eat my diploma, and the carving is exquisite*. (APHB 455 4731)
74. *X, and Y or Z* is understood as *X and (Y or Z)* (3 examples)²⁸
 - a. Tom *knew his place, and kept it or suffered severely for breach of discipline*. (APHB 173 5307)
 - b. *The war was long past, and he hadn't even been born then or had he?* (APHB 67 2646)
75. *X and Y, or Z* is understood as *(X and Y) or Z* (8 examples)
 - a. The bush babies *cluster together and groom each other, or run through the trees in gangs*. (APHB 74 741)
 - b. Would they want me to call them *aunt and uncle, or by their first names?* (APHB 281 398)
76. *X, or Y and Z* is understood as *X or (Y and Z)* (12 examples)
 - a. I figured perhaps I could *catch its bridle, or swing up and ride it*. (APHB 438 564)
 - b. A club must have *a chairman, or a committee and a chairman*. (APHB 478 211)

Paraphrase Relations in Mixed Coordinate Compounds

In mixed coordinate compounds, punctuation can be also be used selectively to indicate paraphrase relations between members, as described in "Use of Punctuation to Indicate a Paraphrase Relation between Members". I found a total of six such compounds; all had three ultimate members. In (77) through (79), I list the schematic forms these compounds take and following each schema I present all of the examples that illustrate it.²⁹

77. *X, or Y, and Z* may be understood as *(X i.e. Y) and Z* (3 examples)
 - a. Both knew that *wealth, or prosperity, and economic progress* spring from social organization. (APHB 169 589)
 - b. *Spiles, or stakes, and planks* seemed to be the answer. (APHB 361 1057)
 - c. Anglo-Saxon Prosody organizes verse on the principles of *stress, or intensity of emphasis, and Alliteration*. (APHB 487 299)
78. *X, or Y and Z,* may be understood as *X i.e. (Y and Z)* (1 example)
 - a. In the present discussion, the *second, or broader and less mystical,* meaning is accepted. (APHB 283 1399)
79. *X and Y, or Z* may be understood as *X and (Y i.e. Z)* (2 examples)
 - a. In the second row are *the flight surgeon and the spacecraft communicator, or com.*" (APHB 24 195)
 - b. The man was *as white as a piece of paper and trembling, or jerking.* (APHB 553 2890)

The member nesting of the compound schematized in (77) is the same as that of (73); the extra comma before the connective in (77) provides orthographic indication of the interpretation of that connective. Similarly, the member nesting of the compound schematized in (78) is the same as that of (76); again the extra comma, this time following the final member of the coordinate compound, provides orthographic indication of the interpretation of the connective.³⁰

Finally, it should be noted that the member nesting of the compound schematized in (79) is the opposite of the member nesting of the compound schematized in (75), despite the identity of their punctuation patterns. Thus, this punctuation pattern provides no decisive clue as to its interpretation, and one has to use other clues in order to determine the appropriate member nesting.

Use of Punctuation to Set Off Members of a Disjunction

Four other examples, three from the same text, in (80) through (83), have the punctuation and member nesting pattern of schema (79), but a paraphrase relation does not hold between the members connected by *or*.

80. There was *a doctor and some nurse creature, or something*. (APHB 52 443)
81. *Chill and serve with a plain mayonnaise to which you have added fresh dill to taste; or serve with Green Mayonnaise*. (APHB 519 1662)
82. *Cool and serve over vanilla ice cream, or serve with a rich custard sauce*. (APHB 519 2635)

83. *Stuff the chicken lightly and fasten the vent with metal skewers, or close it by folding a piece of foil into several thicknesses and tucking into the opening.* (APHB 519 5302)

The use of the comma (or semicolon!) in these examples may be a generalization of its use in (77) and (79), which is simply to set off any second member of a disjunction by a punctuation mark. Whether the mark also signifies that the first member of the disjunction is the immediately preceding ultimate member, or leaves open the question as to what the first member is, we cannot tell from these examples.

I found five other examples in the APHB corpus that have a comma before both the *or* and the *and* in a three-member mixed coordinate compound. These compounds are all interpreted as having the member nesting pattern of (77) or (79) although, again, the *or* does not mean exactly 'that is'. The fact that in all of these examples, *and* has scope over *or* suggests that the comma that accompanies the *and* is being used to indicate the intended member nesting, while the comma that accompanies the *or* is being used simply to indicate that the second member of a disjunction follows. However, I cannot rule out the possibility that in these examples the comma is simply not being used selectively.

84. *Slip off the skins and stems, and slice, or leave whole, if very small.* (APHB 519 6774)
85. *Someone asked that in the Bible, and there was no answer, or was there?*³¹ (APHB 147 1780)
86. *No taxis, or they're whipping right by, and I'm cold.* (APHB 161 161)
87. *Madeline nodded, or Leo thought she did, and he took her hand.* (APHB 161 3567)
88. Sometimes the disc casing *bulges out, or actually ruptures, and presses against a nerve root.* (APHB 410 724)

Selective Use of Punctuation in Long Mixed Coordinate Compounds

I found eight mixed coordinate compounds in the APHB corpus with four ultimate members and three connectives in which punctuation is used selectively. Curiously and perhaps significantly, in all eight examples, the second connective (the one that occurs between the second and the third ultimate member) is *or*. In six of these examples, a comma appears before that connective only. Also in six examples (not the same six), the other connectives are both *and*. In the examples in (89) through (92), the comma appears to be used simply to indicate the intended member nesting.

89. I think you are *young and hysterical, or old and mad.* (APHB 55 1195)
90. He can bring about his enemy's death *slowly and in lingering pain, or quickly and violently.* (APHB 198 436)
91. *Place the breast meat in a mortar and pound with a pestle, or use a heavy wooden bowl and beat with a hammer or cleaver* (APHB 375 2749)
92. The tips of their *noses and ears, or fingers and toes* dropped off. (APHB 435 706)
- a. *!(W and X) or (Y and Z)*
- b. **W and (X or Y) and Z*

Similarly, in (93), in which *or* occurs as the first connective, the comma before the second *or* rules out the unintended interpretations, whether it is being used to indicate member nesting or to set off the second member of a disjunction.

93. Their effect may be *positive or negative, or positive for some people and negative for others*. (APHB 12 828)
- a. !(*W or X*) or (*Y and Z*)
 - b. **W or X or (Y and Z)*
 - c. *(*W or X or Y*) and *Z*

The punctuation of this compound explicitly overrides the avoid member nesting of disjunctions within disjunctions principle, and reinforces the prefer parallelism of internal structure principle.

Next, in (94), in which *or* also occurs as the first connective, a comma precedes both occurrences of *or*. In this example, the commas indicate that the whole compound is to be understood as a disjunction whose last member is a conjunction.

94. You might *feel drowsy, or develop the jitters, or even get sick and vomit*. (APHB 435 1137)
- a. !*W or X or (Y and Z)*
 - b. *(*W or X*) or (*Y and Z*)
 - c. *(*W or X or Y*) and *Z*

In the compound in (95), whose first connective is *and*, the natural interpretation suggests that the two commas are being used together in the manner described in "Use of Punctuation to Set Off Members of a Disjunction". If so, then we see that that usage does not imply that the ultimate member immediately preceding the first comma is necessarily the first member of the disjunction, since in this case, the first member is clearly intended to be the entire conjunction *soft and smiling*, not simply *smiling*, as predicted by the prefer parallelism of internal structure principle.

95. A face that is *soft and smiling, or alert and excited*, attracts us strongly. (APHB 483 838)
- a. !(*W and X*) or (*Y and Z*)
 - b. **W and (X or Y)* and *Z*

Finally, in (96), as in (95), the commas are used as described in "Use of Punctuation to Set Off Members of a Disjunction". However, in (96), the first member of the disjunction is intended to be *beer*, not *bread and beer*, since if the latter were the case, the degree of member nesting would be two, in violation of the avoid multiple member nesting principle. This is the only example out of the eight in this group in which *and* has scope over *or*.

96. She will also have *bread and beer, or white wine, and then coffee*. (APHB 55 6013)
- a. !*W and (X or Y)* and *Z*
 - b. *(*W and X*) or (*Y and Z*)

In addition, I found eight mixed coordinate compounds in the APHB corpus with from four to twelve ultimate members in which punctuation marks are used selectively to indicate member nesting of partial syndetons. One, with five ultimate members, occurs in (68) and is also disambiguated syntactically.

In five of the remaining seven compounds of this type, occurring in (97) through (101)>, punctuation is used selectively to indicate its single natural interpretation.

97. Have them stenciled with *family name, initial, and date, or* UNION 19 .."
(APHB 278 2080)
- a. !*W and X and (Y or Z)*
 - b. **W or (X and Y) or Z*
 - c. **(W and X and Y) or Z*
98. Add *beef, potatoes, carrots, and beef stock or water*. (APHB 375 1519)
99. The Norwegians *boil, roast, stew, and smoke or salt* their meats. (APHB 402 649)
- a. !*V and W and X and (Y or Z)*
 - b. **V or W or (X and Y) or Z*
 - c. **V or (W and X and Y) or Z*
 - d. **(V and W and X and Y) or Z*
100. You may use *a shallow dish and a fork; a bowl and an egg beater or wire whisk; or an electric beater*. (APHB 519 6005)
- a. !*(V and W) or (X and Y) or Z*
 - b. **(V and W) and X and (Y or Z)*
101. Combine apricots with *strawberries and pineapple; strawberries and bananas; grapes and strawberries; pineapple; or peaches and plums*. (APHB 519 2259)
- a. !*(R and S) or (T and U) or (V and W) or X or (Y and Z)*
 - b. **(R and S) and (T and U) and V and (W or X or Y) and Z*

In (97), the comma preceding the *or* and the comma preceding the *and* work together in the manner described in "Use of Punctuation to Set Off Members of a Disjunction"; see in particular, the analysis of (84) through (87). In (98) and (99), the comma preceding the final *and* indicates that it has scope over the following *or*. In (100), the semicolon before the final *or* indicates that it has scope over the two preceding *ands*. In that example, moreover, the second member of the disjunction contains a disjunction as a nested submember. If the word *a* is inserted before *wire whisk*, then the compound would have to be analyzed as having second degree member nesting. In (101)>, the semicolon before the *or* in indicates that the *or* has scope over all the occurrences of *and* that precede and follow it.

Finally, punctuation marks are used selectively in two examples, one with eight ultimate members and the other with twelve, to indicate that interpretations with second degree member nesting are intended, thus overriding the avoid multiple member nesting principle. These appear in (102) and (103).

102. Combine grapes with *melon balls and grapefruit sections; melon balls, strawberries and grapefruit sections; or grapefruit sections and raspberries or strawberries*. (APHB 519 2414)

103. Combine grapefruit with *bananas, strawberries and bananas, bananas and melon balls, raspberries or strawberries and melon balls, seedless white grapes and melon balls, or pineapple cubes and orange slices.* (APHB 519 2397)

In both of the compounds in these examples, punctuation is used selectively to indicate that they are to be interpreted as disjunctions, and each disjunction contains a member which is itself a mixed coordinate compound whose natural interpretation is not indicated by punctuation. In (102), that compound is *grapefruit sections and raspberries or strawberries*; in (103), it is *raspberries or strawberries and melon balls*.

Nonselective Use of Punctuation in Long Mixed Coordinate Compounds

I found 48 mixed coordinate compounds in the APHB corpus with from four to twelve ultimate members with member nesting of partial syndetons.³² In 40 of these compounds, punctuation marks are used but not selectively; the eight compounds in which they are used selectively are analyzed in "Selective Use of Punctuation in Long Mixed Coordinate Compounds". Four of these 40 compounds are disambiguated syntactically; they appear in (60) through (62), and in (68). In accordance with the prefer syndetons principle, none of the remaining 36 compounds are naturally understood as asyndetons. In Figure 2, these compounds are classified by number of ultimate members, number of occurrences of the connectives *and* and *or*, and number of punctuation marks.

Type	Number of Ultimate Members	Number of Connectives	Number of <i>ands</i>	Number of <i>ors</i>	Number of Punctuation Marks	Number of Examples
4-1	4	2	1	1	1	10
4-2	4	2	1	1	2	1
Subtotal	4	2	1	1	1-2	11
5-1	5	2	1	1	2	5
5-2	5	2	1	1	4	1
5-3	5	3	2	1	1	1
5-4	5	3	2	1	2	1
Subtotal	5	2-3	1-2	1	1-4	8
6-1	6	2	1	1	3	5
6-2	6	3	2	1	2	1
6-3	6	3	1	2	2	1
6-4	6	4	2	2	2	1
Subtotal	6	2-4	1-2	1-2	2-3	8
7-1	7	2	1	1	4	3
7-2	7	3	1	2	3	1
Subtotal	7	2-3	1	1-2	3-4	4
8-1	8	2	1	1	5	2
10-1	10	3	2	1	7	1
11-1	11	3	1	2	7	1

12-1	12	3	1	2	8	1
Total	4-12	2-4	1-2	1-2	1-8	36

Figure 2. Classification of Long Mixed Coordinate Compounds without Selective Punctuation

The ten compounds of the type 4-1 can be further classified as belonging to one of the two subtypes in (104) and (105), where C_1 and C_2 are distinct connectives. Compounds of the subtype (104) can be interpreted either as (104a) or (104b); these interpretations are analogous to those in (39a) and (39b). Compounds of the subtype (105) can be interpreted in any of the ways in (105a) through (105c). Citations from the APHB corpus containing mixed coordinate compounds that exemplify each of these subtypes are listed following each analysis.

104. $W_1 X, Y C_2 Z$ (4 examples)
- a. Natural interpretation is $W_1 (X C_2 Y C_2 Z)$ (2 examples)
 - i. Was there *a dusty silence or a roaring storm, tossing trees and driving rain?* (APHB 116 1658)
 - ii. Add the *chicken meat and cooked rice, noodles or vermicelli.* (APHB 375 1690)
 - b. Natural interpretation is $(W_1 X) C_2 Y C_2 Z$ (2 examples)³³
 - i. In the evenings we enjoyed *dinner and drinks, dancing or a movie.* (APHB 328 5558)
 - ii. Add *broth or bouillon, wine and thyme.* (APHB 375 2110)
105. $W, X_1 Y C_2 Z$ (5 naturally unambiguous examples; 1 ambiguous example)
- a. Natural interpretation is $W_1 X C_1 (Y C_2 Z)$ (1 example)³⁴
 - i. Combine with *sugar, orange juice and champagne or white wine.*
 - b. Natural interpretation is $(W_1 X C_1 Y) C_2 Z$ (no examples)
 - c. Natural interpretation is $W_2 (X C_1 Y) C_2 Z$ (4 examples)
 - i. It includes *baked potato, coffee or tea and ice cream.* (APHB 19 2379)
 - ii. Stir in *cream, smoked ham or tongue and wine.*³⁵ (APHB 375 1747)
 - iii. Combine the *schav, onions or scallions and salt* with 2 quarts water. (APHB 375 2455)
 - iv. Serve with *melted butter, maple syrup or honey and a touch of lemon juice.* (APHB 519 510)
 - d. Natural interpretation is that of (105a, b or c) (1 example)
 - i. When firm add a layer of *vegetables, cold meats or hard-cooked eggs and more aspic.* (APHB 519 5911)

The compound of type 4-2, in which the second comma before C_2 appears to be nonselectively used, occurs in (106), and is naturally interpreted as in (104b).

106. Brown *ham bone or ham, veal, and chicken*, adding more lard if necessary. (APHB 277 2172)

Of the 25 mixed coordinate compounds with five or more ultimate members tabulated in Figure 2, 16 (64%) have exactly two connectives (types 5-1, 5-2, 6-1, 7-1 and 8-1). They are naturally interpreted in manners analogous to four of the five ways schematized in

(104a) through (105c). None of these compounds is naturally interpreted in a manner analogous to that in (105b).

Two of these compounds are naturally interpreted in a manner analogous to that of (104a). One, in (107), is of type 5-2 and the other, in (108), is of type 6-1.

107. The compressed air mixture may be *pure oxygen, oxygen-helium, or oxygen, helium, and nitrogen*. (APHB 197 426)

- a. !*V or W or (X and Y and Z)*
- b. ?*(V or W or X) and Y and Z*
- c. ?*V and (W or X) and Y and Z*

108. Add the *fish, tomatoes, bay leaf and fish stock, clam juice or water*. (APHB 375 2837)

- a. !*U and V and W and (X or Y or Z)*
- b. ?*U or V or (W and X) or Y or Z*
- c. ?*U or (V and W and X) or Y or Z*
- d. ?*(U and V and W and X) or Y or Z*

Another two compounds, one of type 5-1 and the other of type 8-1, are naturally interpreted in a manner analogous to that of (104b).

109. Season with *lemon juice or vinegar, salt, pepper and sugar*. (APHB 375 2636)

- a. !*(V or W) and X and Y and Z*
- b. ?*V or (W and X and Y and Z)*

110. Add *honey or sugar, cinnamon, nutmeg, cloves, allspice, salt and lemon juice*. (APHB 375 667)

- a. !*(S or T) and U and V and W and X and Y and Z*
- b. ?*S or (T and U and V and W and X and Y and Z)*

Another eight compounds, three of type 5-1, two of type 6-1, two of type 7-1 and one of type 8-1, are naturally interpreted in a manner analogous to that of (105a). Two, one of type 5-1 and one of type 8-1, occur in (111) and (112) respectively; the other six occur in examples listed in Nonselective Use of Punctuation in Long Compounds .

111. Place *lentils, mutton stock, onions and pork or bacon rind* in soup kettle. (APHB 375 3234)

- a. !*V and W and X and (Y or Z)*
- b. ?*V or W or (X and Y) or Z*
- c. ?*V or (W and X and Y) or Z*
- d. ?*(V and W and X and Y) or Z*

112. Add *pork, onions, carrots, celery, leeks, ginger and marjoram or thyme*. (APHB 375 3038)

- a. !*S and T and U and V and W and X and (Y or Z)*
- b. ?*S or T or U or V or W or (X and Y) or Z*
- c. ?*S or T or U or V or (W and X and Y) or Z*
- d. ?*S or T or U or (V and W and X and Y) or Z*
- e. ?*S or T or (U and V and W and X and Y) or Z*
- f. ?*S or (T and U and V and W and X and Y) or Z*
- g. ?*(S and T and U and V and W and X and Y) or Z*

Finally, four compounds, one of type 5-1, two of type 6-1 and one of type 7-1, are naturally interpreted in a manner analogous to that of (105c). The last two of these are assigned to this interpretation class somewhat arbitrarily; their actual interpretation partly resembles that of (104b) and partly that of (105c).

113. Add *salt, pepper, mace or nutmeg and sherry*. (APHB 375 3505)
- !V and W and (X or Y) and Z
 - ?V and (W or X or Y) and Z
 - ?(V or W or X or Y) and Z
114. Stir in *tomatoes, pimiento, paprika, nutmeg or mace and chili*. (APHB 375 2998)
- !U and V and W and (X or Y) and Z
 - ?U and V and (W or X or Y) and Z
 - ?U and (V or W or X or Y) and Z
 - ?(U or V or W or X or Y) and Z
115. Add the *chicken stock, mace or nutmeg, clove, salt and pepper*. (APHB 375 2932)
- !U and (V or W) and X and Y and Z
 - ?(U or V or W) and X and Y and Z
 - ?U or V or (W and X and Y and Z)
116. Add the *cabbage, apples, lemon juice or vinegar, sugar, salt and pepper*. (APHB 375 1896)
- !T and U and (V or W) and X and Y and Z
 - ?T and (U or V or W) and X and Y and Z
 - ?(T or U or V or W) and X and Y and Z
 - ?T or U or V or (W and X and Y and Z)

In addition, the compound of type 12-2 is naturally interpreted in a manner analogous to that of (105c), with a three-member full disjunctive syndeton as a nested member.³⁶

117. Add *mushrooms, celery, tomato, carrot, green pepper, scallions, parsnip or turnip or cauliflowerets, parsley, bay leaf and peppercorns*. (APHB 375 1684)
- !O and P and Q and R and S and T and (U or V or W) and X and Y and Z
 - ?(O or P or Q or R or S or T or U or V) or (W and X and Y and Z)

Of the remaining eight mixed coordinate compounds tabulated in Figure 2, all with three connectives, one has only one interpretation as a syndeton with no multiple member nesting consistent with the punctuation; the other seven have two or more. The one that has only one such interpretation is of type 5-3 and appears in (118).

118. Many of these thiamine-deficients are *nervous and apprehensive or irritable, tired and listless*. (APHB 307 3433)
- !(V and W) or (X and Y and Z)

The prefer syndetons and the avoid multiple member nesting principles by themselves correctly predict that this example is naturally interpreted only as a disjunction with two conjunctions as nested members.

The remaining seven compounds are of types 5-4, 6-2, 6-3, 6-4, 7-2 10-1 and 11-1, and occur in (119) through (125).

119. Below were *two altos, a tenor and a baritone, or two altos and two tenors.* (APHB 138 2569)
- !(*V and W and X*) or (*Y and Z*)
 - !*V or (W and X) or (Y and Z)*
120. Serve the fresh ham with the *potatoes and onions, braised cabbage or sauerkraut, dill pickles and thinly sliced rye bread.* (APHB 519 4615)
- !(*U and V*) and (*W or X*) and *Y and Z*
 - ?(*U and V*) or *W or (X and Y and Z)*
121. When all the pieces of meat are well browned, add the *chopped green onions, rosemary or thyme, white wine or vermouth and water.* (APHB 519 4011)
- !*U and (V or W) and (X or Y) and Z*
 - ?(*U or V or W*) and (*X or Y*) and *Z*
 - ?*U or (V or W) or X or (Y and Z)*
122. The girls are brought in *frightened or defiant, cursing and fighting or sullen and withdrawn.* (APHB 60 326)
- !(*U or V*) or (*W and X*) or (*Y and Z*)
 - !*U or (V and W and X) or (Y and Z)*
123. Add the *stock or bouillon, lemon juice or vinegar, sugar, salt and pepper.* (APHB 375 1058)
- !(*T or U*) and (*V or W*) and *X and Y and Z*
 - ?(*T or U*) or *V or (W and X and Y and Z)*
124. Mix together the *rice, ground round, egg, garlic, onion, parsley, salt and pepper, and nutmeg or allspice.* (APHB 375 1459)
- !*Q and R and S and T and U and V and (W and X) and (Y or Z)*
 - !(*Q and R and S and T and U and V and W and X*) and (*Y or Z*)
 - ?*Q and R and S and T and U and (V and W and X) and (Y or Z)*
 - ?*Q and R and S and T and (U and V and W and X) and (Y or Z)*
 - ?*Q and R and S and (T and U and V and W and X) and (Y or Z)*
 - ?*Q and R and (S and T and U and V and W and X) and (Y or Z)*
 - ?*Q and (R and S and T and U and V and W and X) and (Y or Z)*
 - **Q or R or S or T or U or V or (W and X and Y) or Z*
125. Add the remaining *stock, onion or leeks, carrot, celery, turnip or parsnip, mushrooms, butter, salt and pepper.* (APHB 375 1311)
- !*P and (Q or R) and S and T and (U or V) and W and X and Y and Z*
 - ?(*P or Q or R*) and *S and T and (U or V) and W and X and Y and Z*
 - ?(*P or Q or R*) and *S and (T or U or V) and W and X and Y and Z*
 - ?(*P or Q or R*) and (*S or T or U or V*) and *W and X and Y and Z*
 - ?*P and (Q or R) and S and (T or U or V) and (W and X and Y and Z)*
 - ?*P and (Q or R) and (S or T or U or V) and (W and X and Y and Z)*
 - ?*P or (Q or R) or S or T or U or (V and W and X and Y and Z)*
 - ?(*P or Q or R*) or *S or T or U or (V and W and X and Y and Z)*
 - ?*P and (Q or R or S or T or U or V) and W and X and Y and Z*

The relative lack of acceptability of the interpretations corresponding to (121c), (123b) and (125g-h) may be due in part to the avoid member nesting of disjunctions within disjunctions principle. On the other hand, one of the natural interpretations of the ambiguous compound in (122), namely (122a), does contain a disjunctive member of a disjunction. To account for the judgment that the interpretation is a natural one, one might argue that the avoid member nesting of disjunctions within disjunctions principle is relatively weak compared to the prefer parallelism of internal structure principle.

Finally, the compound in (124) may be said to exhibit partial selective use of punctuation. The comma preceding the second *and* in (124) indicates that this connective has scope over the preceding *and* and the following *or*. However, the punctuation does not indicate precisely which of the two *ands* is the understood connective between the first six pairs of ultimate members. Of the seven possibilities, two correspond to natural interpretations and five do not.³⁷

Semantic and Pragmatic Disambiguation of Mixed Coordinate Compounds

We now consider the problem of how mixed coordinate compounds are naturally disambiguated, without the help of syntactically disambiguating contexts and of selective use of punctuation. For example, (53) contains an unpunctuated mixed coordinate compound with three ultimate members and no disambiguating context in which *or* naturally has scope over *and*, while (54) contains such a compound in which *and* naturally has scope over *or*. For convenience, we repeat these examples here as (126) and (127). An informal account of how these particular compounds are naturally disambiguated is not difficult to formulate.

126. You may *cut them in half and core them or leave them whole*. (APHB 519 2504)
- a. $!(X \text{ and } Y) \text{ or } Z$
 - b. $?X \text{ and } (Y \text{ or } Z)$
127. *Peel the plums and halve them or slice them*. (APHB 519 2565)
- a. $!X \text{ and } (Y \text{ or } Z)$
 - b. $? (X \text{ and } Y) \text{ or } Z$

In the case of the compound in (126), suppose it had the interpretation in (126b). By distributivity, this interpretation is equivalent to (128).

128. $(X \text{ and } Y) \text{ or } (X \text{ and } Z)$

In (128), the second disjunct expresses a contradictory sense, namely that of (129).

129. *cut them in half and leave them whole*

On the other hand, the interpretation in (126a) does not contain a contradictory subsense. If we suppose that there is an **avoid contradictory subsenses principle**, then the disambiguation of the compound in (126) is accounted for.

The natural interpretation of (127) can be accounted for by appeal to a principle which says in effect that if the members of a disjunction form a natural class, then an interpretation which contains such a disjunction is preferred to one which does not. We

refer to this as the **prefer natural class disjunctions principle**. The disjunction in (127a) expresses a natural class, whereas the one in (127b) does not.

To complete this informal account of the natural disambiguation of the compounds in (126) and (54), we must also show that the effect of the prefer natural class disjunctions principle does not outweigh the effect of the avoid contradictory subsenses principle in (126), and that the effect of the avoid contradictory subsenses principle does not outweigh the effect of the prefer natural class disjunctions principle in (127). In the case of the compound in (126), the prefer natural class disjunctions principle does not appear to have much effect; the disjunctions in the two interpretations appear quite comparable as natural classes of activities. In the case of the compound in (127), no contradiction arises under either interpretation, so the avoid contradictory subsenses principle has no effect on the natural interpretation of that compound. Hence, the natural disambiguation of the compounds in (126) and (127) is completely accounted for by the two proposed principles.

Of these two principles, one, the avoid contradictory subsenses principle, can be subsumed under more general principles of language use which stress economy and clarity of expression, such as Grice's maxims of quality and quantity (Grice 1975, 1978), and the maxim of relevance (Sperber and Wilson 1986). The prefer natural class disjunctions principle, on the other hand, is based on with the meaning of *or* itself. Before we demonstrate how this principle is based on the meaning of that connective, however, we consider a similar principle of interpretation which is based on the meaning of the connective *and*.

The need for such a principle is illustrated by the mixed coordinate compound in (130), which is disambiguated by neither the avoid contradictory subsenses nor the prefer natural class disjunction principle.

130. Animals often travel great distances to find *food and water or a more satisfactory territory*. (APHB 65 623)
- a. $!(X \text{ and } Y) \text{ or } Z$
 - b. $?X \text{ and } (Y \text{ or } Z)$

The natural interpretation of the compound in (130) as (130a) is not accounted for by the avoid contradictory subsenses principle, since the interpretation in (130a) does not lead to a contradictory subsense. Nor does the prefer natural class disjunctions principle clearly pick out the interpretation in (130a) over that in (130b). Rather, the natural interpretation of the compound in (130) appears to be guided by a principle that says in effect that if the members of a conjunction form a natural whole, then an interpretation which contains such a conjunction is, *mutatis mutandis*, favored over one which does not. We call this the **prefer natural whole conjunctions principle**.

Both the prefer natural class disjunctions and the prefer natural whole conjunctions principles can be used to select a preferred interpretation of a mixed coordinate compound, without the bases for the alternative interpretations being constructed. For example, suppose we consider *soup or salad* to denote a natural class,³⁸ *soup and bread*

to denote a natural whole, and relative to these *salad or bread* and *soup or bread* not to denote natural classes and *salad and bread* and *salad and soup* not to denote natural wholes. Then the compounds in (131) through (136) are naturally interpreted as indicated.³⁹

131. You may have *soup or salad and bread*.
 a. $!(X \text{ or } Y) \text{ and } Z$
 b. $?X \text{ or } (Y \text{ and } Z)$
132. You may have *soup and bread or salad*.
 a. $!(X \text{ and } Y) \text{ or } Z$
 b. $?X \text{ and } (Y \text{ or } Z)$
133. You may have *bread and soup or salad*.
 a. $!(X \text{ and } Y) \text{ or } Z$
 b. $!X \text{ and } (Y \text{ or } Z)$
134. You may have *soup and salad or bread*.
 a. $? (X \text{ and } Y) \text{ or } Z$
 b. $?X \text{ and } (Y \text{ or } Z)$
135. You may have *salad and soup or bread*.
 a. $? (X \text{ and } Y) \text{ or } Z$
 b. $?X \text{ and } (Y \text{ or } Z)$
136. You may have *bread or soup and salad*.
 a. $? (X \text{ and } Y) \text{ or } Z$
 b. $?X \text{ and } (Y \text{ or } Z)$

The preferred interpretation of the compound in (131) is obtained simply by identifying the nested member *soup or salad* as denoting a natural class, and invoking the prefer natural class disjunctions principle. The alternative interpretation is not obtained because *salad and bread* is not identified as a natural whole. Similarly, the preferred interpretation of the compound in (132) is obtained by identifying the nested member *soup and bread* as denoting a natural whole, and invoking the prefer natural whole conjunctions principle. Next, the compound in (133) has two natural interpretations, corresponding to the fact that on one interpretation it contains *bread and soup*, which constitutes a natural whole, as a nested member; and on the other it contains *soup or salad*, which constitutes a natural class, as a nested member. Finally, the compounds in (134) through (136) have no clearly preferred interpretations, since under no interpretation do they contain nested members that denote natural classes or natural wholes.

In saying that the prefer natural class disjunctions and prefer natural whole conjunctions principles are explainable on semantic grounds, I do not claim that the determination of natural classes and natural wholes is entirely a matter of semantics. Clearly it is not, since for example, the judgment that the compound *soup or salad* denotes a natural class but that *soup or bread* does not, is based at least in part on pragmatic considerations. Rather, what I claim is that the principles are based on the meanings of the connectives *or* and *and*, which do have to do with the semantic notions of classes and wholes.

[[Sections on implication structures and interpretation of *and* and *or* omitted]]

Structural Properties of Nondisambiguated Mixed Coordinate Compounds

Before discussing the use of the semantic and pragmatic principles introduced in "Semantic and Pragmatic Disambiguation of Mixed Coordinate Compounds" in disambiguating mixed coordinate compounds that lack both orthographic and syntactic disambiguating cues, I present some statistics concerning the compounds of this sort that I found in the APHB corpus and in *Webster's Seventh Collegiate Dictionary*. I also consider the extent to which other structural cues are available for disambiguating such compounds.

I found 83 mixed coordinate compounds with three ultimate members that lacked disambiguating punctuation in the APHB corpus. Of these, four are disambiguated syntactically, namely those occurring in (55), (56) and (58); and in (64). Of the remaining 79 compounds, I found I could not readily disambiguate three. In the 76 compounds that I could readily disambiguate, *and* has scope over *or* in 53 cases (70%) and *or* has scope over *and* in 23 cases (30%). This skewing in favor of higher scope for *and* is largely accounted for by the examples occurring in texts having to do with food preparation and serving (what I refer to as **cookbook examples**). Of the 76 examples I am able to disambiguate naturally, 38 are cookbook examples and 38 are not. Of the 38 cookbook examples, *and* has scope over *or* in 32 cases (84%). On the other hand, of the 38 non-cookbook examples, *and* has scope over *or* in 21 cases (55%). I conclude that there is no general principle of interpretation that associates higher scope with *and* by default. Further, when we examine the cookbook examples, we find that the principles we have already elucidated provide an explanation for their natural interpretations.

Nor is the order of the connectives significant. In the 53 examples in which *and* has higher scope, *and* occurs first in 31 cases (58%). In the 23 examples in which *or* has higher scope, *or* occurs first in 12 cases (52%).

I found four mixed coordinate compounds with three ultimate members in *Webster's Seventh Collegiate Dictionary* lacking disambiguating punctuation and syntax; these appear in (195) through (198). The compound that appears in (195), I find somewhat difficult to interpret; moreover, on one interpretation, it exhibits submember rather than member nesting. The other three are easily disambiguated; in two of them *and* has scope over *or*, and in one of them *or* has scope over *and*.

I found seven mixed coordinate compounds with four ultimate members with no disambiguating punctuation in the APHB corpus, and none with more than four ultimate members. Of these seven examples, one is disambiguated syntactically, namely the one occurring in (69). All six remaining examples, which appear in (137) through (142), are naturally interpreted with the second connective having scope over the first and the third; thus there is an overwhelming tendency to interpret such examples as having a balanced coordinate structure of two members each with two

nested members. This tendency is accounted for by the prefer parallelism of internal structure principle.

137. He'd rather *stay in and read or just lie around and do nothing*. (APHB 83 482)
138. *Anger and counterattack or extreme, soul-searching guilt and despair*. (APHB 99 2357)
139. Recall what happens when you mix two such colors as *red and yellow or red and blue*.⁴⁰ (APHB 163 1934)
140. They can be *sliced very thin and eaten cold or heated through in the oven and then carved*. (APHB 519 4826)
141. The boys wear *blue jeans or tan pants and cotton aloha shirts or T-shirts*. (APHB 175 2855)
142. Insert a meat thermometer, and rub the meat well with *salt and pepper and oregano or rosemary*. (APHB 519 4285)

The second connective (the one with scope over the others) is *or* in four cases (those in (137) through (140)), and *and* in two cases (those in (141) and (142)). In all but one of these examples, the first and the third connectives are different from the second. In that one case, in(142), the first and second connectives are *and*; cf. example (38).

The one example of a mixed coordinate compound with four ultimate members without disambiguating punctuation and syntax that occurs in *Webster's Seventh Collegiate Dictionary* appears in (199). In it, the second connective is *or* and the other connectives are *and*.

Mixed Coordinate Compounds Whose Natural Interpretation is Conjunctive

We return now to the problem of disambiguating mixed coordinate compounds which lack disambiguating punctuation and syntax, and begin by considering those whose natural interpretation is conjunctive; that is, those in which *and* has scope over *or*, or equivalently, those in which *or* has priority over *and*. In "Semantic and Pragmatic Disambiguation of Mixed Coordinate Compounds", one principle of interpretation is identified that results in a naturally conjunctive reading, the prefer natural class disjunctions principle. The example that we used to illustrate this principle appears in (127). The example is a cookbook example, and there are 31 other cookbook examples like it. Of these 32 examples, 12 are verb-phrase compounds and 20 are noun-phrase compounds. The natural classes that appear in the disjunctive members of the 12 VP compounds range from cutting to mashing, peeling, heating, serving, and connecting; the compound in (127) illustrates cutting. In (143) through (145) we provide three additional examples containing such compounds; the remaining eight are listed in (190a) through (190i).

143. This vegetable is usually *peeled and sliced or cubed* before cooking. (APHB 519 7161)
144. Larger carrots should be *peeled or scraped and cut in long strips*. (APHB 519 6959)
145. *Drain and put through a food mill or puree in a blender*. (APHB 375 1245)

The natural classes that appear in the disjunctive members of the NP compounds range from soupbases to onions, spices, sweeteners, toppings, thin liquids, herbs, foodstuff, flavorings, dairy products and baked goods. Seven representative examples are provided in (146) through (152); the remainder appear in (191a) through (191l).

146. Serve with *hot biscuits or hot bread and a good green salad*. (APHB 519 4429)
147. Remove *foil and rice or beans*. (APHB 519 648)
148. Stir in *stock or broth and white wine*. (APHB 375 826)
149. Add *tomato puree and stock or water*. (APHB 519 3515)
150. Add *shrimp and onion or scallion* and simmer for 3 to 5 minutes. (APHB 375 2821)
151. Serve poached pears topped with *vanilla ice cream and crushed raspberries or raspberry syrup*. (APHB 519 2525)
152. Mix as for pie crust, adding *rose water or other flavoring and unbeaten egg white*. (APHB 277 1704)

Of the 21 non-cookbook examples with three ultimate members and no syntactic or orthographic disambiguation in which *and* is naturally understood as having scope over *or*, the prefer natural class disjunctions principle applied only to the ultimate members of those compounds accounts for the natural interpretations of 14 cases. Two of these compounds appear in (59) and (72); they are repeated here as (153) and (154). Four others appear in (155) through (158); and the remaining eight appear in (192a) through (192h).

153. As always, it is important to distinguish between *tasters or experimenters and chronic inhalant abusers*. (APHB 435 268)
154. Sybil never found him *alone and quiet or in a mood to talk*. (APHB 381 3796)
155. Then they were *captured or stolen and put to work*. (APHB 348 1097)
156. Make a model of the galaxy using *cotton and cardboard or plywood*. (APHB 63 2680)
157. Others learn to *live alone and like it or at least pretend to like it*. (APHB 527 562)
159. An important one is the growth of the *suburbs and small farms or farmettes*. (APHB 348 3988)

In (153), *tasters* and *experimenters* form a more plausible natural class ('dilettantes' or 'nonaddicts') than do *experimenters* and *chronic inhalant abusers* a natural whole. Moreover, the natural interpretation is reinforced by the plural context established by *between* as discussed in "Plural Contexts". Similarly, in (154), *quiet* and *in a mood to talk* form a more plausible natural class ('receptive') than do *alone* and *quiet* a natural whole. In this case, the natural interpretation runs counter to the syntactic patterning of word classes, as noted in "Syntactic Properties of the Ultimate Members as Clues to Interpretation".

Of the next four examples, those in (155) and (156) straightforwardly exemplify the application of the prefer natural class disjunctions principle, as do all the ones that appear in the appendix. However, the two examples in (157) and (158), require further analysis.

First, in (157), the treatment of *like it or at least pretend to like it* as a natural class ('give the appearance of liking it') is reinforced by the qualifier *at least*. Moreover, the anaphoric dependence of *it* in the ultimate member *at least pretend to like it* on *live alone* is only possible if the compound as a whole is analyzed as a conjunction with a disjunctive nested member.

Second, in (158), the two ultimate members *small farms* and *farmettes* are synonyms. Thus the natural class denoted by their disjunction is identical to each member. Accordingly, this compound is understood in the same manner as are the compounds discussed in "Paraphrase Relations in Mixed Coordinate Compounds", and suggests that the punctuation used in the latter class of examples is not really needed for their interpretation.⁴¹

The seven mixed coordinate compounds for which the prefer natural class disjunctions principle applied to the ultimate members of those compounds does not by itself account for their natural interpretations in which *and* has scope over *or* appear in (159) through (165).

159. Effort is made to find out what people *know and like or dislike* about the various candidates. (APHB 34 2561)
160. Wouldn't it be best to *leave the car and walk or run*? (APHB 132 3898)
161. She thought he *was sick or had done something wrong and had come to her for help*. (APHB 202 5325)
162. Maybe they cannot *come in and kill us or drive us out of the rocks*. (APHB 489 398)
163. Manzu wished the priest would *shut up or even go away and let him work in peace*. (APHB 111 1461)
164. *I only joke with him and he should eat or he will be hungry*. (APHB 305 2911)
165. All right, I'd *walk off or rather, bounce off and recite to myself*. (APHB 195 1530)

In (159), the members *like* and *dislike* form a natural class ('have affect'), but the members *know* and *like* also form a natural whole.⁴² Thus, the natural interpretation of the compound as a conjunction with a nested disjunction is not simply determined by application of the prefer natural class disjunction principle to adjacent ultimate-member pairs. Rather, it requires also the application of the prefer natural class disjunctions and the prefer natural whole conjunctions principles to the alternative analyses of the compound into submembers. In this case, the fact that *know* and *like or dislike* forms a more natural whole than does *know and like* and *dislike* a natural class, leads to the natural interpretation of the example.⁴³

The analyses of the compounds in (160) through (164) are similar to that of the compound in (159). In each of them, application of the prefer natural class disjunctions and the prefer natural whole conjunctions principles to adjacent ultimate-member pairs results in two viable alternative analyses. For example, in (160), *walk or run* denotes a natural class and *leave the car and walk* forms a natural whole. However, when the resulting alternative analyses are themselves evaluated, we find that *leave the car* and *walk or run* form a natural whole but that *leave the car and walk* and *run* do not form a

natural class. Indeed, under the nonpreferred interpretation, the implied subject of the infinitive would be understood as being asked to evaluate the absurd option of leaving the car and walking or of not leaving it and running.

Finally, in (165), the connective *or* is not used in its ordinary sense of indicating a class, but instead is used metalinguistically, as indicated by the qualifier *rather*, to mean that the sense of the member following *or* is to be understood as replacing the sense of the member preceding it. The problem then is to determine on what basis *bounce off* rather than *bounce off and recite to myself* is to be construed as the second member of the disjunction. The solution, it seems to me, is to evaluate the compound as if *or* has its ordinary sense, in which case the prefer natural class disjunctions principle selects the grouping which results in the natural interpretation of the compound.

Mixed Coordinate Compounds Whose Natural Interpretation is Disjunctive

The interpretation of mixed coordinate compounds with three ultimate members as disjunctive can arise as a result of the application of either the avoid contradictory subsenses principle or the prefer natural whole conjunctions principle, as described in "Semantic and Pragmatic Disambiguation of Mixed Coordinate Compounds". Of the 23 compounds that I found in the APHB corpus that naturally have a disjunctive interpretation, 9 (including the compound in (126)) receive that interpretation as a result of the application of the avoid contradictory subsenses principle, and 14 (including the compound in (130)) as a result of the application of the prefer natural whole conjunctions principle. Application of the avoid contradictory subsenses principle also accounts for the natural interpretation of the compound in (65), repeated here as (166); while application of the prefer natural whole conjunctions principle accounts for the natural interpretation of the compound in (66), repeated here as (167), and in part for the natural interpretation of the compound in (70), repeated here as (168).⁴⁴

166. Mister Moses is about an African village that must either *quit its ancestral home to accommodate the new dam or stay and get drowned*. (APHB 317 858)
167. Puddings can be either *hearty or light and elegant* desserts. (APHB 519 981)
168. You'd have sold him out to *me or Royce and Benson*. (APHB 385 4242)

In (169) and (170), are two additional compounds whose interpretation is determined by the avoid contradictory subsenses principle; the remaining five examples appear in (193a-e).

169. Should they *enlist now or finish high school and go on to college*? (APHB 502 425)
170. It can be *creamy or dry and crumbly*. (APHB 519 564)

Next, in (171) through (174), are given four additional examples containing compounds whose natural interpretation is a consequence of the prefer natural whole conjunctions principle.⁴⁵ An additional seven examples of this type appear in (194a-g).

171. Island girls wear bright-colored cotton *dresses or blouses and skirts* to school. (APHB 175 2854)
172. Maybe I'd never see *Mom and Dad or home* again. (APHB 191 202)

173. It could *overheat the chimney or burn through somewhere and drop fire on the floor*. (APHB 92 1705)
174. It meant *drop everything and come running or risk dire consequences*. (APHB 276 77)

The nested conjunctions in (173) and (174) are strictly speaking not conjunctive in meaning, since the order of their members is significant. However, in both cases, the members form natural wholes so that the prefer natural whole conjunctions principle is still operative.

Ambiguous Mixed Coordinate Compounds

As I pointed out in "Choice Contexts", I found three mixed coordinate compounds with three ultimate members that did not strike me as having a naturally preferred interpretation. One of these occurs in (67) and is repeated here as (175). The others occur in (176) and (177).

175. Besides most of these occult documents were either *pagan or heretical and therefore totally evil*. (APHB 452 133)
176. *Guilty and ashamed or foolish* afterwards, but excited and passionate at the moment. (APHB 453 1251)
177. Caroline was going into the possibility of *the Pope or his priests and the nuns*. (APHB 540 155)

A Partial Formal Account of the Structure of Coordinate Compounds

The different syntactic properties of syndetons and asyndetons can be accounted for, in part, by assuming that syndetons are single constituents of the same type as their head daughters, but that asyndetons are simply sequences of constituents of the same type that do not form a constituent.⁴⁶ From these assumptions, the no member nesting of asyndetons principle follows automatically, since a member of a coordinate compound must either be a constituent or a structure consisting of different constituents.

An asyndeton of a root category type cannot be distinguished formally from a sequence of root constituents in a text. On the other hand, an asyndeton of a nonroot category type *K* which occurs as a daughter of type *A*, distinct from *K*, can be introduced by the schema in (178), if *K* is optional; and by the schema in (179), if *K* is obligatory.

178. $A \rightarrow \dots K^* \dots$
179. $A \rightarrow \dots K^+ \dots$

Conjunctive asyndetons, unlike syndetons and disjunctive asyndetons, are limited to 'maximal projections' of category types. For example, one cannot grammatically rephrase Ralph Rackstraw's declaration in (180), from in which the word *the* has been factored out of the conjunctive asyndeton.

180. Josephine, in one brief breath I will concentrate *the hopes, the doubts, the anxious fears* of six weary months. Josephine, I am a British sailor, and I love you!
181. *Josephine, in one brief breath I will concentrate the *hopes, doubts, anxious fears* of six weary months. Josephine, I am a British sailor, and I love you!

Syndetons, on the other hand, are introduced by a category type *K* that contains an attribute that specifies which kind of compound it is, disjunction or conjunction. We use the attribute *C* for specifying conjunctions and the attribute *D* for specifying disjunctions. Any occurrence of *K* which is specified for neither *C* nor *D* is not a compound. Following Ross (1967), we assume that connectives are spelled out as left-sisters of members; we further assume that any category which introduces a member and its associated connective contains an attribute which indicates which connective appears as its daughter. We use the attribute *AND* to indicate that the left daughter of that constituent is *and* and the attribute *OR* to indicate that the left daughter of that constituent is *or*. These attributes must be distinct from the ones which identify the type of compound, since members of syndetons may themselves be compound; so for example, we must allow for the possibility, discussed in "Mixed Coordinate Compound Expressions", of a constituent being specified as both *C* and *OR* or as both *D* and *AND*.

We account for the structural properties of syndetons by means of the rule schemata in (182) through (185).⁴⁷

182. $K(C) \rightarrow K^+ K(AND) \mid K(AND)^+ K(AND)$
 183. $K(D) \rightarrow K^+ K(OR) \mid K(OR)^+ K(OR)$
 184. $K(AND) \rightarrow \text{and } K(\sim AND)$
 185. $K(OR) \rightarrow \text{or } K(\sim OR)$

A full syndeton results if exactly one instance of *K* not specified as *AND* in (182) or *OR* in (183) is chosen. A partial syndeton results if more than one such *K* is chosen. Member nesting results if one or more instances of *K* on the right side of (182) and (183) receive the attribute *C* or *D*.

Additional Examples of Mixed Coordinate Compounds from the APHB Corpus

Selective Use of Punctuation in Compounds with Three Ultimate Members

186. *X or Y, and Z* is understood as *(X or Y) and Z*; see (73).
 a. Christkindlein shortened to *Christ Kindel or Kriss Kindle, and finally Kriss Kinkle*. (APHB 277 501)
 b. Without this, there was *stagnation or spillage, and the anarchy of death's rot*. (APHB 111 1585)
187. *X and Y, or Z* is understood as *(X and Y) or Z*; see ((75)).
 a. You think he's *wandered off and got lost, or gone hunting on his own?* (APHB 83 4621)

- b. Must he *pack up and go home, or wait until his vacation is over?* (APHB 148 1165)
 - c. *Keep off and let me by, or I'll fire.* (APHB 186 3753)
 - d. All others had succumbed to *famine and disease, or the massacres of the Indian wars.* (APHB 277 1574)
 - e. *Oak leaves and bittersweet, or other local colorful foliage,* around lamppost and mailbox. (APHB 278 2442)
 - f. Would you *stay in them and direct, or go out in the field?* (APHB 374 925)
188. *X, or Y and Z* is understood as *X or (Y and Z)*; see (76).
- a. Adult education can be *more or less haphazard, or directed and purposeful.* (APHB 21 1471)
 - b. To *find such a house, or buy a block and build one,* is difficult everywhere. (APHB 86 4114)
 - c. Since then, people have asked us why we didn't *buy on credit, or fish and hunt.* (APHB 92 3885)
 - d. Did you ever see *a dun, my dear; or a bailiff and his man?* (APHB 133 3978)
 - e. There are *desks, or tables and chairs,* perhaps carpeting to sit on.⁴⁸ (APHB 175 2833)
 - f. Just *skip them, or check back to the record and straighten out your memory.* (APHB 196 1310)
 - g. To serve, *reheat by steaming, or wrap pudding in foil paper and heat in oven.* (APHB 277 574)
 - h. *Cook carrot in fluted rounds for garnish, or cook fresh carrot and cut in rounds.* (APHB 277 3466)
 - i. *Use maple sugar, or omit sugar and baste with maple syrup.* (APHB 519 2241)
 - j. Heat the *butter, or oil and butter,* in a skillet and add the pepper strips. (APHB 519 7496)

Nonselective Use of Punctuation in Long Compounds

189. See (111) and (112).
- a. Add *a few peppercorns, the onion, bay leaf and thyme or rosemary.* (APHB 519 5383)
 - b. It is made with a base of *onion, salt pork, potatoes and milk or cream.* (APHB 519 6460)
 - c. Place the *beef bone, chicken, ham and bacon or salt pork* in a soup kettle. (APHB 375 3021)
 - d. Add *shrimp, oysters, clams, scallops and flounder or halibut.* (APHB 375 3026)
 - e. Add the *bay leaf, marjoram, celery, salt, pepper and mace or nutmeg.* (APHB 375 780)
 - f. Add *onions, celery, Canadian bacon, salt, pepper and thyme or sage.* (APHB 375 2334)

Unpunctuated Mixed Coordinate Compounds with Three Ultimate Members

190. Cookbook examples of compound verb phrases with *and* having scope over *or*; cf. (143) through (145).
- a. The rolls are *fastened or tied and then browned in butter or other fat*. (APHB 519 4071)
 - b. *Stuff the veal pocket with this mixture and sew it up or fasten it with skewers*. (APHB 519 3919)
 - c. *Peel the onion and chop very fine or grate*. (APHB 519 1769)
 - d. *Peel the boiled potatoes and cut them into very small cubes or chop them*. (APHB 519 7676)
 - e. *Peel the apricot and leave them whole or halve them*, but do not discard the pits. (APHB 519 2260)
 - f. *Increase heat or run the duck under the broiler and baste*. (APHB 519 5421)
 - g. *Crush the fruit or put it through a mill and add sugar to taste*. (APHB 519 6301)
 - h. *Drain the cooked rutabaga and mash thoroughly with a potato masher or put through the ricer*. (APHB 519 7943)
 - i. *Spoon out and serve on toast or serve as a garnish for meat dishes*. (APHB 519 3777)
191. Cookbook examples of compound noun phrases with *and* having scope over *or*; cf. (146) through (152).
- a. Sometimes *cream or sour cream and herbs* are added to the pan juices to make a sauce. (APHB 519 4074)
 - b. Fill pastry shell with *foil and rice or beans* to weight it down during baking. (APHB 519 945)
 - c. Serve with *wild rice or barley and small white onions steamed in butter*. (APHB 519 5524)
 - d. Add *mint or dill and salt*. (APHB 375 2645)
 - e. *Potato pancakes and green salad or sliced tomatoes*. (APHB 519 2327)
 - f. *[A]dd an onion and tomato catsup or chili sauce*. (APHB 64 134)
 - g. Add *broth or consomme and cauliflower*. (APHB 375 3424)
 - h. Add *hambone or stock and bouillon*. (APHB 375 1804)
 - i. In a kettle, combine *stock or broth and wine*. (APHB 375 1586)
 - j. Add *raisins and nutmeg or cinnamon*. (APHB 375 662)
 - k. Scald the milk with *the onion slices and nutmeg or mace*. (APHB 375 1211)
 - l. You may find bitter herb teas more palatable with *sugar or honey and lemon* added. (APHB 537 1116)
192. Non-cookbook examples of compounds with *and* having scope over *or*; cf. (153) through (158).
- a. Perhaps he has *a sandwich and a glass of milk or a soft drink*.
 - b. Provide each person with *a stiff brush and scarf or towel*. (APHB 54 94) (APHB 108 97)

- c. Then there is the question of how we eat: of *manners or etiquette and instrumentation*. (APHB 82 488)
 - d. It *is called the ANAGRAPHIC Performance Pak and sells for \$9995 or rents for \$213 a month*. (APHB 47 266)
 - e. Write *Queen or King and the name of a guest* on this heart. (APHB 478 718)
 - f. They never *lost contact with their surroundings and flung themselves about or fell to the ground*. (APHB 396 73)
 - g. Pleasure yachts were *rented or bought and converted to revenue use*. (APHB 364 682)
 - h. The boys wore *blue jeans and T-shirts or open-necked plaid shirts*. (APHB 114 (137))
193. Examples containing compounds with *or* having scope over *and* as a result of the avoid contradictory subsenses principle; cf. (170) and (171).
- a. More and more often he came home *listless and dull or angry at everyone*. (APHB 356 3251)
 - b. So Howard's men *lounged and talked or played cards* on that bright May afternoon. (APHB 520 1273)
 - c. *Two goals or a goal and one foul* would put Glenview in the lead. (APHB 187 844)
 - d. *Buy it sliced or buy a piece and slice it yourself*. (APHB 519 1410)
 - e. They can be *roasted whole or split and broiled*. (APHB 519 5118)
194. Examples containing compounds with *or* having scope over *and* as a result of the prefer natural whole conjunctions principle; cf. (171) and (172).
- a. Stages could be *steamy-hot or cold and drafty*. (APHB 271 948)
 - b. *Go on, now or come in and eat with me*. (APHB 245 1837)
 - c. How to catch fish without a *hook and line or net*. (APHB 116 3621)
 - d. He had not yet reached the lodestone of *loneliness and sacrifice or whatever had to be eventually found*. (APHB 211 717)
 - e. Finish with *cheese and fresh fruit or an old-fashioned bread and butter pudding*. (APHB 519 3426)
 - f. *My ethics are my own and they're not especially rigid or I wouldn't be in this business*. (APHB 451 834)
 - g. *Sit there and take it or lose my job*. (APHB 288 5882)

Mixed Coordinate Compounds in Webster's Seventh Collegiate Dictionary

- 195. a retail dealer in *provisions and supplies or equipment* of a specified kind (from definition of *chandler*)
- 196. a barrier intended to prevent escape or intrusion or to mark a boundary, esp. such a barrier made of *posts and wire or boards* (from definition of *fence*)
- 197. to show mirth, joy, or scorn with a *smile and chuckle or explosive sound* (from definition of *laugh*)
- 198. *down or forward and down* (from definition of *over*)
- 199. *back and forth or up and down* (from definition of *wave*)

200. a company of persons gathered for *deliberation and legislation, worship or entertainment* (from definition of *assembly*)
201. *tedious, disagreeable, and unrecognized or thankless* (from definition of *dirty*)
202. an iced cocktail made from *creme de cacao, sweet cream, and gin or brandy* (from definition of *alexander*)

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Notes

1. A preliminary report on this and related research was presented at the First LSA/ASL Conference on Logic and Linguistics at Stanford University in July 1987 in a paper by Arnold Koslow, D. Terence Langendoen and C. Andrew Neff entitled "The Syntax and Semantics of Coordinate Compounding in English".

2. We assume, following Gazdar *et al.* (1985), Sag *et al.* (1985) and Steedman (1985) that the compounding of elements of apparently different types can be analyzed as involving the compounding of elements of the same type. We do not consider coordinate compounds of sequences of elements; for discussion, see van Oirsouw (1987).

3. Certain coordinate constructions are limited to exactly two members; these constructions are traditionally called **correlative**. This paper is concerned only with constructions which impose no upper bound on the number of members. As Gazdar *et al.* (1985: 170) point out, there are no coordinate constructions which require exactly n members for $n > 2$. Other terms for what we here call members are **conjunct** (Gazdar *et al.* 1985: 170) and **conjoin** (Quirk *et al.* 1972: 550).

4. Other terms for these particles are **coordinators** (Bloomfield 1933: 195; Quirk *et al.* 1972: 550) and **conjunctions** (Gazdar *et al.* 1985: 170).

5. The APHB corpus is a roughly twenty-five million word collection drawn from over five hundred sources, including stories, magazine articles and cookbooks, to which I had access during my sabbatical year as visiting scholar at the IBM T.J. Watson Research Center in Hawthorne, New York in 1986-87. I thank George Heidorn for his hospitality as the manager of the group in which I worked, and Slava Katz for his assistance in making the corpus usable for my research. I also thank Roy Byrd for providing me access to tools for extracting definitions from the electronic version of *Webster's Seventh Collegiate Dictionary*. Citations are referred to by text and sentence number, as obtained by a lemmatization program written by Slava Katz.

6. Example (9) contains an embedded asyndeton *up stairs, up fire escapes, up aerial ladders* occurring as part of a member of the containing asyndeton. This type of embedding is discussed below in "Submember Nesting of Coordinate Compounds". The example is also ambiguous concerning whether certain phrases, such as *jumping three*

stories into a net, are to be construed as members of the asyndeton or as modifiers of other members. The alternation in the punctuation between commas and semicolons in the example suggests that these phrases should be considered modifiers of other members, but the choice of punctuation mark in (9) is not consistent.

7. The entire poem from which this fragment is taken is quoted in its entirety in (11).

8. Example (13) may also be analyzed as containing a continuous syndeton, whose members are *sober men*, *true* and *attentive to our duty*, since predicate adjectives and noun phrases can be compounded in English. Example (15) contains a discontinuous asyndeton.

9. The coordinate compounds contained within individual members of the asyndeton are enclosed in parentheses.

10. See "Submember Nesting of Coordinate Compounds" for a definition of this notion.

11. The notion of **degree of nesting** of submembers is defined in an analogous manner to that of degree of embedding defined in Miller and Chomsky (1963: 469).

12. The term **ultimate member** is comparable to Bloomfield's term **ultimate constituent** (1933:195), and is recursively defined as a member or an ultimate member of a member. Thus the example in (24) has four ultimate members, no matter what its analysis is.

13. Like multiple center embedding, multiple member nesting is not ruled out by any grammatical principle. The principle that limits the degree of member nesting in acceptable usage is more stringent than the one that limits the degree of center embedding, since second and even in some cases third and fourth degree center embedding is acceptable (Bever 1974: 188-189).

14. Alternatively, the punctuation may be considered simply to indicate that the phrase *of fish, poultry, meat, lentils and beans* should not be construed as a common factor of the entire compound preceding it, but rather that it goes with the last member only.

15. Recall that the default interpretation of an asyndeton is as a conjunction.

16. All other potential interpretations for (37) are ruled out by the no member nesting of conjunctive asyndetons principle.

17. Conceivably, this compound can be interpreted as containing a disjunctive asyndeton, based on the disjunctive nature of the two members of the asyndeton. However, I find this interpretation quite unnatural.

18. The interpretations, however, can be differentiated in speech by intonation; cf. Langendoen (1987).

19. The natural interpretation of this compound is strengthened by the later occurrence of what appears to be another three-member asyndeton in that sentence beginning with the word *millions*, though the interpretation of that material does present some difficulties. First, it must be shown that the string *orderly homes, devoted marriages, men and women* forms a three-member asyndeton, rather than a four-member partial syndeton. My chief reason for supposing that it should be analyzed as a three-member asyndeton is that the string *kindly and affectionate, troubled and happy with children* is much more aptly understood as a modifier of *men and women* than as a modifier of *women*, and is certainly not understood as a modifier of the entire structure beginning with *orderly*. My best guess as to the intended internal structure of that string is that it is itself a complex asyndeton whose members are *kindly and affectionate* and *troubled and happy*, with the phrase *with children* factored out from both members.

20. An exception to this generalization is the compound in (12), in which a comma appears before every connective, but which must be interpreted with member nesting. See "Use of Punctuation to Set Off Members of a Disjunction" for a possible explanation of the use of the commas in this example.

21. In this example, selective use of commas also determines the intended interpretation of the compound. See "Use of Punctuation to Indicate Member Nesting".

22. In these and subsequent examples containing compounds that may be analyzed as containing asyndetons, we ignore their possible interpretations as asyndetons on the assumption that the prefer syndetons principle accounts for their unlikelihood.

23. In this and other examples containing mixed coordinate compounds with three or more connectives, we ignore interpretations with more than one degree of member nesting unless they are required by the punctuation, on the assumption that their unnaturalness is accounted for by the avoid multiple member nesting principle. In (63) the interpretations corresponding to the schemata in (i)-(iv) are possible, though highly unlikely, in part because of the avoid multiple member nesting principle.

- i. ?(*W and X*) or *Y*) and *Z*
- ii. ?*W and (X or (Y and Z))*
- iii. ?(*W and (X or Y)*) and *Z*
- iv. ?*W and (X or Y) and Z*

24. This is the only example of its type that I found in the APHB corpus. In principle, the particle *both* should disambiguate a mixed coordinate compound in the opposite way that *either* does, since *both* can take a conjunction as a complement. However, I have found no textual examples of such a construction. The particle *both* also differs from *either* also in occurring only with two-member coordinate compounds in the APHB corpus, whereas *either* occurs with coordinate compounds with three or more members, as in (47) and (i) below. See also Gazdar *et al.* (1985:173).

- i. Most have *either skipped school, run away from home, been in a series of fist fights, stolen small quantities of candy, clothing, toys or jewelry, or been caught*

drinking on several occasions. (APHB 216 31)

Also note that the compound that appears in (i) is not a mixed coordinate compound, since the disjunction occurs as a submember of the second member of the conjunction. If the word *either* is omitted, however, the resulting mixed coordinate compound is structurally ambiguous.

i. The gimmick was for me to *keep the ball and either pass or run.* (APHB 188 963)

25. The punctuation pattern in (68) reinforces its intended interpretation; see "Selective Use of Punctuation in Long Mixed Coordinate Compounds".

26. See "Use of Punctuation to Indicate Member Nesting".

27. Eight of the compounds have a comma before both connectives, but in three of these, the commas flank the second member of a disjunction. In the remaining five examples, it can be argued that the comma before the *and* indicates member nesting and the comma before the *or* is used to set off a member of a disjunction; see "Use of Punctuation to Set Off Members of a Disjunction" for discussion.

28. One of these compounds occurs in (56), and is also syntactically disambiguated.

29. The expression *i.e.* specifies the 'that is' interpretation of *or* described in "Paraphrase Relations in Mixed Coordinate Compounds".

30. If a compound of the type schematized in (78) were to occur sentence finally, the orthographic indication of the semantic difference in the connective would be lost. However, I have found no examples in which a compound of the type in (78) occurs sentence finally.

31. Compare this example with (74b), whose natural interpretation has the same member nesting pattern, but in which no comma precedes the *or*.

32. One additional example, contained in (i), is analyzable as such a mixed coordinate compound, but it is more naturally understood as a two-member asyndeton with a two-member conjunction as its first member and a two-member disjunction as a nested submember of its second member.

i. In this his purpose was *precautionary and preventive, not punitive or vindictive.*
(APHB 6 4116)

The alternative analysis as a mixed coordinate compound is as a three-member disjunction with a two-member conjunction as its first member, with *not punitive* as its second member and with *vindictive* as its third member. We cannot account for the preference for the interpretation as an asyndeton simply by appealing to the maximal factorization principle (thus giving preference to wider rather than narrower scope for *not*), because we have already shown in "Factoring Ambiguities Involving Coordinate Compounds" that

the prefer syndetons principle is more potent than the maximal factorization principle by itself. We might counter by arguing that the prefer parallelism of internal structure principle together with the maximal factorization principle outweighs the prefer syndetons principle, but to make this argument work, we would also have to alter our formulation of the prefer parallelism of internal structure principle as stated in "Member Nesting of Full Syndetons Within Full Syndetons".

33. Also interpreted in this manner is the compound in (200), from *Webster's Seventh Collegiate Dictionary*.

34. Also interpreted in this manner are the compounds in (201) and (202), from *Webster's Seventh Collegiate Dictionary*.

35. This example can also be analyzed as an ordinary conjunction with three members, with submember nesting of the disjunction *ham or tongue* inside the second member.

36. The unnaturalness of the alternative interpretation may be partly due to the avoid member nesting of disjunctions within disjunctions principle.

37. The adverb *together* in (124) also provides a syntactic context which disambiguates the compound between its disjunctive and conjunctive readings, but does not itself choose among the seven possible conjunctive interpretations.

38. In all of these compounds, order of members is not significant, so that if *soup or salad* denotes a natural class, then so does *salad or soup*).

39. The question marks associated with the interpretations of the compounds in (134) through (136) mean that these interpretations are not particularly salient under the conditions described above.

40. This example also occurs as (63).

41. The prefer natural class disjunctions principle can, moreover, be invoked to account for the preferred interpretations of the examples in "Use of Punctuation to Set Off Members of a Disjunction", which appear either to be inconsistent with their punctuation, as in (80) through (83), or at least not to be favored by their punctuation, as in (84) through (88).

42. Compare the compound in (133), in which competing interpretations are set up as a result of the prefer natural class disjunctions and prefer natural whole conjunctions principles. However, in the case of the compound in (159), the local ambiguity is resolved by application of the same principles to the resulting alternative analyses.

43. Note that if *ignore* is substituted for *dislike* in (159), the connective *or* would be naturally understood as having scope over *and* in virtue of the prefer natural whole conjunctions principle applied to the ultimate members only.

44. In the case of the compound in (168), the syntactic cue provided by the grouping of proper names together with the prefer natural whole conjunctions principle, provides the basis for the natural interpretation.

45. In the compound in (171), the natural interpretation could also be the result of the Gricean maxim of quantity ruling out the alternative, according to which one of the subsenses would have the girls wearing dresses and skirts together.

46. Recall from the discussion at the end of "Member Nesting of Conjunctive Asyndetons is Impossible", I have chosen to ignore the fact that member nesting of disjunctive asyndetons is possible and to assume that the no member nesting of conjunctive asyndetons principle extends to asyndetons generally.

47. We assume that any of the *Ks* on the right side of the schemata in (182) and in (183) may be specified with the attribute *C*, *D* or neither, and that the specifications for *C* and *D* of the *Ks* in the schemata in (184) and (185) are the same. We do not account for discontinuous coordinate compound structures of the sort described in "Discontinuous Coordinate Compounds".

48. The mixed coordinate compound in this example occurs as a nested member of an asyndeton.