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Coordination and the Syntax–Discourse Interface

DANIEL ALTSHULER AND ROBERT TRUSWELL
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Oxford Surveys in Syntax and Morphology provides overviews of the major approaches to subjects and questions at the centre of linguistic research in morphology and syntax. The volumes are accessible, critical, and up to date. Individually and collectively, they aim to reveal the field’s intellectual history and theoretical diversity. Each book published in the series will characteristically contain: (1) a brief historical overview of relevant research in the subject; (2) a critical presentation of approaches from relevant (but usually seen as competing) theoretical perspectives to the phenomena and issues at hand, including an objective evaluation of the strengths and weaknesses of each approach to the central problems and issues; (3) a balanced account of the current issues, problems, and opportunities relating to the topic, showing the degree of consensus or otherwise in each case. The volumes will thus provide researchers and graduate students concerned with syntax, morphology, and related aspects of semantics with a vital source of information and reference.

Coordination and the Syntax–Discourse Interface investigates one of the fundamental issues in linguistic theory over the past half century, namely the role of discourse in explaining syntactic phenomena. The authors examine displacement out of coordinate structures, and ask the question, ‘what is the better explanation for the phenomena observed, purely syntactic constraints or discourse-motivated restrictions?’ The answer is not simple and straightforward, as befits the complexity of these phenomena, and it challenges assumptions many theories make regarding the syntax–discourse interface.

Robert D. Van Valin, Jr
General Editor

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The goal of this volume is to explore interactions between syntactic structure and discourse structure, through a case study of patterns of extraction from coordinate structures. It is not a typical survey monograph because the primary empirical focus is a fairly obscure and recalcitrant corner of locality theory. However, this obscure and recalcitrant corner serves us well as a microcosm, and allows us to illustrate fundamental methodological points about the interactions between syntax and discourse.

As is typical for a survey, there is not much original research in what follows. Nevertheless, we believe that this is the most complete account of extraction from coordinate structures to date. This is a consequence of the theoretical breadth of the survey: extraction from coordinate structures is, at first blush, a syntactic matter, but the survey ranges far beyond syntax, and this breadth raises theoretical and empirical questions across syntax, semantics, pragmatics, and discourse structure. A complete survey of extraction from coordinate structure must pay attention to all of these domains, and their interactions.

It will quickly become clear that we are not aiming to promote a single analysis. Instead, we want to motivate reasonable hypotheses which allow us to reason deductively from empirical facts to theoretical conclusions. The theoretical conclusions are likely to be significant in scope: we aim to show that this empirical area has the potential to enable us to discriminate between current syntactic theories, and to inform work on the interfaces between the domains just listed. However, in many cases, the necessary empirical work has not yet been done, and too much of the literature revolves around the same handful of examples, mainly in English. We hope that this survey will inspire further work on extraction from coordinate structures, particularly in understudied languages, and provide a guide to how to tease out the theoretical implications of empirical findings.

In the rest of this introduction, we introduce some overarching issues concerning syntax–discourse interactions, and then motivate our choice of case study.

1.1 Syntax, semantics, and discourse

Although it is now common to see the term ‘syntax–discourse interface’ in the literature (see, for instance, Avrutin 1999, Burkhardt 2005, and Erteschik-Shir 2007), the term is surprising, because such an interface seems to straddle the divide between competence and performance. Syntax, as part of competence grammar, should interface with other parts of competence grammar (morphophonology and semantics), while discourse effects are usually analyzed, with pragmatics, as performance phenomena, concerned with language use in context.
This means that we should be alert to the possibility of fundamental differences between the syntax–discourse interface and, say, the syntax–phonology interface, because the latter, as a mapping between two declarative ‘competence’ representations, is of a different nature from the former, with one foot in competence and one foot in performance.

There are two overly simple responses to this challenge, which we will not pursue seriously. The first is to say that empirical phenomena involving the ‘syntax–discourse interface’ are all performance phenomena. It will be hard to take this seriously because the empirical facts laid out in Chapters 3 and 4 in particular are too intimately related to locality phenomena which are central to the study of syntax in competence grammar.

The second simple response is to say that the syntax–discourse interface is somehow prefigured in syntactic structure, through syntactic counterparts of discourse relations. An example of this approach would be the cartographic syntax of Rizzi (1997), where syntactic [TOPIC] and [FOCUS] features derive syntactic restrictions (for instance on word order) with correlates in discourse structure. The gist of the problem with this approach, regardless of its general merits, is that syntactic structure demonstrably is not discourse structure, and it will turn out that we need to refer to both, and find a vocabulary for describing the interactions between the two structures.

This survey instead follows a separate path, one which is possible only because the landscape around representations of meaning above the sentence level has changed. Research into cross-sentential binding phenomena by Kamp (1981) and Heim (1982) led to the development of formal semantic theories in which the status of semantic correlates of the sentence is diminished, and sentence meanings are compositionally integrated into larger representations of discourse-level information. In short, this body of work motivates a redrawing of the line between competence and performance, and a conceptualization of part of the syntax–discourse interface as belonging within competence grammar, as a component of the syntax–semantics interface.

In Chapter 6, we will focus on a particular extension of Kamp’s Discourse Representation Theory (DRT), namely SDRT, or Segmented Discourse Representation Theory (Asher and Lascarides 2003), which embodies rich hypotheses about discourse structure. As we shall see, representations of discourse structure share certain properties with representations of syntactic structure (e.g. both make use of a relation of hierarchical embedding, or subordination), but are incommensurate in various ways (for instance, discourse subordination relations do not always map onto syntactic subordination relations).

This approach to the syntax–discourse interface gives rise to several foundational questions, including the following:

- Are certain theories of syntactic structure more congenial to theories of discourse structure, and vice versa?
- Which structures represent which empirical phenomena?

Questions like these are familiar from other work on linguistic interfaces. Linguistic theory is a long way from providing definitive answers to them, so the best way to make progress is through case studies such as this one, chosen with one eye on empirical tractability and one eye on theoretical richness across subdisciplines. The latter consideration is important because progress in linguistics can become encapsulated within subdisciplinary communities, such as ‘syntactic theory’ or ‘discourse semantics’. Working on an interface
like this one necessarily involves drawing out connections between those subdisciplines. Perhaps unsurprisingly, the empirical discoveries that those subdisciplines have made, and the conclusions that researchers have drawn on the basis of those discoveries, don’t always translate across disciplinary boundaries. Articulating what a realistic synthesis looks like, therefore, is a difficult challenge. This volume illustrates that challenge, as well as the virtues of meeting the challenge.

Instead of tackling questions like the above head on, we will identify a series of choice points in the course of this survey (collated in Appendix for easy reference). These choice points are interrelated, and range across syntax and discourse. Ultimately, they are all empirical questions, but in our opinion we do not yet have the data to resolve them. We hope that the choice points set an agenda for future research on extraction from coordinate structures, and on the syntax–discourse interface, by identifying the core questions, the relationships between them, and ways in which answers to these questions might be found.

1.2 Extraction from coordinate structures

Our case study concerns correlations between the interpretation of coordinate structures and patterns of extraction from those structures. Extraction from coordinate structures is limited. In fact, Ross (1967) proposed the Coordinate Structure Constraint, or CSC, which prohibits extraction of conjuncts, and extraction out of conjuncts. The effects of these two parts of the CSC are illustrated in (1) and (2), respectively.

(1)  a. Who did you meet __?  
   b. *Who did you meet [__ and Sue]?

(2)  a. What did you eat __?  
   b. *What did you [eat __] and [drink water]?

There are several known classes of counterexample to the CSC. Some can be characterized in purely syntactic terms. For instance, we will see in Chapter 3 that some languages do, in fact, allow extraction of initial conjuncts, of precisely the sort which (1b) shows to be ungrammatical in English. These examples are interesting in their own right, but not particularly illuminating for the study of the syntax–discourse interface, so we will draw a line around them and leave them to one side, for the attention of specialists in ‘pure’ comparative syntax.

We focus instead on patterns of extraction from one or more conjuncts, each apparently correlated with a particular interpretation of the coordinate structure. The first, and most discussed, pattern is Across-The-Board movement, or ATB extraction, also first observed by Ross. In ATB extraction, a single moved phrase corresponds to a gap in each conjunct. Often, but not always, ATB extractions correspond to parallel or contrastive interpretations. For instance, in (3), Kim and Sally contrast, as do enjoy and hate.

(3) What did [[Kim enjoy __] but [Sally hate __]]?

Three more correlations were established by Lakoff (1986), building on observations amassed by researchers over the previous twenty years. In (4) (Lakoff’s ‘Type A’), the
coordinate structure is interpreted as a **narration** and gaps are located in one or more typically noninitial conjuncts.

(4) What did you [[go to the store] and [buy __]]?

In (5) (Lakoff’s ‘Type B’), the interpretation involves a **violated expectation**, and the gap is in the initial conjunct only.

(5) How much can you [[drink __] and [still stay sober]]?

In (6) (Lakoff’s ‘Type C’), the interpretation is that the state of affairs described in the second conjunct is a **result** of the state of affairs described in the first conjunct, and extraction is again from the first conjunct only.

(6) What do people [[eat __ here] and [then get sick]]?

Lakoff develops an analysis of these correlations with the following two main components:

- **Conjunctions such as English and** are interpreted as expressing a variety of discourse relations between propositions.
- **Patterns of extraction from coordinate structures are conditioned by the discourse relation expressed by the conjunction.**

This is a radically different approach to Ross’s, because the acceptable patterns of movement are described not in syntactic terms like ‘coordinate structure’ or ‘conjunct’, but in terms of descriptions of interpretations like ‘result’ or ‘narration’. However, Lakoff only actually describes correlations between certain interpretations and certain patterns of extraction. These correlations (even if empirically accurate) are only a step toward a full theory, because we don’t know why the correlations should be this way, or why they should be visible in this empirical domain.

We might hope that established theories of syntax and of discourse structure could help answer these ‘why’ questions. However, we then encounter a further property of this empirical domain:

- **Different syntactic theories have very different analyses of coordinate structures, and make significantly different predictions about extraction from coordinate structures.** No theory currently makes fully accurate predictions for the attested data.
- **Different theories of discourse structure make significantly different predictions about the interpretation of conjunctions like and.** No theory currently makes fully accurate predictions for the attested data.

We will see in Chapter 2 that there is an almost embarrassingly wide range of analyses of the syntax of coordination under active current development. Chapter 3 shows that most theories don’t predict the noted diversity of extraction patterns, and that we have a choice between analyses which are too restrictive, or which are too liberal.

Formal theories of discourse are newer, and the range of analyses is narrower as a consequence, but there are still several approaches under current development. The labels we used above (‘parallel’, ‘contrast’, ‘narration’, ‘violated expectation’, ‘result’) are fairly widespread, and, in fact, have been defined in several slightly different ways (see
1.2 EXTRACTION FROM COORDINATE STRUCTURES

Chapter 5), but only one work (Kehler 2002) has attempted to relate reasonably explicit definitions of those labels directly to patterns of extraction. Kehler (2002), therefore, is the most direct antecedent of the discourse research reported in this monograph, but we will diverge from Kehler in several important respects, particularly in Chapters 5 and 6.

Because neither the syntactic theory nor the discourse theory has stabilized, there are many moving parts to consider when attempting to build a unified account of syntax and discourse in this empirical domain. This problem has sometimes been underestimated on both sides: syntacticians have often been content with a demonstration that extraction from coordinate structures is semantically conditioned, without attempting to show how semantics influences a syntactic phenomenon like nonlocal dependencies (e.g. Munn 1993, Johannessen 1998). And the question of extraction from coordinate structures barely registers in many works on discourse semantics (with the notable exception of Kehler 2002), because, well, that’s syntax.

Perhaps as a result of this disconnect, there have been two main approaches to extraction from coordinate structures in recent work. One, which we will refer to as ‘syntax calls the shots’, aims to reduce patterns of extraction from coordinate structures to principled statements about constraints on unbounded dependencies in syntax. The other, which we will call ‘discourse calls the shots’, aims to explain restrictions on extraction from coordinate structures in terms of syntactic statements about the interpretation of unbounded dependency constructions in specific discourse contexts. We will survey research to date in these two approaches in Chapters 4 and 5 respectively. The following is a very brief summary of our findings.

- Certain variants of the syntax-calls-the-shots approach can offer real insight into data related to (3)–(6), but this approach offers no real hope for addressing the heart of Lakoff’s challenge, namely the relationship between extraction patterns and interpretation of coordinate structures.
- Claims, such as Lakoff’s or Kehler’s, that extraction patterns correlate with discourse relations such as ‘narration’ or ‘violated expectation’ are approximately correct, but no more than that. Accordingly, variants of the discourse-calls-the-shots approach such as Lakoff’s (which build directly on such relations) cannot address the relationship between extraction and interpretation in detail, despite their initial promise. These approaches also cannot capture certain patterns which admit explanations in a syntax-calls-the-shots vein.

The summary just given is largely negative, but all is not lost. There are two ways forward, which jointly offer potential for preserving the strengths of the two approaches while avoiding the weaknesses. The first is simple: divide and conquer. The syntax-calls-the-shots approach can explain some patterns quite naturally, in ways which are beyond the scope of the discourse-calls-the-shots approach. So we should let syntax take care of those patterns. To give one example, there is some crosslinguistic variation with respect to the extraction patterns in (3)–(6). The most important variation concerns the availability of extraction from noninitial conjuncts that are interpreted as being part of a narrative, like (4). For instance, English allows this pattern, but French and German do not. A syntactic explanation of this difference will be sketched in Chapter 4, but it is unclear how this crosslinguistic difference could be pinned on an invariant fact about discourse structure, such as the
The second way forward comes from examining the theoretical status of discourse relations. Lakoff treated the different interpretations of coordinate structures as unanalyzed primitives, but there have been attempts since then to look for a principled reason why these particular relations feature in the way that they do. Kehler (2002) attempted this, but we will conclude in Chapter 5 that his approach is incomplete. We develop an approach in Chapter 6 that we believe to be more promising. This approach takes SDRT’s analysis of discourse relations (Asher 1993, Lascarides and Asher 1993, Asher 1999, Asher and Lascarides 2003, Asher and Vieu 2005, inter alia) and coordination (Txurruka 2003) to generate hypotheses about common properties of interpretations of coordinate structures, and information-structural differences between these interpretations. These information-structural differences motivate the different extraction patterns that Lakoff noticed, as well as many nuances that are beyond his, or Kehler’s, approach.

In sum, the questions that motivate this monograph have been investigated from a number of angles, for over fifty years, but to our knowledge, no previous work offers a truly integrative perspective on these questions, covering syntax, semantics, discourse, and the relations between these domains. We hope to demonstrate that progress in this area requires this integrative perspective. Our attempt to synthesize work across these domains has made us confront critical opportunities for comparison among established current syntactic and semantic theories. It has also substantially sharpened previous research questions, and implied a novel research agenda.

1.3 Structure of the volume

The first two chapters lay out the empirical focus of the monograph more precisely. Chapter 2 begins by searching for definitions of ‘coordination’ and ‘coordinate structure’. Section 2.2 proposes a first pass, roughly following Chomsky (1957), based on the propositional connectives \( \land \) and \( \lor \), with subsentential coordination being derived from sentential coordination by ellipsis. However, Section 2.3 reviews evidence that not all coordinate structures can be reduced to sentential, or propositional, coordination, for instance because ‘group-forming’ NP coordination does not have a propositional analog (Mary and John hugged is not derived from Mary hugged and John hugged). This suggests that coordinate structures are not semantically uniform: some are interpreted in ways which can be paraphrased as propositional conjunction or disjunction, while others are interpreted as groups.

In response to this, Section 2.4 discusses a range of analyses of the morphosyntax of coordination, developed on grounds independent of extraction. However, this section fails to identify a clear morphosyntactic ‘hallmark’ of coordination: no necessary and sufficient properties for distinguishing coordinate structures are identified. This conclusion chimes with the semantic map proposed by Haspelmath (2004), in which a range of different coordinate structures may be distinguished within a language, and certain types of coordinate structure may shade into adverbiai and compounding structures.

Chapter 3 introduces data on patterns of extraction from coordinate structures. It is sometimes suggested that the patterns, and particularly the Coordinate Structure Constraint introduced in Section 1.2, is just the kind of hallmark of coordinate structures that
Chapter 2 failed to identify. Section 3.2 gives a fuller introduction to the CSC, and Section 3.3 describes many documented classes of counterexamples, which problematize the notion that the CSC is a hallmark of coordinate structures. Section 3.4 aims to dispel the possible impression that the patterns described in this chapter relate specifically to *and* and similar lexical items in Western European languages. While a proper typological survey of the CSC and its exceptions is not possible at this time (in part because descriptive grammars typically do not address such issues at all, and certainly not in the necessary depth), we can nevertheless show that similar patterns hold across multiple conjunctions in several genetically and areally unrelated languages. Section 3.5 discusses the scope of the CSC and its counterexamples across *A*, *A*, and head movement. Finally, Section 3.6 introduces a particularly complex case, the SLF construction found in many languages, but most widely discussed with reference to German and Dutch. This construction involves the interaction of syntactic and interpretive phenomena, which are informative about the syntax and discourse semantics of coordinate structures. Although there is a large literature on this construction, it is often ignored in discussions of Lakoff-style effects, so we devote extra space to it here.

The survey in Chapter 3 suggests that almost all cases of asymmetric extraction are specifically from VP coordination. This entails that, in order to make sense of Lakoff’s data and the challenge that the data pose, we need to strike a proper balance between the general validity of the CSC and the range of apparent counterexamples concentrated in the special case of VP conjunction. In turn, this raises a general question, discussed in Section 1.2 and articulated more fully in Section 3.8: what kind of explanation should we seek for these patterns? The CSC, as formulated by Ross, clearly contains more than a grain of truth, but is strictly falsified by the patterns discussed in the second half of Chapter 3. On the other hand, discourse-based accounts such as Lakoff’s suffer from several shortcomings. The question, then, is: who (if anyone) calls the shots?

Chapters 4 and 5 discuss this question from the perspective of syntax and discourse, respectively. Chapter 4 begins with a discussion of the desiderata for a syntactic account in Section 4.2, and a brief introduction to mainstream locality theory, the theoretical context for the CSC, in Section 4.3. The main point, articulated in Section 4.4, is that mainstream locality theory has ‘moved away’ from the CSC since Ross’s thesis. The processes of unification and generalization of locality theory in Chomsky (1973, 1981) implied increasingly clearly that the CSC was different. In response to this, Section 4.5 discusses locality theories which aim to incorporate the CSC and derive it from more general principles.

This establishes a choice point. Chomskyan locality theory essentially ignores the CSC, but the theories discussed in Section 4.5 integrate the CSC so tightly with the foundations of locality theory that there is only limited scope for addressing counterexamples. Hence, we need a third way. Section 4.6 discusses one possibility in detail, namely the possibility of relating patterns of extraction from coordinate structures to patterns of extraction from adjunction structures. The leading idea in this approach is to capitalize on similarities between ATB extraction and parasitic gaps, the other major class of cases in which a single moved element corresponds to multiple gaps. The approach has had a rocky history, mainly because Postal (1993) gave a thorough account of the many dissimilarities between ATB extraction and parasitic gaps. Our estimation is that Hornstein and Nunes (2002) provides the outline of a viable response to Postal’s argument: parasitic gaps are more restricted than ATB extraction, and these additional restrictions are due to an additional syntactic factor.
superimposed on an essentially identical movement configuration. The rest of Section 4.6 develops further predictions of this conjunctions-as-adjuncts analysis. The broad outline of these predictions (a slight reformulation of ideas in Postal 1998) is that extraction from initial conjuncts should be syntactically unrestricted, while extraction from non-initial conjuncts in VP conjunction structures should be as restricted, crosslinguistically and intralinguistically, as extraction from VP adjuncts. We show in this section that those predictions have some validity, but leave a string of unanswered questions.

The upshot of Chapter 4 is that certain options within syntactic theory can predict patterns of extraction from coordinate structures with greater subtlety than Ross could, without resorting to treating extraction from coordinate structures as sui generis. However, this does not, in itself, constitute a response to Lakoff’s challenge. In fact, the patterns described in Section 4.6 are strictly orthogonal to those described by Lakoff. That is, it is a syntactic fact that extraction from initial conjuncts is often easier than extraction from noninitial conjuncts, and that noninitial conjuncts (even when they allow extraction) behave like weak islands. On the other hand, if Lakoff (1986) is correct, it is a nonsyntactic fact that ‘narration’-like coordinate structures allow extraction from noninitial conjuncts, while ‘violated expectation’ and ‘result’ allow only extraction from initial conjuncts. These two types of observation appear to have irreducibly different statuses, but they both pertain to the same set of empirical phenomena.

Chapter 5 investigates Lakoff’s analysis on its own terms. The heart of the analysis is a series of correlations between discourse relations and patterns of extraction. In Section 5.2, we outline Kehler’s (2002) taxonomy of discourse relations. This taxonomy is based on seminal work by Hobbs (1979, 1985, 1990), who extends David Hume’s philosophical ideas about the association of ideas to natural language discourse. We also provide a brief glimpse of how the Hobbs/Kehler program—originally intended for AI research—has led to fruitful research in semantics and pragmatics. Subsequently, in Section 5.3, we consider Kehler’s (2002) formal definitions of some well-studied discourse relations that are relevant to Lakoff’s analysis, namely OCCASION, RESULT, VIOLATED EXPECTATION, PARALLEL, and BACKGROUND. We discuss the challenges and shortcomings of Kehler’s (2002) definitions and provide a glimpse of steps that have been taken to address some of these challenges.

Against this background, Section 5.4 evaluates the fit between these independently defined discourse relations and patterns of extraction from coordinate structures. Our conclusion is that there is no real scope for analyzing discourse relations as direct causal factors explaining the different extraction patterns that Lakoff identifies. There are two reasons. The first is that Lakoff’s correlations don’t give any immediate way to explain why VP conjunction allows this range of interpretations, but not others. The second, and more challenging, is that once we have explicit and reasonable definitions of NARRATION and RESULT, it becomes apparent that these relations do not stand in opposition to each other. Rather, they stand in an entailment relation: RESULT is a special case of NARRATION. This drastically limits the scope for explaining Lakoff’s patterns in these terms: if RESULT is a special case of NARRATION, how are we to explain the apparent fact that RESULT doesn’t allow the same extraction patterns as NARRATION? We conclude that discourse relations in their own right could not explain Lakoff’s correlations, even though those correlations were originally stated in terms of discourse relations.

In the light of this conclusion, Chapter 6 develops a hypothesis mentioned briefly by Kehler (2002), namely that the distribution of TOPICS mediates the relationship between
discourse relations and extraction patterns, because only topics can be extracted from coordinate structures. Section 6.2 introduces, fleshes out, and critiques Kehler’s hypothesis. The most important criticism is that Kehler overstates the role of topics. In some cases, particularly the examples with a ‘narration’ interpretation and extraction from a noninitial conjunct, topicality seems to drive patterns of extraction, but in most other cases, examples can be found where an element which is clearly not a topic can nonetheless extract.

This leads us to introduce SDRT, as a formal, integrated theory of discourse structure with well-developed analyses of discourse relations, topicality, and coordination. SDRT gives us the resources to state hypotheses about why topicality is important with some discourse relations, but not others.

In Section 6.3, we spell out the graph-theoretic basics that underlie SDRT’s analysis of discourse structure, focusing on a property of discourse relations that is especially important: the distinction between subordination and coordination. Section 6.4 then introduces Txurruka’s (2003) groundbreaking hypothesis that and is only compatible with coordinating discourse relations.

Next, in Section 6.5, we consider how logical forms of discourses are constructed according to SDRT, focusing on how discourse relations factor into the construction of topics, and a broadly similar object called a common theme. The crucial point is that some discourse relations create discourse units that stand in a particular structural relation to a (possibly implicit) discourse topic, and others give a particular structural status to the common theme, while still others have no explicit discourse topic or common theme.

With all of these elements in place, Section 6.6 considers the prospects of working out an SDRT-based analysis of extraction from coordinate structures, and Section 6.7 extends this analysis to coordinate structures with more than two conjuncts. In particular, we propose that there are four patterns to consider, corresponding to four classes of relation just described:

1. Subordinating relations cannot be expressed by coordinate structures in the first place;
2. discourse relations which refer in their semantics to a common theme require ATB movement in the syntax;
3. all other relations also permit asymmetric extraction from initial conjuncts;
4. discourse relations which stand in a structural relation to a discourse topic allow extraction of topical elements from noninitial conjuncts.

Chapter 7 rounds off the survey with an evaluation of the strengths and weaknesses of the different approaches surveyed, focusing on a comparison of syntactic analyses from Chapter 4 and the SDRT-based approach developed in Chapter 6. We also give a summary of the choice points and their interrelationships, and a series of open questions, intended as a stimulus to further research. The new SDRT-based approach to extraction from coordinate structures developed in Chapter 6 has implications for everything from the syntax of coordination through to the relationship between information structure and extraction. We think that it is a new way of stitching together pieces of syntactic and discourse-semantic analysis to give a promising unified whole. However, several questions need to be answered in future research before it can be properly evaluated. These include the following:
• What are the implications of this analysis for the rest of syntactic locality theory?
• What can we learn about the nature of islands from this approach?
• What is the bridging hypothesis linking information structure and patterns of movement?
• What are the possible loci of crosslinguistic variation of extraction, on this analysis?

1.4 What this volume is, and isn’t

Although the empirical scope of the survey is narrower than those of many other surveys in the series, we believe that this is necessary in view of the theoretical breadth that the topic requires.

As surveys go, this one is quite opinionated. We have endeavored to do justice to the range of current theories of relevant areas of syntax and discourse semantics, as well as to the history of these ideas, but we have also chosen to focus on theoretical choices that, in our opinion, hold real descriptive advantages. There is a limited amount of original research in the survey, in the service of these opinions.

There are many things that this book is not a survey of. It is not a survey of:

• Coordination. Van Oirsouw (1987) is an excellent survey of the early work on the syntax of coordination, not yet surpassed in its coverage despite the significant advances in understanding since 1987. More recent monographs with a survey aspect include Zhang (2009), while Progovac (1998a, b) briefly surveys the range of then-current proposed coordinate structures, and Haspelmath (2004, 2007) are particularly useful as chapter-length typological overviews.
• Locality. Recent surveys of locality effects and locality theories include Rizzi (2013) and Boeckx (2012), as well as Chapter 2 of Truswell (2011).
• Information structure. Among others, the survey in this series by Erteschik-Shir (2007) is a comprehensive introduction to information structure and its interface with syntax.
• The relationship between competence and performance. There is a large body of work on sentence processing and island constraints (see many chapters in Goodluck and Rochemont 1992), and Harris (2011) has demonstrated that processing studies can help us understand the syntax and semantics of extraction from coordinate structures.
• Discourse structure. Zeevat (2011) and Jasinskaja and Karagjosova (2020) are excellent surveys of work on discourse relations, with the latter also discussing their impact on discourse structure. For an overview of discourse structure within SDRT, see Asher and Vieu (2005). For a basic guide to SDRT, see, e.g., Lascarides and Asher (2007), Alshuler and Schlöder (2019).

We will truncate discussions in all of these areas in order to keep our eye on the prize. We will see that some elegant and parsimonious current syntactic theories leave empirical holes that may be fillable by a discourse-semantic analysis of coordination. Discourse theorists, for their part, are just trying to develop theories of discourse structure, without paying particular attention to what syntactic theory would like it to do. How close can we get to a complete account just by joining the dots between bodies of research that don’t typically
interact enough? How well do the different theories articulate? Where are the gaps, and what are the prospects for filling those gaps? These are the questions that we do aim to cover.

Finally, there are several other putatively syntactic phenomena where similar questions arise, including gapping and other ellipsis phenomena, and other ‘island’ effects. Any of these in principle could have been chosen as the empirical domain for this survey. We hope that the approach we take here to joining the dots can inspire similar work in those other areas.
2

What is coordination?

2.1 Introduction

Ideally, a survey such as this one would begin with a clear definition of its object of study. However, the simplest definitions of coordination, whether morphosyntactic or semantic, very quickly prove to be unsatisfactory. Over the course of this chapter, our first-pass definitions are iteratively refined, and our understanding of the object of study becomes more subtle. Nevertheless, we do not settle on a definition.

In fact, by the end of this chapter, and even by the end of this monograph, we will not have an adequate definition of ‘coordination’ or ‘coordinate structure’, which is able at once to capture the full range of structures that we would expect to fall under that definition, and exclude structures like adverbial modification and compounding, which share some properties with coordination but are normally excluded from the class of coordinate structures.

It is easy enough, however, to give an informal characterization of the object of study. We are interested in aspects of the syntactic and semantic behavior of forms like English and or. These are often given as natural-language translations of the propositional logic connectives, with the former translated as and the latter as or. A natural initial hypothesis is therefore that coordination is a syntactic relation that corresponds to propositional or. Section 2.2 elaborates on this initial hypothesis, including some preliminary discussion of but, which (like or) is often translated as.

The simplicity of this hypothesis makes it straightforward to identify its limitations. Those limitations include the following:

- Lexical items like and and or need not relate propositions.
- When such lexical items do relate propositions, the interpretation is not always particularly close to that of or.
- The basis for grouping and or as a natural class, to the exclusion of other functional elements, is not clear, requiring further justification.

Section 2.3 elaborates on those limitations. An analytical choice arises already at this point, between building more elaborate syntactic and semantic structures on the foundation of or, or considering analyses that have quite distinct logical properties.

Section 2.4 summarizes major proposals concerning the syntax of coordinate structures. Section 2.4.1 covers analyses which are more or less symmetrical, in that each conjunct has approximately the same status vis-à-vis the whole coordinate structure. An important point that emerges in this section is the diversity of coordinate structures. This was emphasized within English by Gazdar et al. (1985), and from a typological perspective by Haspelmath...
Section 2.4.2 motivates an approach which includes both base-generation of subsentential coordinate structures and derivation of subsentential coordinate structures from sentential coordination by ellipsis. Finally, Section 2.4.3 discusses asymmetrical analyses of coordination, in which the conjuncts have different phrase-structural status (for instance, as specifier and complement, or in an adjunction relation). An interesting property of these approaches is that they tend to be reductionist. In particular, they integrate coordinate structures into the core of X'-theoretic phrase structure. We will see that some such approaches are quite promising and far-reaching: if the properties of coordination were reducible to the properties of, say, adjunction, we would have the germ of an argument that coordination is not a natural syntactic class, but diverse, with some coordinate structures being reducible to noncoordinate structures.

The conclusion of this chapter is therefore negative: we learn a lot about the properties of certain coordinate structures, but even as we do, the monolithic notion of ‘coordinate structure’ begins to fragment.

### 2.2 And, ∧, and conjunction reduction

The simplest hypothesis about the semantics of coordination can be found in propositional logic. The basic elements of propositional logic are a set of elementary propositions, and a set of connectives, ∧, ∨, →, and ¬. We can define the set of well-formed expressions of propositional logic as follows.

1. a. Any elementary proposition \( P \) is a well-formed expression of propositional logic.
   b. If \( P \) and \( Q \) are well-formed expressions of propositional logic, then:
      i. \( (P \land Q) \), \( (P \lor Q) \), and \( (P \rightarrow Q) \) are well-formed expressions of propositional logic.
      ii. \( (\neg P) \) is a well-formed expression of propositional logic.

We now define a semantics to accompany the syntax. We assume that the truth value of an elementary proposition is given, and provide rules for recursively determining the truth value of a complex proposition on the basis of its internal structure:

2. a. If \( P \) is true and \( Q \) is true, then \( (P \land Q) \) is true. Otherwise \( (P \land Q) \) is false.
   b. If \( P \) is false and \( Q \) is false, then \( (P \lor Q) \) is false. Otherwise \( (P \lor Q) \) is true.
   c. If \( P \) is true and \( Q \) is false, then \( (P \rightarrow Q) \) is false. Otherwise \( (P \rightarrow Q) \) is true.
   d. If \( P \) is true then \( (\neg P) \) is false. Otherwise \( (\neg P) \) is true.

There are approximate English translations for each of these connectives. And behaves roughly like ∧: (3a) is true iff (3b) and (3c) are independently true.

3. a. Horses fear unicorns and dogs adore goldfish.
   b. Horses fear unicorns.
   c. Dogs adore goldfish.
(Either…) or is a crude approximation of \( \lor \): (4a) is false if both (4b) and (4c) are false, but true if one of (4b) and (4c) is true.

(4)  
   a. Either horses fear unicorns or dogs adore goldfish.  
   b. Horses fear unicorns.  
   c. Dogs adore goldfish.

People are often reluctant to admit that (4a) is true if both (4b) and (4c) are true, but that may be explained away as a pragmatic phenomenon: in contexts where both (4b) and (4c) are true, the more informative (3a) is typically preferred over (4a). Because of examples like (5), the use of or is still taken to yield a true sentence where both (4b) and (4c) are true.

(5)  
   If horses fear unicorns or dogs adore goldfish, I win the bet. In fact, horses fear unicorns and dogs adore goldfish, so I win easily.

\((P \rightarrow Q)\) corresponds roughly to if … then, although here, the correspondence is quite imprecise. While (6a) is certainly false if (6b) is true and (6c) is false, the truth of (6b) and (6c) is felt to be insufficient to guarantee the truth of (6a). Moreover, if (6b) is false then bets are off.

(6)  
   a. If horses fear unicorns then dogs adore goldfish.  
   b. Horses fear unicorns.  
   c. Dogs adore goldfish.

Instead, if \( P \) then \( Q \) implies some causal or other relation between \( P \) and \( Q \) beyond the contingent fact of the truth or falsity of those propositions, which is all that \( \rightarrow \) relies on. Still, \( \rightarrow \) as a model of if … then is the best that propositional logic can do.

Finally, \( \neg P \) corresponds to not, or slightly more long-windedly, it is not the case that: if (7a) is true then (7b) is false, and vice versa.

(7)  
   a. It is not the case that horses fear unicorns.  
   b. Horses fear unicorns.

Among these four connectives, only \( \land \) and \( \lor \) are binary (they take two arguments) and symmetrical (switching the two arguments does not affect truth conditions). If \( P \land Q \) is true, then so is \( Q \land P \), and the same goes for \( P \lor Q \) and \( P \lor Q \). In contrast, it is possible for \( P \rightarrow Q \) to be true, but \( Q \rightarrow P \) to be false (specifically, if \( P \) is false but \( Q \) is true).

At least at first sight, these properties appear to be shared by their approximate natural language equivalents: (8a) and (8b) are truth-conditionally identical, as are (9a) and (9b), but the same is not the case for (10a) and (10b).

(8)  
   a. Horses fear unicorns and dogs adore goldfish.  
   b. Dogs adore goldfish and horses fear unicorns.

(9)  
   a. Either horses fear unicorns or dogs adore goldfish.  
   b. Either dogs adore goldfish or horses fear unicorns.

(10)  
   a. If horses fear unicorns then dogs adore goldfish.  
   b. If dogs adore goldfish then horses fear unicorns.
Building on this insight, (11) is a first-pass characterization of coordination. As we shall see, the reference to ‘symmetry’ will be a recurring point of discussion for the syntax and semantics of coordination in what follows.¹

(11) **What is coordination?** (First pass)
   a. A **coordinating conjunction** is a natural language expression that denotes one of the symmetrical propositional connectives $\land$ or $\lor$.
   b. **Coordination** is the relationship between a coordinating conjunction and its arguments.
   c. A **coordinate structure** is a syntactic structure interpreted as a coordination.

In addition to *and* and *or*, a third English word which meets this definition is *but*. Like *and*, $P$ *but* $Q$ requires that both of its conjuncts be true. The examples in (12) differ from equivalent examples with *and* not so much in terms of their truth conditions, but in terms of an implication that the two conjuncts contrast, in a sense that we will make more precise in Chapter 6.²

(12) a. Horses fear unicorns but dogs adore goldfish.
    b. Dogs adore goldfish but horses fear unicorns.

Now consider the mini-discourses in (13), which appear to be truth-conditionally equivalent to the sentences in (8).

    b. Dogs adore goldfish. Horses fear unicorns.

One possible way of explaining this observation is to assume a $\emptyset$-coordinator (truth-conditionally equivalent to *and*) relating the sentences in (13). However, we will reject this move, because it is unlikely that intersentential (discourse) semantic relations can be adequately modeled using $\land$ in the general case, and we don’t want to build a whole family of null intersentential connectives. We will put aside the nature and extent of the similarity between (8) and (13) until Chapters 5 and 6.

In some cases, we might be able to extend the characterization above to cover the interpretation of words like *and* or *or* when they relate subsentential constituents, as in (14), or even nonconstituents, as in (15).

(14) a. Mary [$_{VP}$ [$_{VP}$ laughed]] and [$_{VP}$ cried]].
    b. [$_{NP}$ [$_{NP}$ John]] and [$_{NP}$ Mary]] jumped.

(15) I gave [[a policeman a flower] and [a rioter a donut]].

This was in fact assumed in the earliest generative work on coordination, such as Chomsky (1957) and Gleitman (1965). The broad idea, often referred to as **conjunction reduction,**

¹ It is also a central element of Haspelmath (2004) typologically oriented characterization of coordinating constructions.
² We will see presently that *but* is also syntactically distinct from *and*, in that it is limited to two conjuncts (*She swore, screamed, but apologized*), and cannot directly conjoin NPs (*John but Mary came*).
is that the sentences in (14) and (15) can be derived from their equivalents with sentential coordination by deletion of material repeated across conjuncts.³

Following Partee and Rooth (1983), the connective-based approach to coordination can be extended to cases like (14) if the subsentential coordinations they contain can be related to propositional coordination.

(16) a. Mary laughed and cried is true iff Mary laughed is true and Mary cried is true.
    b. John and Mary jumped is true iff John jumped is true and Mary jumped is true.

The procedure is recursive: in (16), the semantics of coordinated 1-place predicates is related to the semantics of coordinated propositions. In the same way, the semantics of coordinated 2-place predicates can be related to the semantics of coordinated 1-place predicates. Partee and Rooth give a general truth-conditional treatment for conjunction of types ‘ending in $t$’ (that is, propositions of type $t$, 1-place predicates of type $\langle e, t \rangle$, 2-place predicates of type $\langle e, \langle e, t \rangle \rangle$, modifiers of type $\langle \langle e, t \rangle, \langle e, t \rangle \rangle$, etc.), ultimately in terms of propositional coordination.

A challenge for the procedure just noted comes from ‘nonconstituent’ coordination in examples like (15). One must determine how those strings behave like constituents of types ‘ending in $t$’. In fact, the relevant strings are predicted to be constituents on any syntactic theory adopting the VP-shell structure of Larson (1988). However, Combinatory Categorial Grammar, or CCG (Steedman 1985, 2000), goes much further in this direction, and treats essentially any coordinatable strings as constituents. In other words, compared to classical generative grammar, CCG takes very seriously the idea that coordination is a constituency test. This leads not only to the conclusion that ‘a policeman a flower’ and ‘a rioter a donut’ in (15) are constituents, but also that: (i) subject and verb form a (base-generated) constituent to the exclusion of the object in Right Node Raising constructions like (17), and even (ii) subject and object form a constituent to the exclusion of the verb in Gapping structures like (18) (which Steedman 1990 analyzes, in essence, as coordination of subject–object clusters in the scope of a single verb).

(17) [[Mary likes], but [John detests]], donuts.
(18) [[Mary likes donuts], and [John, gruel]].

The virtues of the conjunction reduction approach to the syntax and semantics of coordination are simplicity and explicitness. However, it is universally accepted that $\land$ and $\lor$, and sentential coordination, do not exhaust the empirical terrain of coordination. The next section describes two problems for this propositional approach. The first concerns collective predicates, which show straightforwardly that coordination is not just propositional. The second comes from asymmetric interpretations of and. Here, the analysis is more nuanced, and will occupy us for much of this survey.

³ In the early generative literature, this deletion operation bore several different names, and indeed ‘conjunction reduction’ referred to different operations in different works. The use of this term for this kind of analysis appears to have stabilized by the late 1970s.
2.3 Limitations of ∧ and ∨

Section 2.2 has shown the scope of a propositional analysis of the semantics of coordination, including coordination of subsentential constituents of types ‘ending in t’. For all its virtues, this analysis is clearly incomplete (see already an appendix in Partee and Rooth 1983). Something more is needed for (19), where the most salient reading is that there is a single event of Mary and John hugging each other.

(19) Mary and John hugged.

This is truth-conditionally distinct from (20): if (20) is interpretable at all, it probably means something like *Mary hugged the individual in question and John also hugged that individual.*

(20) #Mary hugged and John hugged.

This is a straightforward indication that *and* does not just denote ∧, and that the semantics of noun phrase coordination need not, or even cannot be derived from ∧. In other words, coordination of individual-denoting noun phrases works differently from Partee and Rooth’s schema for coordination of types ‘ending in t.’ *And* in (19) is often described as a ‘group-forming’ operator: *Mary and John* denotes the group composed of the individuals Mary and John (the group itself may still be an individual, if one adopts the approach of Link 1983, but that is not our concern here). This group is capable of acting as the argument to a collective predicate, like other group-denoting NPs:

(21) The team hugged.

Earlier arguments, aiming to demonstrate the insufficiency of conjunction reduction as a general theory of the syntax of coordination, reinforce this conclusion (see Lakoff and Peters 1967, and Dougherty 1970a,b for a summary of related work). Those arguments revolved around interpretive differences like those between (22a) and (22b), or (23a) and (23b) (the latter pair attributed to Chomsky).

(22) a. Mary and John are in love.
   b. Mary is in love with John. (Dougherty 1970a: 858)

(23) a. The drunk and the lamppost embraced.
   b. The drunk embraced the lamppost.

Despite the ingenuity of many syntactic analyses of such pairs, no analysis proved capable in the general case of reducing the (a)-sentences (with coordinate structures) to conjunction of sentences like the (b)-sentences (without coordinate structures); see Dong (1971) for discussion. Once again, this leads to the conclusion that (22a) and (23a) are genuine instances of NP coordination, not reduced sentential coordination.

In fact, further arguments against conjunction reduction motivate direct (unreduced) coordination of VPs, as well as sentences and NPs. For instance, it is not viable to analyze (24a) as derived from (24b) by ellipsis, because the two sentences are truth-conditionally
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distinct: if someone sang and someone else danced, then (24a) may be true, but (24b) is false.

(24)  a. No one sang and danced.
      b. No one sang and no one danced.

Even without (for now) venturing an opinion about the semantics of VP coordination in (24a),⁴ the immediate implication of these facts should be clear: a general definition of ‘coordinate structure’ cannot be built on propositional connectives like ∧ and ∨, because not all coordinate structures have denotations derivable from such formulae of propositional logic.

A different challenge comes from cases where and has uses that go beyond the meaning usually assigned to Boolean conjunction. One of the most often-discussed differences concerns the fact that whereas logical conjunction is a symmetrical operation, natural language and has certain asymmetric uses, such as (25).

(25)  a. I started to type and the power went off.
      b. The lights were off and I couldn’t see. (Bar-Lev and Palacas 1980)

In these examples, the order of the clauses affects the interpretation: although both (25a) and (26) require both of their conjuncts to be true, (25a) and (26) are judged to be true in different situations, a defining property of an asymmetric interpretation.

(26) The power went off and I started to type.

In this respect, and is like but (see (12)), and in fact asymmetric uses of or can also be found, as in (27). (27a) is naturally interpreted as a threat (this use was labeled as ‘threat-or’ by Culicover and Jackendoff 1997). The threat can seem asymmetric because it can be paraphrased as a conditional: If you don’t return the money then I call the cops. In contrast, (27b) lacks such a salient asymmetric interpretation.

(27)  a. You return the money or I call the cops.
      b. I call the cops or you return the money.

Faced with asymmetric uses of all three coordinating conjunctions, researchers have adopted two general strategies. We illustrate these here with respect to and, the most widely discussed of the three (see Posner 1980), but similar considerations apply to the others.

The first approach is the meaning-minimalist strategy (Grice 1975, Gazdar 1979, Kempson 1975, Schmerling 1975, Schriffin 1986, Carston 1993, Blakemore and Carston

⁴ We are being deliberately evasive here, because a more complex analysis using propositional coordination can handle (24a), and is in fact widely assumed. This involves quantifier raising of no one from both conjuncts, to derive a logical form like ¬∃x. (person(x) ∧ x sang ∧ x danced). It will become clear that this isn’t a viable complete analysis of VP coordination, but for now, this QR-based analysis could be seen as a reason to rephrase the lesson from (24): (24a) and (24b) must mean different things, so some constraint must prevent the derivation of (24a) from (24b) by ellipsis of no one. On any account which treats sentential coordination as basic, the necessity of that constraint is surprising.
This strategy works by claiming that the meaning of *and* is symmetrical logical conjunction, but pragmatic principles allow the derivation of the asymmetric use. In contrast, according to the **meaning-maximalist** strategy (most notably Bar-Lev and Palacas 1980), *and* has a rich lexical meaning, including various temporal and causal relations, but under appropriate circumstances may also be interpreted as logical conjunction. Chapter 3 will discuss correlations between asymmetric interpretations and asymmetric extraction patterns, and Chapter 6 will return to the tension between these two strategies. For this chapter, the simple point is that it is not automatically the case that any coordinating conjunction unambiguously denotes a symmetrical propositional connective.

### 2.4 The syntax of coordination

#### 2.4.1 Ross and GPSG

The discussion in the previous section suggests that there may be no unified semantic characterization of coordination. Coordinate structures sometimes correspond to propositional relations like conjunction or disjunction in the semantics. Coordinate structures may also correspond to group-formation, and perhaps to other relations, e.g. in VP coordination. It is not clear that there is any semantic unity to these different relations.

Consequently, it is natural to turn to morphosyntax to look for a unified definition of coordinate structures. Introductory syntax classes frequently tell students that there is something syntactically distinctive about coordination: take multiple phrases of the same category, add in a conjunction, and you get a larger phrase of the same category. Other pieces of syntactic structure don’t (or at least, don’t often) work this way, and this is what licenses the use of coordination as a constituency test (Chomsky 1957: Ch. 5).

That distinctive syntactic property of coordination suggests a first-pass syntactic structure for coordination where the mother (the coordinate structure) has the same category as at least two daughters (the conjuncts), with conjunctions appearing at designated positions between the conjuncts, as in (28), where ‘(Conj)’ represents places where we may or may not find conjunctions.

\[
(28) \quad \begin{array}{c}
\text{(Conj)} \\
X \\
\text{(Conj)} \\
X \\
\text{...}
\end{array}
\]

For English binary sentential conjunction (the first case we discussed in this chapter), this structure would be fleshed out as in (29).

\[
(29) \quad \begin{array}{c}
S \\
\text{and} \\
S
\end{array}
\]

Coordination is also known to give quite different results from other constituency tests. We won’t worry about this, as the first-pass structure we’re developing here will soon be superseded anyway.
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For cases with more than two conjuncts, the structure in (29) could be generalized to (30a).
This would cover sentences like (30b), which contains one or more ands.⁶

(30) a. 

\[
\begin{array}{c}
S \\
\text{(and)} \\
\vdots \\
\text{and} \\
S
\end{array}
\]

b. Horses fear unicorns, (and) dogs adore goldfish, and cats hate people.

Likewise, group-forming NP coordination is symmetrical in the same sense, so we could represent group-forming NP coordination as in (31).

(31)

\[
\begin{array}{c}
NP \\
\vdots \\
\text{and} \\
NP
\end{array}
\]

One initially attractive property of these structures is that they are symmetrical: all conjuncts have equal status with respect to hierarchical relations such as c-command. This could be argued to reflect the fact that Boolean $\land$ is symmetrical, and also that all conjuncts have equal status with respect to a worked-out semantics of group-formation. This kind of reasoning motivates the LFG analysis of coordination (Kaplan and Maxwell 1988, Peterson 2004), for instance, where conjuncts all feature equally as members of a set.

However, we have just seen that there is no English coordinating conjunction which always projects a fully semantically symmetrical semantic structure, and there are also morphological, prosodic, and syntactic asymmetries among conjuncts in coordinate structures. In fact, Haspelmath (2007: 9) goes so far as to state that ‘monosyndetic coordination appears to be universally asymmetric.’ It is therefore no surprise that all current syntactic theories that we are aware of have rejected a fully symmetrical structure for coordination.

Evidence against the symmetrical structure above was first presented by Ross (1967), who argued that and forms a phonological and syntactic unit with the following conjunct, to the exclusion of the preceding conjunct. He gave several pieces of suggestive evidence in favor of this conclusion. The first was the sentence boundary in (32): and can be sentence-initial, but not sentence-final.

(32) a. John left. And he didn’t even say goodbye. 

b. *John left and. He didn’t even say goodbye. (Ross 1967: 163)

Secondly, clitic coordinators like Latin -que can occur within a final conjunct, as in (33), but not within an initial conjunct.

(33) vitam salutemque

\[
\begin{array}{c}
\text{life} \\
\text{safety-and} \\
\text{‘the life and safety’}
\end{array}
\]

(Cicero, Divinatio against Quintus Caecilius, 1.3)

⁶ The propositional connectives corresponding to coordinate structures are only defined for pairs of propositions. However, it would be straightforward to define extensions of $\land$ and $\lor$ for arbitrarily large sets of propositions: for a set of propositions $\mathcal{P} = \{P_1, \ldots, P_n\}$, $\land(\mathcal{P}) = T$ iff every $P \in \mathcal{P} = T$, and $\lor(\mathcal{P}) = F$ iff every $P \in \mathcal{P} = F$. A semantics for coordination along these lines is assumed in Gazdar (1981). Similar considerations would apply to group-forming and, discussed in Section 2.3.
Thirdly, *and* can introduce a parenthetical appositive clause, but cannot be stranded by one. That is, (34a) and (34b) are both grammatical and approximately semantically equivalent, while (34c) is ungrammatical.

(34) 
  a. Even Harold failed, and he is the smartest boy in our class.  
  b. Even Harold, and he is the smartest boy in our class, failed.  
  c. *Even Harold, he is the smartest boy in our class, failed and.

Finally, the prosodic grouping of multiple coordination in English can indicate association of *and* with following, but not preceding, conjuncts.

(35) 
  a. ((Tom) (and Dick) (and Harry)) all love watermelon.  
  b. *((Tom and) (Dick and) (Harry)) all love watermelon.  

Ross (citing joint work with Lakoff) proposed a deep structure of the form $\left[ S \text{ CONJ } S^n \right]$, where $n \geq 2$ (p. 165), followed by a transformational derivation in which the conjunction is Chomsky-adjoined to each conjunct, and then deleted according to language-particular rules. This has the effect of grouping *and* with following, rather than preceding, conjuncts, as required. This was clearly intended as a general treatment for coordinate structures.

Elements of Ross’s treatment can be discerned in the analysis of coordination in Gazdar (1981). Gazdar proposed the two rules in (36), where the first member of the triple is an index, the second member states that a certain local configuration of categories is admissible, and the third member indicates the compositional combination of the denotations of elements of the second member. The subscript $[\beta]$ in (36a) is essentially a diacritic feature on $\alpha$, whose value ranges over *and*, *or*, etc. This diacritic is then spelled out by the rule in (36b).

(36) 
  a. $\left( 2, [\alpha, \alpha_1, \ldots, \alpha_n], [\beta]^{\beta'(\alpha_1', \ldots, \alpha_n')} \right)$  
  b. $\left( 3, [\alpha, [\beta], \alpha'], \alpha' \right)$

These two rules jointly generate structures like those in (37).

(37) 
  a. 
     \[ \begin{array}{c} 
     \text{NP} \\
     \text{NP} \\
     \text{[and]} \\
     \text{and} \\
     \text{NP} \\
     \end{array} \]  

  b. 
     \[ \begin{array}{c} 
     \text{VP} \\
     \text{VP} \\
     \text{VP} \\
     \text{[or]} \\
     \text{or} \\
     \text{VP} \\
     \end{array} \]  

(Gazdar 1981: 158)