



A Dependency Grammar of English

An introduction and beyond



Timothy Osborne

John Benjamins Publishing Company

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CHAPTER 1

Some concepts of syntactic theory

1.1 Overview

The goal of this first chapter is to establish an understanding of some key concepts that the theory of syntax and grammar presented in later chapters then takes for granted (*constituent*, *phrase*, *grammatical relation*, *subject*, *semantic role*, *predicate*, *argument*, and *adjunct*). The reason for devoting a chapter to these basic notions is the desire to make the content of this book accessible to a wide audience in general. The reader who already understands these notions can skip ahead to Chapter 2, which introduces and establishes the key distinction between dependency and phrase structure syntax.

Most theories of syntax and grammar acknowledge the presence of words, phrases, and clauses, and many theories also adopt an umbrella term for denoting all these units of syntactic structure, namely the *constituent*. The *grammatical relations* – also called *syntactic relations* or *syntactic functions* – are acknowledged by most theories of syntax and grammar. Central constituents are assumed to fulfill specific relations within the clause. Familiar terminology is employed to denote these relations, e.g. *subject*, *object*, *direct object*, *indirect object*, *oblique object*, *prepositional object*, etc. Most people have a sense of what these relations are, and it is difficult to imagine a theory of syntax that could ignore them, since many aspects of our understanding of syntax and grammar are sensitive to their existence. There are, however, quite distinct ways to approach the role of the grammatical relations in the theory of syntax.

Unlike the grammatical relations, *semantic roles* (e.g. agent, patient, experiencer, goal, etc., also called *thematic roles*), are semantic notions. While the semantic roles reside on the semantic plane, they impact aspects of syntax. There are, for instance, certain correspondences between the semantic role that a given nominal bears and the morphological case that it shows. The dative case is often associated with an experiencer or beneficiary, and the instrumental case is (trivially) matched to a nominal that serves as an instrument. Agents are subjects in active sentences, whereas patients are subjects in passive sentences. Furthermore, the semantic role that a nominal has can influence its relative prominence in its clause. Pronouns, for instance, often prefer to take a prominent antecedent, i.e. an agent or

an experiencer. Given their impact on aspects of (morpho)syntax, theories of syntax and grammar acknowledge the importance of the semantic roles.

Another important area for theories of syntax concerns the distinction between *predicates*, *arguments*, and *adjuncts*. Predicates open slots that are filled by their arguments, and adjuncts constitute additional information that is added to predicate-argument structures. Most theories of syntax distinguish between arguments and adjuncts in one way or another, and some theories draw the distinction in particularly rigorous terms, and certainly numerous phenomena of syntax are sensitive to the distinction. For instance, arguments behave much differently in coordinate structures than adjuncts. The current theory of syntax also builds heavily on this distinction; it is essential in numerous ways.

This chapter focuses on the areas just mentioned. The following table provides some orientation about the latter three areas: grammatical relations, semantic roles, and predicate-argument structures:

Table 1.

Important notions for theories of syntax	Associated with	Examples
grammatical relations	the lexicon and the syntax proper	subject, object, first object, second object, prepositional object
semantic roles	the semantic plane	agent, patient, experiencer, theme, goal, etc.
predicate-argument structures (predicates, arguments, and adjuncts)	semantics as well as syntax	Verbs are typically predicates; nouns and NPs are typically arguments; and adverbs and PPs are typically adjuncts.

1.2 Constituents and some tests that identify them

Words do not appear in arbitrary sequences, but rather they are grouped. Words that belong together semantically are generally positioned next to each other. The groups of words are called *phrases*, *clauses*, and *sentences* in common lingo. It is helpful, however, to have a term that acknowledges groupings of words in general. The generic term used in most theories of syntax is *constituent*. Sentences consist of constituents. Individual words (or certain individual words) are constituents, and certain groups of words are constituents as well. Greater constituents can be broken down into lesser constituents, and lesser constituents combine with or attach to other lesser constituents to form greater constituents.

The existence of constituents is supported by a battery of discovery procedures. These discovery procedures are called *diagnostics for constituents* or *tests*

for constituents or *constituency tests*. Five standard diagnostics for constituents are introduced and illustrated here now (and in more detail later in Section 3.2 below): *topicalization*, *clefting*, *pseudoclefting*, *proform substitution*, and *answer fragments*. These tests are widely employed in syntax and linguistics textbooks to introduce the concept of *constituent structure*. Each of these tests is applied first to the noun phrase *the concept* in sentence (1):

- (1) Sam has explained **the concept**.
 - a. ...and **the concept** Sam (certainly) has explained. – Topicalization
 - b. It is **the concept** that Sam has explained. – Clefting
 - c. What Sam has explained is **the concept**. – Pseudoclefting
 - d. Sam has explained **that**.
(*that* = *the concept*) – Proform substitution
 - e. What has Sam explained? – **The concept**. – Answer fragment

Topicalization fronts the test constituent; clefting and pseudoclefting focus the test constituent by varying means, i.e. after *it is/was* in the case of clefting and using *what...is/was* in the case of pseudoclefting. Proform substitution identifies the test constituent by replacing it with a definite proform.¹ And the answer fragment test identifies the test constituent by seeing if it can be questioned using a single question word. These tests all succeed at identifying *the concept* as a constituent, as shown in (1a–e).

To provide a second example, the five tests (actually only four of them) are applied next to the noun *Sam*:

- (2) Sam has explained **the concept**.
 - a. (Inapplicable) – Topicalization
 - b. It is **Sam** that has explained the concept. – Clefting
 - c. The one who has explained the concept
is **Sam**. – (Pseudoclefting)
 - d. He has explained the concept.
(*He* = *Sam*) – Proform substitution
 - e. Who has explained the concept? – **Sam**. – Answer fragment

Since the test string *Sam* is already at the front of the sentence, topicalization is not an applicable test, as indicated in (2a). In addition, the fact that *Sam* is human means that the *what* of the pseudoclefting test cannot be used, hence it has been

1. A proform is a word that stands in for another word or phrase. While pronouns are typical proforms, other types of proforms also exist, e.g. pro-adverbs (*then*, *there*), pro-verbs (e.g. *do so*, *do that*), pro-adjectives (*such*), etc.

replaced by *the one who* in (2c). Despite these qualifications, the tests deliver enough evidence to conclude that the subject noun *Sam* is a constituent, a fact that should not surprise anyone.

The success of the five diagnostics at identifying *the concept* and *Sam* as constituents can be compared with their failure (or success depending on point of view) to identify a non-constituent string as a constituent. For instance, the tests reveal that *explained the* in the same sentence, which is repeated here as (3), is NOT a constituent:

- (3) Sam has **explained the concept**.
 - a. *...and **explained the** Sam (certainly) has concept. – Topicalization
 - b. *It is **explained the** that Sam has concept. – Clefting
 - c. *What Sam has concept is **explained the**. – Pseudoclefting
 - d. *Sam has **that/so** concept.
(*that/so = explained the*) – Proform substitution
 - e. *What has Sam concept? – *Explained the. – Answer fragment

These tests unanimously verify that *explained the* is NOT a constituent.

The five tests for constituents just introduced and illustrated with Examples (1)–(3) as well as other such tests play a major role in the theory of syntax presented in this book. The stance adopted here is that the tests deliver crucial clues about the nature of syntactic structure, and a theory of syntax can and should be as congruent as possible with what the tests reveal about sentence structure. Much more information about the tests is given in Chapter 3, especially in Section 3.2 – the interested reader can jump ahead to read that section. At present, some difficulties associated with the tests must be acknowledged. When using the tests, one needs to be aware of certain inconsistencies associated with their use.

Sometimes the tests appear to deliver inconsistent and thus contradictory results. This point is illustrated here by applying the five tests to the string *explained the concept* in (1)–(2), that sentence repeated again next as (4):

- (4) Sam has **explained the concept**.
 - a. ...and **explained the concept**, Sam (certainly) has. – Topicalization
 - b. *It was **explained the concept** that Sam has. – Clefting
 - c. *What Sam has is **explained the concept**. – Pseudoclefting
 - d. *Sam has **that**.
(*that = explained the concept*) – Proform substitution
 - e. *What has Sam? – Explained the concept. – Answer fragment

Four of the five tests seem to suggest that *explained the concept* is NOT a constituent. Topicalization, however, suggests that *explained the concept* is a constituent. This disagreement demonstrates the point, namely that diagnostics for constituents are imperfect in their ability to verify the status of strings as constituents or non-constituents. In this case, topicalization, a *permutation test*, disagrees with the other four tests, which are *proform tests*. Permutation tests rearrange the order of the words in the sentence, whereas proform tests always involve a proform. Since the proforms *that* and *what* are pronouns (as opposed to pro-verbs), it is not surprising that they cannot identify the verb phrase *explained the concept* as a constituent.

If, however, the proform tests employ the verbal proform *do (that)*, then three of them succeed at identifying *explained the concept* as a constituent:

- (5) Sam has explained the concept.
 - a. ??It is **explained the concept** that Sam has done. – Clefing
 - b. What Sam has done is **explained the concept**. – Pseudoclefing
 - c. Sam has **done that**. (done that = *explained the concept*) – Proform substitution
 - d. What has Sam done? – **Explained the concept**. – Answer fragment

Pseudoclefing, pronominalization, and answer fragments now suggest that *explained the concept* is a constituent. Only clefing suggests otherwise. Based upon such results, it is reasonable to conclude that *explained the concept* is indeed a constituent. The fact, however, that the tests are still inconsistent insofar as one of the tests, i.e. clefing, contradicts the other four further illustrates the imperfect nature of such tests. No conclusion about constituent structure should be reached based on the results of just a single test.

Beyond the fact that the results of diagnostics for constituents often contradict each other, two further difficulties are associated with the tests. First, some of them are language-specific, and second, the results can vary dramatically based upon the language under investigation. In fact, exposure to the use of the tests reveals that they are employed mainly in introductory syntax and linguistics textbooks that are introducing the notion of constituent structure in English. Consider in this regard that a permutation test such as topicalization is going to deliver drastically different results in a free word order language like Russian. Despite these difficulties, the position here is that diagnostics for constituents, if employed with caution, nevertheless deliver important clues about sentence structure. They actually provide the main argument in favor of dependency syntax (Section 3.3).

1.3 Phrases

Using the five diagnostics for constituents from the previous section, one can identify multi-word constituents. These multi-word constituents can be classified as *phrases* or *clauses*, whereby phrases are distinguished from clauses mainly by the absence/presence of a finite verb. The preceding section took the existence of phrases for granted. The discussion will now make the phrase concept more precise.

Each phrase can be classified in terms of one of its words. That is, one word in any given phrase is more prominent than the other words in that phrase. The prominent word in a phrase is called the *head* or the *root*, depending on the particular theory of sentence structure that one is employing. The current theory shall use the term *root*; the term *head* is reserved for another unit (see Section 4.3). The category of the root is then used as the identifier for the entire phrase. A phrase in which a noun is most prominent is a noun phrase, a phrase in which an adjective is most prominent is an adjective phrase, etc. At least six of the approximately ten parts of speech correspond to phrase categories. The following list is an overview of phrase types:

Table 2.

Type of phrase	Abbreviation	Examples
Adjective phrase	AP	<i>very happy, quite lucky, satisfied with that</i>
Adverb phrase	AdvP	<i>most probably, too slowly, very gracefully</i>
Determiner phrase ²	DP	<i>the man I know's, my sibling's, a woman from England's</i>
Noun phrase	NP	<i>a book, strong love, the aura of success</i>
Prepositional phrase	PP	<i>behind you, down there, without salt</i>
Verb phrase	VP	<i>change something, having left immediately</i>

Coordinators and particles are not generally viewed as being capable of serving as phrase roots. Most determiners are not capable of being phrase roots, but possessive 's is an exception. Subordinators usually introduce clauses and are hence closely associated with clauses. We shall therefore not acknowledge subordinator phrases in this book, although one could certainly make a case for doing so.

The understanding of the phrase just introduced and henceforth employed in this book matches the use of the term in everyday speech, where a phrase consists of two or more words. One should be aware, however, that other theories of grammar

2. The DPs assumed here are much different from the DP analysis of nominal groups associated with some theories of syntax. A DP in the current grammar has possessive 's as its root, whereas DPs in many other theories see any nominal group containing a determiner as a DP, e.g. *the house*. See Section 4.10.

define the phrase in terms of structure and that accordingly, single words – especially nouns and pronouns – often end up qualifying as phrases. This practice is a source of confusion that is avoided here. In this book, a phrase always consists of two or more words (see Section 4.2).

1.4 Grammatical relations

The standard example produced in grammar school when introducing the grammatical relations involves a predicate of giving, e.g.

Table 3.

Subject	Verb	Indirect object	Direct object
The man	gave	Susan	the book.

The explanation produced is that the subject is the entity that performs the action, the direct object is the entity that is acted upon, and the indirect object is the entity that receives the direct object or benefits from the action. Two things can be noted about this traditional explanation. First, it is *relational*. That is, the grammatical relation of a constituent cannot be understood in isolation, but rather it is identified by considering how it relates to other parts of the clause in which it appears. The second point is that the explanation is essentially semantic in nature. The grammatical relations of constituents are identified by examining the meaning that the clause conveys.

There are, however, obvious problems with a purely semantic explanation of the grammatical relations. These problems are evident with sentences of the following sorts:

- (6) a. Susan was given the book.
- b. We know the man giving Susan the book.

Purely semantic considerations suggest that *Susan* in (6a) should be the indirect object, since she is still the one receiving the book, and in (6b) *the man* might still be viewed as the subject, since he is still giving the book to Susan. Analyses of this sort lack insight, however, since the syntax takes *Susan* to be the subject in (6a) and *the man giving Susan the book* as the object in (6b). The syntax in such cases is relying on morphological considerations (i.e. subject-verb agreement) and positional considerations (i.e. the subject precedes and the object follows the finite verb).

A further difficulty facing attempts to define the grammatical relations purely in terms of semantic considerations occurs with alternations like the following one:

- (7) a. The woman gave Fred the book.
 b. The woman gave the book to Fred.

The meaning of these two sentences is essentially the same. But if semantic considerations alone identify the direct and indirect object, then *Fred* should be viewed as the indirect object in both cases. This analysis ignores, however, the role played by the preposition *to*. Prepositions are, namely, assumed to introduce prepositional objects (i.e. objects of prepositions), not indirect objects. Furthermore, passivizing sentence (7a) to *Fred was given the book* suggests that *Fred* should be viewed as the direct object in (7a), since the direct object becomes the subject in the passive counterpart to an active sentence.³

The considerations in the preceding paragraphs cast doubt on any attempt to define the grammatical relations purely in terms of semantic notions. Furthermore, the stance here is that the traditional semantic distinction between direct and indirect objects is inconsistent and should therefore be rejected.⁴ In other words, the following breakdown of the grammatical relations is rejected here:

Table 4.

Partition of grammatical relations rejected here			
subject	direct object	indirect object	prepositional object

In place of this breakdown, an analysis of the grammatical relations is assumed that, in addition to purely relational semantic criteria, also observes morphological, positional, and discourse-pragmatic considerations. Based on these additional areas, the understanding of the grammatical relations that arises assumes the following partition:

Table 5.

Partition of grammatical relations assumed here		
subject	object	
	bare object	
first object	second object	prepositional object

3. Note that when one passivizes (7a) over *the book*, the result is strongly marginal: ??*The book was given Fred* (vs. *The book was given to Fred*).

4. There is agreement here with Miller (2011: 199–202) in this area. Note that Miller prefers the term *oblique object* over *prepositional object*.

The distinction between *bare objects* and *prepositional objects* is defined purely by the presence/absence of a preposition. An object introduced by a preposition is a prepositional object, whereas an object that lacks a preposition is a bare object. Concerning bare objects, a first object immediately follows the verb (e.g. *A man gave Susan the book*) and the second object follows the first object (e.g. *A man gave Susan the book*). Further subdivisions are certainly possible, especially with respect to the morphological case of objects (English lacks morphological case for the most part).

The key aspect of the breakdown is the initial division into subject and object. Maintaining this breakdown necessitates that one can consistently identify subjects and thus distinguish them from objects. In this regard, semantic, morphological, positional, and discourse-pragmatic considerations all contribute to identifying subjects.

1.5 Subjects

Given a sentence like *Bill saw Fred*, most people identify *Bill* as the subject and *Fred* as the (direct) object. In English, the subject typically precedes the finite verb in declarative clauses. Difficulties can arise, however, with any sentence that deviates from the standard SV (subject-verb) pattern, e.g.

- (8) There was a man and a woman at the door.

It is not clear in (8) whether *there* or *a man and a woman* should be viewed as the subject. The fact that *there* precedes the finite verb suggests that it should be taken as the subject. Furthermore, the finite verb appears in 3rd person singular, a fact that contradicts the semantic plurality of *a man and a woman* – subject and finite verb typically agree in person and number. But *there* is semantically empty and the sentence clearly tells us something about *a man and a woman*, not about *there*. These further considerations suggest that *a man and a woman* should be the subject.⁵

Example (8) illustrates that at least three criteria are employed to identify subjects: a positional criterion, a morphological criterion, and a discourse-pragmatic criterion. These three criteria are summarized as follows:

5. Starosta (1988: 187) takes existential *there* to be the subject in such cases because it takes part in subject-auxiliary inversion (e.g. *There are... → Are there...?*) and remains overt in cases of VP-ellipsis (e.g. *Are there problems? – Yes, there are*). Anderson (2006: 157, 216) assumes two subject notions to account for existential *there*-constructions: *there* is the *positional subject* but the post-copula nominal group is the *inflectional subject*.

Table 6.**Criteria for identifying subjects**

Positional criterion	The subject typically precedes the finite verb in declarative sentences in English.
Morphological criterion	The subject and finite verb typically agree, that is, they are congruent with respect to morphology of person and number, and in languages with morphological case, the subject is marked with a particular case (e.g. the nominative).
Discourse-pragmatic criterion	The subject is typically the entity about which something is said, that is, the sentence/clause provides information about the subject.

The positional criterion is a strong tendency across numerous languages. Given neutral declarative force, the subject tends to precede the object(s). The morphological criterion is also a strong tendency. Many languages have subject-verb agreement, but lack object-verb agreement, and if a language has object-verb agreement, it necessarily also has subject-verb agreement. Furthermore, languages with rich inflectional systems mark the subject with nominative case (accusative languages) or ergative case (ergative languages). The discourse-pragmatic criterion is also a strong tendency across languages; the subject is typically the entity about which one wants to say something when producing an utterance.

The difficulties arise when these three criteria come in conflict. In the case of Example (8), the discourse-pragmatic criterion contradicts the positional and morphological criteria. This situation presents the grammarian with a dilemma: in order to acknowledge a subject, one must ignore at least one of the three criteria. The following examples further illustrate clashes of the three criteria:

- (9) a. *?Nothing have we kept secret.*
- b. *It upset us, the music.*
- c. *The problem ?is/??are these contradictions.*

Sentence (9a) has the positional criterion and the discourse-pragmatic criterion contradicting the morphological criterion. The impersonal pronoun *nothing* precedes the finite verb (positional criterion) and the sentence appears to be a statement about *nothing* (discourse-pragmatic criterion), but the finite verb agrees with *we* (morphological criterion). In sentence (9b), the positional criterion (and the morphological criterion) suggests that *it* is the subject, but the discourse-pragmatic criterion clearly sees *the music* as the subject. Sentence (9c) is particularly interesting. The positional and the discourse-pragmatic criteria conflict, the result being that the morphological criterion can swing either way, whereby neither choice is really very good.

The problem identifying subjects is not limited to English, but rather it is a common occurrence across languages. German is a rich source of such conflicts, e.g.

- (10) a. Mir gefallen die Preise.
me.DAT please the prices
'I like the prices.'
- b. Dir ist kalt.
you.DAT is cold
'You are cold.'
- c. Oft wird getanzt.
often become danced
'Often one dances.'

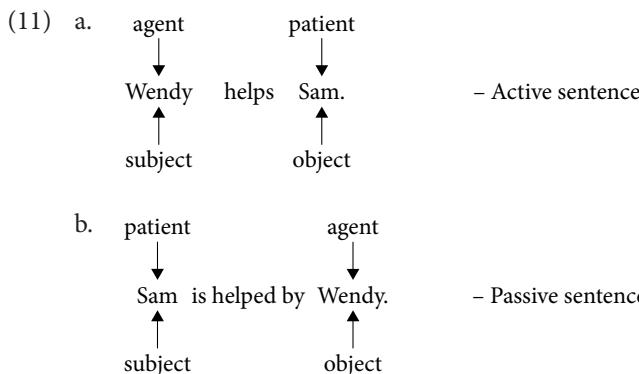
Sentence (10a) has the positional and discourse-pragmatic criteria contradicting the morphological criterion. The sentence is about *mir*, but the verb agrees with *die Preise*. Sentence (10b) also has the positional and discourse-pragmatic criteria contradicting the morphological criterion. The fact that *dir* is dative, not nominative, discourages one from viewing *dir* as the subject. Sentence (10c) is particularly problematic, since it completely lacks a constituent which could be viewed as the subject. The adverb *oft* 'often' is hardly a candidate for subject status.

The discussion of subjects so far has demonstrated that at times there are significant difficulties identifying the/a subject. Based upon these difficulties, one might opt to reject the subject concept in general, which would necessitate rejecting the entire inventory of grammatical relations outright. As a consequence, the study of syntax and grammar would have to get by without these "dubious" concepts. The stance taken here is that this conclusion is unwarranted. In the majority of sentences, the three criteria overlap, delivering a clear candidate for subject status. And when the criteria conflict, the conflict can be overcome by ranking the three criteria. The morphological criterion is viewed as the strongest indicator identifying a subject. The discourse-pragmatic criterion comes in second, and the positional criterion is a distant third.

Concerning the positional criterion, its influence is much stronger in languages like English that have a poor system of inflectional markings. These languages rely more heavily on word order to establish the grammatical relations of constituents. Languages that have richer inflectional systems, like German, can rely more on the inflectional case markings to establish subject status.

1.6 Semantic roles

In addition to the grammatical relations, most theories of grammar acknowledge *semantic roles* (e.g. agent, experiencer, goal, patient, theme, etc.), which are also called *case relations*, *thematic roles*, *thematic relations*, *theta roles*, etc. Unlike the grammatical relations however, semantic roles are understood purely in terms of relational semantic considerations, which means the role assigned to an expression can remain consistent as the syntactic constellation containing that expression is altered. The clearest illustration of this state of affairs is evident with the passive-active alternation:



Wendy remains the agent as one goes from the active sentence (11a) to the passive sentence (11b), and *Sam* remains the patient. This consistency obtains despite the fact that the grammatical relations of the expressions vary.

While many theories of grammar acknowledge the semantic roles, there is no consensus about an inventory of these roles. Furthermore, the semantic contribution of, for instance, a patient (or a beneficiary, or an experiencer, etc.) is often unclear and inconsistent. That is, grammarians employ the notions liberally and with much variation. The following definitions of (some of) the semantic roles serve merely as orientation:⁶

6. Inventories of semantics roles are frequent (e.g. Fillmore 1968, 1971; Starosta 1988: 126; Haegeman 1991: 41–2; Heringer 1996: 64; Eroms 2000: 178–83; Starosta 2003a: 276), although the actual inventories of roles assumed vary significantly.

Table 7.

Semantic roles	
Agent	An animate entity that performs an action willingly or knowingly, e.g. <u>You are reading this text.</u>
Beneficiary	An animate entity that in some sense either benefits from, or is harmed or hindered by, an action, event, occurrence, or state of affairs, e.g. <u>She cleaned the kitchen for us.</u>
Cause	An inanimate entity, event, occurrence, or state of affairs that affects another entity or evokes another occurrence or state of affairs, e.g. <u>The shortage of gasoline generated panic.</u>
Experiencer	An animate entity that experiences an action, event, occurrence, or state of affairs, e.g. <u>The suggestion impressed the boys.</u>
Goal	A destination or endpoint of literal or metaphorical movement, e.g. <u>We put it in the box.</u>
Instrument	The object used by an agent to help accomplish a goal or task, <u>He turned the sausages with grabbers.</u>
Location	The place where an entity is located or where an event, occurrence, or state of affairs occurs or holds, e.g. <u>Fred sleeps on the sofa.</u>
Origin	The origin of a literal or metaphorical movement, e.g. <u>She came directly from Austin.</u>
Patient	An entity that is affected by an action or occurrence, e.g. <u>They picked her up.</u>
Recipient	An animate entity that receives an entity, e.g. <u>She sent you a card.</u>
Theme	An entity that is acted upon or of which a property is predicated, e.g. <u>He solved the problem, That is funny.</u>
Time	A point in time, interval in time, or frequency in time for which an action, event, occurrence, or state of affairs occurs or holds, e.g. <u>We left immediately.</u>

This list is by no means exhaustive, and worth emphasizing again is that there is no consensus about how many roles exist and exactly how each role should be defined.⁷ For instance, “patient” and “theme” are often used almost interchangeably, although the preference here is to use “patient” for animate entities and “theme” for inanimate ones.

There are a number of correspondences that one can note about these roles. An agent role is closely associated with the subject in an active sentence and the object of the preposition *by* in a passive sentence. A beneficiary is often marked by the preposition *for*. An experiencer is associated with a specific class of predicates, called *psychological predicates* (e.g. *anger*, *annoy*, *impress*, *please*, *surprise*, *upset*, etc.) and with the dative case (in languages that have morphological case). An

7. Concerning the lack of agreement about the inventory of semantic roles, numerous linguists point out that there is no consensus about an inventory of these roles (see for instance Tarvainen 1981: 17; Schubert 1987: 196; Starosta 1988: 117, 180; Eroms 2000: 178–83; Anderson 2006: 222).

instrumental role is closely associated with the preposition *with*. A location role is often marked by a preposition of locality (e.g. *above*, *in*, *on*, *under*, etc.). And a recipient can appear by virtue of the appearance of a theme and is thus associated with ditransitive verbs.

In addition to the lack of consensus about the inventory and definitions of the semantic roles, there is another problem associated with them. Their usefulness for arriving at semantic generalizations is challenged by certain cases. Examine the following four sentences with respect to the semantic roles that one assigns to each of the indicated expressions:

- (12) a. agent theme goal
 ↓ ↓ ↓
 We loaded hay onto the wagon.
- b. agent ? ?
 ↓ ↓ ↓
 We loaded the wagon with hay.
- c. theme goal agent
 ↓ ↓ ↓
 Hay was loaded onto the wagon by us.
- d. ? ? agent
 ↓ ↓ ↓
 The wagon was loaded with hay by us.

These four sentences are closely similar in meaning. It is problematic, however, to assign the same role to *the wagon* and *hay* across the four sentences. *The wagon* in (12b) and (12d) seems like it should be the theme, not the goal, and *hay* in (12b) and (12d) seems like it should be an instrument, not a theme. What is necessary to account for these four cases is perspective. If the perspective changes, the semantic role of a given entity can also change despite the fact that the core meaning remains largely the same.⁸

While there is a lack of agreement about the inventory of semantic roles and perspective impacts how they are construed, they are nevertheless a useful tool in the grammarian's toolbox. The difficulty establishing clear definitions across broad swaths of language is not a problem if the roles that one employs remain consistent

8. For discussion of examples like (12a–d) and the difficulties they pose for theories of semantic roles, see Miller (2011: 205–7).

in the given context of comparison. As an example of this point, consider the following sentences:

- (13) a. experiencer theme
 ↓ ↓
 Susan likes beans.
- b. theme experiencer
 ↓ ↓
 Beans please Susan.

If the grammarian who is pointing to the similarity in meaning across these two sentences has a clear and consistent understanding of the experiencer and theme roles, the similarity in meaning that the roles help express is insightful.

1.7 Predicates, arguments, and adjuncts

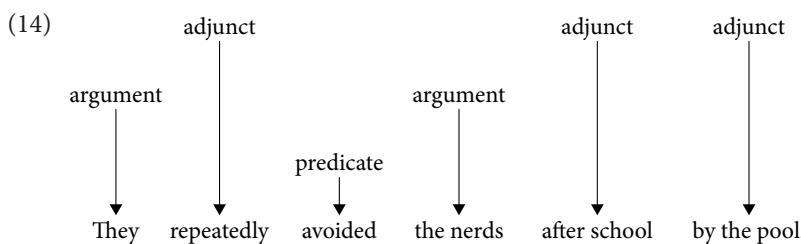
A prominent distinction for theories of semantics, syntax, and grammar is that between predicates, arguments, and adjuncts. *Predicates* are relational units of meaning that help to assign a property to an argument or to establish a relationship between *arguments*. Arguments are units of core meaning that serve to complete the meaning of a predicate, and *adjuncts* are units of circumstantial meaning that appear in order to modify the core meaning of a predicate and its arguments.⁹ A predicate opens slots for its arguments; it does not, however, open slots for adjuncts. Rather, the adjuncts appear to modify the core meaning established by the predicate and its arguments. The distinction between arguments and adjuncts is central for most theories of grammar, since numerous phenomena of syntax are sensitive to the distinction.

There may be confusion concerning the term *predicate*, however. Many grammars understand a predicate to be everything in a sentence except the subject. Thus, in a sentence such as *Frank likes cats*, the string *likes cats* is deemed to be the predicate. Such an understanding of predicates is rejected here. Instead, an

9. The distinction between arguments and adjuncts is central to most theories of syntax and grammar. Dependency grammars have been concerned with the distinction between arguments and adjuncts since very early on, starting with Tesnière (1959/2015: Chapter 48, see also Weber 1992: 34–6). Tesnière called arguments *actants*, and adjuncts *circonstants*. DG accounts of the argument vs. adjunct distinction are in general numerous (e.g. Heringer 1996: 157–8; Hudson 2007: 162–6). Note that some theories employ the term *complement* instead of *argument* (e.g. Starosta 1988; Heringer 1996; Hudson 2007).

understanding of predicates is assumed that is inspired by *predicate calculus*, as associated with the logician Gottlob Frege (1848–1925). Predicates are, as stated above, units of meaning that assign a property to an argument or establish a relationship between arguments. On this alternative understanding of predicates, content verbs and adjectives are typical predicates, e.g. *eat*, *laugh*, *see*, *work*, *study*, *happy*, *angry*, *hungry*, etc., whereas the object of a content verb or adjective is typically one of its arguments. Section 2.3 has more to say about the traditional binary division of the clause into a subject and a predicate that is rejected here.

When applied to clauses and sentences, a typical argument is a subject or object NP, and a typical adjunct is an adverb or a PP. The following sentence provides an initial illustration of these distinctions:



The subject pronoun *they* and the object NP *the nerds* are the arguments of the predicate *avoided*. The frequency adverb *repeatedly*, the PP of time *after school*, and the PP of location *by the pool* are adjuncts. The placement of the designations on different levels is intended to symbolize the contribution to core meaning. The predicate *avoided* is the epicenter of meaning and its designation therefore positioned lowest; it establishes a relation between its arguments *they* and *the nerds*, the designations for which appear on the next level up. The three adjuncts provide additional meaning that is in some sense non-essential, and so their designations appear above those for the arguments.

The concept of predicates and arguments assumed here originates with *predicate logic*. Traditionally, predicate logic has listed predicates and their arguments in a manner similar to what is given here next:

(15)	Sentence	Predicate-argument structure
a.	It rained.	RAINED()
b.	Larry slept.	SLEPT(LARRY)
c.	We eat pizza.	EAT(WE, PIZZA)
d.	They sent him a present.	SENT(THEY, HIM, A PRESENT)

Small caps are used when producing predicate-argument structures. The predicate appears on the left, and the arguments that it takes are given in brackets. The predicate *rained* takes no arguments; it is *avalent* – the pronoun *it* that appears with it

is semantically empty. The predicate *slept* is *monovalent*; it takes a single argument. The predicate *eat* is *divalent*; it takes two arguments, and the predicate *sent* is *trivalent*; it takes three arguments.

While content verbs are viewed as canonical predicates, adjectives too are acknowledged as predicates. Most adjectives are monovalent, taking just a single argument. Some adjectives are bivalent, though:

(16)	Sentence	Predicate-argument structure
a.	The dog is big.	IS BIG (THE DOG)
b.	The cat is fat.	IS FAT (THE CAT)
c.	Sue is satisfied with the cake.	IS SATISFIED (SUE, WITH THE CAKE)
d.	They are angry at the students.	ARE ANGRY (THEY, AT THE STUDENTS)

The copular verb *is* is included with the adjective each time because from a technical point of view, the two together form the predicate – more about this below in Chapter 5. While content verbs and adjectives are the most commonly acknowledged types of predicates, other categories can also be acknowledged as predicates. In particular, any category that can appear with a predicative function can be construed as a predicate, e.g.

(17)	Sentence	Predicate-argument structure
a.	The man is a soldier.	IS A SOLDIER (THE MAN)
b.	The cake is in the fridge.	IS IN (THE CAKE, THE FRIDGE)
c.	The party is before the game starts.	IS BEFORE (THE PARTY, THE GAME STARTS)

Example (17a), in which the noun *soldier* serves as the core of the predicate, suggests that most any noun can be viewed as a predicate. Example (17b), in which the preposition *in* is the core of the predicate, and Example (17c), in which the subordinator *before* is the core of the predicate, demonstrate that prepositions and subordinators can also appear as predicates.¹⁰

The predicates and arguments just illustrated generally allow adjuncts to appear with them as well. The number of arguments that predicates take is limited, whereas they allow adjuncts to appear with them more freely.¹¹ The following sentences are repeated from above, but one or two adjuncts have been added to each sentence:

10. The term *subordinator* is used in this book; it is synonymous with *subordinate conjunction*.

11. Sgall et al. (1986: 127) characterize the distinction between arguments and adjuncts in terms of two criteria: adjuncts appear freely, that is, they are not limited in their distribution by the predicates with which they co-occur, and more than one adjunct of the same type can appear in a clause, e.g. *Due to the weather, we stayed in because we didn't want to get wet* – two causal adjuncts.

- (18) a. It rained yesterday.
b. Larry slept on the couch in the afternoon.
c. We eat pizza when we can.
d. They sent him a present because they had to.
e. The dog is probably big.
f. The cat is fat because it eats too much.
g. Sue is certainly satisfied with the cake some of the time.
h. They are always angry at the students at test time.
i. The man is a soldier on the weekend in order to earn extra money.
j. Most importantly, the cake is in the fridge so that it keeps longer.
k. This time the party is before the game starts.

The expression(s) in bold in each of these sentences is/are adjuncts. Their appearance is not necessary to complete the meaning of the predicate, but rather they appear to add additional information about the predicate and arguments that are present.

As stated above, the notions of predicate and argument originate with the study of predicate logic, and in this regard, they are in fact more semantic than syntactic concepts. The current grammar, however, follows a prominent trend in applying these (what are essentially) semantic concepts to the study of syntax, acknowledging predicates and arguments in sentence structure as just done above. Worth noting in this regard is that there is a related concept that is entirely syntactic. The term *complement* is often used to denote what is an object argument. Thus, in a sentence such as *We ate pizza*, the noun *pizza* is said to be the complement of the verb *ate*. Both of these terms, i.e. *argument* and *complement*, are used below more generally in this book depending on the context. The term *complement* is used to denote an expression that “completes” the combinatory necessities of another word such as a preposition or an auxiliary verb, whereas the term *argument* is used to denote an expression that fills a semantic slot opened by a predicate. Often the two terms can be used interchangeably.

1.8 Identifying arguments and adjuncts

One can distinguish between arguments and adjuncts in sentence structure via discovery diagnostics.¹² One prominent diagnostic in this area is *omission*. If an expression cannot be omitted without rendering the sentence unacceptable, then

¹². The distinction between arguments and adjuncts was established extensively in the 1970s in the literature on valency in Germany. Numerous diagnostics were employed for distinguishing between arguments and adjuncts in German, and these same diagnostics can be adapted and

that expression is assumed to be an argument (or a predicate).¹³ Applying this diagnostic to the first example in the previous section, *they* and *the nerds* appear to be arguments.

- (19) They repeatedly avoided the nerds after school by the pool.
- a. * Repeatedly avoided the nerds after school by the pool.
 - b. *They repeatedly avoided after school by the pool.

Since neither *they* nor *the nerds* can be omitted without rendering the sentence unacceptable, both are assumed to be arguments. Their status should be compared with that of *repeatedly*, *after school*, and *by the pool*. These constituents CAN be omitted without rendering the sentence unacceptable:

- (19) c. They avoided the nerds.

Based on these data, one can conclude that *they* and *the nerds* are indeed arguments and that *repeatedly*, *after school*, and *by the pool* are adjuncts.

A second diagnostic that can be used to distinguish between arguments and adjuncts separates off the test constituent and places it in a relative clause introduced by *which happened*.¹⁴ If the result is acceptable, the test constituent is an adjunct. If the sentence is unacceptable, the test constituent may be an argument:

- (20) a. *Avoided the nerds, which happened they.
 b. *They avoided, which happened the nerds.
 c. They avoided the nerds, which happened repeatedly.
 d. They avoided the nerds, which happened after school.
 e. They avoided the nerds, which happened by the pool.

This diagnostic is called the *relativization diagnostic* here. The relativization diagnostic confirms that *they* and *the nerds* are arguments and that *repeatedly*, *after school*, and *by the pool* are adjuncts.

A third diagnostic that helps distinguish between arguments and adjuncts is *substitution*. The expression *do so* or the question *what...do...?* are substituted

employed for English. Happ (1976: 329–36) and Korhonen (1977: 129–62) discuss the diagnostics and problems associated with them in detail.

13. Omission is used here to help distinguish between arguments and adjuncts. Omission has also been used in the context of dependency grammar to identify *constituents* (Weber 1992: 45) (see Sections 1.2 and 3.2). Furthermore, the omission test is a helpful for identifying the direction of *government* (see Section 4.7).

14. Diagnostics for identifying arguments and adjuncts in terms of a separate clause (as done here in terms of a relative clause) are frequently employed and discussed (e.g. Happ 1976: 358–9, 442; Tarvainen 1981: 26–31).

into the sentence. Adjuncts can appear with these elements, but object arguments cannot, e.g.

- (21) a. They did so **repeatedly**.
 b. They did so **after school**.
 c. They did so **by the pool**.
 d. *They did so **the nerds**.

- (22) a. What did they do **repeatedly**?
 b. What did they do **after school**?
 c. What did they do **by the pool**?
 d. *What did they do **the nerds**?

The acceptable a-, b-, and c-sentences suggest that *repeatedly*, *after school*, and *by the pool* are adjuncts and the d-sentences reveal that *the nerds* is an argument. For some unknown reason, expressions that stand in for verb phrases necessarily incorporate any object argument of that verb, but they need not incorporate adjuncts on that verb.

The expressions in Examples (20)–(22) are straightforward insofar as the results of the omission, relativization, and substitution diagnostics agree. The results of these diagnostics can disagree, however, a situation that clouds the distinction between arguments and adjuncts. Examine the following examples in this regard:

- (23) Fred has eaten the eggplant.
 - a. Fred has eaten. – Omission
 - b. *Fred has eaten, which happened the eggplant. – Relativization
 - c. *Fred did so the eggplant. – Substitution

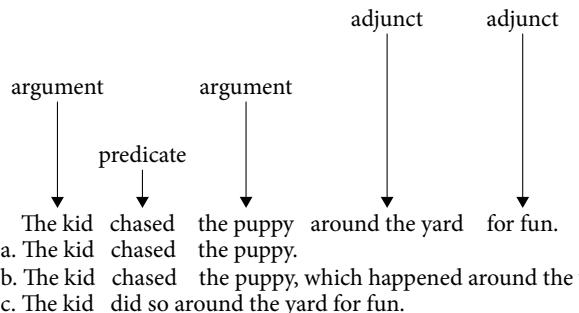
- (24) We talked about politics.
 - a. We talked. – Omission
 - b. *We talked, which happened about politics. – Relativization
 - c. *We did so about politics. – Substitution

- (25) You waited for me.
 - a. You waited. – Omission
 - b. *You waited, which happened for me. – Relativization
 - c. *You did so for me. – Substitution

These diagnostics now deliver contradictory results. According to omission, *the eggplant*, *about politics*, and *for me* are adjuncts. But according to relativization and substitution, these expressions are arguments. Such cases uncover a difficulty that challenges the argument vs. adjunct distinction.

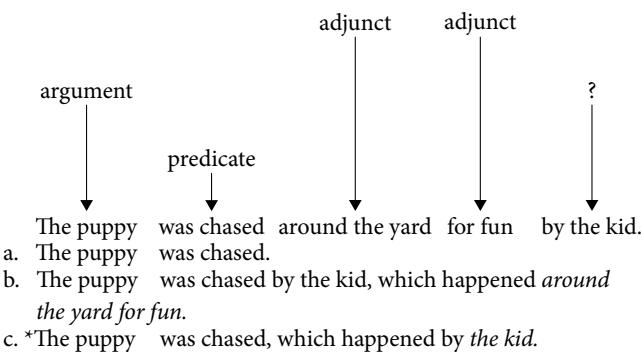
The difficulty facing the argument vs. adjunct distinction is illustrated further with the following examples:

(26)



The diagnostics now agree again: *around the yard* and *for fun* are adjuncts. The difficulty arises when the sentence is expressed in its passive form:

(27)



The substitution diagnostic is inapplicable here (due to the passive). The PPs *around the yard* and *for fun* are again identified as adjuncts. The results are, however, contradictory for the PP *by the kid*. The omission diagnostic illustrated in (27a) suggests that *by the kid* is an adjunct, whereas the relativization diagnostic shown in (27c) suggests that it is an argument. Consider in this respect that in the active counterpart (26), the subject *the kid* is an argument, since subjects are generally arguments. Furthermore, the predicate-argument structure of predicate logic, CHASED (THE KID, THE PUPPY), necessitates an analysis that views *the kid* as an argument.¹⁵

These observations suggest that the traditional argument-adjunct distinction is insufficient at a basic level. This situation might motivate one to reject of the distinction outright. This conclusion would be unwarranted, however, and it would be contrary to most theorizing in the area. The data examined above can be rectified

¹⁵. Korhonen (1977: 191) lists numerous accounts that agree with the conclusion here, namely that the *by*-phrase is an optional argument. These accounts take the German equivalent of the *by*-phrase (*von*-phrase/*durch*-phrase) as an argument.

if one acknowledges a ternary distinction as opposed to just a binary one. In addition to the distinction between arguments and adjuncts, one distinguishes between obligatory and optional arguments:¹⁶

Table 8.

Arguments vs. adjuncts			
	Can be omitted	Can appear in separate relative clause	Can appear despite substitution
Obligatory arguments	No	No	No
Optional arguments	Yes	No	No
Adjuncts	Yes	Yes	Yes

The omission diagnostics groups optional arguments with adjuncts, whereas the relativization and substitution diagnostics group them with obligatory arguments. When the results of the diagnostics are in conflict, one is dealing with an optional argument. Thus, *the eggplant* in (23), *about politics* in (24), *for me* in (25), and *by the kid* in (27) are optional arguments.

The ternary division receives support from a fourth, little known diagnostic. When interrogative *wh*-elements are coordinated, the pattern associated with the omission diagnostic occurs again:

- (28) Bill ate a hamburger at 2pm.
 - a. What and when did Bill eat?
 - b. *Who and what did eat at 2pm?
 - c. *Who and when did eat a hamburger?
- (29) Fred helped Susan in the garage.
 - a. ?Who and where did Fred help?
 - b. *Who and where did help Susan?
 - c. *Who and who did help in the garage?

The a-questions demonstrate that the PP adjunct in each case can be questioned when coordinated with the object. The b- and c-questions show, in contrast, that this sort of coordination is not possible when the subject is one of the expressions questioned. Now compare (28)–(29) with the following cases:

- (30) Bill picked up his daughter after school.
*Who and when did Bill pick up?
- (31) Sam stroked the cat with his foot.
*What and with what did Sam stroke?

16. See Hudson (2007: 164–5) for a discussion of certain types of complements (~arguments) that further cloud the distinction between arguments and adjuncts.

The questions are now bad, which demonstrates that not all *wh*-objects can be coordinated with *wh*-adjuncts. The relevant difference here is of course that the objects in (30)–(31) are obligatory arguments, whereas they are optional arguments in (28)–(29). This third diagnostic will be called the *wh-coordination diagnostic*.

In sum, the results delivered by the four diagnostics motivate the ternary division, whereby one distinguishes between obligatory arguments, optional arguments, and adjuncts. The omission and *wh*-coordination diagnostics group optional arguments with adjuncts, whereas the relativization and substitution diagnostics group them with obligatory arguments. A word of caution is necessary concerning these distinctions. While the ternary division discussed here is widely accepted and the argument vs. adjunct distinction is a pillar of most theories of grammar, there are numerous expressions that do not fit cleanly into one of the three categories identified (e.g. many determiners, particles of various sorts, depictive and resultative expressions). One should therefore not expect a given non-predicative expression to always be neatly classifiable into one of the three categories.

1.9 The content of adjuncts

The discussion of arguments and adjuncts in the previous section employed four operational diagnostics to help distinguish between arguments and adjuncts on the one hand and between obligatory and optional arguments on the other. Arguments and adjuncts, once identified as such, can be classified in terms of semantic and functional considerations. A given argument is placed in a subclass based upon the grammatical relation that it bears and the semantic role that it plays. Similarly, a given adjunct can be placed into a subclass based upon the semantic and/or functional content that it contributes. Some subclasses of adjuncts are now considered here.

Adjuncts appear as single words, phrases, and clauses. The adjuncts used for illustration in the previous section were single adverbs or PPs. The following data illustrate adjunct clauses:

- (32) a. That happened because it was raining. – Causal
- b. We stopped, although we wanted to continue. – Concessive
- c. He stays if he has time. – Conditional
- d. The market crashed so that everyone suffered. – Consecutive
- e. She left in order that he would stay. – Rationale
- f. That occurred where no one expected it to. – Locational
- g. We agree insofar as word order is concerned. – Restrictive
- h. They arrived after the presentation was over. – Temporal

The adjunct clauses are in boldface, and the type of adjunct clause in each case is listed to the right. For example, the subordinate adjunct clause *after the presentation was over* in (32h) contributes temporal meaning to the sentence, which means that it modifies the main clause in terms of time. The subordinate clause *so that everyone suffered* in (32d) is a consecutive adjunct, which means that it provides an/the effect associated with the cause expressed by the main clause.

Examples (32a–h) provide a sampling of the types of adjunct clauses that are widely acknowledged. A more complete list of adjunct types is now given, with a brief definition and some illustrative examples. Most of these adjunct types can appear as individual words, phrases, and/or clauses.¹⁷

Table 9.

Types of adjuncts

Causal	Indicates the cause in a cause-effect chain, e.g. <i>because..., because of..., due to..., for...</i>
Comitative	Indicates accompaniment, e.g. <i>with Fred, with the girls</i>
Concessive	Indicates a contrary fact or state of affairs, e.g. <i>although..., despite..., even though..., in spite of..., though...</i>
Conditional	Indicates a condition, e.g. <i>even if..., if..., when...</i>
Consecutive	Indicates the effect in a cause-effect chain, e.g. <i>so that..., that...</i>
Contextual	Indicates the connection in the flow of information provided by the speaker, e.g. <i>above all, first, however, in addition, in contrast, second, therefore</i>
Instrumental	Indicates the instrument with which a task is accomplished, e.g. <i>with the hammer, with your help</i>
Locational	Indicates the location of an entity, event, occurrence or state of affairs, e.g. <i>at..., between..., here, in..., on..., over..., there, where...</i>
Manner	Indicates the mode by which an action is performed, e.g. <i>carefully, fast, quickly, slowly, with difficulty</i>
Modal	Indicates the speaker's assessment of truth or actuality, e.g. <i>certainly, definitely, maybe, perhaps, possibly, of course</i>
Predicational	Functions as a predication over an argument, e.g. <i>drunk</i> in <i>Bill arrived drunk; spotless</i> in <i>They polished the tub spotless.</i>
Quantificational	Indicates the frequency or quantity of an event, occurrence, or state of affairs, e.g. <i>always, frequently, never, often, once, seldom, twice</i>
Rationale	Indicates a goal or purpose associated with an action or event, <i>in order that, for..., so that..., to...</i>
Temporal	Indicates when an action, event, or a state of affairs occurs or holds, e.g. <i>after..., before..., during..., while...</i>

¹⁷ Similar inventories of adjunct types can be found in numerous DGs (e.g. Tarvainen 1981: 91–3; Heringer 1996: 166–8; Eroms 2000: 230–46).

This list of adjunct types is by no means exhaustive. Furthermore, it is often difficult to place a given adjunct clearly into one of these categories. Many adjuncts appear to straddle two or more of the categories simultaneously. The designations employed are, however, widely encountered in grammars of all sorts.

One particular caveat concerning adjuncts must be mentioned. The adjunct types just listed are classified based upon their semantic contribution to the clause in which they appear. One should note in this regard that arguments can provide content that one normally associates with adjuncts, e.g.

- (33) a. London is pretty.
- b. I like mornings.
- c. The storm caused much misery.

The expression *London* is a location, but functions as the subject argument in (33a); the expression *mornings* indicates a time of day, but it functions as an argument in (33b); and the expression *the storm* is the cause of *much misery*, but it functions as the subject argument in (33c). These examples therefore demonstrate that the argument vs. adjunct distinction cannot be maintained based solely on semantic considerations. Functional and lexical considerations also play a major part.

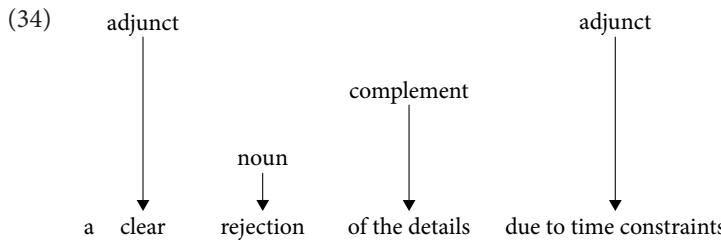
1.10 Complements and adjuncts within NPs

The discussion of arguments and adjuncts in the preceding sections has considered the distinction in the context of clauses. That is, the adjuncts in the examples so far appear within clauses, as opposed to within some smaller unit of structure. In this regard, the distinction is also crucial to the analysis of NPs and smaller units. The dependents of nouns can also be classified in a similar way, although instead of the term *argument*, the term *complement* is preferred in this domain.¹⁸ What this means is that within NPs, one can also distinguish between complement and adjunct dependents of nouns.¹⁹

The following example illustrates a predicate, a complement, and adjuncts within the NP *clear rejection of the details due to time constraints*:

18. The reason why the term *complement* is preferred in place of *argument* when examining the dependents of nouns is that it is difficult to view many nouns as predicates in the same way that verbs and adjectives are clearly predicates.

19. See Korhonen (1977: 172–4) for a discussion of nouns as predicates that take arguments and allow adjuncts.



The levels are again employed to symbolize the contribution provided by each expression. The derived noun *rejection* is the semantic core of the entire NP. The expression *of the details* is viewed as a complement for reasons that will be made clear momentarily. The expressions *clear* and *due to time constraints* are viewed as adjuncts also for reasons that will also be made clear momentarily.

The omission diagnostic employed in Section 1.8 to help distinguish between arguments and adjuncts sheds little light on the status of the expressions that make up NPs. Most expressions in NPs can be omitted without resulting in unacceptability, e.g. *a rejection of the details due to time constraints*, *a clear rejection due to time constraints*, *a clear rejection of the details*. This situation indicates that the omission diagnostic is either invalid as a diagnostic for the status of expressions that make up NPs, or many of the complements that may be present should be viewed as optional. The latter possibility may indeed be the more principled interpretation, for the relativization diagnostic produces results similar to those seen for clauses. Consider Example (34) in light of the following examples:

- (35) a. a rejection that was clear
b. *a rejection that was of the details
c. a rejection that was due to time constraints

The relativization diagnostic in such cases consists of placing the expression under scrutiny as the predicate of a relative clause that is introduced by *that/who is/was*. If the result is acceptable, the test constituent is likely an adjunct. If the result is unacceptable, the test constituent is likely a complement. Thus, the relativization diagnostic identifies *clear* and *due to time constraints* as adjuncts and *of the details* as a complement.

The relativization diagnostic is illustrated further with the following examples:

- (36) a. the removal of the problem - *Of the problem* is a complement.
b. *the removal that is of the problem

(37) a. the repetition of mistakes - *Of mistakes* is a complement.
b. *the repetition that is of mistakes

- (38) a. the start of spring – *Of spring* is a complement.
 b. *the start that is of spring
- (39) a. the book on the shelf – *On the shelf* is an adjunct.
 b. the book that is on the shelf
- (40) a. the person with my brother – *With my brother* is an adjunct.
 b. the person who is with my brother
- (41) a. the party after work – *After work* is an adjunct.
 b. the party that was after work

The relativization diagnostic identifies the *of*-PPs in (36a), (37a), (38a) as complements, whereas other PPs are adjuncts, as illustrated in (39)–(41). These data identify a broad generalization. This generalization is that *of*-PPs in NPs are usually complements, whereas many other PPs in NPs are usually adjuncts.²⁰

Not just *of*-PPs are usually complements in NPs; other PP-types can also be complements in NPs, for example:

- (42) a. our satisfaction with the weather – *With the weather* is a complement.
 b. *our satisfaction that was with the weather
- (43) a. his belief in ghosts – *In ghosts* is a complement.
 b. *his belief that is in ghosts
- (44) a. the reliance on low-wage workers
 b. ??the reliance that is on low-wage workers

The collocational nature of combinations like *satisfied with* and *believe in* forces the PP in such cases to take on complement status. The fact that Example (44b) seems not entirely bad reveals a difficulty. The acceptability judgments are at times less than clear, a situation that suggests that a continuum may be a more accurate means of construing the complement vs. adjunct distinction, prototypical complements appearing at one end of the continuum, and prototypical adjuncts at the other.

The relativization diagnostic identifies attributive adjectives as adjuncts, e.g.

- (45) a. the old car – *Old* is an adjunct.
 b. the car that is old
- (46) a. an interesting discussion – *Interesting* is an adjunct.
 b. a discussion that was interesting
- (47) a. the broken bat – *Broken* is an adjunct.
 b. the bat that is broken

²⁰. Not all dependent *of*-PPs of nouns are complements; some can be adjuncts, e.g. *the picture of Susan* → *the picture that is of Susan*.

Determiners, in contrast, are not adjuncts, e.g.

- (48) a. the diagnostic – *The* is not an adjunct.
b. *diagnostic that is the
- (49) a. every idea – *Every* is not an adjunct.
b. *idea that is every
- (50) a. her friends – *Her* is not an adjunct.
b. *friends that are her

The diagnostic easily identifies attributive adjectives in the pre-noun domain as adjuncts, whereas it puts determiners in the complement category.

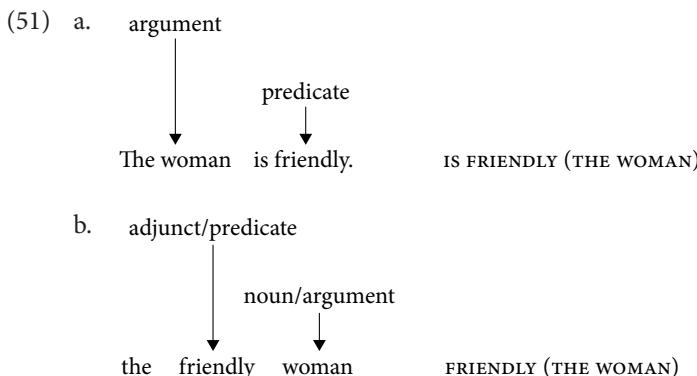
There are certainly some difficult cases that do not allow for a clear decision, e.g. *the two men* → ?*the men who are two*. In general, however, most constituents of NPs can be clearly identified as complements or adjuncts. To conclude the discussion of simple arguments/complements and adjuncts (until later), two points remain. The first is that the distinction also plays a role in other phrase types, i.e. in VPs, AdjPs, and AdvPs, a fact that shall not be illustrated here but that could easily be demonstrated along the same lines seen above. The second is that numerous phenomena of grammar are sensitive to the distinction between arguments and adjuncts. This fact will become clear as various phenomena are addressed. The argument/complement vs. adjunct distinction is important for any theory of grammar.

1.11 Second-order predicates

The discussion of predicates and their arguments in Section 1.7 demonstrated that most word categories can appear as (part of) the main predicate of a clause. Content verbs and adjectives are the canonical predicate types, but nouns, prepositions, and subordinators can also serve as predicates. If one expands the reasoning employed in this area to adjuncts in general, one sees that a theory of predicates and arguments can in fact acknowledge most adjuncts as (containing) **second-order predicates**.²¹ Adjunct adjectives, prepositions, nominals, subordinators, etc. can be construed as predicates in the relevant sense.

The best illustration of the second-order status of adjuncts occurs with adjectives. Consider the similarity in analysis across the following two examples involving the predicative adjective *friendly* and the corresponding attributive adjective *friendly*:

²¹. That adjuncts are second order predicates is acknowledged and discussed in many places (e.g. Bondzio 1974; Happ 1976: 142–3; Korhonen 1977: 131, 154; Eroms 2000: 83).



The predicative adjective *friendly* in (51a) is the core of the main predicate; it takes *the woman* as its argument. Similarly, the attributive adjective *friendly* in (51b) can be construed as a predicate, also taking *the woman* as its argument.²² According to the relativization diagnostic discussed in the previous section, however, attributive adjectives are adjuncts inside NPs: *the woman who is friendly*. Thus, the account of predicates is faced with a contradiction of a sort: on the one hand, attributive adjectives are adjuncts with respect to their noun, and on the other hand, they are predicates taking their noun as their argument.

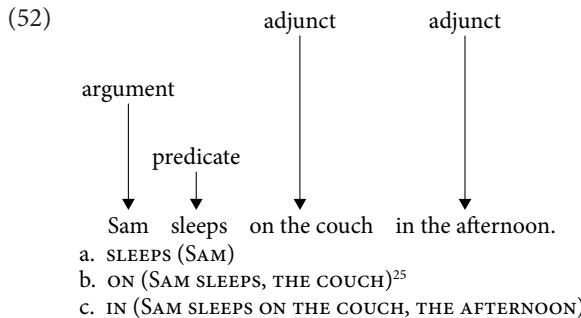
The distinction between *first-* and *second-order predicates* overcomes the contradiction. A given clause or NP typically contains a single first-order predicate, and any adjuncts that are present are second-order predictions. In a clause, the main content verb (and auxiliary verbs that appear with it) is a first-order predicate. Any adjuncts on that verb are then second-order predictions. In an NP, any adjuncts that are present then contain second-order predicates.²³

This understanding of predicates allows one to pursue a much more varied and fine-grained account of predicate-argument structures. Many adjunct predicates take the entire rest of the clause in which they appear as their argument.²⁴ The temporal and locative prepositions of adjunct PPs, for instance, are second-order predicates that can take the rest of the clause as their first argument:

22. Jung (1995: 106; 2003: 293) makes this point, namely that attributive adjectives are like predicative adjectives in taking the nominal as their argument.

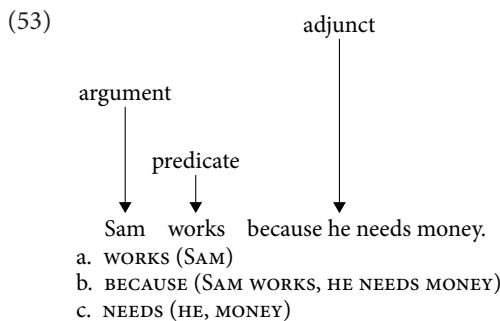
23. Typical nouns (e.g. *book*, *table*, *yard*, etc.) are clearly predicates when they are used predicatively, e.g. *This is a book*, *That is a table*, etc. In such cases, the property of being a book is predicated of the subject. When nouns appear as arguments, e.g. *The table is wide*, the property of being a table is predicated of an entity in the linguistic context, and this entity is the argument of *table*.

24. A number of DGs produce this insight, namely that some adjuncts take the rest of the clause (or at least the verb) as their first argument (e.g. Tarvainen 1981: 9, 91; Starosta 1988: 134; Heringer 1996: 61; Jung 1995: 111–3; Welke 1995: 167; Anderson 2006: 231; Miller 2011: 58).



The main predicate *sleeps* takes *Sam* as its one argument. Each of the two adjunct prepositions *on* and *in* is a second-order predicate. Each takes (most of) the rest of the clause as its first argument and its complement NP as its second argument.

The same sort of analysis is applicable to subordinators:

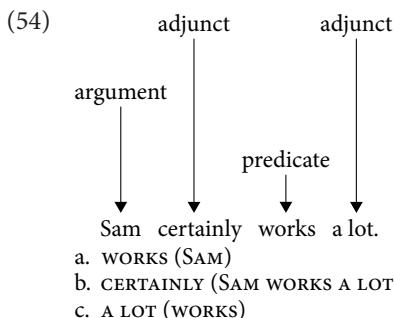


The main predicate *works* takes *Sam* as its one argument. The adjunct subordinator *because* is a second-order predicate; it takes *Sam works* as its first argument and *he needs money* as its second argument.²⁶ Within the subordinate clause, *needs* is the main predicate; it takes *he* and *money* as its arguments.

The sort of analysis is also valid for adverbs:

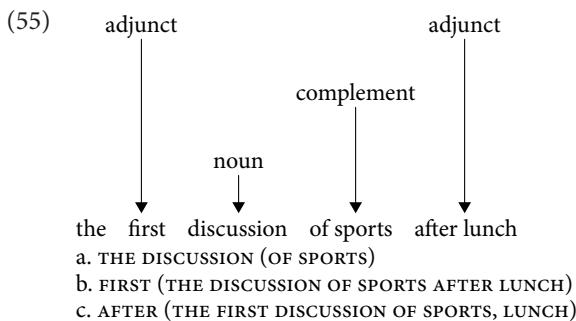
25. Observe that IN THE AFTERNOON is not given here as part of the first argument. This aspect of the analysis is controversial. The assumption is that adjuncts can scope over fellow adjuncts only if the latter adjuncts appear closer to their common head.

26. Colliander (2003: 265) emphasizes that subordinators like *because* here (*weil* in German) take two arguments as indicated here, the one being the matrix clause and the other being embedded clauses.



The content verb *works* is the main predicate, the first-order predicate; it takes *Sam* as its one argument. The modal adverb and the frequency adverb are adjuncts, and as such they are second-order predicates. The modal adverb *certainly* takes the entire rest of its sentence as its argument, and the frequency adverb *a lot* takes the verb alone its one argument.²⁷

This sort of analysis is also applicable to the elements that constitute NPs:



The common noun *discussion* is the semantic core and it takes *of sports* as its complement. The attributive adjective *first* is a second-order predicate that takes the rest of the NP as its argument. Similarly, the preposition *after* is a second-order predicate that takes *the discussion of sports* as its first argument and *lunch* as its second argument.²⁸

The ability to acknowledge that adjuncts are predication significantly expands what the theory of predicate-argument structures can accomplish.

27. Korhonen (1977: 176) makes this point, namely that some adverbs can be second order predicates that take just the verb as their argument.

28. The determiner *the* in (55) can be viewed as a complement. Starosta (2003b: 538) views determiners as complements. Note, however, that viewing determiners as complements does not seem right at times, especially for articles and quantifiers. Articles lack real content; their contribution to the meaning of their NP is merely functional. How many determiners should be analyzed in the theory of predicates and arguments is therefore an open issue.

CHAPTER 2

Dependency and phrase structure

2.1 Overview

There are by now two widely acknowledged means for analyzing syntactic structures, *dependency* and *phrase structure* – phrase structure is also known as *constituency*. Theories of syntax and grammar generally adopt one of these two ways of analyzing and representing syntactic structures, or they unknowingly employ both at the same time, which means they are hybrid systems. Dependency is a principle that assumes direct links between the elements of sentence structure, that is, between words. Phrase structure, in contrast, is a principle that views the links between the units of sentence structure as indirect; the links are mediated by additional groupings that are present as additional nodes in the syntactic structures.

To provide a bit of historical background, the distinction between dependency and phrase structure approaches to the syntax of natural languages became established in the 1960s. The first comprehensive approach to the syntax of natural language primarily in terms of the dependencies was produced by Lucien Tesnière's (1896–1954), a Frenchman. Tesnière's major work *Éléments de syntaxe structurale* 'Elements of Structural Syntax' appeared posthumously in 1959. David Hays, an American linguist working at the Rand Corporation in California, quickly picked up on Tesnière's ideas, adopting dependency as the basis for the first attempts at automated text processing. Hays pioneered the field of computational linguistics.

Noam Chomsky's first major work on syntax, *Syntactic Structures*, appeared in 1957, just two years before Tesnière's oeuvre. Certainly, since the appearance of *Syntactic Structures*, the study of syntax and grammar at institutions of higher learning has been dominated by phrase structure notions as inspired by Chomsky's ideas. Dependency syntax has, though, enjoyed a following in Europe, particularly in Germany. Tesnière's ideas seemed to quickly reach acceptance among German linguists, perhaps because the verb centrality of Tesnière's approach was deemed more compatible with the V2 (verb second) principle of word order in German (and other Germanic languages).

Dependency grammarians have always been very aware of the distinction between dependency and phrase structure systems. Phrase structure grammarians, in contrast, have on the whole been much less knowledgeable about the distinction. In fact, many books on syntax and grammar that have appeared in the last 60 years in the English-speaking world have taken phrase structure for granted, that is, they are seemingly unaware of the alternative approach to syntax that dependency brings to the table.²⁹ This chapter has been written with this lack of awareness in mind. The intent here is to firmly establish the distinction between dependency and phrase structure.

The approach to syntax and grammar being developed in this book is of course primarily dependency-based. When coordination is examined in Chapters 10 and 11, however, phrase structure is also deemed necessary (see Section 10.3 in particular). Thus, from a technical point of view, the approach to syntax and grammar in this book is a hybrid, employing both dependency and phrase structure. In this respect, a firm understanding of the distinction between dependency and phrase structure is indeed necessary.

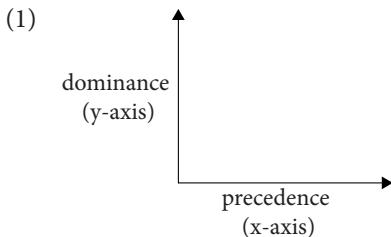
2.2 Precedence and dominance

Theories of syntax assume that words do not appear in arbitrary order, but rather they are organized into groups that convey meaning. Underlying these groups are two principles of organization, *precedence* and *dominance*.³⁰ Precedence is a horizontal left-to-right principle of organization (or right to left if the language at hand is written right to left), whereas dominance is a vertical top-down (or bottom-up) principle. These two principles can be understood in terms of two-dimensions, the

29. What follows is a list of textbooks on syntax and linguistics that take phrase structure for granted; they do not mention dependency: Bach 1974, Keyser and Postal 1976, Allerton 1979, Baker 1978, Brown and Miller 1980, Radford 1981, Aarts & Aarts 1982, Radford 1988, Baker 1989, Akmajian et al. 1990, Haegeman 1991, Cowper 1992, Thomas 1993, Napoli 1993, Eggins 1994, Fabb 1994, Ouhalla 1994, Radford 1997, Roberts 1997, Burton-Roberts 1997, Haegeman & Guéron 1999, Fromkin 2000, Lasnik 2000, Lobeck 2000, Börjars & Burridge 2001, Falk 2001, Huddleston and Pullum 2001, van Valin 2001, Poole 2002, Adger 2003, Radford 2004, Hornstein et al. 2005, Kroeger 2005, Tallerman 2005, Downing & Locke 2006, Haegeman 2006, Payne 2006, Kim and Sells 2008, Culicover 2009, Carnie 2010, Quirk et al. 2010, Sabin 2011, Carnie 2013, Denham & Lobeck 2013, Sportiche et al. 2014.

30. The importance of precedence and dominance for theories of syntax is emphasized by both dependency and phrase structure grammars. Concerning precedence and dominance in dependency grammars, see for instance Tesnière (1959/2015: Chapter 6) and Weber (1992: 19).

horizontal dimension (x-axis) and the vertical dimension (y-axis), as shown with the following Cartesian-style graph:



Precedence is the more obvious of the two relations. Spoken and written language is always one-dimensional and uni-directional insofar as words follow each other.³¹ A word that is uttered prior to another word is said to *precede* it, and a word that is uttered after another word is said to *follow* it. The precedence relation is therefore absolutely obvious in any spoken or written language, such as in the sentence you are currently reading. If a word appears to the left of another word in a written sentence (in a language where one writes from left to right), then it precedes it. Thus, in the previous sentence, *if* precedes *a*, and *a* precedes *word*, and *word* precedes *appears*, etc.

Dominance is the principle of vertical organization. Unlike precedence, which is concrete insofar as it is indisputably present in every utterance, dominance is abstract; it cannot be heard or measured as concretely as precedence can, but rather it is assumed to be the abstract principle grouping words together. Examine the following sentence in this regard:

- (2) The words of all sentences are organized into coherent sequences.

The words in this sentence are not arranged arbitrarily, but rather they are grouped in such a manner that meaning is conveyed. Intuitively we know, for instance, that *coherent* and *sequences* should be grouped together, that is, *coherent sequences* should be a group. In contrast, we know intuitively that *into coherent* to the exclusion of *sequences* should not qualify as a group. Similarly, we sense that *of all sentences* should qualify as a group, but that *of all* to the exclusion of *sentences* should not qualify as a group. When we group words together in this manner, we are acknowledging the role of dominance.

Many theories of syntax assume that dominance is more basic than precedence. That is, they assume that at some abstract level of linguistic representation,

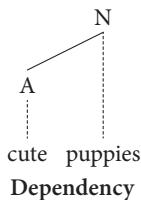
³¹. Tesnière (1959/2015: Chapter 5) famously declared that the spoken chain is one-dimensional.

only dominance obtains.³² Precedence, which is, again, indisputably organizing the words of each and every utterance, is seen as secondary. In other words, the precedence relation is actually derived from the dominance relation. In contrast, the theory of syntax pursued in this book takes a different approach. The current system views both precedence and dominance as primitive; the one is NOT derived from the other. The two have “equal rights” in the current system (see Sections 2.10 and 7.2).

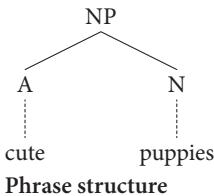
2.3 Dependency vs. phrase structure

There are two distinct possibilities for interpreting how dominance organizes syntactic units (e.g. words) into groups: *dependency* and *phrase structure*. Phrase structure is also known as *constituency*.³³ The dependency and phrase structure analyses of a simple NP are next:

(3) a.



b.



32. The stance that dominance is more basic than precedence is adopted by certain dependency and phrase structure grammars alike. For instance, the phrase structure Minimalist Program (Chomsky 1995) assumes that syntactic structures are constructed first hierarchically in terms of Merge; a linearization procedure then imposes linear order among the constituents of these hierarchies. In a similar sense, the dependency framework of Meaning-Text Theory (Mel'čuk & Pertsov 1987; Mel'čuk 1988) posits two levels of syntactic representation, both of which lack linear order.

33. The basic distinction between dependency and phrase structure is presented and discussed in numerous places (e.g. Baumgärtner 1970; Matthews 1981: 71–95; Tarvainen 1981: 11–3; Mel'čuk 1988: 12–7; Schubert 1987: 17–20; Jung 1995: 15–27; Heringer 1996: 27–9; Uzonyi 2003; Hudson 2010: 147–50).

The two trees represent the role of *dominance*. In the dependency tree (3a) the adjective *cute* attaches to the noun *puppies* in such a manner that *puppies* dominates *cute*. In the phrase structure tree (3b) *cute* and *puppies* combine in such a manner that the noun phrase *cute puppies* is created. These trees illustrate that dependency is a strict *parent-child relation*, whereas phrase structure is a *part-whole relation*.³⁴ Dependency sees words *attaching* to one another, creating greater units, whereas phrase structure sees words *combining* with each other to form greater units.

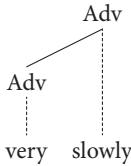
The graphic conventions in the diagrams (3a–b) are described next. The *nodes* bear category labels (A = adjective, N = noun, NP = noun phrase). The faintly dotted vertical lines connecting the words to the nodes are called *projection lines*, and the solid lines connecting the nodes are called *edges* or *branches*. The projection lines represent the manner in which words *project* the nodes of syntactic structure and the edges mark the dependencies that obtain between units of structure. These diagrams are *trees* because any given node has just one parent node. Furthermore, these trees are *rooted*, because one node, i.e. the *root*, dominates all the other nodes. Notice that in the phrase structure tree (3b), the number of nodes exceeds the number of words by one (two words but three nodes), whereas in the dependency tree, the number of nodes exactly matches the number of words (two words and two nodes). In this regard, dependency is a *one-to-one mapping* (words to nodes), whereas phrase structure is a *one-to-one-or-more mapping* (words to nodes).³⁵ Regardless of these differences, both relations are possible by acknowledging dominance.

The following trees illustrate the competing dependency and phrase structure analyses of an adverb phrase, a prepositional phrase, an adjective phrase, and a verb phrase:

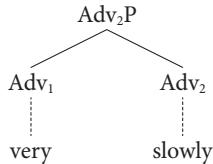
34. The terms *parent* and *child* denote the hierarchical relationship between a given word and the words to which it is directly connected. The parent of a given word is of course the one node that immediately dominates it, and vice versa, a child of a given word is a word that that word immediately dominates. The concept of head and parent are closely related. This terminology is introduced and explained in detail in Section 4.3.

35. The word-to-node mapping is taken by a number of linguists as the/a main criterion or indicator for distinguishing between dependency and phrase structure (e.g. Mel'čuk 1979: 96; Mel'čuk & Pertsov 1987: 48, 57–8; Schubert 1987: 78–86, 129; Engel 1994: 25, 28; Kahane 1996: 45; Bröker 2003: 297; Hudson 2003: 520; 2007: 183; Carnie 2010: 177).

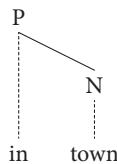
(4) a.



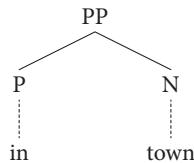
b.



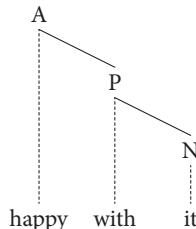
c.



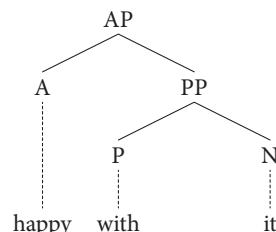
d.

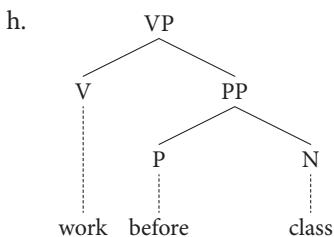
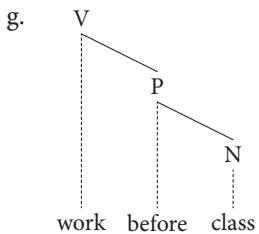


e.



f.



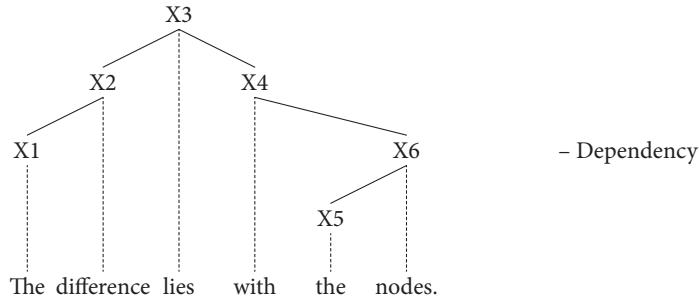


The distinction is again most visible with respect to the word-to-node ratio. Each dependency tree has the number of nodes matching exactly the number of words, whereas in the phrase structure trees, there are more nodes than words. Observe the labeling conventions as well. The nodes in the phrase structure trees that include “P” are *phrasal nodes*; no such purely phrasal nodes exist in the dependency trees. The words that project up to the nodes marked with P are the heads of the phrases. Thus, the adverb *slowly* is head over *very* in *very slowly*, the preposition *in* is head over *town* in *in town*, etc.

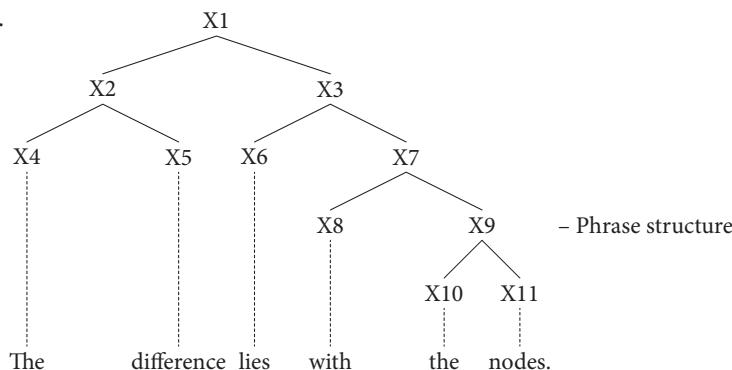
An aspect of these trees that is not being addressed at present concerns the identification of heads and dependents. The trees are hierarchies representing sentence structure and these hierarchies show the heads of phrases. A basic question in this regard concerns how these hierarchies are determined. For instance, how does one know that *slowly* is head over *very* in (4a–b), that *in* is head over *town* in (4c–d), etc.? The answers to these questions is that there are a variety of discovery procedures, e.g. diagnostics for constituents, that identify constituents and that based on the results of these procedures, one can distinguish between heads and dependents. Diagnostics for constituents were introduced in Section 1.2 above, and they are examined in more detail in Section 3.2 below. The discussion in the rest of this chapter takes the validity of the numerous tree structures used for illustration for granted. Be aware, however, that the hierarchies are well motivated by the diagnostics for constituents.

Two more trees, this time of full sentences, further illustrate the distinction between dependency and phrase structure. In order to focus more intently on the core distinction between the two, the generic category labels X1, X2, X3, etc. are now used:

(5) a.



b.



Both trees show the manner in which the words are projecting the nodes that constitute syntactic structure. The dependency tree shows the finite verb *lies* projecting the root node of the entire structure. The phrase structure tree, in contrast, shows an initial binary division of the clause into the subject *the difference* X2 and the predicate *lies with the nodes* X3.³⁶ This initial binary division of clause structure (into a subject and a predicate) is a hallmark of phrase structure.

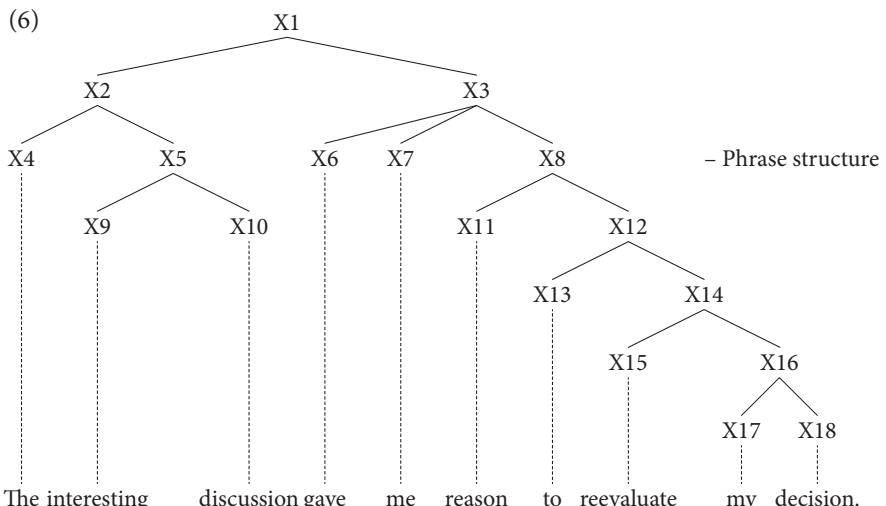
The one-to-one mapping of dependency is very evident in (5a), which has six words and exactly six nodes. The one-to-one-or-more mapping of phrase structure is also very evident in (5b), where eleven nodes are present. Observe that both trees show the grouping of words. Each node is the root of a *complete subtree*, that

³⁶. The term *predicate* here is referring to the second half of the sentence, that is, to everything except the subject. This traditional understanding of predicates is unlike the predicates discussed in Chapter 1 (see Sections 1.5 and 1.9).

is, of a *constituent*. Phrase structure acknowledges many more constituents than dependency. The phrase structure tree contains eleven constituents (11 nodes = 11 constituents), whereas the dependency tree has just six (6 nodes = 6 constituents).³⁷ Note that some of the groupings are constituents across both structure types. The subject noun phrase *the difference*, for instance, is shown as a complete subtree in both (5a) and (5b), and the same is true of the prepositional phrase *with the nodes* and the complement noun phrase *the nodes* of the preposition *with*.

A word of clarification is needed at this point concerning the terms *dependency*, *phrase structure*, *constituent*, and *complete subtree*. The terms *dependency* and *phrase structure* are seen as denoting opposing principles of organization. The term *constituent* is generally associated with phrase structures only, not with dependency structures as well. However, phrase structure grammars view any complete subtree of a phrase structure tree as a constituent. This understanding of the constituent unit can be applied in a theory-neutral manner to both types of trees. In other words, any complete subtree of a tree is a constituent, regardless of whether the tree at hand is a dependency or phrase structure tree.

The one-to-one-or-more mapping of phrase structure allows phrase structures to be more layered than dependency structures. For instance, phrase structure can take most if not all instances of branching to be binary. Examine the following phrase structure tree in this regard:

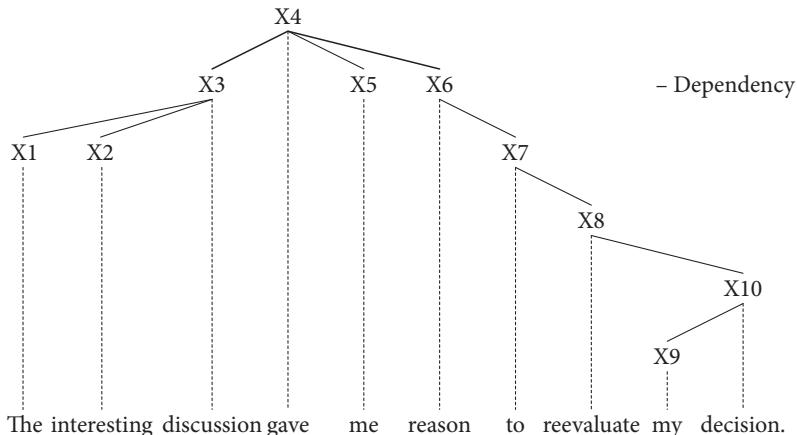


37. These statements are simplifying a bit insofar as the root node is viewed as marking a constituent. In other words, the whole is assumed to be a constituent of itself.

The structure assumed here may be controversial, although many phrase structure grammars would likely assume such a structure (or one that is similar). The important thing to acknowledge about this tree in the current context is that with the exception of the X3 node, each instance of branching is binary. Due to one-to-one-or-more mapping, phrase structure has the option to assume syntactic structures are quite layered, i.e. quite tall.

This option to posit strictly binary branching is not available to dependency structures, since the number of nodes is prevented from outnumbering the number of words. The sentence in (6) would likely be assigned the following structure by many DGs:

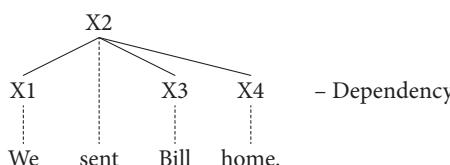
(7)



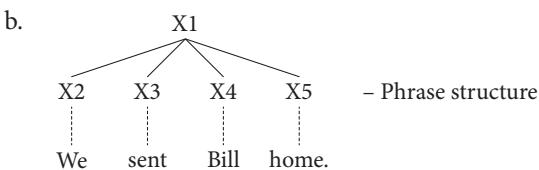
This dependency tree contains many fewer nodes than its phrase structure-counterpart (10 vs. 18). This tree has six layers, whereas the phrase structure tree (6) has seven. The ternary branching node X4 here is typical of dependency structures, which tend to be flatter than the corresponding phrase structures.

While many phrase structure systems opt for strictly binary branching structures, doing so is not a necessity.³⁸ As long as the number of nodes exceeds the number of words by at least one, phrase structures can be just as flat as dependency structures. Compare the following trees:

(8) a.



³⁸. Happ (1976: 45) makes this same point. He demonstrates that phrase structure can assume strict binarity of branching, or it can allow non-binary branching, i.e. n-ary branching.



These two trees are equivalent with respect to layers; both have just two. The one-to-one mapping still holds in the dependency tree, four words and four nodes, and the one-to-one-or-more mapping also still obtains in the phrase structure tree, four words but five nodes. In this regard, (8a) is unmistakably a dependency tree and (8b) is unmistakably a phrase structure tree. While tree (8b) is a phrase structure tree from a technical point of view, most phrase structure grammars would reject the flat structure given there.

The distinction between dependency and phrase structure established in this section is scrutinized and defended in Section 2.10 below.

2.4 Strengths and weaknesses

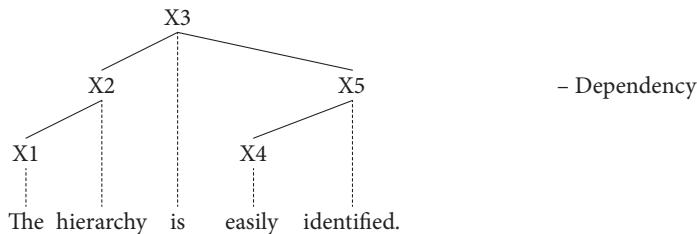
Both dependency and phrase structure can be viewed as having strengths and weaknesses. The strength of the one principle is also the weakness of the other. The major strength of dependency was evident in the last section: the one-to-one mapping of dependency generates minimal tree structures in comparison to the one-to-one-or-more mapping of phrase structure.³⁹ The strength of phrase structure, in contrast, was also suggested in the previous section: the one-to-one-or-more mapping allows for much richer structures. This difference is perhaps most evident with respect to a *finite VP constituent*. While most phrase structure grammars assume a finite VP constituent for English, dependency does not acknowledge such a constituent.⁴⁰

39. The minimal nature of dependency trees is emphasized in Osborne et al. (2011). The message there is in part that dependency syntax is significantly more minimal than even those versions of phrase structure syntax that strive for minimalism, such as so-called Simpler Syntax (Culicover & Jackendoff 2005). Many DGs emphasize the simplicity of dependency structures (e.g. Engel 1994: 23, 26; Anderson 2006: 48; Hudson 2007: 117).

40. Note that the term *finite VP* is being used here in the manner associated with the binary division of phrase structure grammars ($S \rightarrow NP\ VP$) into a subject NP and a predicate VP, whereby the VP is a finite VP. Some DGs actually acknowledge finite VPs (e.g. Engel 1994: 104–5), although what they understand a finite VP to be is, rather, a complete clause (i.e. S), the root of which is a finite verb. Thus, in a DG, a simple sentence can be designated a finite VP because its root is a finite verb.

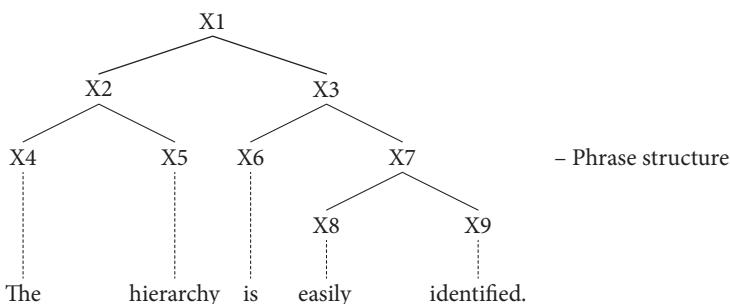
Despite the minimal structures that dependency generates, it inherently identifies *heads* and *dependents*, something which phrase structure does not do.⁴¹ In a dependency tree, the head of a given word is the one word that immediately dominates that word, and a dependent of that word is a constituent that the given word immediately dominates.⁴² Examine the following structures in this regard:

(9) a.



– Dependency

b.



– Phrase structure

The projection lines and edges in the dependency structure (9a) show clearly that *is* is head over *hierarchy* and *easily identified*, that *hierarchy* is head over *the*, and that *identified* is head over *easily*. The phrase structure (9b), in contrast, does not identify heads in this manner.⁴³ In order for phrase structure to distinguish heads from dependents, it can augment its trees with *labels* on the nodes (e.g. N, NP, V, VP, etc.).

Indeed, phrase structure trees have traditionally employed category labels on the nodes, as with the examples in (3)–(4) above. These labels distinguish between

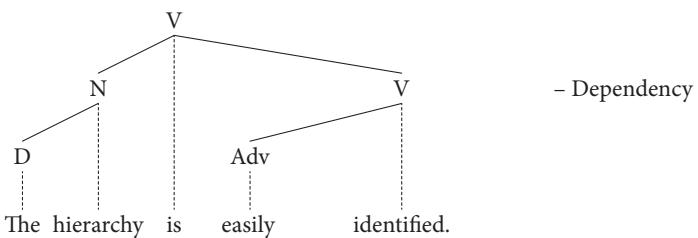
41. See Uzonyi (2003: 237) concerning dependency's inherent ability to distinguish between heads and dependents without the use of labels.

42. The term *head* is used here in a somewhat different way from how it issued in many other grammars. The current grammar distinguishes between *heads* and *roots*. The terminology of dependency trees is developed in detail in Sections 4.2 and 4.3.

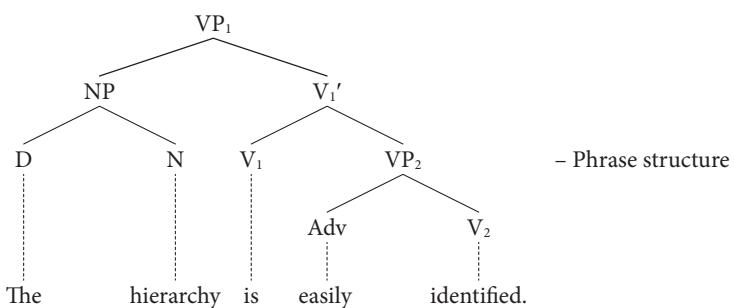
43. Matthews (1981: 84–5) and Jung (1995: 25) make this point, namely that phrase structures like the one given in (9b) do not identify heads and dependents and therefore cannot be translated to dependency.

heads and dependents. Dependency trees can also employ category labels on the nodes. Trees (10a–b) are rendered as follows:

(10) a.

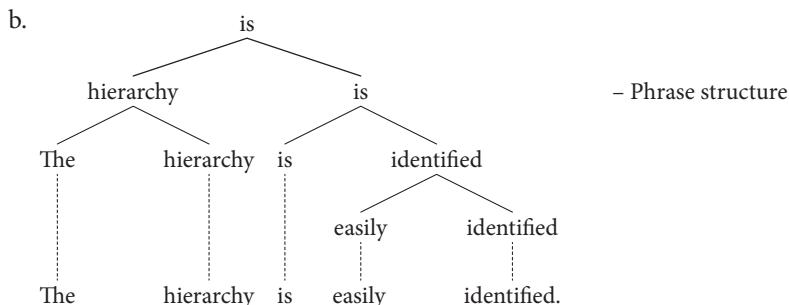
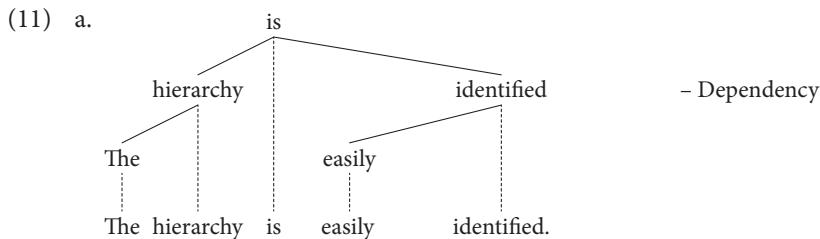


b.



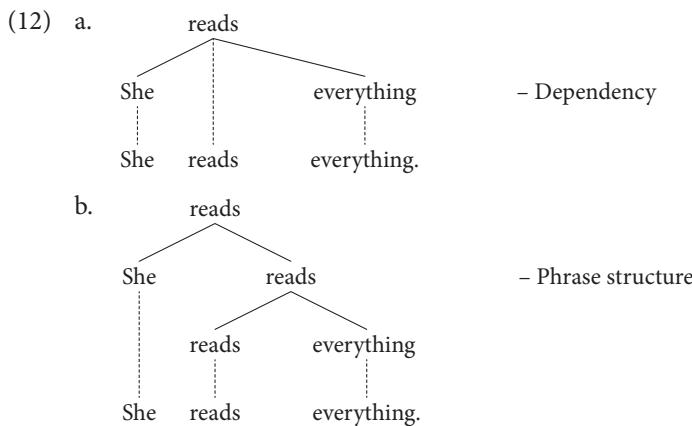
The phrase structure tree (10b) now distinguishes between heads and dependents. The head word projects its category status upward. Thus, *is* in (10b) projects its category status up to the VP₁ node, *hierarchy* projects its category status upward to the node NP, and *identified* projects its category status up to the node VP₂. The words in the dependency tree can also be seen as projecting their category status upward. The dependency trees have the advantage in this area, however, insofar as they already distinguished between heads and dependents without the labels. The necessity for phrase structure trees to employ labels to distinguish between heads and dependents represents an augmentation of the theoretical apparatus. The necessity to posit the greater theoretical apparatus in this area is a weakness of phrase structure.

Examples (10a–b) employ category labels on the nodes of the trees. Instead of category labels, however, one can choose to insert the words themselves directly into the positions of the nodes. This practice results in the following trees:



The words themselves now serve as the node labels. Since this convention results in maximally transparent tree structures, it is preferred henceforth throughout this book.

Turning now to the major strength of phrase structures, they have the advantage over dependency structures insofar as they are capable of acknowledging much richer structures.⁴⁴ In this regard, the one-to-one mapping of dependency is a major limitation on the amount of structure that dependency can acknowledge. This point is most evident with respect to finite VP; phrase structure can assume a finite VP constituent, whereas dependency really cannot:

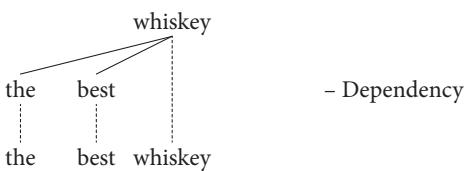


⁴⁴. See Baumgärtner (1970: 58–9) concerning the ability of phrase structure to acknowledge richer structures than dependency.

The phrase structure tree (12b) groups *reads* and *everything* together as the constituent *reads everything*, the head of which is *reads*. The dependency tree, in contrast, does not and cannot acknowledge this constituent. This aspect of phrase structure syntax is perhaps what is most appealing for its proponents. Dependency is incapable of acknowledging the binary subject-predicate division of traditional grammar.

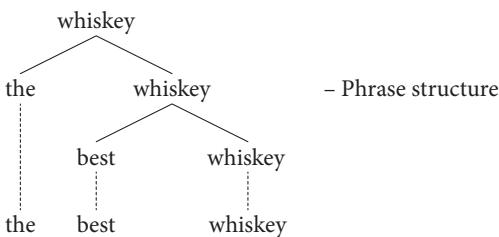
A second example solidifies the point. Phrase structure can assign a richer structure to NPs than dependency, e.g.

(13) a.



– Dependency

b.



– Phrase structure

The richer phrase structure succeeds at grouping *best* and *whiskey* together to the exclusion of *the* and yet simultaneously manages to view the entirety as a noun phrase headed by *whiskey*. Dependency, in contrast, is not capable of grouping *best* and *whiskey* together to the exclusion of *the* and simultaneously viewing the entirety as a noun phrase – or, at least, it cannot do this in same way that phrase structure does it.⁴⁵ For proponents of phrase structure syntax, this capability of the richer phrase structures is a strong argument for phrase structure.

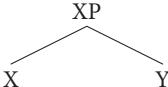
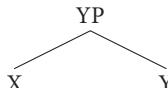
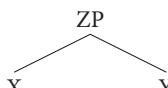
In sum, the strength of dependency syntax lies in its parsimony. Dependency can more easily and efficiently assign plausible structures to sentences than phrase structure. Phrase structure, in contrast, sees its ability to assign sentences much richer structures as its strength. The discussion returns to these points in Section 3.3.

45. The DG presented in this book addresses this supposed weakness of DG in terms of the *component unit*, which is introduced in Section 4.2. The words *best* and *whiskey* form a component to the exclusion of *the*, but not vice versa, that is, *the* and *whiskey* do not form a component to the exclusion of *best*.

2.5 Endo- vs. exocentric structures

The richer phrase structures can distinguish between endo- and exocentric constituents. The minimal dependency structures, by contrast, cannot acknowledge this distinction. Dependency necessarily views all structures as endocentric.⁴⁶ An *endocentric constituent* is a constituent the category status of which is similar to that of one of its parts. An *exocentric constituent*, in contrast, is a constituent the category status of which is unlike that of any of its parts.⁴⁷

The distinction is illustrated with the following structures:

- (14) a.  – Endocentric
- b.  – Endocentric
- c.  – Exocentric

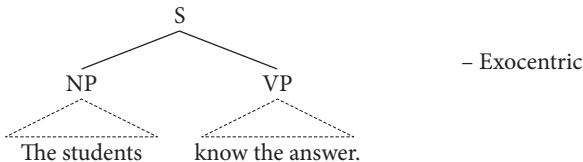
Examples (14a–b) are endocentric phrase structures. Either X or Y projects its category status up to the root node. Example (14c), in contrast, is an exocentric phrase structure because neither X nor Y projects its category status up to the phrasal node; the whole has a category status that is distinct from the status of either of its parts. A prominent example of an exocentric structure is the traditional binary division of the clause into subject NP and a predicate VP,⁴⁸ e.g.

46. Robinson (1970) provides detailed discussion and formalization of the inability of dependency to acknowledge exocentrism. She comments that the inability of dependency to acknowledge headless structures is one reason why some linguists reject dependency as a basis for syntactic analysis in general.

47. The distinction between endo- and exocentric constituents goes back to Bloomfield (1933: 194–6). For a discussion of the distinction that differs slightly from the one here, see Starosta (1988: 106–7).

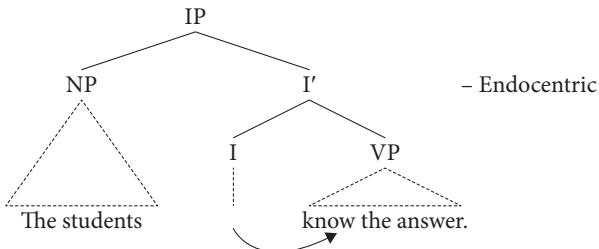
48. The subject-predicate division is associated with context free grammars, as expressed in the first rewrite rule of Chomsky (1957: 26): Sentence = NP + VP.

(15) a.



Since the whole, an S (sentence), is a category distinct from both of its parts, NP and VP, the sentence has the status of an exocentric structure.⁴⁹ By the 1980s, the traditional exocentric analysis of the clause had been rejected in favor of an endocentric analysis along the following lines:⁵⁰

(15) b.



The initial binary division is still present, but since the whole is now an IP (inflection phrase), it carries the category status of one of its parts, that is, of I' (inflection bar), so the structure is endocentric. The arrow indicates that in the absence of an auxiliary verb, the inflectional head of the sentence lowers from I down to the content verb *know*.⁵¹

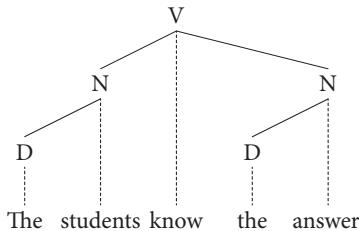
Dependency by its very nature has always been incapable of acknowledging exocentric structures like the ones in (14c) and (15a). It views the finite verb as the root of the clause instead:

49. The exocentric nature of the subject-predicate division of the clause is acknowledged by others (e.g. Uzonyi 2003: 242).

50. The rejection of the traditional exocentric division in favor of an endocentric one is associated with X-bar Theory, which became established in the 1970s (Chomsky 1970; Jackendoff 1977).

51. The mechanism by which the inflection head lowers down to the content in the V of VP was known as *affix hopping*.

(15) c.



Since dependency is incapable of acknowledging exocentric structure, the possibility that some structures might be exocentric presents the dependency understanding of sentence structure with an existential challenge. If exocentric structures can be conclusively demonstrated to be necessary, dependency as the underlying principle of organization comes into question. The stance of this book, however, is that barring coordination (see Chapters 10 and 11), truly exocentric structures do not exist and that upon scrutiny, apparent exceptions actually submit to an endocentric analysis.

The following two sections examine the extent to which translation across phrase structures and dependency structures is possible. If one rejects the possibility of exocentric structures and thus assumes that all structures are endocentric, then translation back and forth is always possible.⁵²

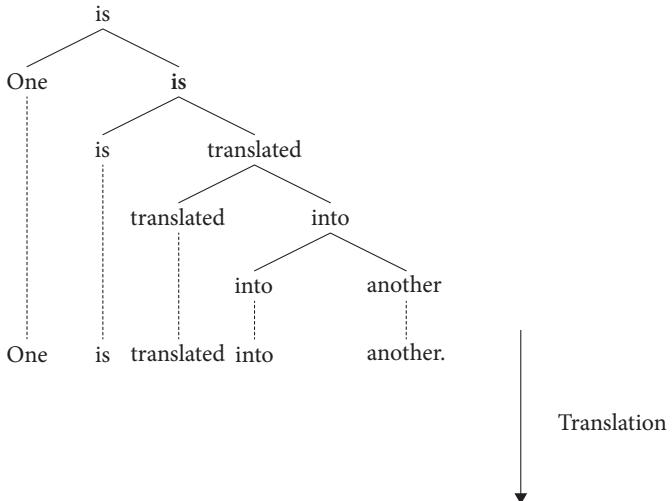
2.6 Translation: Phrase structure → dependency

Endocentric phrase structures are always easily translatable into the corresponding dependency structures.⁵³ The lower projections of the words are eliminated, only the maximal projections remain:

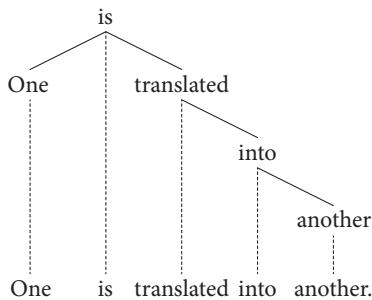
52. The discussion of the translation process (phrase structure → dependency, dependency → phrase structure) in the next two sections is informal. Robinson (1970) formalizes the translation process and provides a detailed discussion.

53. For a discussion of the translation process similar to the one given here in this section (phrase structure → dependency) and the next section (dependency → phrase structure), see Uzonyi (2003: 240–5).

(16) a.

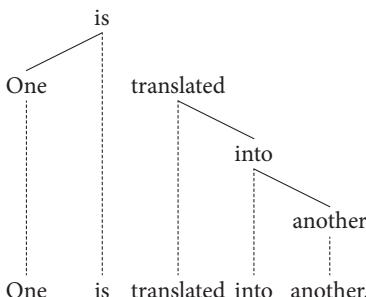


b.



To translate the phrase structure (16a) to the dependency structure (16b), the lower projections of the words (in bold) are removed so that only the highest projection of each word remains. The lower projections of *is*, the lower projection of *translated*, and the lower projection of *into* are removed so that only the highest projection of each remains. The intermediate result is as follows:

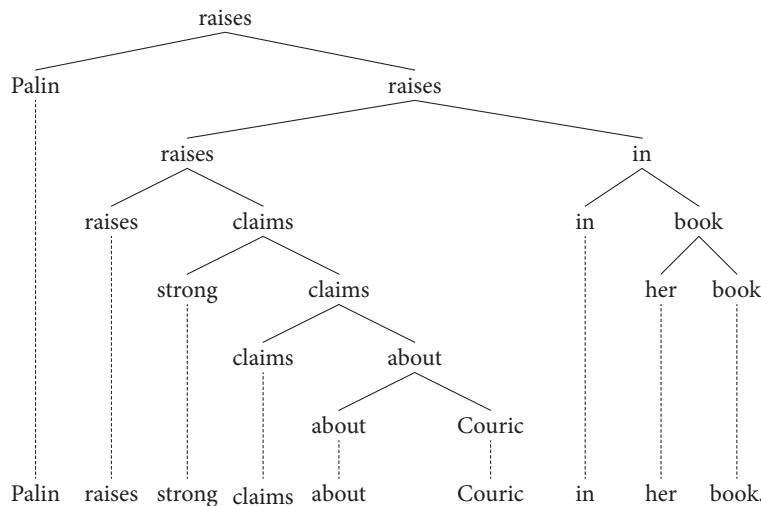
(16) c.



Any unconnected part of the structure (here *translated into another*) is then connected to the word a projection of which its highest projection was a child. Thus, in this case *translated into another* is attached to *is*. The resulting tree is the dependency tree (16b).

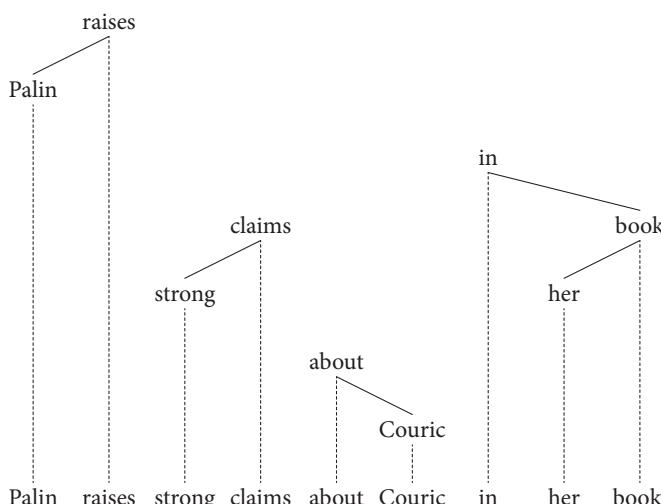
A second example further illustrates the translation process:

(17) a.



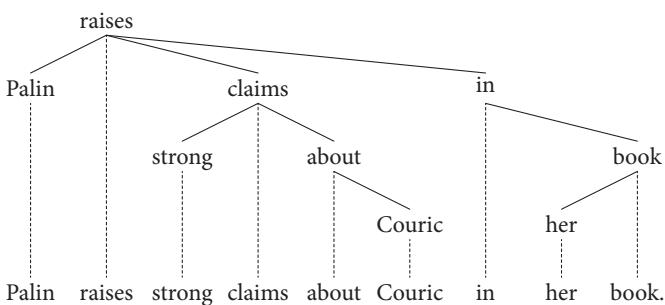
To translate this phrase structure into the corresponding dependency structure, one again first removes all nonmaximal projections of the words, arriving at the following representation:

(17) b.



The next step is to attach the disconnected parts to the words, the projections of which their maximal projections were children. So since the node that immediately dominates the maximal projection of *about* in (17a) is a projection of *claims*, the subtree *about Couric* is attached to *claims*; since the node that immediately dominates the maximal projection of *claims* in (17a) is a projection of *raises*, the newly created subtree *strong claims about Couric* is attached to *raises*; and since the node that immediately dominates the maximal projection of *in* in (17a) is a projection of *raises*, the subtree *in her book* is attached to *raises*. The result is the following dependency tree:

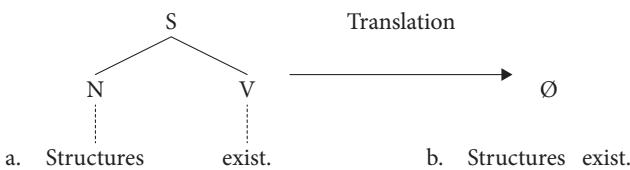
(17) c.



This process of translation from an endocentric phrase structure to the corresponding dependency structure is always easily possible.

If the phrase structure is exocentric, however, then translation from phrase structure to dependency is no longer possible. This fact is illustrated with the initial binary division of the clause into subject and predicate. Early phrase structure grammars assumed an exocentric structure for this division, as mentioned in the preceding section.

(18)



The complete structure carries the label S (sentence), which matches neither of the labels of its two parts. Since the S is neither a projection of *structures* nor of *exist*, there is no way to choose which of the two words should become the sentence root in the corresponding dependency tree. Translation to dependency is therefore not possible.

A noteworthy aspect of the translation (phrase structure → dependency) is that the resulting dependency trees are, like most dependency structures, relatively

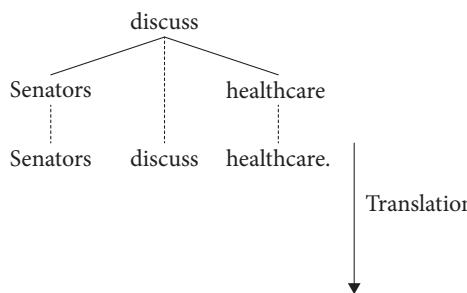
flat.⁵⁴ Many phrase structure grammars in existence would be reluctant to accept such flat structures. Interestingly, however, when one translates in the other direction (dependency → phrase structure) the resulting phrase structures, which are, again, relatively flat, are viewed as valid renditions of sentence structure by DGs – they simply employ phrase structure instead of dependency. This point is taken up in the next section.

2.7 Translation: Dependency → phrase structure

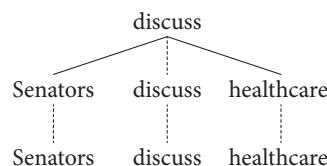
The previous section established that translating from endocentric phrase structures to the corresponding dependency structures is always possible. Translating from dependency to phrase structure is also always possible. There are, however, two major limitations on the resulting phrase structures. The first of these should be apparent by now: every phrase structure that is the result of translation from a dependency structure is necessarily strictly endocentric. The second limitation is less obvious but more important. The one-to-one dependency relation is a major restriction on the amount of structure that is possible. The resulting phrase structures are therefore relatively flat, usually flatter than most phrase structure grammars want to assume.

Consider the translation of a simple subject-verb-object dependency structure to the corresponding phrase structure:

(19) a.



b.

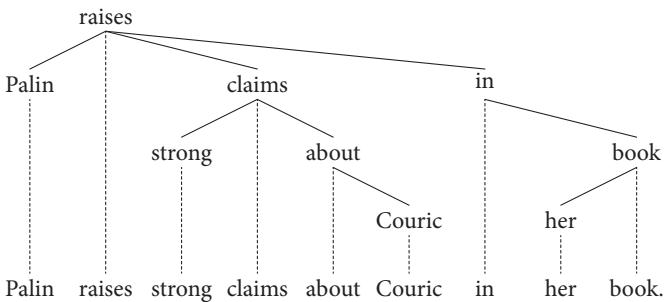


54. Baumgärtner (1970: 59) makes this point, namely that the structures that result from the translation of phrase structure to dependency are likely to be very limited and too flat to please the adherents of phrase structure grammars. See also Matthews (1981: 84–7) and Jung (1995: 24) for similar statements about the difficulties associated with translating from phrase structure to dependency.

To accomplish the translation, a non-maximal projection is introduced of each node that dominates one or more other nodes. In this case then, a lower projection of *discuss* is introduced. The important thing to acknowledge about the translation is that the resulting phrase structure is flatter than most phrase structure grammars prefer to assume.⁵⁵ This fact is evident in (19b), which lacks a finite VP constituent corresponding to *discuss healthcare*.

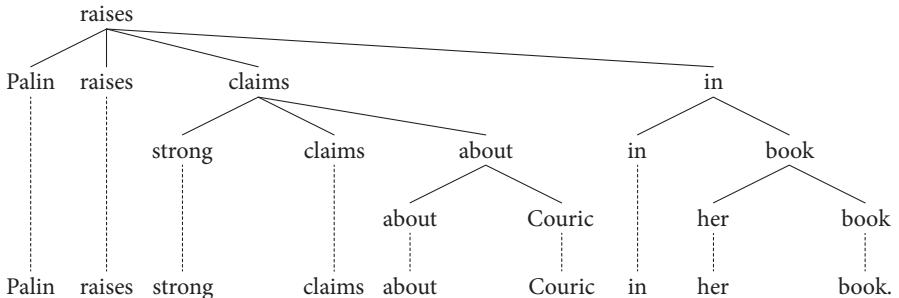
A second example illustrating translation from dependency to phrase structure reinforces the point. Sentence (17) from above, repeated here as (20), is employed again. This time however, the translation occurs in the opposite direction (i.e. from dependency to phrase structure instead of from phrase structure to dependency):

(20) a.



Each word that dominates one or more other words must be duplicated and introduced as a lower projection:

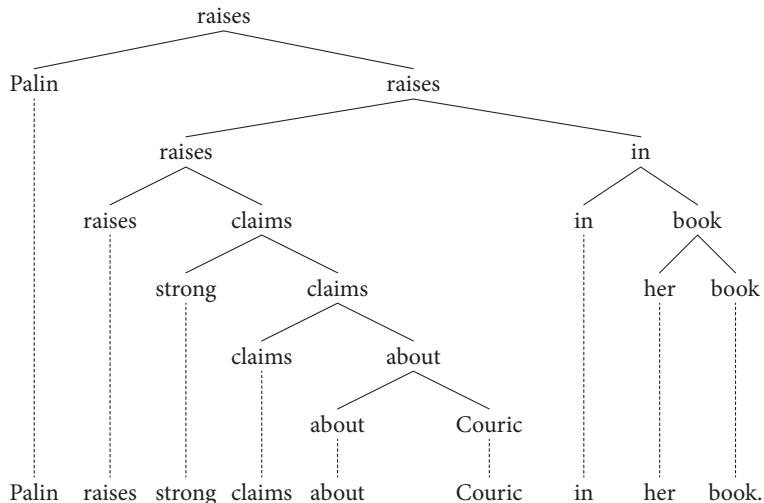
(20) b.



This phrase structure is relatively flat. In this regard, compare it to the phrase structure originally assumed for the sentence, to (17a) above, repeated here as (20c):

55. Most phrase structure grammars would reject the flatness of (19b), since it lacks a VP constituent. There are exceptions, however. Starosta (1988) pursues what is essentially a phrase structure approach to syntax that assumes such flat phrase structures. Interestingly, though, he characterizes his approach as a DG (p. 3). See in particular his comments on page 110.

(20) c.



The flatness of (20b), five layers, stands in contrast to the more layered (20c), seven layers. Starting from a dependency structure such as (20a), the translation process (phrase structure → dependency) is incapable of producing the richness of structure seen in (20c). This example thus further underlines the point that the dependency relation is incapable of acknowledging the richness of structure that many phrase structure grammars assume.⁵⁶

The discussion of the translation process in this section and the last one has helped uncover some important differences between dependency and phrase structure grammars. Dependency by nature always acknowledges heads, which means exocentrism is not possible. Phrase structure, in contrast, can generate both endocentric and exocentric structures. Most importantly, phrase structure can generate much richer, more layered structures than dependency. The pertinent question from the perspective of the relative merits of dependency and phrase structure is therefore whether the richer, more layered structures that phrase structure allows are needed to account for the variety of phenomena that confront theories of syntax.

⁵⁶. This point about the richness of structure that phrase structure does, but dependency does not, allow is expressed by various DGs (e.g. Matthews 1981: 86–7; Heringer 1996: 55).

2.8 Hybrid systems – Reed-Kellogg diagrams

Although they have fallen out of favor in recent decades, Reed-Kellogg sentence diagrams were a widely employed, century-long technique for teaching sentence structure in American schools.⁵⁷ A brief examination of the Reed-Kellogg system shall promote an understanding of the distinction between dependency and phrase structure grammars, especially since some readers may have been exposed to this system in their school days. Reed-Kellogg diagrams employ phrase structure and dependency simultaneously, which makes the Reed-Kellogg system a hybrid.

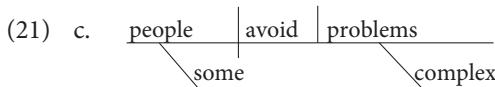
Reed-Kellogg diagrams begin with the binary division of the clause at the core of most phrase structure grammars (see Section 2.3). Basic clause structure acknowledges a subject and a predicate; the two are placed equi-level on a horizontal axis and then divided by a vertical axis, e.g.

- (21) a. Some people|avoid complex problems.

The subject *some people* appears equi-level with the predicate *avoid complex problems*. The vertical line splitting the horizontal axis separates the two. This initial subject-predicate division is phrase structure, since the two appear equi-level, and neither is head over the other. The next separation occurs between the verb and the object phrase. The two are divided by an additional vertical line. The secondary nature of this division is indicated by the fact that this line does not cross the horizontal axis:

- (21) b. Some people|avoid|complex problems.

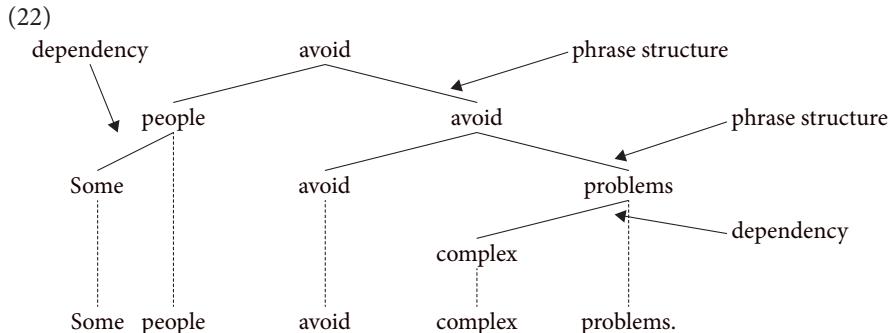
This secondary verb-object division is also phrase structure, since the two appear equi-level, and neither is head over the other. The dependency relation comes into play with the modifiers *some* and *complex*. The status of these words as modifiers of the nouns is captured in the system by dangling them off the nouns on slanted lines:



57. The first edition of Reed and Kellogg's book *Graded lessons in English*, which was most responsible for establishing their sentence diagrams, appeared in 1889, but their system of diagramming sentences appeared in earlier publications, too.

The manner in which the modifiers appear below the nouns that they modify is dependency, since the two are not equi-level; the noun is clearly head over the modifier. In sum then, Example (21c) has the phrase structure relation occurring twice and the dependency relation also occurring twice.

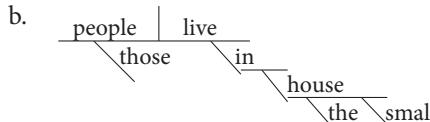
Diagram (21c) can be rendered using modern tree conventions of the sort employed above. The resulting tree is as follows:



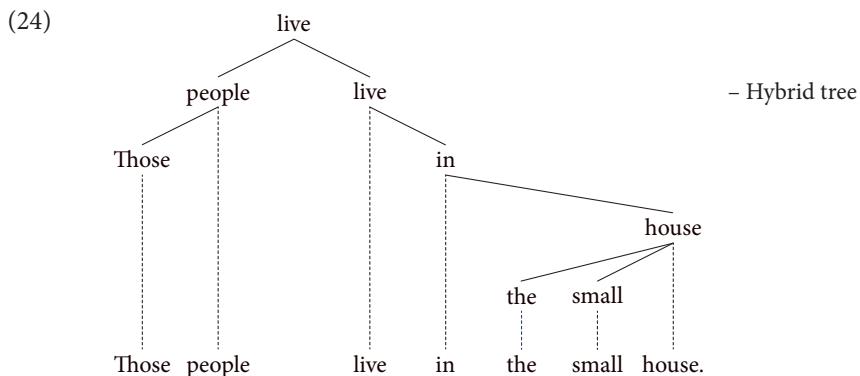
This tree is a hybrid. The phrase structure relation appears with the *avoid* nodes. The two upper *avoid* nodes do not correspond to individual words. The dependency relation is seen in the manner that *some*, *people*, *complex*, and *problems* project just a single node each.

A second example further illustrates the hybrid nature of Reed-Kellogg diagrams:

- (23) a. Those people live in the small house.



The phrase structure relation is manifest with the vertical divider separating *those people* from *live in the small house*. The relation relating the other words to each other is dependency because the one word is always below and connected to the other word. Hence the phrase structure relation occurs once, and the dependency relation five times. Using modern tree drawing conventions, sentence (23b) is rendered as (24):



The phrase structure relation is seen in the fact that *live* projects two nodes in the tree. The rest of the tree is dependency-based, since each word corresponds directly to exactly one node (and vice versa).

Alonzo Reed and Brainerd Kellogg were certainly unaware of the fact that their diagrams use two distinct ordering relations, since they developed their system for diagramming sentences almost a century before phrase structure and dependency were identified in the 1960s as distinct relations upon which theories of syntax can be based.

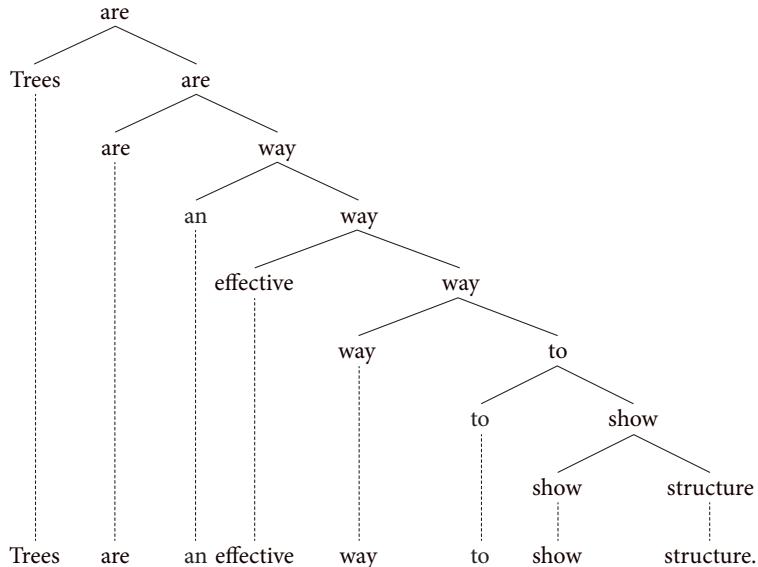
2.9 Brackets, arced arrows, and indentations

The trees employed above are one particular convention for representing hierarchical structure in terms of dependency and phrase structure. There are three other conventions that can be, and often are, used to indicate the hierarchy of syntactic structure: *brackets*, *arced arrows*, and *indentations*. This section draws attention to these other conventions and considers their merits. While they are ultimately rejected, one should be aware of them, since they are often encountered in the literature about syntax.

Phrase structure grammars traditionally rely heavily on brackets to indicate constituent structure. In this regard, brackets are associated primarily with phrase structures, not with dependency structures. An important trait of brackets, though, is that they are also capable of showing dependencies. Words that appear lower in the phrase structure or dependency hierarchy appear enclosed within more sets of brackets. Example (25a) illustrates the use of brackets to indicate phrase structure. Example (25b) is the corresponding phrase structure tree. Note that an analysis is assumed that takes all branching to be binary in order to illustrate the most layered of phrase structures containing the most overt constituents possible:

- (25) a. [[Trees] [[are] [[an] [[effective] [[way] [[to] [[show] [structure]]]]]]]]].

b.



The brackets in (25a) are used in such a manner that each constituent is enclosed in a pair of brackets. Since there are 15 constituents present, there are 15 pairs of brackets, and since each individual word is taken to be a constituent in phrase structure syntax, each individual word is first enclosed in a set of brackets. This aspect of the brackets is actually usually abbreviated, though. The first set of brackets surrounding each individual word is omitted, so that the resulting bracketing is much reduced:

- (25) a'. [Trees [are [an [effective [way [to [show [structure]]]]]]]]].

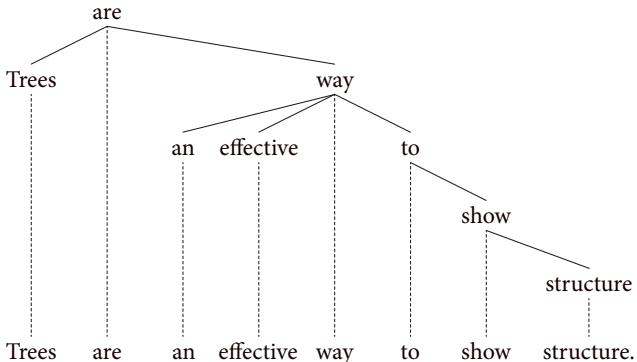
There are now just eight sets of brackets as opposed to 15. Despite the much lower number of brackets, (25a') is still a phrase structure analysis.

The same use of brackets can show dependency relations. Words appearing lower in the dependency hierarchy appear enclosed within more brackets.⁵⁸ Example (26a) illustrates the use of dependency brackets and Example (26b) is the corresponding dependency tree:

58. Many DGs use brackets to indicate dependencies (e.g. Baumgärtner 1970: 54–7; Starosta 1988: 57–9; Heringer 1996: 37–8).

- (26) a. [[Trees] are [[an] [effective] way [to [show [structure]]]]].

b.

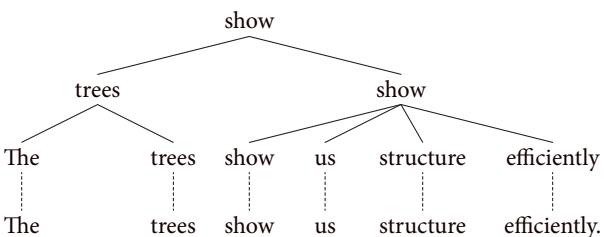


Dependents are enclosed in more brackets than their heads. The finite verb *are*, since it is the root of the sentence, is enclosed in only one set of brackets, and the noun *structure*, since it is the lowest word in the hierarchy, is enclosed within the most brackets.

A second example further illustrates the conventions. A flatter analysis is assumed this time. Example (27a) employs brackets to indicate phrase structure, and Example (27b) is the corresponding phrase structure tree:

- (27) a. [[[The] [trees]] [[show] [us] [structure] [efficiently]]].

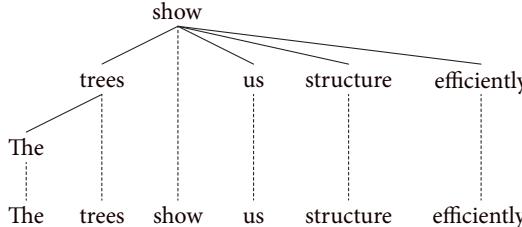
b.



One could certainly assign this sentence a more layered phrase structure. The flat structure shown is chosen to demonstrate a point. This point is that flatter structures involve fewer brackets. Example (28a) employs brackets to indicate the corresponding dependency structure, and Example (28b) is the corresponding dependency tree:

- (28) a. [[[The] trees] show [us] [structure] [efficiently]].

b.



The flatness of this dependency structure is unlikely to be disputed, since a plausible alternative is not evident. This fact bears witness to another important difference between dependency and phrase structure. The richness of structure that phrase structure allows often results in competing structural analyses of one and the same sentence. The comparative poverty of structure that dependency necessitates, gives rise, in contrast, to fewer competing analyses. The structural analysis of most sentences is relatively clear for most DGs.

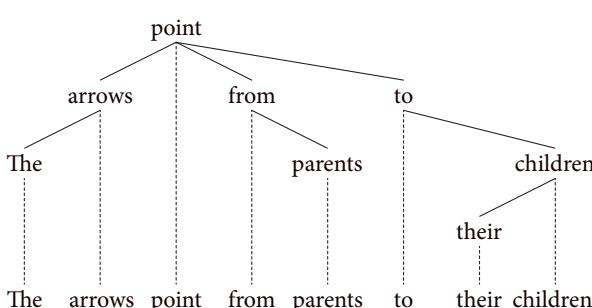
The brackets convention shown in the a-examples above has a major strength and a major weakness. The strength is that brackets require little additional space; the constituent structure of a sentence is shown within the string of words itself. The weakness is that the actual structure is not nearly as transparent as with trees. This fact is most evident in Example (25a) above, where one must count the brackets in order to get an idea of the constituent structure. Trees do not suffer from this weakness; the structure they show is transparent. This transparency speaks strongly in favor of the tree convention, and for this reason, trees are favored in this book.

Arced arrows are another convention that is frequently employed to indicate the hierarchy of words in sentences. Unlike brackets, however, arced arrows are well suited for showing dependency structure only. Sentence (27a) shows the arced arrows convention, and sentence (27b) is the corresponding tree:

- (29) a.

The arrows point from parents to their children.

b.



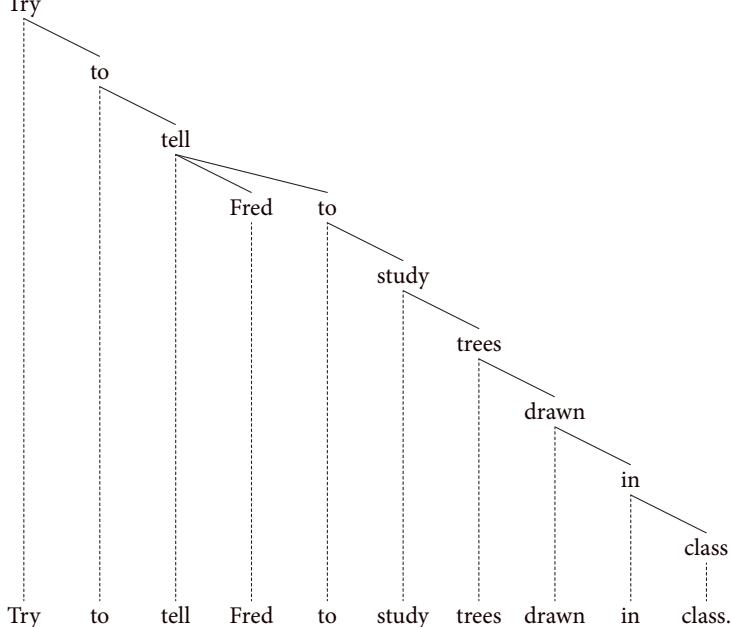
The arrows point from parents to children. Thus, the root word in (29a) is *point* because there is no arrow that points to *point*. Since arced arrows point directly from *point* to *arrows*, *from*, and *to*, these words are the children of *point*.

The following example illustrates the arced arrows convention with a quite layered structure where children always follow their parent:

(30) a.

Try to tell Fred to study trees drawn in class.

b.

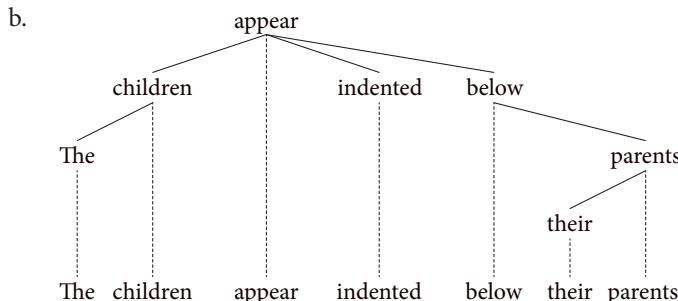


An advantage to the arced arrows is the same advantage associated with brackets: arced arrows occupy relatively little space. This fact is evident across the a- and b-examples in (29)–(30), the b-examples taking up much more space. The disadvantage of arced arrows, though, is that they, like brackets, render syntactic structure in a manner that is less transparent than trees.⁵⁹ For this reason, arced arrows are not used any further in this book.

59. Groß (2003: 332) discusses the arc convention and seems to reject it for this reason, namely because it does not render syntactic structure in a transparent way. Groß opts for trees instead.

A final convention for representing dependencies is mentioned here. On occasion, indentations are employed to show hierarchical dependency.⁶⁰ Children appear indented to the right below their parents, as illustrated by (31a):

- (31) a. appear
 children
 the
 indented
 below
 parents
 their



The indentation convention in (31a) indicates hierarchical structure. The children of each parent appear equally indented under their parent. The indentations therefore indicate that *children*, *indented*, and *below* are children of *appear*, that *the* is a child of *children*, that *parents* is a child of *below*, and that *their* is a child of *parents*.

The key aspect of the indentations is that they do not reflect actual word order. The left-to-right order of words is not evident if one looks at (31a) alone. This trait of indentations makes the convention suited for those DGs that choose to abstract away from linear order to focus solely on hierarchical order. The current DG, however, grants precedence and dominance “equal rights”, meaning that it always acknowledges both simultaneously (see Section 2.2). Given this state of affairs, the indentations convention is not employed in this book.

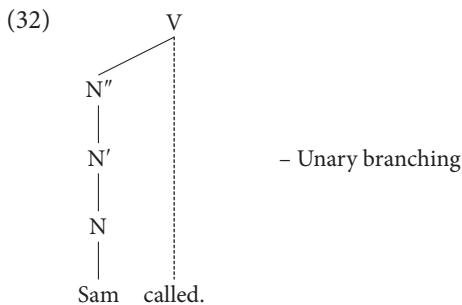
2.10 Dependency vs. phrase structure scrutinized

The reader who already has exposure to the differences between dependency and phrase structure syntax might object to the characterization of this distinction given above. This objection would be based on previous accounts, accounts that

⁶⁰. For example, Lobin (1993) makes extensive use of indentations to show dependency hierarchies.

vary from the one above. This section addresses these potential objections; it is included here in the interest of defending the particular DG developed in this book, and it is intended more for seasoned syntacticians than for those readers who are just beginning to build an understanding of the distinction between dependency and phrase structure models of syntactic analysis. Such readers can skip forward to the next chapter.

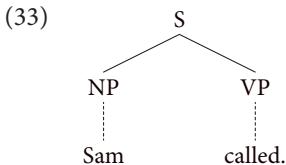
The distinction between dependency- and phrase structure systems established above turns mainly on the mapping of words to nodes (Section 2.3). Dependency has been characterized as a *one-to-one mapping* (words to nodes), whereas phrase structure is deemed a *one-to-one-or-more mapping* (words to nodes). This counting of words and nodes oversimplifies the distinction, however, since it is easy to produce syntactic structures that challenge this understanding, e.g.



This structure involves instances of what is known (in phrase structure grammars) as *unary branching* ($N'' - N'$ and $N' - N$). Unary branching occurs when just a single branch extends down from the given node in a tree (as opposed to two or more).⁶¹ Some phrase structure grammars reject unary branching outright; they assume that all branching is in fact binary (see Section 3.8). In the current context, however, what is important about such cases is that they challenge the definitions of dependency and phrase structure given above. If dependency is a one-to-one mapping (words to nodes), then this example certainly cannot be construed as involving dependency, since there are only two words present but four nodes. However, viewing this example as involving phrase structure does not seem right either, since the finite verb is the root of the structure, which is consistent with the verb centrality of dependency syntax and inconsistent with the binary subject-predicate division of most phrase structure grammars.

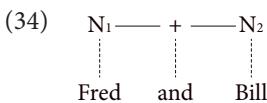
^{61.} Anderson's (1997; 2006; 2011) syntax is a prominent example of an approach that assumes unary branching structures – note that Anderson characterizes his syntax as a dependency grammar. The term Anderson uses to characterize unary branching is *subjunction*. See Anderson (1997: 35–42) in particular.

What therefore seems to be more telling about the dependency vs. phrase structure distinction concerns the number of distinct *groupings of words* present, whereby *complete subtrees* qualify as groupings. The tree in (32) contains just two distinct groupings of words: *Sam* and *Sam called*. Compare tree (32) in this regard with an analysis that is indisputably phrase structure:



This analysis contains the canonical subject-predicate division of phrase structure grammars ($S \rightarrow NP\ VP$). It has just three nodes, one less than tree (32), which contains four nodes, yet it is indisputably an instance phrase structure. The fact that it is indeed a phrase structure analysis is revealed by counting the number of word groupings; it contains three (*Sam*, *called*, and *Sam called*), instead of just two. What these observations mean is that the distinction between dependency and phrase structure should be characterized in terms of the number of distinct word groupings rather than in terms of the number of nodes.

Another type of structure that challenges the characterization in terms of the word-to-node mapping occurs when the link between two nodes is completely horizontal, e.g.



This structure is an instance of coordination (see Chapters 10 and 11). The analysis is similar to the one that Tesnière (1959/2015) originally gave for coordinate structures. Tesnière viewed the conjuncts as equi-level, and he connected them with a simple horizontal line, the coordinator then appearing between the two. The relevant aspect of (34) in the current context is that there are three words present (*Fred*, *and*, *Bill*) and three nodes (N_1 , $+$, N_2). The one-to-one mapping of dependency would therefore appear to be met, which means (34) should qualify as dependency structure. That does not seem right, though, since it is impossible to acknowledge dependency in the standard sense in such a structure, for it is impossible to view any one of the three words as depending on any of the other two. Observe in this regard that characterizing phrase structure as a one-to-one-or-more mapping (words to nodes) does not exclude a structure that has the number of words matching the number of nodes exactly from qualifying as phrase structure.

Examples (32) and (34) challenge the simplified account of dependency and phrase structure given in Section 2.3. To address these challenges, the following definitions of dependency and phrase structure are needed:

Dependency

A one-to-one mapping (words to groupings of words) resulting in syntactic structures that are entirely headed/rooted.

Phrase structure

A one-to-one-or-more mapping (words to groupings of words) resulting in syntactic structures that may or may not be headed/rooted.

By substituting in *groupings of words* for *nodes*, the definitions overcome the problem illustrated with Example (32), where the structure seems like a dependency analysis, yet the number of nodes exceeds the number of words by two, and by requiring dependency structures to be headed/rooted, one guarantees that (34) cannot be construed as a dependency analysis; it is, rather, a phrase structure analysis, since only phrase structure allows for headless/rootless structures. The current DG now advocates these two definitions; they provide guidance for distinguishing between dependency and phrase structures.

With the two key definitions established, the discussion can now turn to other ways in which the distinction between dependency and phrase structure has been characterized in the literature. One prominent alternative is in terms of the headedness/rootedness concept alone, which is present in the two definitions just given. Richard Hudson, the linguist behind the dependency framework Word Grammar, writes the following statement in this regard:⁶²

...a grammar tradition “is called DEPENDENCY GRAMMAR” when “syntactic relations always signal an unequal relationship between the words concerned, with one word subordinate to the other.”
(Hudson 2010: 146)

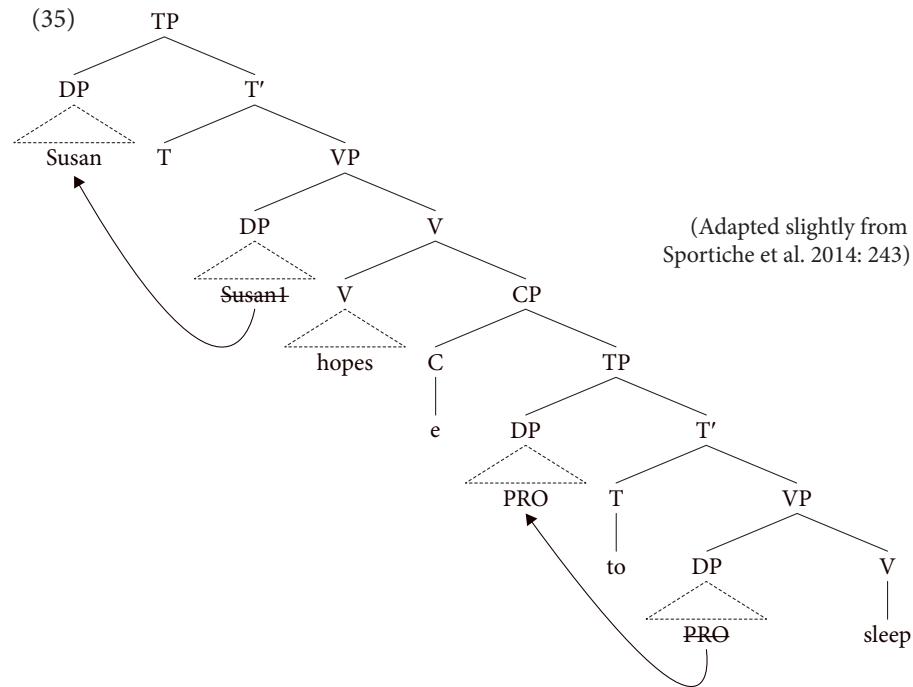
Hudson’s characterization of dependency here emphasizes that dependency sees a given word as always subordinate to another word (excepting the one root word, of course).⁶³ Notice that Hudson’s statements include nothing about the number of nodes or groupings present in the structure, and indeed, Hudson does not count

62. Hudson’s Word Grammar is developed and presented in a number of books reaching back decades (e.g. Hudson 1984; 1990; 2007; 2010).

63. Anderson (1997; 2006; 2011) also appears to view headhood as the defining trait of dependency. When discussing the role of agreement in determining syntactic dependencies, he (1997: 40) writes: “...I should at least comment that it seems to me mistaken to try to equate dependency or headhood with one or more of a set of distinct morphosyntactic notions....” This comment suggests that for Anderson, dependency and headhood are the same thing.

nodes or groupings in his discussion of dependency and phrase structure in his 2010 book.⁶⁴

The problem with taking headedness as the sole defining trait of dependency is that the structures associated with phrase structure can also easily, and usually do, distinguish between heads and dependents. They do so by including node labels to identify heads, as established above in Section 2.4, and they thus avoid exocentrism (see Section 2.5). In fact, if distinguishing between heads and dependents were the sole criterion for defining dependency, one would have to view the most layered of X-bar-type analyses as dependency structures, e.g.



This tree is, as indicated, taken from Sportiche et al. (2014). The details it contains are certainly not important for the current discussion. The point is simply that the tree is entirely headed; the head of each element (word, phrase, or otherwise) is indicated by the labels on the nodes. The structure is therefore entirely endocentric. Most dependency grammarians would, however, be reluctant to accept the claim that such an analysis is a dependency structure. If one considers the word-to-node

64. In his 2007 book, however, Hudson comments that "...dependency analyses such as Word Grammar syntax allow only one node per word" (Hudson 2007: 183).

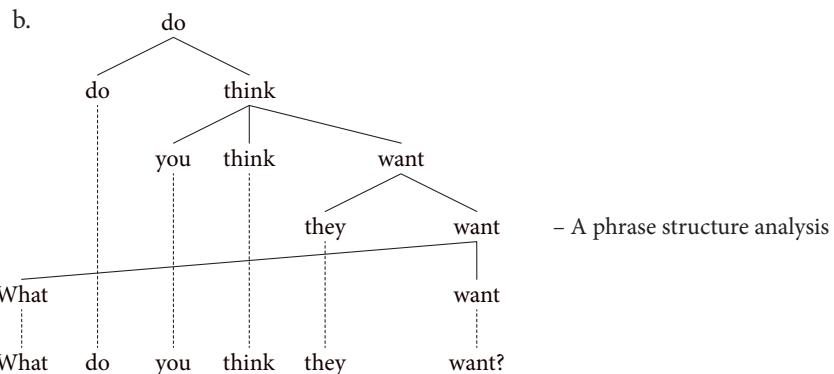
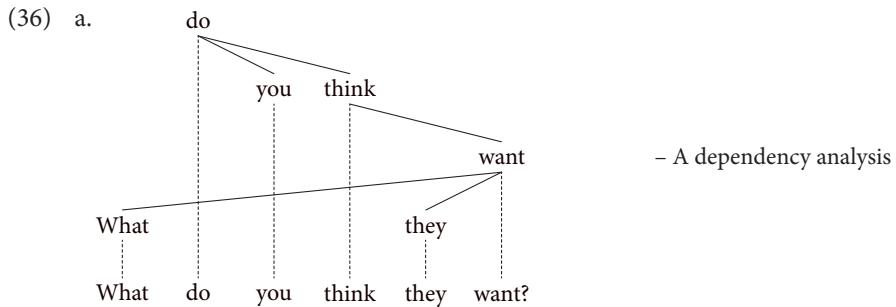
mapping in the tree, there are just four overt words present, yet there are 17 nodes assumed, and if one considers the word-to-groupings-of-words mapping, there are 4 overt words present but 7 distinct overt groupings of words indicated (*Susan*, *hopes*, *to*, *sleep*, *to sleep*, *hopes to sleep*, and *Susan hopes to sleep*). Thus, based on these considerations, headedness alone should not be construed as distinguishing between dependency and phrase structure.

Another prominent claim about dependency and phrase structure concerns linear *contiguity*. Starting in the 1960s, some grammarians posited that phrase structure is reliant on contiguity of the words that constitute constituents, whereas dependency does not require a parent word and her children to be contiguous.⁶⁵ This issue has to do with the history of DG and in particular, with the manner in which Tesnière understood syntax. Tesnière produced 366 stemmas in his main oeuvre *Elements of Structural Syntax* (1959/2015), tree-like representations that did not encode actual word order, but rather they abstracted away from word order to focus on hierarchical order alone. The emphasis on hierarchical order and the resulting de-emphasis of linear order, i.e. of actual word order, thus became associated with dependency syntax in general.

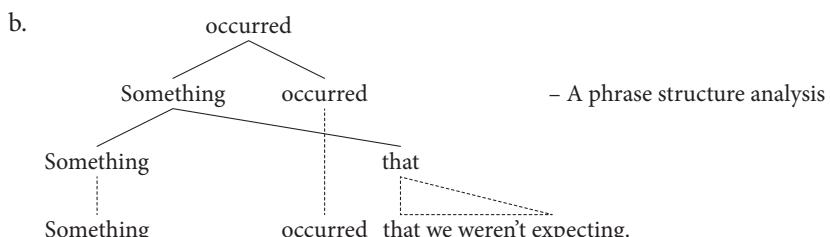
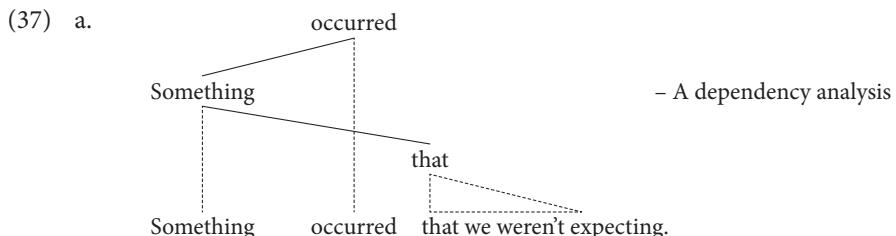
Dependency structures are indeed on average flatter than phrase structures, as established in Sections 2.4–2.7, and flatter structures provide fewer opportunities for discontinuities, which are identified in terms of *projectivity* (see Section 7.3). This means that contiguity of head and dependent seems less central to dependency syntax, whereas phrase structure syntax, with its layered structures, would seem to necessitate more theoretical assumptions that reduce the potential for projectivity violations to occur, such as movement transformations. This issue is, however, a secondary trait of the two relations of syntactic organization. Dependency and phrase structure are actually equally as capable of investigating linear order in terms of projectivity. Contiguity is therefore of similar (non)importance for distinguishing between the relations.

The (non)importance of contiguity for distinguishing between dependency and phrase structure is illustrated here now first by comparing a typical projectivity violation incurred by *wh*-fronting (see Section 8.2),

⁶⁵. Numerous grammarians have pointed to the continuity of the words that constitute phrases as a key criterion for distinguishing between dependency and phrase structure (e.g. Baumgärtner 1970: 53; Korhonen 1977: 31; Mel'čuk & Pertsov 1987: 7; Schubert 1987: 63; Jung 1995: 16; Tarvainen 1981: 13; Kruijff 2006: 405; Hudson 2010: 170–2).



and second by a typical discontinuity incurred by extraposition (see Section 8.6)

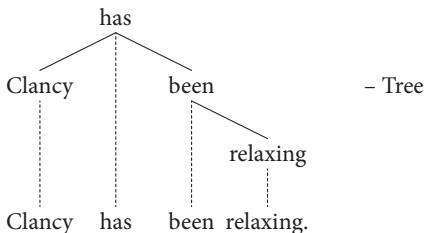


These analyses acknowledge the discontinuity in terms of crossing lines in the tree. Whether the grammar at hand chooses to allow such crossing lines, or whether it

chooses to introduce additional theoretical assumptions that avoid such crossing lines (such as movement or rising), is up to that grammar. The choice of dependency does not prevent one from pursuing an analysis of such cases that categorically avoids crossing lines. Similarly, the choice of phrase structure does not block one from pursuing an analysis that allows such crossing lines to occur. In view of these considerations, claims about the importance of contiguity for the distinction between dependency and phrase structure are not principled.

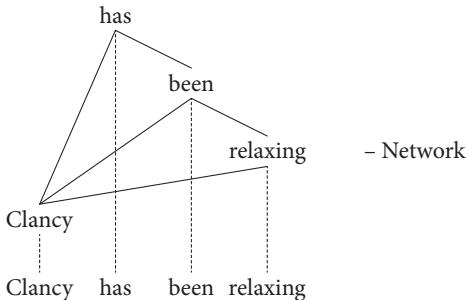
A final confounding issue associated with some DGs is addressed next. This issue has to do with the choice of some DGs to assume *networks* as opposed to *trees*. Two prominent DGs, Hudson's Word Grammar mentioned above and John Anderson's syntax in terms of substance (2006; 2011), are DGs that assume networks, whereas most other DGs assume just trees.⁶⁶ In a tree, any given word has one and only one parent word, whereas in a network, a given word can have two or more parent words.⁶⁷ The distinction is illustrated with the following diagrams:

(38) a.



- Tree

b.



- Network

66. Concerning Word Grammar's decision to acknowledge networks, see Hudson (1984: 83; 1990: 114–20; 2010: 173–4), and concerning Anderson's syntax choice for networks, see Anderson (1997: 32–4).

67. Anderson (1997: 34) characterizes this distinction in terms of *proper trees*. For Anderson, a proper tree is one in which no word has more than one parent. When he then loosens this restriction on parenthood, he does so in terms of the notion of "legal improprieties". When a word has more than one head, a legal impropriety has occurred.

In the tree in (38a), three words each have just a single parent word – the root node *has* has no parent, of course. In the network in (38b), in contrast, the subject *Clancy* has three parents: *has*, *been*, and *relaxing*. Hudson and Anderson motivate networks like the one in (38b) in terms of the valency of the verbs involved. Non-finite verbs like *been* and *relaxing* select a subject valent. Since the network approach allows these verbs to share the subject noun, it accommodates the valency requirements of all three verbs in the syntactic representation.

Networks like the one in (38b) are rejected in the current DG – trees like the one in (38a) are preferred. The valency traits that the network approach addresses are accommodated in the current DG in valency frames (see Chapter 6 and Section 6.4 in particular), whereby two notions of valency are acknowledged, semantic valency and syntactic valency. The relevance of the network approach for the discussion here now concerns its impact on the distinction between dependency and phrase structure. The network in (38b) contains the same number of nodes as the tree in (38a). This means that the number of groupings of words is the same, four in each case. Interestingly, however, these groupings differ across the two diagrams. The tree in (38a) contains the four groupings *Clancy*, *relaxing*, *been relaxing*, and *Clancy has been relaxing*, whereas the network in (38b) contains the four groupings *Clancy*, *Clancy relaxing*, *Clancy been relaxing*, and *Clancy has been relaxing*. While networks posit more dependency edges (5 in (38b)) than trees (3 in (38a)), they acknowledge the same number of nodes, which means the number of word groupings is consistent. Networks can therefore be dependency-based in the same manner as trees.

CHAPTER 3

The argument for dependency

3.1 Overview

Tests for constituents are widely used as a means of introducing the notion of syntactic structure. Five tests for constituents were briefly presented and employed in Section 1.2 to introduce the constituent unit (topicalization, clefting, pseudoclefting proform substitution, and answer fragments). There are many more such tests; three further ones that are widely employed are coordination, *do-so*-substitution, and *one*-substitution. This section takes a closer look at all eight of these tests. To provide an overview, all eight are listed as follows:

1. Topicalization
2. Clefting
3. Pseudoclefting
4. Proform substitution
5. Answer fragments
6. Coordination
7. *Do-so*-substitution
8. One-substitution

These eight tests are the most frequently employed tests for constituents that one encounters in textbooks on syntax, linguistics, and grammar.

In the current dependency vs. phrase structure debate, the interesting thing about these tests is that on the whole, they support dependency over phrase structure, because they identify far less sentence structure than phrase structure assumes. This chapter develops this insight in some detail. What the tests actually reveal about sentence structure is demonstrated using numerous examples for illustration. For the most part, the tests verify the existence of phrasal constituents, but they do not convincingly support the existence of sub-phrasal strings as constituents. This situation is consistent with dependency syntax, since dependency by its very nature does not acknowledge the existence of most sub-phrasal strings as constituents.

In addition to the main message developed in terms of phrasal and sub-phrasal strings, two tangential issues are also examined: the evidence delivered by the

tests for and against the existence of a finite VP constituent as well as evidence against the assumption that all syntactic structures are binary in branching. Scrutiny of these two additional issues further supports the conclusion in favor of dependency.

3.2 Tests for constituents

The following paragraphs present each of the eight tests for constituents just listed in the overview. They build on the brief introduction of tests for constituents given in Section 1.2. As stated, these eight tests are frequently employed in syntax, linguistics, and grammar textbooks. Just how frequently they are employed is demonstrated here by including a footnote for each diagnostic that lists many of the textbooks on syntax, linguistics, and grammar that employ the test. By acknowledging the large number of texts listed, one gets a sense of how important the tests have been for syntactic theorizing in general; they are basic tools with which syntacticians practice their trade.

Topicalization (or *fronting* or *preposing*) is a permutation test that changes the order of words in the sentence at hand by placing the target string at the front of the sentence.⁶⁸ If the result is acceptable, the target string may be a constituent, e.g.

- (1) Fred played tennis this spring
 - a. ...but tennis Fred did play this spring.
 - b. This spring Fred played tennis.

The test often works better if it is construed as the continuation of a previous sentence, hence the use of the dots ... and coordinator *but* in (1a). These examples identify *tennis* and *this spring* as constituents in the original sentence. Topicalization is widely used to identify phrasal constituents of all sorts. It consistently fails, however, to identify many sub-phrasal strings as constituents. This point is crucial for the argument in favor of dependency produced below.

68. Topicalization is a widely employed test for constituents (e.g. Allerton 1979: 114; Atkinson et al. 1982: 171–2; Radford 1988: 95, Borsley 1991: 24; Haegeman 1991: 35; Napoli 1993: 422; Fabb 1994: 4; Ouhalla 1994: 20; Burton-Roberts 1997: 17–8; Haegeman & Guéron 1999: 46; Fromkin 2000: 151; Jurafsky & Martin 2000: 352; Lasnik 2000: 10; Lobeck 2000: 47–9; Börjars & Burridge 2001: 26; van Valin 2001: 11; Poole 2002: 32; Adger 2003: 65; Sag et al. 2003: 33; Radford 2004: 72; Kroeger 2005: 31; Downing & Locke 2006: 10; Haegeman 2006: 79; Payne 2006: 160; Culicover 2009: 84; Quirk et al. 2010: 51; Miller 2011: 55; Sabin 2011: 31; Sportiche et al. 2014: 68; Müller 2016: 10).

Clefting is a test that uses a cleft sentence to see if the test unit can appear as the focus, e.g.⁶⁹

- (2) Fred played tennis this spring.
- a. It was Fred who played tennis this spring.
- b. It was tennis that Fred played this spring.
- c. It was this spring that Fred played tennis.

The focus is the unit that appears immediately after the form of the auxiliary *is*, *are*, or *was*. These examples suggest therefore that *Fred*, *tennis*, and *this spring* are constituents in the original sentence. Like topicalization, clefting is widely employed to identify phrasal constituents, and like topicalization, it fails to identify many sub-phrasal strings (i.e. words) as constituents.

Pseudocleaving is a test that is similar to clefting insofar it checks to see if the test unit can be focused, e.g.^{70, 71}

- (3) Fred played tennis this spring.
- a. The one who played tennis this spring was Fred.
- a'. Fred was the one who played tennis this spring.
- b. What Fred played this spring was tennis.
- b'. Tennis is what Fred played this spring.
- c. The time when Fred played tennis was this spring.
- c'. This spring is when Fred played tennis.

There are two variants of this test, as the examples show. The test unit is placed immediately after the form of the auxiliary *is*, *are*, or *was* as a predicative expression or immediately before it as the subject. These examples again demonstrate that *Fred*, *tennis*, and *this spring* can be viewed as constituents in the original sentence.

69. Clefting is also a widely employed diagnostic for identifying constituents (e.g. Brown & Miller 1980: 25; Radford 1981: 109–10; Aarts & Aarts 1982: 97–8; Akmajian et al. 1990: 150; Borsley 1991: 23; Napoli 1993: 148; McCawley 1998: 64; Haegeman & Guéron 1999: 49; Börjars & Burridge 2001: 27; Adger 2003: 67; Sag et al. 2003: 33; Tallerman 2005: 127; Downing & Locke 2006: 10; Haegeman 2006: 85; Kim & Sells 2008: 19; Carnie 2013: 98; Sportiche et al. 2014: 70).

70. Pseudocleaving is frequently employed as a diagnostic for sentence structure (e.g. 1982: 98; Borsley 1991: 24; Napoli 1993: 168; McCawley 1998: 64; Haegeman & Guéron 1999: 50; Kroeger 2005: 82; Downing & Locke 2006: 10; Haegeman 2006: 88; Payne 2006: 160; Culicover 2009: 89; Miller 2011: 56; Carnie 2013: 99; Sportiche et al. 2014: 71).

71. Examples (3a, 3a') are technically not instances of pseudocleaving, since they employ *the one who* in place of *what*. Altering the pseudocleft test somewhat in this manner allows it to test for the animate noun *Fred*. Similarly, *the time when* replaces *what* in (3c, 3c') in order to test for the status of the temporal adjunct *this spring*.

Proform substitution substitutes a proform (usually a definite proform) in for the test unit.⁷² If the result is acceptable, the test unit may be a constituent, e.g.

- (4) Fred played tennis this spring.
 - a. He played tennis this spring.
 - b. Fred played it this spring.
 - c. Fred played it then.

These examples suggest that *Fred*, *tennis*, and *this spring* are constituents in the original sentence. This test is widely employed to identify phrasal constituents. Like many of the other tests, however, it fails to identify many sub-phrasal strings (i.e. words) as constituents, a fact that is, again, crucial for the argument in favor of dependency.

Answer fragments (stand alone test) is a test that checks to see if the target string can stand alone as the answer to a question, e.g.⁷³

- (5) Fred played tennis this spring.
 - a. Who played tennis this spring? – **Fred**.
 - b. What did Fred play this spring? – **Tennis**.
 - c. When did Fred play tennis? – **This spring**.

Because the units *Fred*, *tennis*, and *this spring* can stand alone as the answers to the questions, they can be viewed as constituents. This test is like the previous four insofar it is widely employed to identify phrasal constituents, and like the previous four tests, it fails to identify many sub-phrasal strings (i.e. words) as constituents.

Coordination (or *conjunction*) is a test that assumes that if a given unit can be coordinated with a like unit, then that unit is a constituent, e.g.⁷⁴

72. Proform substitution is also a very widely used diagnostic for identifying constituents, second only to coordination (e.g. Allerton 1979: 113–4; Radford 1981: 63–6; Atkinson et al. 1982: 173–4; Radford 1988: 78–81, 98–9; Napoli 1993: 168; Thomas 1993: 10–12; Eggins 1994: 134; Fabb 1994: 3; Ouhalla 1994: 19; Radford 1997: 109; Haegeman & Guéron 1999: 46; Fromkin et al. 2000: 155–8; Jurafsky & Martin 2000: 351; Lasnik 2000: 9–10; Lobeck 2000: 53–7; Börjars & Burridge 2001: 24–5; van Valin 2001: 111–2; Poole 2002: 29–31; Adger 2003: 63; Radford 2004: 71; Tallerman 2005: 140–2; Haegeman 2006: 74–9; Moravcsik 2006: 123; Herbst & Schüler 2008: 21–2; Kim & Sells 2008: 21–2; Culicover 2009: 81; Carnie 2010: 19–20; Quirk et al. 2010: 75–7; Miller 2011: 54–5; Sabin 2011: 32; Carnie 2013: 98; Denham & Lobeck 2013: 262–5; Sportiche et al. 2014: 50; Müller 2016: 8).

73. Answer fragments are also widely employed to identify constituents (e.g. Brown & Miller 1980: 25; Radford 1981: 72, 92; Radford 1988: 91; Eggins 1994: 134; Burton-Roberts 1997: 15–8; Radford 1997: 107; Börjars & Burridge 2001: 25; Kroeger 2005: 31; Tallerman 2005: 125; Downing & Locke 2006: 10; Haegeman 2006: 82; Moravcsik 2006: 123; Herbst & Schüler 2008: 6–7; Kim & Sells 2008: 20; Carnie 2010: 18; Sabin 2011: 31; Carnie 2013: 98).

74. Coordination is the most widely employed diagnostic for identifying constituents (e.g. Chomsky 1957: 35–7; Baker 1978: 269–76; Radford 1981: 59–60; Atkinson et al. 1982: 172–3;

- (6) Fred played tennis this spring.
- [Fred] and [Sam] played tennis this spring.
 - Fred played [tennis] and [badminton] this spring.
 - Fred played tennis [this spring] and [last fall].

The square brackets mark the coordinated strings. In line with the previous five tests, these examples allow one to view *Fred*, *tennis*, and *this spring* as constituents. Further examples would certainly identify many more constituents in the test sentence. In this regard, coordination is the most widely employed diagnostic for constituents because it is unrivaled in its ability to suggest that most any string is a constituent. Section 3.4 below demonstrates that coordination actually suggests that far too many strings are constituents and its value as a diagnostic for constituents is therefore suspect.

Do-so-substitution has been influential in establishing the status of VPs as constituents, in particular of finite VPs.⁷⁵ It is a proform substitution test that substitutes in the proform *do so* for a VP, e.g.

- (7) Fred will play tennis this spring.
- Fred will **do so**. (*do so = play tennis this spring*)
 - Fred will **do so** this spring. (*do so = play tennis*)
- (8) Fred played tennis this spring.
- Fred **did so**. (*did so = played tennis this spring*)
 - Fred **did so** this spring. (*did so = played tennis*)

Based on these examples, one assumes that the nonfinite VPs *play tennis this spring* and *play tennis* in (7) are constituents and that the finite VPs *played tennis this spring* and *played tennis* in (8) are constituents. In order to accommodate such cases, one

Radford 1988: 75–8; Baker 1989: 419–27; Akmajian et al. 1990: 152–3; Borsley 1991: 25–30; Cowper 1992: 34–7; Napoli 1993: 159–61; Ouhalla 1994: 17; Radford 1997: 104–7; Roberts 1997: 12; Haegeman & Guérón 1999: 27; Fromkin 2000: 160–2; Lasnik 2000: 11; Lobeck 2000: 61–3; Börjars & Burridge 2001: 27–31; van Valin 2001: 113–4; Huddleston and Pullum 2002: 1348–9; Poole 2002: 31–2; Adger 2003: 125–6; Sag et al. 2003: 30; Radford 2004: 70–1; Kroeger 2005: 91, 218–9; Tallerman 2005: 144–6; Haegeman 2006: 89–92; Payne 2006: 162; Kim & Sells 2008: 22; Carnie 2010: 115–6, 125; Quirk et al. 2010: 46–7; Sabin 2011: 31–2; Carnie 2013: 99–100; Sportiche et al. 2014: 62–8; Müller 2016: 10, 16–7).

75. The *do-so*-diagnostic to identify constituents in VPs also occurs frequently (e.g. Baker 1978: 261–68; Aarts & Aarts 1982: 56; Atkinson et al. 1982: 174; Borsley 1991: 63; Haegeman 1991: 79–82; Cowper 1992: 31; Napoli 1993: 423–5; Burton-Roberts 1997: 104–7; Haegeman & Guérón 1999: 74; Fromkin 2000: 156–7; van Valin 2001: 123, 127; Poole 2002: 41–3; Tallerman 2005: 130–1, 141; Haegeman 2006: 75–6; Payne 2006: 162; Culicover 2009: 81; Carnie 2010: 115–6; Quirk et al. 2010: 76, 82; Miller 2011: 54–5; Sabin 2011: 33; Carnie 2013: 169–70; Denham & Lobeck 2013: 265; Sportiche et al. 2014: 61).

then posits a left-branching VP structure. The *do (so)* test is examined in some detail in Section 3.5, where it is demonstrated that the conclusions based on the test have misconstrued the results that it delivers. While it does provide evidence for the existence of nonfinite VP constituents, it does not do the same for finite VPs.

The one test is used for a particular purpose, i.e. to explore the constituent structure of NPs.⁷⁶ The results that it delivers have led many to conclude that the constituent structure of NPs is quite layered, e.g.

- (9) the old fat cat around the corner
- a. that old fat cat around the corner and the young skinny **one** down the street
 - b. the old fat cat around the corner and the young **one** down the street
 - c. the old fat cat around the corner and the **one** down the street
 - d. that first old fat cat around the corner and the second **one**

In each of these examples, the pronominal count noun *one* can be construed as standing in for the underlined string in the first conjunct of the coordinate structure. The examples therefore suggest that *cat*, *fat cat*, *old fat cat*, and *old fat cat around the corner* are constituents in the original NP. Thus, to accommodate such cases, one assumes a quite layered structure for the NP, one that shows each of the underlined strings to be a constituent. A problem with the *one* test is discussed below in Section 3.6, where it is demonstrated that the conclusions about the constituent structure of NPs based on the test are not warranted.

To summarize, the first five tests are widely employed to identify phrasal constituents (topicalization, clefting, pseudoclefting, proform substitution, and answer fragments). Those five tests do not, however, deliver support for the existence of sub-phrasal constituents. The latter three tests (coordination, *do-so*-substitution, and *one*-substitution) are not good tests for sentence structure in the standard sense, a point that is developed in some detail below in Sections 3.4–3.6.

76. Many authors use the *one*-substitution diagnostic (e.g. Baker 1978: 327–40, 413–25; Radford 1981: 92, 96–100; Aarts & Aarts 1982: 57; Haegeman 1991: 26, 88–9; Cowper 1992: 26; Napoli 1993: 423–5; Burton-Roberts 1997: 182–9; McCawley 1998: 183; Haegeman & Guéron 1999: 75–6; Fromkin et al. 2000: 157–8; van Valin 2001: 122, 126, 128; Poole 2002: 37–9; Adger 2003: 63; Radford 2004: 37; Hornstein et al. 2005: 180–6; Kroeger 2005: 97–8; Tallerman 2005: 150; Haegeman 2006: 109; Carnie 2010: 114–5; Quirk et al. 2010: 75; Carnie 2013: 166–7; Sportiche et al. 2014: 52, 57, 60).

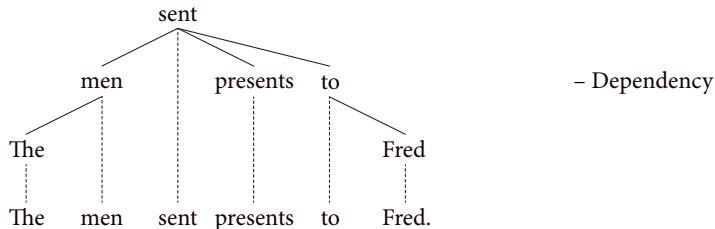
3.3 In favor of dependency

Section 2.4 discussed the central strengths and weaknesses of dependency and phrase structure syntax. The major strength of dependency is the parsimony of structure, whereas the major strength of phrase structure is its ability to acknowledge richer structures when necessary. This section considers what the tests for constituents discussed and illustrated in the previous section reveal about the dependency vs. phrase structure debate. The message is that the results of the tests for constituents deliver a strong indication that the richer structures of phrase structure grammars are unwarranted. The tests identify much less structure than phrase structure grammars want to acknowledge.⁷⁷ This insight, then, is the main argument in favor of dependency.

Both dependency and phrase structure make concrete predictions about the constituent structure of sentences. It should be apparent, though, that the two principles make quite different predictions with respect to the constituents that they posit. Phrase structure often posits about twice the number of constituents that dependency posits and it therefore operates with much more structure than dependency. What evidence is there for or against this extra structure? To shed light on this debate, theory-neutral empiricism is necessary. The tests from the previous section are theory-neutral in this respect. The tests are therefore in a position to shed light on the dependency vs. phrase structure debate.

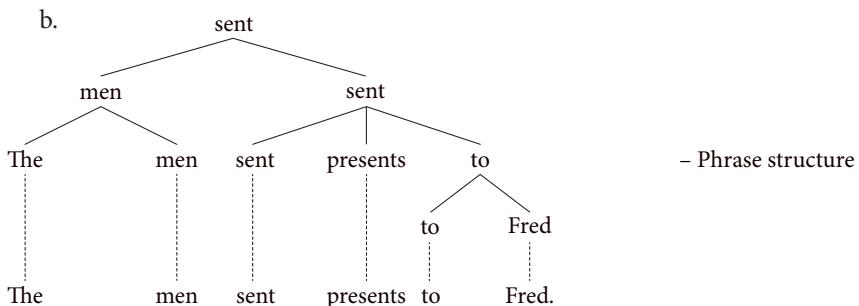
Consider the dependency and phrase structures for the following sentence:

(10) a.



- Dependency

⁷⁷. The reasoning employed and message delivered in this section is developed more extensively in Osborne (2015) and especially Osborne (2018). It also appears more briefly in Osborne (2005: 254–8; 2006a: 53–8; 2008: 1126–32).



The dependency tree assumes six constituents (6 nodes = 6 constituents): *the*, *presents*, *Fred*, *the men*, *to Fred*, and *The men sent presents to Fred*. The phrase structure tree, in contrast, assumes ten constituents (10 nodes = 10 constituents): *the*, *men*, *sent*, *presents*, *to*, *Fred*, *the men*, *to Fred*, *sent presents to Fred*, and *The men sent presents to Fred*. The two views of sentence structure thus disagree with respect to the strings *men*, *sent*, *to*, and *sent presents to Fred*. Phrase structure views these expressions as constituents, whereas dependency sees them as non-constituents. The main point of contention concerns the individual words. Phrase structure by its very nature sees each individual word as a constituent, whereas dependency sees only those individual words as constituents that do not dominate other words.

Before examining the cases of disagreement across the two views of sentence structure, the discussion first considers areas of agreement. Both (10a) and (10b) show *the men*, *presents*, and *to Fred* as constituents. The tests for constituents verify that these units are indeed constituents. The unit *the men* is a constituent:

- (11) a. (Inapplicable)
 - b. It was **the men** that sent presents to Fred.
 - c. (The ones) who sent presents to Fred were **the men**.
 - d. They sent presents to Fred.
(They = The men)
 - e. Who sent presents to Fred? – **The men**.
- Topicalization
 - Clefting
 - (Pseudoclefting)
 - Proform substitution
 - Answer fragment

The topicalization diagnostic is inapplicable because *the men* already appears in initial position. The word *presents* is also identified as a constituent:

- (12) a. ?...and **presents** the men sent to Fred.
 - b. It was **presents** that the men sent to Fred.
 - c. What the men sent to Fred was **presents**.
 - d. The men sent *some* to Fred (*some = presents*)
 - e. What did the men send to Fred? – **Presents**.
- Topicalization
 - Clefting
 - Pseudoclefting
 - Proform substitution
 - Answer fragment

And the unit *to Fred* is a constituent:

- (13) a. ...and **to Fred** the men sent presents. – Topicalization
 b. It was **to Fred** that the men sent presents. – Clefing
 c. ??(The one) to whom the men sent presents
 was to Fred. – Pseudoclefing
 d. ?The men sent presents **there**. (*there* ≈ *to Fred*) – Proform substitution
 e. To whom did the men send presents? – To
 Fred. – Answer fragment

The pseudoclefing test mostly fails in (13c), and the proform substitution test is inconclusive in (13d), probably because there is no clear proform that can substitute for a preposition plus an animate object in those contexts. Despite the lack of complete agreement, the tests deliver enough evidence to conclude that *the men*, *presents*, and *to Fred* are indeed constituents as both the dependency tree (10a) and the phrase structure tree (10b) indicate.

Compare the results in (11)–(13) with the results that the tests deliver for points of disagreement across the two trees. The trees disagree concerning the status of the individual words *men*, *sent*, and *to* in (10a–b). The five tests applied to *men* suggest that *men* is NOT a constituent:

- (14) a. *...and **men** the sent presents to Fred. – Topicalization
 b. *It was **men** that the sent presents to Fred. – Clefing
 c. *(The ones) who the sent presents to Fred
 were men. – Pseudoclefing
 d. *The **they** sent presents to Fred. (*they* = *men*) – Proform substitution
 e. ?The who sent the presents to Fred? – Men. – Answer fragment

Only one of the five tests (answer fragments) suggests that *men* might be a constituent (on an echo question reading). The other four tests clearly indicate that *men* alone is NOT a constituent. The tests applied to *send* demonstrate that it too is NOT a constituent:

- (15) a. *...and **send** the men presents to Fred. – Topicalization
 b. *It was **send** that the men (did) presents to
 Fred. – Clefing
 c. *What the men (did) presents to Fred was
 send. – Pseudoclefing
 d. *The men **did so** presents to Fred. (*did so* =
 send) – Proform substitution
 e. *What did the men do with presents to
 Fred? – *Send. – Answer fragment

And the tests applied to *to* demonstrate that it is not a constituent as well:

- (16) a. *...and **to** the men sent presents Fred. – Topicalization
 b. *It was **to** that the men sent presents Fred. – Clefting
 c. *What the men sent presents Fred was **to**. – Pseudoclefting
 d. *The men sent presents **there** Fred. (*there* = *to*) – Proform substitution
 e. *Where did the men send presents Fred? – ***To**. – Answer fragment

Based on these results, there is a lack of evidence supporting the phrase structure grammar assumption that *men*, *send* and *to* are constituents in the starting sentence. The DG stance that these words are non-constituents therefore receives empirical support.

Some phrase structure grammars seem to be aware of the problem in part. These grammars address the difficulty by positing that some tests for constituents are sensitive to phrasal constituents only. More exactly, the claim is that some tests for constituents are sensitive to a particular kind of constituent, namely to those that correspond to the highest projection (maximal projection) of the lexical category (a word). For instance, in the prepositional phrase *to Fred* in (10b) the named tests for constituents are not sensitive to the preposition *to* alone because *to* projects its category status to the root node of the PP that it heads. In other words, the diagnostic for constituents will identify the entire PP as a constituent, which they do, but not the preposition alone. While this solution to the problem does work, it is a major stipulation. The dependency structures make the correct prediction in such cases without having to introduce the onerous distinction between phrasal and sub-phrasal constituents.

The picture that emerges is that phrase structure is positing much more structure than one can justify based upon the results of the first five tests. Dependency makes a much more accurate prediction in this area. The question now concerns phrase structure's justification for all the extra structure. What theory-neutral evidence is there that supports phrase structure over dependency structure? The approach to syntax pursued in this book of course takes the stance that the extra structure phrase structure assumes is, excepting coordinate structures (see Chapters 10 and 11), unwarranted. Dependency is a more economical and accurate principle upon which to build theories of syntax.

Before concluding this section, one should note that dependency too makes an incorrect prediction with respect to the individual word *the* in (10a). Dependency, like phrase structure, assumes *the* to be a constituent. The diagnostics for constituents, however, clearly fail to identify *the* as such, as the reader can verify for him/herself. Consider in this regard, however, that phrase structure and dependency are equally wrong in this area, which means that the one cannot be preferred over the other with respect to this one prediction.

3.4 The coordination diagnostic

While the five tests for constituents just employed are widely used as tests for sentence structure, coordination is actually the most widely employed test for constituents.⁷⁸ One assumes that if a given string can be coordinated using a coordinate conjunction (*and*, *or*, *but*), then that string is a constituent. Coordination contradicts the data delivered from the other five tests for constituents, however. In particular, it suggests that each individual word is in fact a constituent, and further that many strings are constituents that most theories of syntax do not view as constituents.

The following example is used to illustrate the point about individual words:

(17)

-
- a. Sam can read these explanations.
-
-
- b. Sam can [can] and [should] read these explanations.
- c. Sam [can] and [should] read these explanations.
- d. Sam can [read] and [ponder] these explanations.
- e. Sam can read these [explanations] and [discussions].

The brackets in (17c–e) mark strings that have been coordinated. Based on such examples, one might conclude that the individual words *can*, *read*, and *explanations* are all constituents, which is in line with the phrase structure tree (17b), but

⁷⁸. See footnote 74 concerning the sources that use coordination as a diagnostic for constituents.

contrary to the dependency tree (17a). In this respect, the phrase structure analysis makes the correct prediction. Based on such data, then, phrase structure grammars might breathe a sigh of relief, since they have seemingly found the empirical backing they need after all.

There is, though, a major problem with using coordination in this manner as a test for constituents.⁷⁹ Every possible string in (17) can be coordinated:

- (18) a. [Sam] and [Jill] can read these explanations.
- b. Sam [can] and [should] read these explanations.
- c. Sam can [read] and [ponder] these explanations.
- d. Sam can read [these] and [those] explanations.
- f. Sam can read these [explanations] and [discussions].
- g. [Sam can], and [he should], read these explanations.
- h. Sam [can read], and [should ponder], these explanations.
- i. [?]Sam can [read these] and [ponder those] explanations.
- j. Sam can read [these explanations] and [those discussions].
- k. [?][Sam can read], and [he should ponder], these explanations.
- l. [?]Sam [can read these], and [should ponder those], explanations.
- m. Sam can [read these explanations] and [ponder those discussions].
- n. [?][Sam can read these], and [he can ponder those], explanations.
- o. Sam [can read these explanations] and [should ponder those discussions].
- p. [Sam can read these explanations] and [he should ponder those discussions].

Each of the 15 distinct strings can be coordinated (at least marginally). The most overt constituents that a tree can acknowledge for the sentence, though, is nine, as shown in the binary branching phrase structure tree (17b). Thus, a major discrepancy obtains: the number of constituents that coordination identifies far exceeds the number of constituents that tree structures can acknowledge.

Some of the examples in (18) require a special intonation pattern: Examples (18g, h, i, k, l, n). These examples are precisely the ones that involve the coordination of non-constituent strings. In this regard, phrase structure grammars can seek to save the coordination diagnostic by augmenting the analysis of coordinate structures with an additional mechanism of syntax. This mechanism is then implicated in those cases when the coordinated strings are not constituents. While this “remedy”

79. While coordination is indeed widely employed as a test for constituents, many linguists point to the sort of difficulties with the coordination diagnostic currently being emphasized (e.g. Baker 1989: 424; McCawley 1998: 63; Adger 2003: 115; Kim and Sells 2006: 22; Payne 2006: 162; Carnie 2010: 21; Carnie 2013: 100; Sportiche et al. 2014: 66; Müller 2016: 16–7). Note, however, that many of these sources nevertheless continue to view coordination as a valuable diagnostic for revealing clues about constituent structure.

to the problem is indeed how some phrase structure grammars address such data, this solution does not work with other cases, e.g.

- (19) a. Sam worked [today in the kitchen] and [yesterday in the study].
- b. Larry eats [in the cafeteria on Wednesday to save time] and [in a restaurant on Friday to celebrate the week].

Many phrase structure grammars do not view the bracketed strings in these examples as constituents (namely those that assume left-branching VPs to accommodate adjuncts), yet these coordinate structures are spoken with a normal intonation curve. In other words, there is little motivation to assume that some other mechanism of syntax (beyond simple coordination) is implicated in such cases.

These additional observations reduce the challenge that coordination poses to the dependency analysis. If the coordination diagnostic supports the phrase structure view of sentence structure at all, this support is weak. Chapters 10 and 11 present a DG theory of coordination that accommodates data like those above.

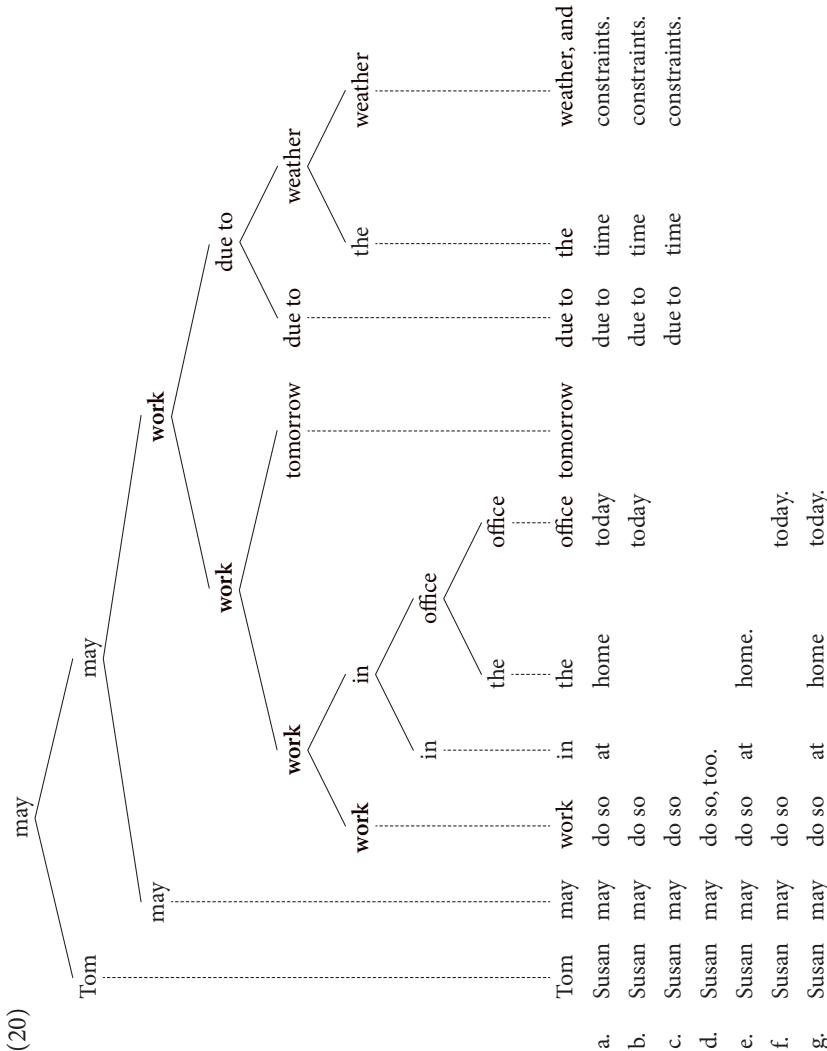
3.5 *Do-so-substitution*

The *do-so*-test is a specific type of proform substitution, whereby the proform *do so* is used to probe the structure of VPs.⁸⁰ Early discussions of the *do-so*-test were influential in establishing the legitimacy of the VP constituent and, when post-verbal adjuncts are present, of the existence of layered VPs in general. It is therefore appropriate to consider the merits of the test in some detail. This section presents observations that reveal weaknesses in the conclusions that stem from *do-so*-substitution.⁸¹

The lengthy example next demonstrates how *do-so*-substitution has usually been employed:

80. The *do-so*-diagnostic as a test for the structure of VPs is very widely employed (e.g. Baker 1978: 261–8; Aarts & Aarts 1982: 56; Atkinson et al. 1982: 174; Borsley 1991: 63; Haegeman 1991: 79–2; Cowper 1992: 31; Napoli 1993: 423–5; Burton-Roberts 1997: 104–7; Haegeman & Guéron 1999: 74; Fromkin 2000: 156–7; van Valin 2001: 123, 127; Poole 2002: 41–3; Tallerman 2005: 130–1, 141; Haegeman 2006: 75–6; Payne 2006: 162; Culicover 2009: 81; Carnie 2010: 115–6; Quirk et al. 2010: 76, 82; Miller 2011: 54–5; Sabin 2011: 33; Carnie 2013: 169–70; Denham & Lobeck 2013: 265; Sportiche et al. 2014: 61).

81. See Miller (2011: 54–5) for a critique of the *do-so*-diagnostic as evidence for the existence of (finite) verb phrases.

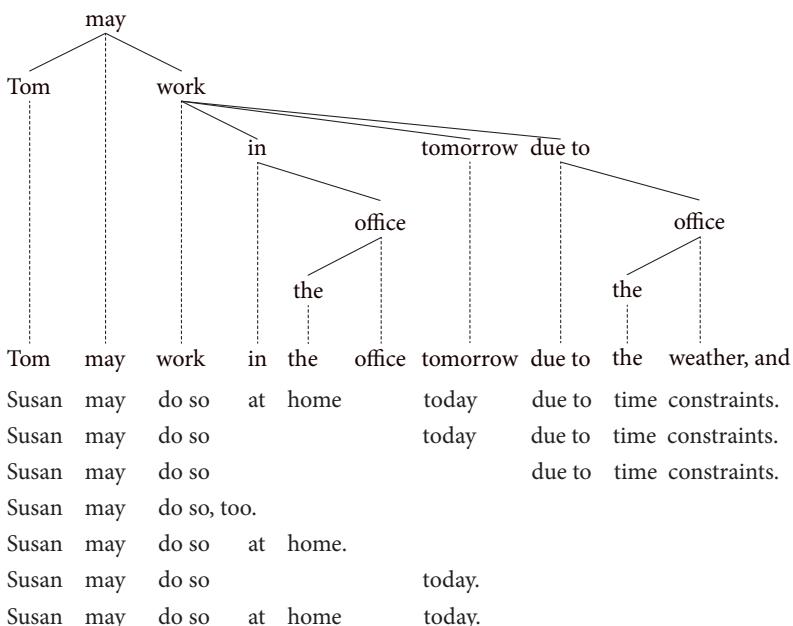


The proform *do so* stands in for *work* in (20a), for *work in the office* in (20b), for *work in the office tomorrow* in (20c), and for *work in the office tomorrow due to the weather* in (20d). Thus, to accommodate Examples (20a–d), the left-branching VP structure shown in the tree is deemed necessary, since it shows each of these strings as a constituent. Based on examples like (20a–d), one concludes that a quite layered VP structure is needed, one that has binary branching to the left as shown in the tree.

The accounts that employ *do-so*-substitution in this manner almost always overlook additional cases that contradict the reasoning they employ. They overlook additional examples such as (20e–g). In Example (20e), *do so* stands in for the non-continuous word combination *work...tomorrow due to the weather*; in (20f) *do so* stands in for the non-continuous word combination *work in the office...due to the weather*; and in (20g) *do so* stands in for the non-continuous word combination *work...due to the weather*. There is quite obviously no way to produce a tree that can view these discontinuous word combinations as constituents.⁸² In other words, *do-so*-substitution actually provides no evidence in favor of layered analyses of VPs.

The DG analysis of the example is as follows:

(21)



82. The insight that *do so* can stand in for non-string word combinations is taken from Culicover and Jackendoff (2005: 125).

Since dependency is incapable of acknowledging more nodes in the structure than there are elements in the sentence at hand, the flat verb string shown here is obligatory. One might object, though, that the flat dependency analysis in (21) is less plausible than the more layered phrase structure analysis in (21) because it is even less capable of accommodating the data. The *catena* unit, which is introduced in Section 4.2 below, provides the necessary tool that can easily account for all of these sentences. In each case, the word combination that *do so* stands in for is a catena, regardless of whether this catena is a continuous sequence of words or not.⁸³

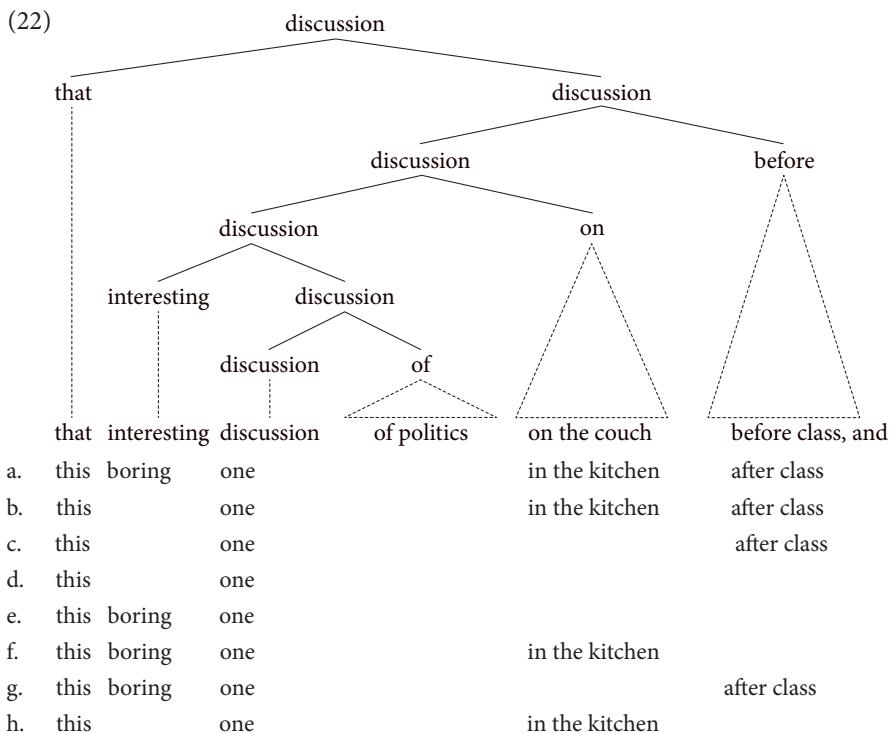
3.6 One-substitution

The pronominal count noun *one* has been used in a way similar to how *do so* has been used, but for NPs instead of VPs.⁸⁴ *One*-substitution is viewed as delivering clues about the constituent structure of NPs, and like the coordination test and *do-so*-test, it tends to maximize the number of constituents that are acknowledged. A closer examination of *one*-substitution reveals, however, that it behaves like *do so*, which means it actually provides no evidence for a layered, phrase structure analysis of NPs. The relatively flat, dependency analysis of NPs that acknowledges the *catena* unit – the *catena* unit is, again, introduced below in Section 4.2 – is actually more consistent with what *one*-substitution is revealing about the structure of NPs.

The following data set illustrates how *one*-substitution has typically been used to motivate a quite layered, phrase structure analysis of NPs:

83. The *catena* analysis of the *do-so* diagnostic is developed at length in Osborne & Groß (2016).

84. The *one*-diagnostic as a test for the structure of nominal groups is very widely employed (e.g. Baker 1978: 327–40, 413–25; Radford 1981: 92, 96–100; Aarts & Aarts 1982: 57; Haegeman 1991: 26, 88–9; Cowper 1992: 26; Napoli 1993: 423–5; Burton-Roberts 1997: 182–9; McCawley 1998: 183; Haegeman & Guérón 1999: 75–6; Fromkin et al. 2000: 157–8; van Valin 2001: 122, 126, 128; Poole 2002: 37–9; Adger 2003: 63; Radford 2004: 37; Hornstein et al. 2005: 180–6; Kroeger 2005: 97–8; Tallerman 2005: 150; Haegeman 2006: 109; Carnie 2010: 114–5; Quirk et al. 2010: 75; Carnie 2013: 166–7; Sportiche et al. 2014: 52, 57, 60).



This tree seems to accommodate Examples (22a–d) because for each of those examples, *one* can be construed as standing in for one of the constituents shown. In (22a), *one* stands in for *discussion of politics*, in (22b) for *interesting discussion of politics*, in (22c) for *interesting discussion of politics on the couch*, and in (22d) for *interesting discussion of politics on the couch before class*. Thus, based on such examples, the layered analysis shown is construed as well motivated.

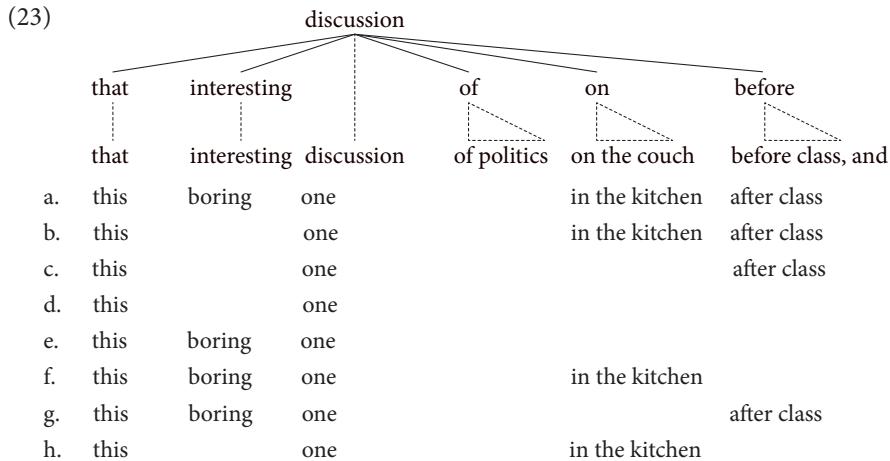
Of course such reasoning is shortsighted, as the further Examples (22e–h) immediately demonstrate.⁸⁵ Not one of the strings for which *one* can be construed as standing in for in (22e–h) is shown as a constituent in (22).⁸⁶ Note in particular that

85. Starosta (1988: 17–8) points to the problem that examples like (22e–h) pose to the *one*-diagnostic, although he does not discuss the issue in detail.

86. The problem with the *one*-diagnostic represented by examples like (23e–h) has been acknowledged by some (e.g. Cowper 1992: 30; Napoli 1993: 425; and Burton-Roberts 1997: 187). The solution to the problem that Cowper and Burton-Roberts propose is to allow for flexible constituent structure. This solution does not work for Examples (23f, h), where the word combinations that *one* stands in for are not even strings.

the word combinations *discussion of politics...before class* in (22f) and *boring discussion of politics...before class* in (22h) are not even continuous sequences.⁸⁷ There is therefore quite obviously no single tree structure that can simultaneously show all the relevant word combinations for which *one* can stand in for as constituents.

The relatively flat DG analysis of the example is as follows:



Since the principle of dependency is incapable of acknowledging more nodes in the structure than there are elements in the sentence at hand, the relatively flat analysis of the NP shown here is obligatory. If one again objects – as one did above concerning the relatively flat analysis in (21) – that (23) is less plausible than the more layered phrase structure analysis in (22) because it is even less capable of accommodating the a–h-sentences, then DG can again counter with the catena unit. In each of (23a–h), the word combination for which *one* can be construed as standing in for qualifies as catenae, and this is so even for Examples (23f) and (23h), where the word combination for which *one* stands in for is not even a continuous sequence.

3.7 Clause binarity

Most phrase structure grammars have a binary division of the clause at their core. Sentence structure is assumed to reflect the subject-predicate division of Aristotelian logic. Dependency syntax cannot, in contrast, acknowledge this initial binary division, as mentioned in Section 2.4. Indeed, the presence/absence of

87. The crucial insight that *one* can stand in for word combinations that fail to qualify as strings is produced by Culicover and Jackendoff (2005: 137).

this binary division seems to be the focus upon which much of the dependency vs. phrase structure distinction rests. A grammar that acknowledges the binary subject-predicate division is likely to go down the path of phrase structure, and if a grammar rejects this division, it is likely to choose the path of dependency.

Lucien Tesnière was keenly aware of the binary division in traditional grammar; he argued vehemently against it, emphasizing that this division was a manifestation of logic and did not belong in linguistic analysis.⁸⁸ Tesnière is now cited directly on this issue:

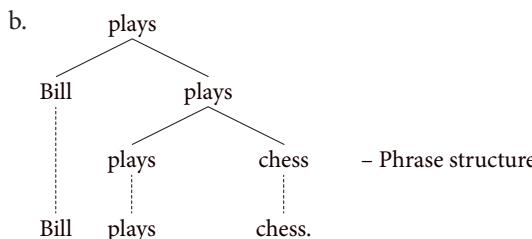
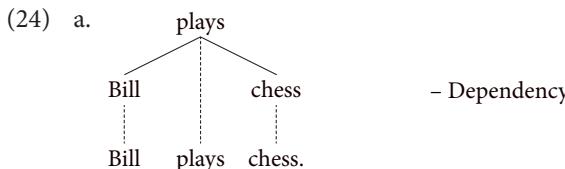
Founded on the principles of logic, traditional grammar forces one to see the logical opposition between subject and predicate in the sentence, the subject being that of which something is said, the predicate that which is said of it. Thus, in the clause *Alfred speaks slowly*, the subject is *Alfred* and the predicate *speak slowly*,... In this conception, it is necessary to recognize only the survival of something that has not yet been eliminated, something that survives from the époque that extended from Aristotle to Port-Royal, where all grammar was founded on logic. In effect, all arguments that can be invoked against the conception of the verb center in favor of the opposition between subject and predicate rests on *a priori* formal logic, which has no place in linguistics. (Tesnière 1959/2015: Chapter 49, § 2–6)

After making these statements, Tesnière presents some less than convincing arguments against the binary division of the clause.⁸⁹ In this regard, a more convincing way to support Tesnière's claim comes from the tests for constituents discussed above. These tests are now brought to bear on the issue.

The simple sentence *Bill plays chess* will be employed for the illustration. The competing dependency and phrase structure analyses of this sentence are as follows:

88. Tesnière was not the first dependency grammarian to reject the binary subject-predicate division associated with most phrase structure grammars. Franz Kern (1883: 2) stated in this regard that the subject should not be defined as that about which something is stated, since such a definition can be valid for any other nominal in a sentence. The only plausible alternative, then, was to position the verb as the root word of the sentence, in particular the finite verb.

89. As a point of comparison, it is interesting and insightful to note what the prominent American structuralist Leonard Bloomfield (1933: 161) wrote about the initial, subject-predicate division of the clause. He took the division for granted; he wrote: "Any English-speaking person who concerns himself with this matter, is likely to tell us that the immediate constituents of *Poor John ran away* are *Poor John* and *ran away*;..." Beyond this statement, Bloomfield did not attempt to motivate the division empirically.



The dependency tree acknowledges three constituents: *Bill*, *chess*, and *Bill plays chess*. The phrase structure tree, in contrast, assumes five constituents: *Bill*, *plays*, *chess*, *plays chess*, and *Bill plays chess*. From the discussion in Section 2.3, we know that the tests for constituents suggest strongly that a finite verb like *plays* alone is NOT a constituent. What about the finite VP *plays chess*? Do the tests for constituents identify it as a constituent? We will now see that the diagnostic for constituents do not provide solid evidence for granting finite VP the status of a constituent.

If an initial binary division is present as shown in (24b), the diagnostics for constituents should identify *plays chess* as a constituent, but they do not do so, at least not in a convincing manner:⁹⁰

- (25) Bill plays chess.
- a. *...and plays chess Bill. – Topicalization
 - b. *It is plays chess that Bill (does). – Clefting
 - c. ??What Bill does is plays chess. – Pseudoclefting
 - c'. What Bill does is play chess.
 - d. Bill does so. (*does so* = *plays chess*) – Proform substitution
 - e. What does Bill do? – ?Plays chess. – Answer fragment
 - e'. – Play chess.
 - f. Bill [plays chess] and [relaxes]. – Coordination

Topicalization and clefting suggest that *plays chess* is not a constituent. While pseudoclefting is less than fully conclusive, the preference for the infinitival *play chess* in (25c') over the finite *plays chess* in (25c) reinforces the message from topicalization and clefting. Proform substitution involving *do so* as given in (25d) can, though, be viewed as supporting the binary division. However, the discussion of *do so* in

⁹⁰. The extent to which finite VP exists as a constituent is addressed directly by Miller (2011: 54–5) and Osborne et al. (2011: 323–4).

Section 3.5 demonstrated that *do so* can easily substitute in for non-constituent word combinations, so any conclusion based on *do-so*-substitution is suspect. The marginal answer fragment in (25e) compared to the fully acceptable (25e') again suggests that *plays chess* is not a constituent. Finally, the fact that coordination identifies *plays chess* as a constituent in (25f) is not decisive because coordination is, as demonstrated in Section 3.4, not a reliable diagnostic for constituents.

Taken together, these data do not support the existence of the initial binary division of the clause. If anything, they suggest the opposite, namely that finite VP is not a constituent. The binary division therefore lacks convincing empirical support. Given this state of affairs, one can legitimately ask how it has come to pass that the binary division is so willingly and widely taken for granted. Two explanations for this willingness come to mind. The first is that the majority of linguists who employ tests for constituents are probably unaware that there is a much different way to construe sentence structure. That is, they are unaware that a dependency analysis stands as an alternative that should be considered. Lacking awareness of a conceivable alternative, the phrase structure theories cannot help but assume the binary division. By its very nature, phrase structure encourages the linguist to acknowledge binary divisions, even when there is otherwise a lack of empirical support for these divisions.

A second explanation for the willingness to acknowledge a finite VP constituent concerns certain limited cases that suggest that the binary division is in fact warranted. In his seminal paper on immediate constituents, Rulon Wells motivated the initial binary division of the clause with the following example:

- (26) What did you say the King of England did?
a. – Opened parliament. (Wells 1947: 85)
b. – Open parliament.

Wells produced the answer fragment in (26a), not the one in (26b), but both fragments are acceptable. In any case, Example (26a) involving a finite VP answer fragment is better than the analogous Example (25e) above, which also involves a finite VP answer fragment (*What does Fred do? – ?Plays chess vs. – Play chess*). There are other cases, however, where a finite VP as an answer fragment is clearly not acceptable, in particular, when an auxiliary verb is present, e.g.

- (27) What is the King of England going to do?

 - a. – *Will open parliament.
 - b. – *Opens parliament
 - c. – Open parliament.

In this case, the nonfinite VP fragment in (27c) is fine, whereas the finite VP fragments in (27a) and (27b) are bad. An insight that might lead to an explanation of

these cases is that the simple past form *opened* in (26a) is homophonic with the nonfinite past participle *opened* (*He has opened parliament*). Perhaps the homophony increases the acceptability of the finite VP fragment in cases like (26a).

The explanation of Example (26a) in terms homophony is supported by the reduced acceptability of finite VP fragments with strong verbs, which do not involve homophony, e.g.

- (28) What did Bill do during the movie?
 - a. – ??Ate popcorn.
 - b. – Eat popcorn.
- (29) What did Lynn do in the seminar?
 - a. – ??Wrote a letter.
 - b. – Write a letter.

Acceptability judgments are difficult in these cases, but the nonfinite fragments *Eat popcorn* and *Write a letter* seem better than the finite fragments. This is surprising, since such fragments would correspond to full sentence answers that would be bad in these contexts, e.g. *What did Bill do during the movie?* – **He did eat popcorn*. This situation suggests that an underlying analysis in terms of a pseudocleft sentence might be tractable, e.g. *What did Bill do during the movie?* – (*What he did during the movie was*) *Eat popcorn*.

While the data delivered by tests for constituents are not entirely consistent, by and large they provide little support for the clause-binarity at the core of most phrase structure grammars. Since dependency does not acknowledge clause-binarity, it is therefore not challenged by what the tests reveal.

3.8 Binary branching vs. flat structures

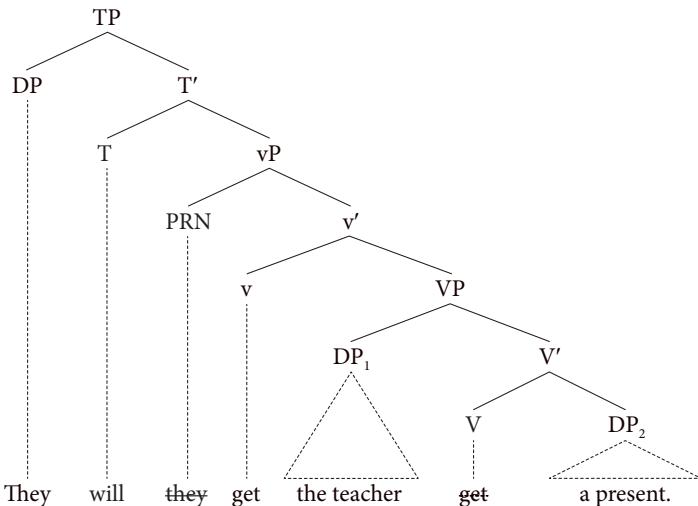
The tendency for linguists to seek binary divisions whenever possible has reached its zenith in some modern phrase structure grammars.⁹¹ The binary branching structures that are assumed are primarily right branching in English, meaning that VPs extend down to the right. The syntactic structures that result are neat and orderly insofar as the shape of trees is relatively consistent. This section briefly scrutinizes these strictly binary structures. Two empirical arguments are brought to bear on the matter. The conclusion will be that the strictly binary branching structures are NOT supported by empirical considerations and that flatter structures

⁹¹. Prominent examples of phrase structure approaches that assume strict binarity of structures can be found in numerous recent textbooks on syntax (e.g. Adger 2003; Radford 2004; Hornstein et al. 2005; Slobin 2011; Sportiche et al. 2014).

are therefore necessary. This conclusion is consistent with dependency structures, which by nature are, as should be evident by now, relatively flat.

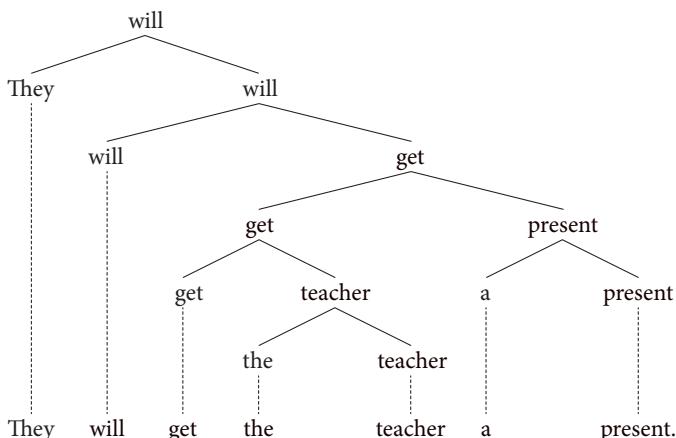
The analysis of a ditransitive structure illustrates the strictly binary branching associated with modern phrase structure syntax. The next example is taken from Radford (2004: 271):

(30)



The struck-through words indicate copies that are not pronounced but that bear witness to the derivational history of the structure. The various categories (T, v, V, etc.) are not important to the matter at hand. What is important is the extent to which all branching is binary. Example (30) shows a strictly right-branching ditransitive structure. A more traditional analysis would likely assume a left-branching VP. On such an analysis, the tree might be as follows:

(31)



While this structure is perhaps less orderly, it also contains binary branching only. The relevant question concerns the motivation for these strictly binary branching structures. Are there theory-neutral, empirical observations that motivate these structures? Evidence from tests for constituents and heavy constituent shift provide an answer to this question: No, there are not.

Observe that the word combination *the teacher a present* is shown as a constituent in (30) because it is exhaustively dominated by the node VP. Since it is shown as a constituent, the tests for constituents should identify it as one, but they do not:

- (32) a. *...and **the teacher a present**, they will get. – Topicalization
 b. *It is **the teacher a present** that they will get. – Clefting
 c. *What they will get is **the teacher a present**. – Pseudoclefting
 d. They will get **that**. – Proform substitution
 (*that* ≠ *the teacher a present*)
 e. Who/What will they get? – ***The teacher a present**. – Answer fragment

Based on these data, the assumption that the word combination *the teacher a present* is a constituent is unwarranted.

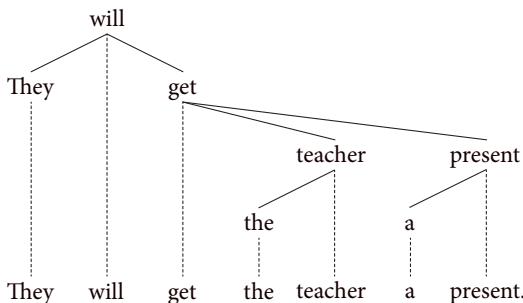
Consider next the status of *get the teacher* in (31); since it is shown as a constituent, the diagnostics for constituents should identify it as one, but they do not:

- (33) a. *...and **get the teacher** they will a present. – Topicalization
 b. *It is **get the teacher** that they will a present. – Clefting
 c. *What they will do a present is **get the teacher**. – Pseudoclefting
 d. *They will **do so** a present. – Proform substitution
 (*do so* = *get the teacher*)
 e. What will they do concerning a present? – ***Get the teacher**. – Answer fragment

Based on these data, one can conclude that *get the teacher* is also NOT a constituent. This situation is problematic for the binary branching structures, since they make a prediction that is contradicted by a number of empirical facts.

The binary branching structures shown in (30)–(31) must be compared with a flat structure of the sort that dependency necessitates:

(34)



On this analysis, *the teacher* and *a present* are each a constituent, but neither *the teacher a present* nor *get the teacher* is a constituent. This analysis is consistent with the results of the diagnostic for constituents, a fact that readers can verify for themselves. The point, then, is that the strictly binary branching structures that are currently employed by some modern theories of syntax lack empirical support at a basic level. The results of tests for constituents contradict the strictly binary structures.

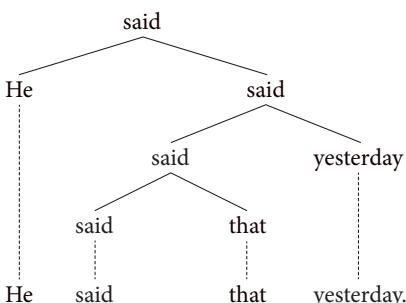
A second source of difficulty for the strictly binary branching structures occurs with heavy constituent shift. Heavy constituent shift occurs in English when a heavy constituent (i.e. it is longer, has more words) shifts to the right to a position where it would not appear if it were lighter (see Section 7.6), e.g.

- (35) a. He said that **yesterday**.
 b. ??He said that he will do everything **yesterday**.
 c. He said **yesterday** that he will do everything.

Sentence (35a) illustrates neutral word order where the object *that* precedes the adjunct *yesterday*. Sentences (35b–c) show what happens when the object is heavy. The heavy object appears to shift to the right, whereby the lighter adjunct shifts to the left.

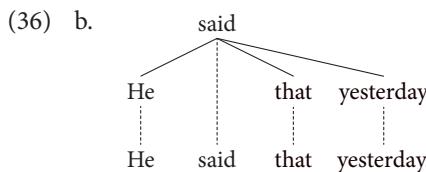
A strictly binary branching analysis of sentence (35a) might be as follows:

(36) a.



The aspect of this analysis that is important in the context of heavy constituent shift concerns the positions of the constituents that shift. In order to maintain strict binarity of branching, the constituents *that* and *yesterday* appear on separate levels, the object *that* appearing below the adjunct *yesterday*. Note that a strictly right-branching binary analysis of the sentence would be similar insofar as *that* and *yesterday* would again necessarily appear on separate levels. This necessity to place the two constituents that shift on separate levels is the aspect of the binary branching account that is implausible.

The point becomes clear when one considers the explanation of **shifting** that a flat structure offers. The DG structure for the sentence is as follows:



The constituents that can shift are siblings, that is, *that* and *yesterday* are siblings. This observation leads to a clear statement about the nature of heavy-constituent shift. Shifting occurs when the constituents involved are sibling constituents that appear on the same side of their head (see Section 7.6). The strictly binary branching structures cannot offer a similarly transparent explanation. Thus, a common principle of word order in many languages (i.e. heavy constituents appear to the right) is easily explained given flatter structures. For the more layered structures that strict binarity necessitates, heavy constituent shift is a problem.

To summarize, two sources of support for the flatter DG structures have been considered in this section: tests for constituent structure and heavy constituent shift. The facts in these areas raise difficulties for theories of sentence structure that take all branching to be binary.

3.9 Historical overview of DG

While the modern history of DG begins with the works of Lucien Tesnière and David Hays, the presence of dependency in theoretical and pedagogical grammars predates Tesnière's and Hay's works by millennia.⁹² Dependency has been identified in the works of the Ancient Sanskrit grammarian Panini (4th century BCE), who is

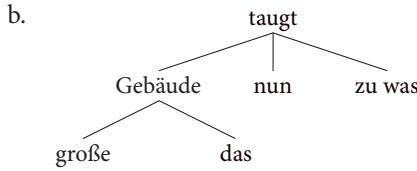
^{92.} Percival (1990) and Kruijff (2006) are two prominent sources that discuss the history of dependency (as opposed to phrase structure) as a concept in grammar theory.

acknowledged as having produced the first recorded accounts of natural language grammar. Dependency has also been identified in the works of medieval Arabic grammarians and in the works of the Modistic grammarians, especially Thomas of Erfurt (early 14th century).⁹³

More concrete statements about dependency and phrase structure in theories of grammar become possible with the appearance of sentence diagrams of the sort produced by Alonzo Reed and Brainerd Kellogg (1834–1920) (see Section 2.8). The diagrams deliver solid indications about the extent to which the grammarians at hand conceived of syntactic structures in terms of dependency and/or phrase structure. Reed-Kellogg diagrams are, as established in Section 2.8, hybrid in nature, assuming both dependency and phrase structure. When one looks further back for sources of inspiration for Reed and Kellogg's sentence diagrams, one finds that Stephen Watkins Clark (1810–1901) produced similar diagrams that also combined both dependency and phrase structure, as did the German grammarian Gustav Billroth (1808–1836) much earlier.⁹⁴

Perhaps the earliest grammar that is arguably almost entirely in terms of dependency is that of Franz Kern (1830–1894). Unlike Reed and Kellogg, Clark, and Billroth, Kern positioned the verb as the root of sentence structure, and in so doing he rejected the subject-predicate division of most phrase structure grammars. The following sentence diagram is taken from Kern (1883):⁹⁵

- (37) a. Zu was taugt nun das große Gebäude?
 To what good.for now the large building?
 'What is the large building now good for?'



Kern's decision to position the verb *taugt* 'good for' as the root over the other words clearly identifies his conception of sentence structure as primarily in terms of dependency. Noteworthy in this respect is the fact that Kern's works on syntax are much less extensive than Tesnière's, so Tesnière's preeminent position in the history

93. See Versteegh (1997: 45) concerning the concept of dependency in the tradition of Arabic grammars, and Baum (1976: 29–31) and especially Covington (1984) for extensive discussions of dependency in the works of Thomas of Erfurt and many other Modistic medieval grammarians.

94. See Clark (1847) and Billroth (1832).

95. The example is adapted slightly from Kern (1883: 29).

of DG is still quite warranted.⁹⁶ In fact what Kern's works and sentence diagrams suggest more than anything is that the verb centrality associated with Tesnière's grammar and modern DGs was present in the German grammar tradition long before Tesnière exercised his influence over the development of syntactic theory in Europe and beyond. Worth noting in this regard is that Tesnière was fluent in German and studied in Leipzig before WWI broke out. He was therefore most certainly influenced by grammatical theory associated with the German language. For instance, he praised the works of the prominent German linguist Wilhelm von Humboldt.

Additional concrete indications of dependency in the theory of grammar can be found in the works of the Hungarian linguist Sámuel Brassai (1800–1897) and in those of the Romanian linguist Heimann Hariton Tiktin (1850–1936).⁹⁷ Brassai produced concrete statements about sentence structure that assumed verb centrality and Tiktin drew sentence diagrams that were almost entirely in terms of dependency.⁹⁸ Concerning influences on Brassai and Tiktin, both knew German well, and Tiktin had strong connections to Germany and the German language, having studied and worked in Germany. Therefore, we again have a further indication that dependency syntax is associated with the grammar tradition of the German language.

When considering the historical development of dependency in the study and teaching of grammar, one must keep in mind that the distinction between dependency and phrase structure was not clearly recognized and explored until the 1960s. Tesnière died in 1954, so one can assume that he himself was not aware of the distinction between dependency and phrase structure approaches to the syntax of natural language as it is understood today. In fact, it has been argued that Tesnière's theory of transfer, which comprises more than a third (270 pages) of his oeuvre *Éléments de syntax structurale* 'Elements of Structural Syntax' (670 pages), employed a schema that is a manifestation of phrase structure, the transfer schema.⁹⁹ This makes Tesnière's theory of grammar a hybrid, surprisingly; it employs both

96. Baum (1976: 42) makes this point, namely that while Kern's works predate Tesnière's works by at least a half a century, Tesnière developed verb centrality into a much more comprehensive theory of syntax, so Tesnière deserves his preeminent position as the linguist most responsible for establishing the approach to natural language syntax that we now understand as dependency grammar.

97. See Brassai (1860) and Tiktin (1891–1893).

98. That Brassai's understanding of sentence structure was in terms of dependency is established by Imrényi (2013), and Tiktin's status as a dependency grammarian is discussed by Coşeriu (1980).

99. Osborne (2013) and Kahane & Osborne (2015: liv–lx) consider the extent to which Tesnière's theory of syntax is (or is not) a hybrid, combining both dependency and phrase structure.

dependency and phrase structure extensively. Tesnière never used the designation *dependency grammar* to denote his approach to syntax. The linguistics world first became aware of the distinction between dependency and phrase structure after the appearance of Tesnière's *Éléments*, as the ideas in the volume were being received and evaluated.

A related development was taking place in the United States around the time when Tesnière's theory of grammar was influencing linguistic theory (in the 1960s). The first attempts at automated processing of texts were under way, and these attempts were using dependency as the means of grouping words together into units of syntax. These developments were associated above all with David Hays (1928–1995) at the Rand Corporation in Santa Monica California.¹⁰⁰ Hays was pioneering the field of computational linguistics. For many decades thereafter, dependency was and still is present as a key concept in computational linguistics, although it remained on the periphery until about the 1990s. Interestingly, the extent to which Hays may or may not have been influenced by Tesnière's grammar is not clear, since Hays did not explicitly cite Tesnière.

Tesnière's ideas enjoyed much interest in the two Germany's starting in the 1960s.¹⁰¹ By the 1970s, DG (Ger. *Dependenzgrammatik*) had become an alternative way to do syntax – alternative to the phrase structure grammar associated with the Chomskyans – and the concept of dependency found its way into university courses on syntax, linguistics, and grammar, mainly in the veiled form of *valency theory* (see Chapter 6).¹⁰² Indeed, if one looks to German linguists and their concept of syntax, one sees that dependency approaches to syntax enjoyed, and continue to enjoy, popularity. The works of numerous grammarians established

^{100.} Hays produced an early, very influential article on dependency syntax in 1964. This article appeared in the journal *Language*; it employed the terms *dependency* and *dependency grammar*, and it established dependency as an alternative way to conceive of sentence structure, that is, alternative to phrase structure. The first textbook on computational linguistics was authored by Hays; it appeared in 1967. Note further that the syntax Hays was advocating was entirely in terms dependency; it was not a hybrid like Tesnière's approach.

^{101.} See Schubert (1987: 23–7) for an overview of the development of DG following Tesnière in Germany, both East and West, and elsewhere in Europe.

^{102.} In the grammar tradition of the German language, the concept of valency has played a particularly important role in recent decades. Valency theory is, however, merely a subtheory of dependency syntax more generally, a fact that is emphasized in various places (e.g. Matthews 1981: 94–5; Jung 1995: 11; Bröker 1999: 159–60), but that has also been overlooked. For instance, Tarvainen's book (1981) bears the title *Dependency Grammar* (Ger. *Dependenzgrammatik*), yet the content of the book concentrates on the concept of valency, having little to say about dependency itself.

dependency as a plausible alternative to phrase structure for the analysis of natural language syntax.¹⁰³

Due to the predominance of Chomskyan phrase structure grammar and the lack of a strong tradition of verb centrality in the grammar tradition of the English language, dependency in grammar theory in the English-speaking world has been much less established. However, the works of Richard Hudson at the University College of London are a prominent exception. Hudson recognized the utility and potential of dependency in the 1970s and took it as the basis for his approach to syntax. He first called this approach *Daughter-Dependency Grammar*, but then later renamed his approach *Word Grammar*.¹⁰⁴ In Anglo-American linguistics, Hudson has been one of the most consistent and vocal advocates of dependency as the basis for the study and exploration of natural language syntax.

Another prominent and very vocal advocate for dependency as the basis for exploring natural language syntax is the Russian/Canadian linguist Igor Mel'čuk. Mel'čuk began advocating dependency as the basis for the study of natural language syntax very early, in the late 1950s around the time that Tesnière's *Éléments* first appeared. Originally in Moscow, Mel'čuk emigrated to Canada in the 1970s, where he became a professor of linguistics at the University of Montreal. His early works were written in Russian, but by the 1980s, his ideas were also appearing in English.¹⁰⁵ Mel'čuk's grammar framework is called *Meaning-Text Theory* (MTT). MTT remains a widely employed dependency approach to natural language syntax.

In mentioning prominent voices in the recent history of dependency syntax, the Prague school of DG (associated with the linguists Petr Sgall, Eva Hajíčová, and Jarmila Panevová) enjoys a prominent position. The Prague school adopted dependency as the basis for its grammar framework relatively early, in the late 1960s;¹⁰⁶ that framework is called *Functional Generative Description* (FGD).¹⁰⁷ Its

¹⁰³. There are numerous prominent DGs produced by German grammarians or grammarians who live and work in Germany (e.g. are Kunze 1975; Baum 1976; Schubert 1987; Weber 1992; Engel 1994; Heringer 1996; Groß 1999; Eroms 2000). See especially the massive volumes on DG and valency theory by Ágel et al. (2003; 2006).

¹⁰⁴. Hudson's main work on Daughter-Dependency Grammar appeared in 1976 (Hudson 1976). His main books on Word Grammar appeared in the decades that followed (Hudson 1984; 1990; 2007; 2010).

¹⁰⁵. Mel'čuk is on record first arguing for dependency in the late 1950s in (Mel'čuk 1958: 252–4). His main earlier works in English appeared in the late 1970s and 1980s (Mel'čuk 1979; 1988; Mel'čuk & Pertsov 1987).

¹⁰⁶. Two foundational papers for the Prague school of DG are Sgall (1967) and Sgall & Hajíčová (1970).

¹⁰⁷. The most frequently cited work on FGD appeared in 1986 (Sgall et al. 1986).

characteristic feature is a multilayered scheme. In addition to surface syntax, there is a level of deep syntax, called the *tectogrammatical* layer, where the focus is on the dependency relations. The Prague Dependency Treebank (PDT) has influenced and continues to influence our understanding of how linguistic explorations of the syntax of actual texts can proceed (think corpus linguistics). A main contribution of the Prague school has been the marriage of linguistic theory (dependency syntax) with practical goals (text processing and evaluation using treebanks).

In mentioning text processing, the consideration of the recent history of DG has arrived at the present (2019). The greatest development in recent years has been the displacement of phrase structure by dependency in automated text processing. Dependency is by now the preferred means for parsing natural language texts in computational linguistics. The work initiated by David Hays in the 1960s (see above) seems to have reached a level of maturity and influence that would do Hays proud. The linguists using dependency in computational linguistics are the main motor at present that are generating an upsurge of interest in DG.¹⁰⁸ The most recent project aiming at specifying syntactic dependency structure and related morphological and morphosyntactic features is the Universal Dependencies project (Nivre et al. 2016). It aims at a balanced compromise so that the same specification can be used for many languages. The Universal Dependencies project currently provides over 100 annotated treebanks in over 60 languages (Nivre et al. 2018, <http://universaldependencies.org>).

A development related to the widespread adoption of dependency in computational circles is its utilization for the quantitative analysis of natural language syntax.¹⁰⁹ The relatively simple dependency hierarchies – that is, simple compared to phrase structure hierarchies – serve well as the basis for explorations into the organizational principles that underlie syntactic structures across languages. One important concept in this area is *dependency distance*, a metric that is calculated based on the distance measured in words separating dependents from their heads. Such a complexity measure leads to simple generalizations about the syntactic structures of related and unrelated languages.¹¹⁰

^{108.} Numerous works in recent decades have helped lead to the current state of the art in automated dependency parsing (e.g. Collins 1999; Maruyama 1990; Menzel & Schröder 1998; Eisner 1996; McDonald 2006; Kudo & Matsumoto 2002; Yamada & Matsumoto 2003; Nivre 2008). Kübler et al. (2009) provide an overview and analysis of the trends in dependency parsing.

^{109.} For examples of dependency used as the basis for the quantitative study of natural language syntax, see for instance Liu (2009; 2010) and Wang & Liu (2013).

^{110.} Heringer et al. (1980: 187–8) may have been the first ones to consider the notion of dependency distance. For more comprehensive explorations of natural language syntax using dependency distance, see for instance Liu (2008) and Liu et al. (2009).

While dependency as the basis for computational parsing and quantitative analyses is by now well established, dependency as a basis for theoretical syntax is at present (2019) still rather peripheral. Most university courses on syntax continue to take phrase structure for granted, often not even mentioning dependency as an alternative.¹¹¹ The current book has been written with this unfortunate situation in mind. The desire is to add another voice to many of the voices mentioned above that employ dependency as the basis for the theoretical analysis of sentence structure and for its pedagogical application in the language classroom.

¹¹¹. See footnote 29 concerning the extent to which most phrase structure grammars ignore DG entirely.

CHAPTER 4

Units of structure

4.1 Overview

The constituent as discussed and illustrated in the previous two chapters has been and continues to be viewed as the basic unit of sentence structure by many theories of syntax and grammar. There are, though, difficulties with the assumption that the constituent is the basic unit of sentence structure. These difficulties occur with a number of phenomena of syntax. A plausible theory of ellipsis is difficult if it is restricted to constituents (see Chapters 12 and 13); a theory of discontinuities that acknowledges no other unit besides the constituent is challenged in certain ways (see Chapters 7–9); and when one begins to examine the word combinations that can express idiomatic meaning, one quickly sees that a theory limited to only constituents is seriously challenged. Due to such difficulties, a look beyond the constituent for other ways to conceive of syntactic structure is warranted.

The problems with the constituent just mentioned are illustrated here now briefly:

- (1) a. Should I call you, or **should** you **call** me? – Ellipsis (gapping)
b. He did it, but we don't know what **he-did** **it** for. – Ellipsis (sluicing)
c. **Have you** Been working a lot lately? – Ellipsis (left edge ellipsis)
- (2) a. **What** have you being **doing**? – Discontinuity (*wh*-fronting)
b. ...but **such things** we would never say. – Discontinuity (topicalization)
c. **Something** occurred that **no one** expected. – Discontinuity (extraction)
- (3) a. He is **pulling** your leg. – Idiom
b. She sent him to the **doghouse**. – Idiom
c. He tried to **chat** her up. – Idiom (involving phrasal verb)

Each of these examples illustrates a phenomenon that is problematic for theories of syntax that take the constituent to be the fundamental unit of syntactic analysis. In each example of ellipsis in (1a–c), the elided words do not qualify as a constituent. Similarly, the words in bold in (2a–c) involving discontinuities belong together

insofar as the one expression in bold governs the other, yet these words are discontinuous and therefore do not form constituents. Further, the word combinations in bold in (3a–c) are units of idiosyncratic meaning and as such, one might expect them to also be units of syntax. They are, however, not constituents.

Examples (1)–(3) challenge theories of syntax that are limited to the constituent unit, since in each case, the word combinations that are relevant to the phenomenon at hand do not qualify as constituents. With these difficulties in mind, the current chapter augments the basic approach to syntactic structure by acknowledging additional types of syntactic units. Of these additional units, the *catena* is the most important. The catena serves as the basis for the explorations of discontinuity types and ellipsis mechanisms that appear in later chapters. But in addition to the catena, other units of syntax are identified and defined, including the *component* unit. Further, key terms such as *governor* and *selector* are presented and delimited from each other. These concepts are the basis for distinguishing between semantic and syntactic dependencies.

4.2 Generic units

The following two sections define and illustrate the units of structure in the current DG. A number of these units have already occurred often above, e.g. *head*, *dependent*, *parent*, *child*, and *root*. These units as well as many others will now be “officially” defined and discussed. The units are divided into two groups, *generic units* and *relational units*. Generic units are defined without regard to other units in their environment, whereas relational units are defined in terms of another unit appearing in the immediate environment. Of all the units defined and discussed below, the *catena* (Latin for ‘chain’, plural *catenae*) is, as stated in the overview above, the most important.¹¹² A theory of syntax that acknowledges catenae is a *catena-based* theory, as opposed to a *constituent-based* theory.

The two ordering relations precedence and dominance (see Section 2.2) are the basis for defining the generic units of syntax:¹¹³

¹¹². The catena unit has been the focus of much research. The catena idea begins most directly with O’Grady (1998). O’Grady introduced the catena unit, although he called it a “chain”. Later efforts built on O’Grady’s insight, using the catena unit as the basis for the analysis of many other aspects of syntax. See in particular Osborne (2005b) and Osborne et al. (2012).

¹¹³. The definitions and discussion of the generic units as given here appear in a number of places, e.g. Osborne (2008: 1133–4; 2012: 5–10).

String

A word or a combination of words that are continuous with respect to precedence

Catena

A word or a combination of words that are continuous with respect to dominance

Component

A word or a combination of words that are continuous with respect to both precedence and dominance

Constituent

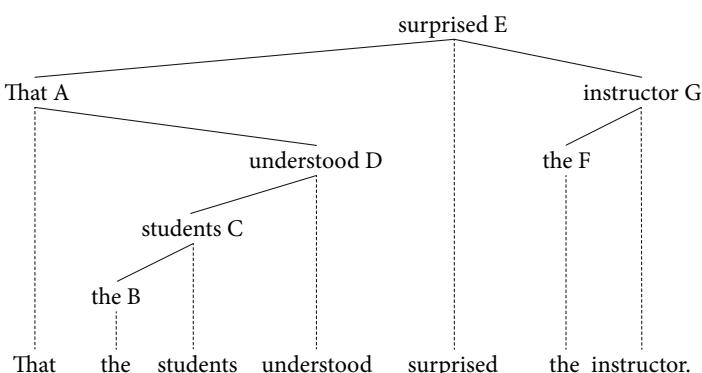
A component that is a complete subtree

Phrase

A constituent that consists of two or more words

These five units are illustrated here using the following dependency hierarchy:

(4)



The capital letters serve to abbreviate the words.

Strings

A string is a word or combinations of words that is left-to-right (and right-to-left) continuous. In terms of the axes, a string is continuous with respect to the horizontal x-axis. There are 28 (= 7 + 6 + 5 + 4 + 3 + 2 + 1) distinct strings possible in (4), all of which are now listed: A, B, C, D, E, F, G, AB, BC, CD, DE, EF, FG, ABC, BCD, CDE, DEF, EFG, ABCD, BCDE, CDEF, DEFG, ABCDE, BCDEF, CDEFG, ABCDEF, BCDEFG, and ABCDEFG. Note that each individual word alone is a string according to the definition.

Catenae

A catena is a word or a combination of words that is top-down (and bottom-up) continuous.¹¹⁴ In terms of the axes, a catena is continuous with respect to the vertical y-axis. In graph-theoretic terms, a catena is any tree or subtree of a tree.¹¹⁵ There are 28 distinct catenae present in (4), all of which are listed here: A, B, C, D, E, F, G, AD, AE, BC, CD, EG, FG, ACD, ADE, AEG, BCD, EFG, ABCD, ACDE, ADEG, AEFG, ABCDE, ACDEG, ABCDEG, ACDEFG, and ABCDEFG. Note that many of the strings are not catenae: AB, DE, EF, ABC, CDE, BCDE, DEFG, BCDEF, CDEFG, ABCDEF, and BCDEFG. Note also that many of the catenae are not strings: AD, AE, EG, AEG, AEFG, ADEFG, ABCDEF, and ACDEFG. The catena is a basic unit of syntax, certainly more basic than the constituent, which is a derived concept. Sections 4.4 and 4.6 examine catenae further.

The definition of the catena given above and just discussed in the previous paragraph is such that it allows for easy comparison with the other units (string, component, constituent, phrase). Some readers might desire a formal definition, however; one that can be tested in terms of formalisms. In this regard, the following alternative definition of the catena should help:

Catena (set-theoretic definition)

Given a dependency tree T, a catena is a set of nodes N in T such that exactly one node in N is not immediately dominated by another node in N.

This definition is set-theoretic; it identifies catenae in terms of set-theoretic notions. The other four units could also be defined in terms of set-theoretic notions, although the discussion here refrains from doing so. The appeal of the catena unit is not that it is defined rigorously in terms of set-theoretic concepts, but that it speaks to intuition. Intuitively, one senses that those word combination in which the words are all linked together by dependencies should be acknowledged as units.

¹¹⁴. The unit being designated with the term *catena* here, Hays (1960: 261) and Kunze (1975: 12) called simply a *subtree* (Ger. *Teilbaum*) and, as emphasized above, O'Grady (1998) calls it a *chain*.

¹¹⁵. The current account distinguishes between *subtrees* and *complete subtrees*. A subtree consists of any word or any combination of words that is chained together by dependencies (i.e. it is a catena). A subtree is complete if it consists of a word plus all the words that that word dominates (i.e. it is a constituent). By distinguishing between subtrees that are and are not complete, the nomenclature here is more exact.

Components

A component is a string that is also a catena, or, taking the opposite perspective, it is a catena that is also a string. There are 15 distinct components in (4): A, B, C, D, E, F, G, BC, CD, FG, BCD, EFG, ABCD, ABCDE, and ABCDEFG. Note that the number of components is a less than the number of strings, which is 28, as well as less than the number of catenae, which is also 28.

Constituents and phrases

A constituent is a complete subtree; it consists of a word plus all the words that that word dominates.¹¹⁶ A phrase is a complete subtree that contains two or more words, as stated in Section 1.3.¹¹⁷ Excluding the entirety, there are only six constituents present in (4): B, F, BC, FG, BCD, ABCD; and there are only four phrases in (4): BC, FG, BCD, ABCD. This definition of the constituent above can be applied in a neutral manner to both dependency and phrase structure hierarchies, a fact that was emphasized above (see Sections 3.2 and 3.3). The key point in this regard is that the definition identifies many more constituents in phrase structures than it does in the corresponding dependency structures. Each individual word alone always qualifies as a constituent in phrase structures. In contrast, those individual words that dominate other words in dependency structures do not qualify as constituents. The words A, C, D, E, and G in (4) do not qualify as constituents, since they dominate other words.

¹¹⁶ Other DGs have also defined the constituent as done here in terms of dependency structures (e.g. Hudson 1984: 92; Starosta 1988: 105; Hellwig 2003: 603; Anderson 2011: 92). Hays (1960: 261; 1964: 520) and Kunze (1975: 13) acknowledged constituents in dependency structures as well, although they designated the unit with the term *complete subtree* (Ger. *Vollständiger Teilbaum*). Engel (1994: 25) states that dependency syntax can acknowledge constituents, but he does not give a definition of the constituent over dependency structures.

¹¹⁷ Numerous DGs have advocated an understanding of the phrase along these lines (e.g. Robinson 1970: 260; Mel'čuk 1988: 15; Starosta 1988: 73; Labin 1993: 43; Engel 1994: 27; Heringer 1996: 52–5; Bröker 1999: 29; Groß 2003: 341; Hudson 2007: 118). Note, however, that on the current definition, a phrase consists of **two or more** words. These other accounts see a phrase consisting of **one or more** words. The current approach is more exact in this regard, since it draws a distinction between phrases and constituents: all phrases are constituents, but not all constituents are phrases.

4.3 Relational units

The discussion now moves to the relational units. The relational units are defined in terms of the generic units and in terms of other words that appear in the immediate context. This section defines and illustrates 11 relational units:

Parent

A word that immediately dominates a given word

Child

A word that a given word immediately dominates

Root

The one word in a given catena that is not dominated by any other word in that catena

Head

The one word that immediately dominates a given catena

Dependent

A constituent that a given word immediately dominates

Pre-child/dependent

A child/dependent that precedes its parent/head

Post-child/dependent

A child/dependent that follows its parent/head

Governor

The one word that licenses the appearance of a given word

Governee

A word the appearance of which is licensed by a given word

Selector

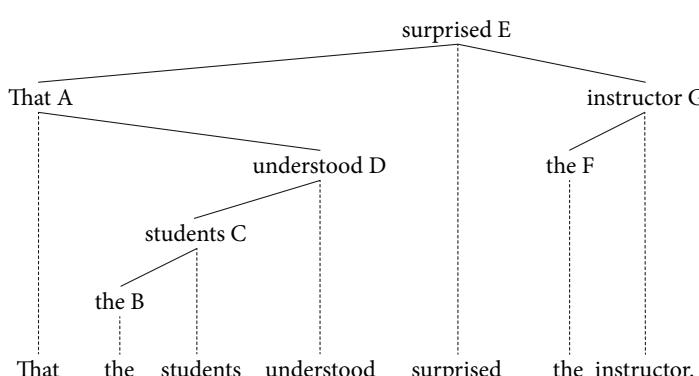
A predicate that selects a given argument catena

Selectee

A catena that is selected by a given predicate

The same dependency tree used to illustrate the generic units, repeated here as (5), is used for these relational units:

(5)



Parents and children

The terms *parent* and *child* denote individual words. The parent of a given word is the one word that immediately dominates that word, whereas the child of a given word is a word that is immediately dominated by that word. Take D as an example: A is its parent and C is its child. Take G as a second example: E is its parent and F is its child. Consider B next: C is its parent and it has no child. Finally, examine E too: it has no parent, and A and G are its children.

Roots vs. heads

The root of a given catena is the highest node in that catena. The head of a given catena, in contrast, is the one word that immediately dominates that catena. Take the catena CD as an example: its root is D, and its head is A. Take the catena ABCD as a second example: its root is A, and its head is E. Take the catena EFG as a third example: its root is E and it has no head. The distinction between ‘root’ and ‘head’ is unique to dependency structures, this distinction being less obvious in phrase structures.¹¹⁸

Parents vs. heads

The distinction between parents and heads is relatively minor. When the term *parent* is used, the focus is on individual words (not on multi-word catenae), whereas when the term *head* is used, the focus is on catenae (be these catenae one-word or multi-word catenae). Take the word and catena C as an example: D is its parent and its head. In contrast, take the catena BC as a second example: D is its head, but strictly speaking not its parent because BC consists of two words as opposed to just one.

Children vs. dependents

The same types of comments are valid for the distinction between children and dependents. When the term *child* is employed, the focus is on individual words. When the term *dependent* is used, in contrast, the focus is on constituents.¹¹⁹ Take the word A as an example: its child is D, whereas its dependent is BCD. Take E as

¹¹⁸. Other DGs employ a different nomenclature to distinguish between what are being called roots and heads here. What is called a head here is called simply a *governor* (Engel 1994: 91), an *outer governor* (Schubert 2003: 641–2, Ger. *äußeres Regens*), or a *parent* (Hudson 2007: 118). What is being called a root here is called a *nucleus* (Lobin 1993: 20; Engel 1994: 91), an *inner governor* (Schubert 2003: 641–2), or a *head* (Hudson 2007: 118).

¹¹⁹. Viewing dependents as constituents (i.e. as complete subtrees) is contrary to other DGs. For Engel (1994: 91), for instance, a dependent is an individual word, not a complete subtree.

a second example: its children are A and G, whereas its dependents are ABCD and FG. And take C as a third example: B is both its child and its dependent.

Pre- and post-dependents/children

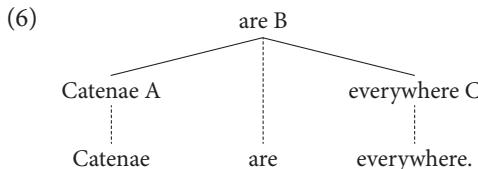
At times it is advantageous to specify whether a child or dependent precedes or follows its parent or head. By prefixing *pre-* and *post-* onto *child* and *dependent*, the distinction is immediately captured. A pre-child/dependent precedes its parent/head, whereas a post-child/dependent follows its parent/head. Take D as an example: it has the pre-child C and the pre-dependent BC, and it has no post-child or post-dependent. Take E as a second example: it has A as a pre-child and ABCD as a pre-dependent; and it has G as a post-child and FG as a post-dependent.

The last four relational units in the list – i.e. governor, governee, selector, and selectee – are discussed in Sections 4.11, 5.4, and 5.6; they are included in the list here in these section for the sake of completeness.

4.4 Catenae and ratios

The catena is a unit of syntax that is largely unique to dependency-based structures. The current theory of grammar sees the catena as one of the two most basic units of syntax, the other being the string. The catena plays the central role below in the DG analyses of both syntactic and semantic phenomena. For this reason, it is necessary to explore catenae in some detail. It is necessary to be clear about which word combinations in a given structure do and do not qualify as catenae. Furthermore, it is necessary to acknowledge the number of catenae in a given structure. The relevant numbers will be expressed as ratios.

The catena is a flexible unit of syntax. Examine the following three-word sentence:

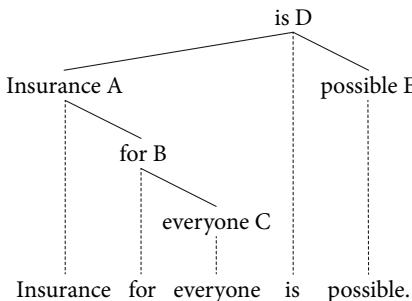


Each individual word qualifies as a catena by definition, A, B, and C; there are two two-word combinations that qualify as catenae, AB and BC; and of course, the entirety qualifies as a catena, ABC. Interestingly, there is only one word combination that fails to qualify as a catena in (6), AC. In sum then, there are six catenae and one non-catena in (6). These numbers can be expressed as a ratio, whereby the

first number in the ratio is the number of catenae, and the second number is the number of non-catenae. This ratio is called the *catena ratio*. The catena ratio for (6) is therefore 6:1.

As the number of words increases, the percentage of non-catena word combinations increases. This point is illustrated with the following structure:

(7)



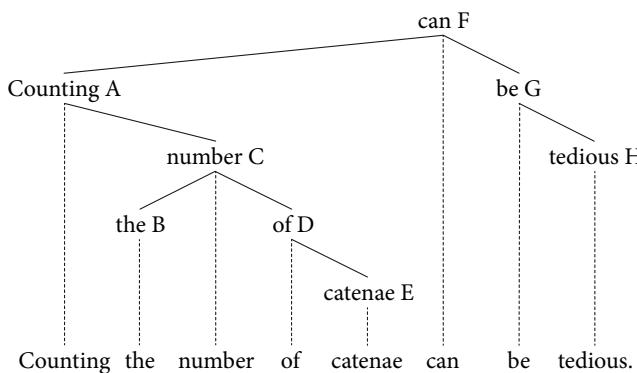
Each of the five individual words qualifies as a catena (by definition): A, B, C, D, and E. There are four two-word combinations that qualify as catenae in (7): AB, AD, BC, and DE. There are three three-word combinations that qualify as catenae: ABC, ABD, and ADE. There are two four-word combinations that qualify as catenae: ABCD and ABDE; and finally, the entirety of course qualifies as a catena: ABCDE. All told, there are 15 distinct catenae in (7). In contrast, there are 16 distinct word combinations in (7) that fail to qualify as catenae, all of which are listed here: AC, AE, BD, BE, CD, CE, ABE, ACD, ACE, ADE, BCD, BCE, BDE, CDE, ABCE, ACDE, and BCDE. The catena ratio for (7) is therefore 15:16.

The same sort of ratios can be acknowledged for components and constituents. There are 11 distinct components in (7): A, B, C, D, E, AB, BC, DE, ABC, ABCD, and ABCDE; and there are 20 word combinations in (7) that fail to qualify as components: AC, AD, AE, BD, BE, CD, CE, ABD, ABE, ACD, ACE, ADE, BCD, BCE, BDE, CDE, ABCE, ABDE, ACDE, and BCDE. The number of (DG) constituents is easy to calculate. This number is always equivalent to the number of words. There are therefore five constituents in (7): C, E, BC, ABC, and ABCDE. The number of non-constituent word combinations in (7) is 26 (which are not listed here). In sum then, the component ratio for (7) is 11:20 and the constituent ratio for (7) is 5:26.

As the number of words increases beyond five, counting all the catenae and components becomes tedious. Arriving at the correct ratios is more doable, however, by calculating the number of distinct word combinations that are possible for the given structure. This number is calculated using the formula $2^n - 1$, where n = the number of words. The number of distinct word combinations in (7) is therefore 31 ($= 2^5 - 1$).

One final example helps solidify these ratios. This final example contains eight words:

(8)



Distinct catenae in (8)

A, B, C, D, E, F, G, H, AC, AF, BC, CD, DE, FG, GH, ABC, ACD, ACF, AFG, BCD, CDE, FGH, ABCD, ABCF, ACDE, ACDF, ACFG, AFGH, BCDE, ABCDE, ABCDF, ABCFG, ACDEF, ACDFG, ACFGH, ABCDEF, ABCDFG, ABCFGH, ACDEFG, ACDFGH, ABCDEFG, ABCDFGH, ACDEFGH, and ABCDEFGH. = 44

Distinct components in (8)

A, B, C, D, E, F, G, H, CD, DE, FG, GH, ABC, BCD, CDE, FGH, ABCD, BCDE, ABCDE, ABCDEF, ABCDEFG, and ABCDEFGH. = 22

Distinct constituents in (8)

B, E, H, DE, GH, BCDE, ABCDE, and ABCDEFGH. = 8

The total number of distinct word combinations in (8) is 255 ($= 2^8 - 1$). Via subtraction, the catena, component, and constituent ratios are now easily calculated. The catena ratio for (8) is 44:211 (211 = 255 – 44); the components ratio for (8) is 22:233 (233 = 255 – 22); and the constituent ratio for (8) is 8:247 (247 = 255 – 8).

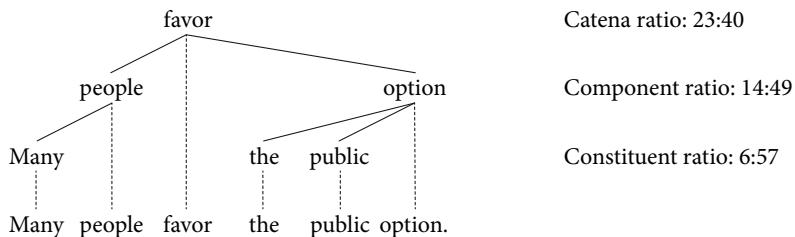
Two important insights should be taken from the examples in this section. The first is that the catena is the most inclusive unit of the three (catena, component, constituent), and it is therefore suited to serve as the fundamental unit of syntax (and morphosyntax). The second important insight is that while the catena is a flexible unit of syntax, it is still quite limited. There are often very many word combinations in a given structure that fail to qualify as catenae. In this regard, one has progressed significantly toward an understanding of a given phenomenon of syntax if one can state that that phenomenon is sensitive to catenae.

4.5 Phrase structure constituents

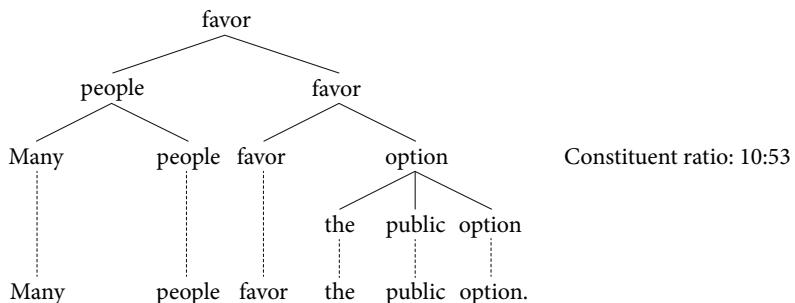
The DG catena should be compared with the constituent of phrase structure grammars. In phrase structure grammars, the constituent is the fundamental unit of syntax. The current DG, however, assumes the catena to be the fundamental unit of syntax.

Ratios of the sort produced in the previous section can be applied to phrase structures as well. The following two trees illustrate the catena, component, and constituent ratios with respect to a dependency tree and then the constituent ratio with respect to the corresponding phrase structure tree.

(9) a.



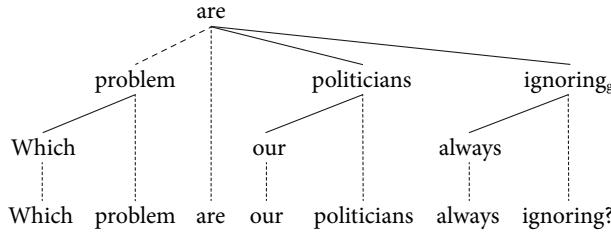
b.



The ratios illustrate an important fact about the units of syntax under investigation. The DG catena is again the most inclusive unit, because more word combinations qualify as catenae than as either of the other two units, and the DG constituent is the most exclusive unit, for fewer word combinations qualify as DG constituents than as any other unit. The phrase structure constituent, in contrast, is less exclusive than the DG constituent but it is less inclusive than the DG component. Note further that a phrase structure constituent is always a DG component, but some DG components are not phrase structure constituents.

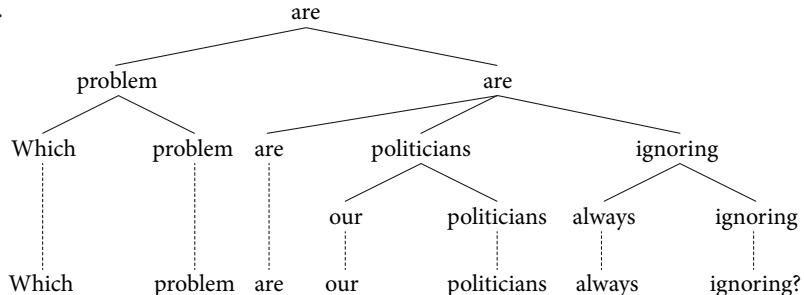
A second example further illustrates the ratios across dependency and phrase structures:

(10) a.



Catena ratio: 33:94, Component ratio: 16:111, Constituent ratio: 7:120

b.



Constituent ratio: 12:115

The dependency tree (10a) illustrates a discontinuous structure, as marked by the dashed dependency edge and the _g subscript (see Section 7.10). Discontinuities like this one are discussed at length in Chapters 8–9. The discontinuity in (10) is not important for the point at hand, but rather it is intended to help foreshadow the discussion of discontinuities below.

The ratios for (10a–b) are what the discussion here is interested in. We again see that the DG catena is much more inclusive than the phrase structure constituent. Furthermore, we also see again that the DG component is slightly more inclusive than the phrase structure constituent. Finally, the DG constituent is the most exclusive unit by far.

4.6 Catenae in phrase structure grammar

So far, the discussion of catenae has assumed that the catena is a unit of syntax available to DG only. This assumption is not entirely accurate, since phrase structure syntax is also capable of acknowledging the same word combinations as catenae that dependency syntax acknowledges. In phrase structure syntax, the catena can be defined as follows:

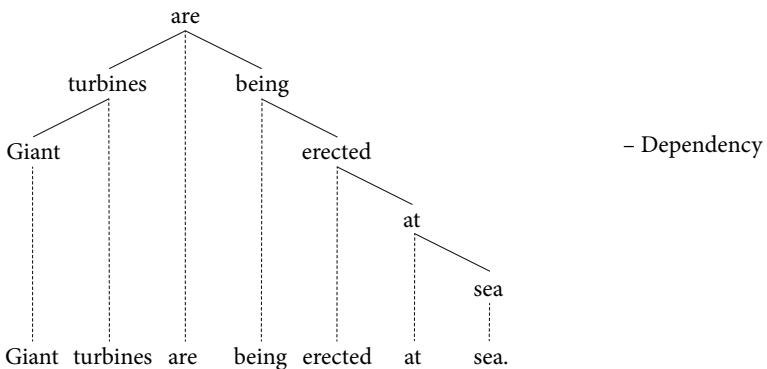
Catena (in phrase structure grammar)

A word or a combination of words the projections of which are continuous with respect to dominance

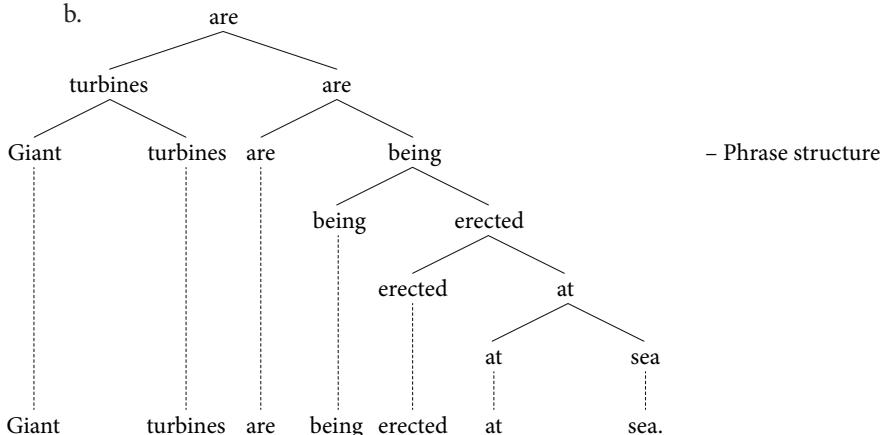
The discussion in this section examines the extent to which this definition can identify the same word combinations as catenae in phrase structures as in dependency structures. While the definition can indeed be made to work, the definition restricts significantly the types of phrase structures that one can assume if one wants to acknowledge the same word combinations as catenae across dependency and phrase structures.

Consider the definition with respect to following dependency and phrase structures:

(11) a.



b.

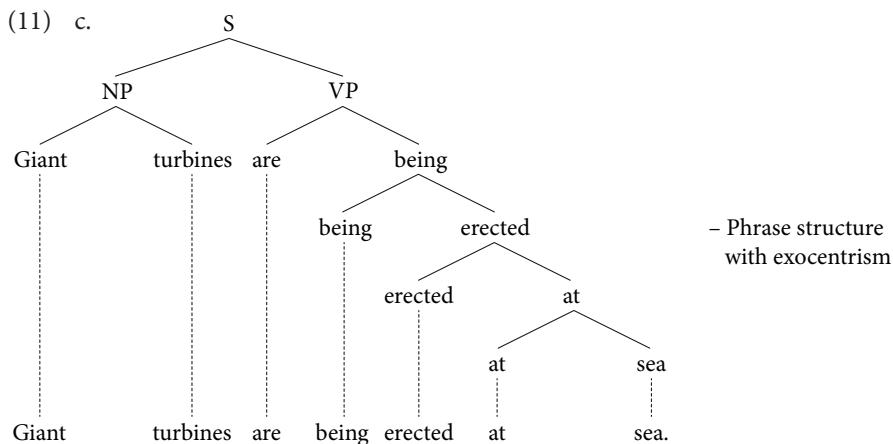


Examine the verb combination *are being erected*, which is the matrix predicate. That these verbs form a catena is immediately visible in (11a). That they also form a catena in (11b) is less obvious, but if one applies the definition, one sees that they form

a catena in (11b) as well: a projection of *are* immediately dominates a projection of *being*, and a projection of *being* immediately dominates a projection of *erected*.

Consider next the word combination *turbines are*. This combination also forms a catena according to the definition because a projection of *are* immediately dominates a projection of *turbines*. By contrast, the word combination *turbines...being* fails to qualify as a catena because a projection of *being* does not immediately dominate a projection of *turbines*, nor vice versa. The definition and these examples demonstrate that the same word combinations can be acknowledged as catenae across dependency and phrase structures.

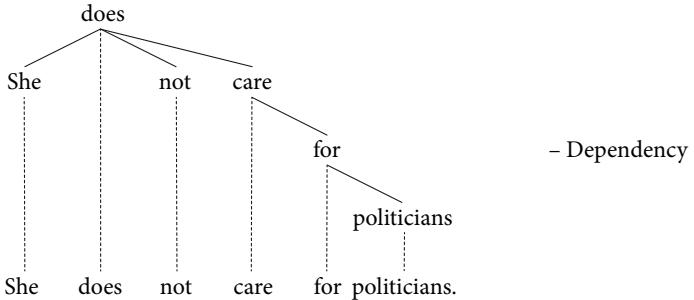
There are, however, some major restrictions that phrase structures must obey in order to acknowledge the same word combinations as catenae. The first of these is that all structure must be endocentric (see Section 2.5). If exocentric structures are allowed, the definition above no longer identifies the same word combinations as catenae across dependency and phrase structures. This point is demonstrated by altering (11b) slightly to show the traditional exocentric analysis of the clause ($S \rightarrow NP + VP$):



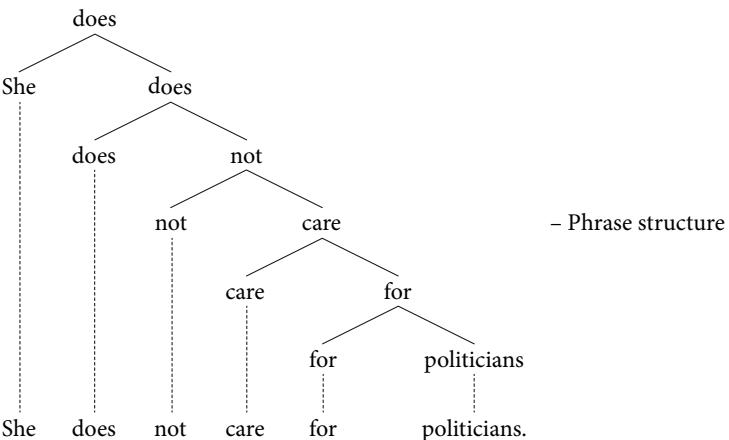
This structure differs from (11b) only insofar as the entirety is viewed as an S as opposed to an entirety headed by the verb *are*. This difference means that the greatest constituent, i.e. the entirety, is exocentric. This exocentric structure is incapable of acknowledging the same word combinations as catenae as the endocentric structure (11b). Consider again the word combination *turbines are* in this respect. Since a projection of *are* no longer immediately dominates a projection of *turbines* (nor vice versa), these two words fail to qualify as a catena.

Another limitation that the definition imposes on phrase structures is that the more layered, strictly binary branching structures that many phrase structure grammars prefer (see Section 3.8) must be abandoned in favor of flatter structures. Consider the following example in this regard:

(12) a.



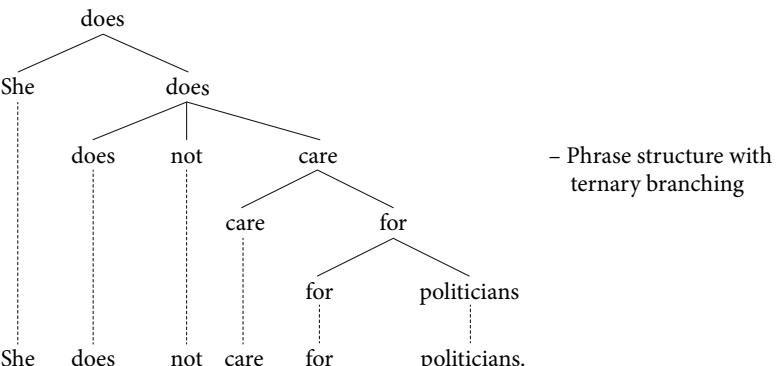
b.



The strictly binary branching phrase structure in (12b) is not uncommon. The negation *not* is assumed to project a phrasal node. Examine the word combination *does...care* in the relatively flat dependency tree in (12a); it is a catena there. The strictly binary branching phrase structure in (12b), in contrast, does not view *does...care* as a catena because a projection of *not* intervenes between the projections of *does* and *care*.

In order for phrase structure to view *does...care* as a catena in (12b), it must assume the following flatter structure:

(12) c.



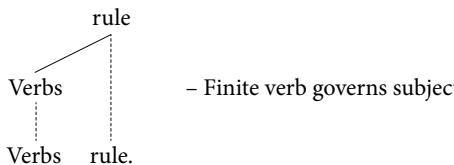
The word combination *does...care* is now a catena. The example demonstrates that in order for phrase structure to acknowledge the same word combinations as catenae as the dependency, analyses are necessary that are flatter than what many phrase structure grammars normally assume.

The fact that the catena concept is applicable to phrase structures too underlines the broad applicability of the notion. A phrase structure grammar that acknowledges catenae can also acknowledge components. The words and word combinations that the two views of structure see as constituents, however, remain quite distinct, phrase structure continuing to acknowledge many more constituents than dependency. While the discussion in this section has demonstrated the applicability of the catena concept across the two views of structure, it must be emphasized that many phrase structure grammars would be unwilling to acknowledge catenae because they either choose to posit exocentric structures and/or to view structure as more layered than dependency is capable of accommodating.

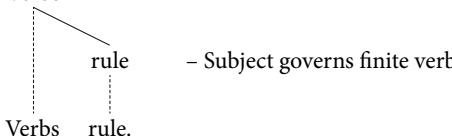
4.7 Subject plus finite verb

The relation between subject and finite verb is at the center of clause structure in English and related languages. Phrase structure tends to grant subject and finite verb equal status insofar as the two end up equi-level (due to the binary division of the clause in a subject and a predicate). Dependency, in contrast, grants the finite verb the more prominent status insofar as it governs the subject. How do we know, though, that the finite verb governs the subject and not vice versa? Consider the next two competing analyses:

(13) a.



b. Verbs



The structure in (13a), where the finite verb dominates the subject, has been taken for granted up to this point.¹²⁰ How do we know, though, that (13b) is not correct? The answer to this question is essential, since the structural relationship between subject and finite verb is the structural core of most sentences.

The main empirical considerations supporting (13a) over (13b) come from sentences that, for whatever reason, lack an overt subject. The fact that the subject can at times be omitted without rendering the sentence ungrammatical but that the opposite is not possible (excepting instances of ellipsis) suggests that the finite verb is indeed the root of all structure. Examine commands in this regard:¹²¹

- (14) a. You stop!
b. Stop! – Subject optional
c. *You!
- (15) a. You go to hell!
b. Go to hell! – Subject optional
c. *You!

The b-sentences are more natural than the a-sentences, the subject appearing in commands for emphasis. The c-sentences, where the verb has been omitted, are incomprehensible (except as an attention grabber).

Many languages have structures that can systematically exclude the presence of a subject. An often-cited example of such a structure comes from German.¹²² German allows impersonal passives with unergative verbs. These sentences can lack a subject entirely.

- (16) Heute wurde nicht gearbeitet. – Subjectless passive
today was not worked.
'Nobody worked today.'

¹²⁰. A majority of DGs position the subject as the dependent of the finite verb, a fact that can be easily verified by examining the trees produced in many of the sources listed throughout this book (see in particular Kunze 1975: 101, 110–1; Heringer 1996: 153).

¹²¹. Kunze (1975: 67) and Jung (1995: 72–3) make this point about the imperative delivering evidence that the finite verb governs the subject.

¹²². The importance of subject-less clauses for syntactic theory is emphasized by various grammarians (e.g. Tarvainen 1981: 43; Ermons 2000: 80, 168–9; Anderson 2006: 248; Miller 2011: 45). These linguists point to the difficulty that subject-less sentences pose to most phrase structure grammars that assume the traditional subject-predicate division of the clause, since it is difficult to see how such sentences could be accounted for given the necessity of maintaining the division. The verb centrality of DG is not faced with this problem.

- (17) Dort wird gern getanzt.
 there becomes happily danced.
 ‘They like to dance there.’
- Subjectless passive

Since these sentences lack NPs entirely, the option to view the subject as the clause root is absent. The only plausible alternative is to view the finite verb as the root.

Further, many languages can systematically omit subject pronouns (e.g. Italian, Romanian, Spanish, the Slavic languages, etc.).¹²³ These languages are known as **pro-drop languages** (pronoun drop).

- (18) Ves este tronco?
 see-2ps this log
 ‘Do you see this log?’
- Pronoun drop in Spanish
 (2ps = 2nd person singular)
- (19) Hochu yest.
 want-1ps eat
 ‘I want to eat.’
- Pronoun drop in Russian
 (1ps = 1st person singular)

That subject pronouns can be dropped from sentences should not be surprising. The rich inflectional morphology on the finite verb in many pro-drop languages can make the appearance of a subject pronoun redundant. Note that while pronoun drop is a widely acknowledged and studied syntactic process, there is no analogous phenomenon of “verb drop”.

The fact that many structures exist in which the appearance of a subject is either optional or blocked supports the dominant stance among DGs that the finite verb is the root of sentence structure. The finite verb governs the subject, not vice versa.

4.8 Government

The terms *governor* and *governee* were defined in Section 4.3, but not illustrated or explained. The discussion now turns to these notions. Government is the main concept that allows one to acknowledge sentence structure. It is the main notion underlying the hierarchical tree representations that appear throughout this book. Chapter 3 discussed diagnostics for constituents and demonstrated how these tests identify constituents, and in so doing, the tree structures being produced received

¹²³. The importance of absent or omitted subjects for dependency syntax is discussed by Järventausta (2003: 719–20).

empirical backing.¹²⁴ This backing for the trees will now be strengthened and expanded by examining the concept of government.

Traditional (Latin) grammars understand government in terms of morphological case. Verbs, prepositions, and some adjectives are said to determine the morphological case of their objects. In German, for instance, the verb *helfen* ‘help’ governs the dative case, the preposition *wegen* ‘due to’ governs the genitive case, and the adjective *wert* ‘worth’ governs the accusative case. This traditional notion of case government is less applicable to English, since morphological case has largely disappeared from English, vestiges of the case system remaining only in the pronoun forms, e.g. *I/me, he/him, she/her, we/us, they/them, who/whom/whose*.

Modern grammars have expanded the narrow notion suggested by traditional case government. This expansion is true of both dependency and phrase structure grammars. Some phrase structure grammars assume government between every head word and its complement, the head governing the complement. Many DGs take the notion further insofar as they see every parent word governing all of its children.¹²⁵ The definition of *governor* presented above in Section 4.3 is consistent with this understanding. That definition is now reformulated to be a definition of *government*:

Government (in syntax)

A word W_1 governs another word W_2 if W_1 licenses the appearance of W_2 .

There are two aspects of this definition that should be noted straight away. The first is that governors and governees are individual words. The second is that the notion of licensing is intentionally vague. This vagueness is necessary in order to present the general concept without getting caught up in specifics. The concept of licensing in the definition is understood in terms of co-occurrence. A given word W_1 licenses another word W_2 if W_2 can occur by virtue of the fact that W_1 occurs.¹²⁶

124. Of the various diagnostics for identifying constituents, the answer fragment diagnostic plays a particularly important role for Van Langendonck (2003: 175). Van Langendonck employs question-answer pairs as the/a primary means of identifying heads, that is, of identifying the direction of dependencies.

125. Many DGs posit that government obtains between a parent word and each of its children (e.g. Kern 1883: 10; Tesnière 1959/2015: Chapter 2; Baumgärtner 1970: 54; Engel 1994: 95–6; Jung 1995: 88; 2003: 282; Bröker 1999: 27).

126. Compare these statements about licensing and co-occurrence with similar formulations of the dependency concept (e.g. Tesnière 1959/2015: Chapter 1; Happ 1976: 105; Korhonen 1977: 40; Engel 1994: 27–8; Jung 1995: 21).

There is hence an operational criterion that underlies the definition of government. This criterion is omission. Given a two-word sequence $W_1 W_2$, W_1 governs W_2 if W_2 can be omitted without generating an unacceptable sentence. Consider the combinations *walk slowly*, *very happy*, *loud people*, *sing songs*, in the following sentences:

- (20) a. We will walk (slowly).
 b. She is (very) happy.
 c. We avoid (loud) people.
 d. You sing (songs).

The words in parentheses can be omitted without rendering each sentence unacceptable or altering the meaning drastically. The conclusions are therefore warranted that *walk* governs *slowly*, that *happy* governs *very*, that *people* governs *loud*, and that *sing* governs *songs*.¹²⁷ In other words, the omission diagnostic indicates that verbs govern their adverbs and (certain) nominals, adjectives govern their adverbs, and nouns govern their attributive adjectives. The generalization is therefore that omission identifies government relations when adjuncts and optional arguments are involved (see Section 1.8).

The omission diagnostic alone, however, fails to establish the direction of government when the influence appears to be mutual. In such cases, additional considerations (beyond plain omission) must be examined in order to determine the direction of government. Three such cases are illustrated in (21). These cases are central to establishing the basic structure of clauses and NPs:

- (21) a. He left. / *He. / *Left. – Subject plus finite verb
 b. It will occur. / *It occur. / *It will.¹²⁸ – Auxiliary verb plus content verb
 c. the couch / *the / *couch – Determiner plus noun

The appearance of both the subject and the finite verb is usually obligatory in English. If the one or the other is omitted, the sentence becomes unacceptable. The situation is similar for auxiliary-verb-plus-content-verb combinations and determiner-noun combinations. When the one or the other is omitted, the resulting expression is usually unacceptable, e.g. **Couch is comfortable*. In such cases, further considerations must be employed to determine which word is the governor, and which the governee.

¹²⁷. This point about omission identifying the direction of dependency is frequent (e.g. Baumgärtner 1970: 54; Kunze 1975: 64–8; Baum 1976: 63; Jung 1995: 52; Heringer 1996: 33).

¹²⁸. The sentence *It will* is of course acceptable in a context that allows an analysis in terms of VP-ellipsis (see Section 12.9). The point here, though, is that in a context in which ellipsis has not been licensed, **It will* is not acceptable.

The difficulty facing the omission diagnostic is that often a given word obligatorily governs another word, as opposed to just optionally governing it. In such cases, omission is incapable of discerning between governor and governee. If one allows related structures to influence the analysis, a decision about the direction of government becomes possible. The following subsections consider related cases that enable clear decisions for the three cases illustrated in (21a–c).

4.9 Auxiliary verb plus content verb

When two or more verbs are present in a clause, most DGs take the finite verb as the root of the sentence, subordinating the non-finite verb(s) to the finite verb.¹²⁹ Thus given a sentence such as *It will occur*, most DGs view *will* as the root governing *occur*. How can one know, though, that this choice is correct? Recall that omission does not decide the direction of government: *It will occur* → **It occur* → **It will*. As with the subject-verb combination, the combination of two or more verbs in a clause requires an informed decision about the hierarchy of the verbs. This section considers two sources of observations that decide the issue: position and uniqueness of finite verb and diagnostics for constituents.¹³⁰

Position and uniqueness of finite verb

When a verb chain in a clause consists of two or more verbs, the finite verb is usually the left-most of these verbs, and of the verbs present, only the finite verb can or must agree in person and number with the subject, e.g. *Dan has been repairing the computer*. Of the three verbs present in this example, the finite verb *has* is left-most, and it alone agrees with the subject *Dan* in person (3rd person) and number (singular). These unique traits of the finite verb are accommodated if it is positioned as the root word of the sentence. Consider the following sentences with respect to these points:

¹²⁹. Most DGs take the finite verb to be the clause root, which means the auxiliary verb, since it is finite, is head over any nonfinite verb with which it co-occurs. The status of the finite verb as the root is discussed directly in many places (e.g. Schubert 1987: 94; Starosta 1988: 239–41; Engel 1994: 107–9; Jung 1995: 67–9; 2003: 286–9, 291; Eroms 2000: 129–32; Anderson 2006: 182–4; Mel'čuk 2009: 44–5, 79–80; Groß & Osborne 2015). Matthews' account (1981: 63, 88) is a prominent exception; he sees the content verb governing the auxiliary.

¹³⁰. The observations produced here and the reasoning follow Groß & Osborne (2015), although their account is much more extensive, producing examples and insights from various languages.

- (22) a. Dan *has been repairing* the computer.
 b. Dan *is repairing* the computer.
 c. Dan *repairs* the computer.

As the number of verbs is reduced by one each time, a finite verb is still present, and this verb is the left-most one. Making the finite verb the root of the clause accommodates these facts.

Diagnostics for constituents

The diagnostics for constituents discussed and employed time and again in Chapters 1 and 3 reveal that there is a nonfinite VP constituent when a nonfinite verb is present. This fact is accommodated if the finite verb is the root of the clause over the nonfinite verb. If the/a nonfinite verb were the root of the clause instead, there would be no way to accommodate the results delivered by the diagnostics. The issue is illustrated with the following two analyses:

- (23) a.
-
- ```

graph TD
 has[has] --- Dan[Dan]
 has --- repaired[repaired]
 repaired --- the(the)
 repaired --- computer[computer]
 the --- computer
 Dan --- DanWord[Dan]
 has --- hasWord[has]
 repaired --- repairedWord[repaired]
 the --- theWord[the]
 computer --- computerWord[computer]

```
- Finite auxiliary verb *has*  
as root
- b.
- 
- ```

graph TD
    repaired[repaired] --- Dan[Dan]
    repaired --- has[has]
    repaired --- computer[computer]
    Dan --- DanWord[Dan]
    has --- hasWord[has]
    repaired --- repairedWord[repaired]
    the --- theWord[the]
    computer --- computerWord[computer]
  
```
- Nonfinite content verb
repaired as root

The analysis in (23a) is standard in this book; the finite verb is the root of the sentence. The nonfinite VP *repaired the computer* is a complete subtree on this analysis, that is, it is a constituent. The alternative analysis in (23b), which takes the content verb *repaired* as the root, does not acknowledge the string *repaired the computer* as a constituent.

The standard diagnostics for constituents strongly support (23a) over (23b), since they identify *repaired the computer* as a constituent:

- (24) a. ...and **repaired the computer**, Dan certainly has. – Topicalization
 b. *It is **repaired the computer** that Dan has done. – Clefting
 c. What Dan has done is **repaired the computer**. – Pseudoclefting
 d. Dan has **done it**. – Proform substitution
 (*done it* = *repaired the computer*)
 e. What has Dan done? – **Repaired the computer**. – Answer fragment

Four of the five tests suggest that *repaired the computer* is a constituent – only clefting suggests otherwise. These results are mostly consistent with the analysis in (23a), but quite inconsistent with the analysis in (23b). If (23b) were the correct structural analysis, we would expect all of (24a–e) to be bad. Thus, the conclusion one can draw is that the analysis in (23a), which has the finite auxiliary verb as the root over the nonfinite content verb, is indeed correct.

Perhaps linguistic argumentation is not needed, though, since intuition already speaks clearly in favor of the finite verb as the root of the clause. In this respect one might question why it has been necessary to motivate this choice here with linguistic observations. The answer to this question is that some DGs have in fact taken this position, that is, they have adopted an approach that positions the nonfinite content verb as root over the auxiliary verb, as shown in (23b).¹³¹ The motivation for doing this misconstrues semantic reasoning for syntactic reasoning. One can, namely, certainly view the content verb as semantically selecting the subject. However, semantic selection is not the same as syntactic government. The distinction between government and selection is established below in Section 4.11.

4.10 NP vs. DP

The hierarchical status of determiners (e.g. *a*, *every*, *my*, *the*, *this*, etc.) is a matter of debate. Some modern approaches to syntax assume a DP (determiner phrase) analysis of nominal groups as opposed to an NP (noun phrase) analysis.¹³² In DG terms, the DP-analysis translates to the determiner dominating the noun. While

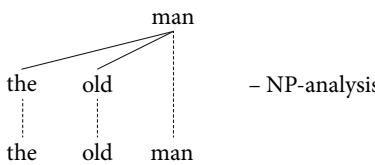
¹³¹. For instance, Matthews (1981: 63, 155) and De Marneffe et al. (2014) subordinate auxiliaries to content verbs. For a comprehensive overview of this issue and how it relates to the historical development of DG, see Osborne and Maxwell (2015).

¹³². This is particularly true of work in the Minimalist Program. See in particular Abney (1987).

most DGs assume that determiners are children of their nouns,¹³³ some DG voices have taken the opposite position, that is, they position nouns as children of their determiners.¹³⁴

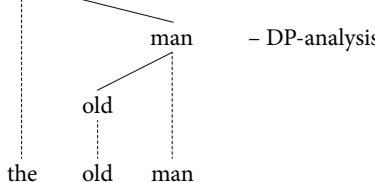
The point at issue is illustrated with the following trees:

(25) a.



- NP-analysis

b. the



- DP-analysis

The majority stance in DGs shown in (25a), where the noun governs its determiner, is indeed the better analysis. To aid the discussion, the two stances shall be denoted as the *NP-analysis* (noun governs determiner) and the *DP-analysis* (determiner governs noun). Four observations motivating the NP-analysis are produced in the following paragraphs: (1) determiner-less nouns, (2) possessive pronouns, (3) idiom catenae, and (4) parallelism across semantics and syntax.

Determiner-less nouns

Unlike singular count nouns, mass and indefinite plural nouns in English can appear with or without a determiner, e.g. *Give me the love* → *Give me love*, *This effort is*

133. A majority of DGs assume NPs, not DPs (e.g. Tesnière 1959/2015; Hays 1964; Robinson 1970; Kunze 1975; Mel'čuk & Pertsov 1987; Mel'čuk 1988; Schubert 1987; Weber 1992; Engel 1994; Van Langendonck 1994; 2003; Jung 1995; Heringer 1996; Bröker 1999; Groß 1999; Hellwig 2003; Hyvärinen 2003; Uzonyi 2003; Starosta 1988). There are many additional arguments, in addition to those produced here, in favor of NP and against DP (see for instance Groß 1993; Payne 1993; van Langendonck 1994; 2003: 176–7; Jung 1995: 73–8; 2003: 292–3; Heringer 1996: 99; Bröker 1999: 97–101; Miller 2011: 50–3).

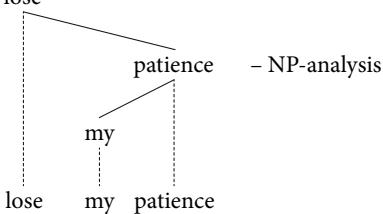
134. The DG voices that position the determiner as head over its noun are a noteworthy minority (e.g. Hudson 1984: 90–2; 1990: 268–276; Lobin 1993: 38–64; Anderson 2006: 184–6). Note as well that there is another possibility. Eroms (2000: 255–6) pursues an account that views the definite and indefinite article as interdependent with the noun; he posits a dual head analysis in this regard. However, Eroms takes other determiners (e.g. possessives, demonstratives, quantifiers) as dependents of the noun in the normal manner.

necessary → *Effort is necessary, These ideas are needed* → *Ideas are needed*. It should be apparent that the omission diagnostic in these cases supports the NP-analysis over the DP-analysis. The ability to omit an expression is easier to accommodate if the omitted expression is a dependent, i.e. it does not appear in an intermediate position in the syntactic hierarchy. A similar insight comes from those languages that lack certain determiners. Russian, for instance, lacks a definite and an indefinite article, which means that nouns often appear bare, i.e. without a determiner at all. This trait of noun phrases in Russian is also easier to accommodate if noun governs determiner.

Possessive pronouns

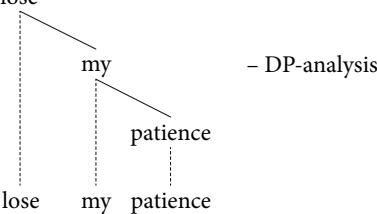
The distribution of possessive determiners (*my, your, his, her, our, their*) and the corresponding possessive pronouns (*mine, yours, his, hers, ours, theirs*) supports the NP-analysis over the DP-analysis. Examine the following VPs in this regard:

(26) a. lose



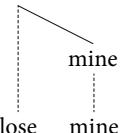
- NP-analysis

b. lose



- DP-analysis

c. lose

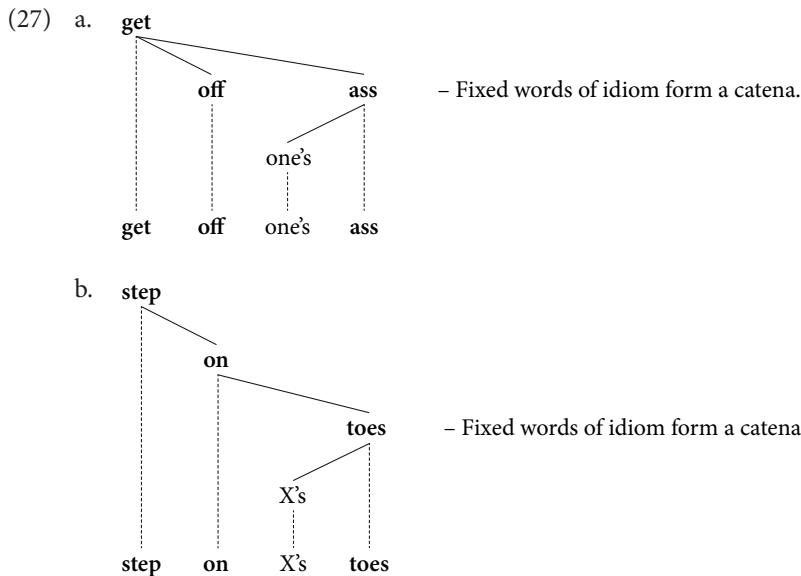


Example (26a) shows the NP-analysis, and Example (26b) the DP-analysis for the possessive determiner *my*, and Example (26c) shows the structure for the possessive pronoun *mine*. Comparing these structures, it should be apparent that the NP-analysis is preferable over the DP-analysis because only the former provides

a principled means of addressing form variation across *my* and *mine*. When the possessive is governed by a noun, it appears as *my*; when it is NOT governed by a noun (and thus functions as a pronoun), it appears as *mine*. The DP-analysis cannot appeal to the distinct positions in the hierarchy to address the varying forms. For the NP-analysis, however, the variation in forms (*my* vs. *mine*) is a straightforward function of the varying positions in the hierarchy.

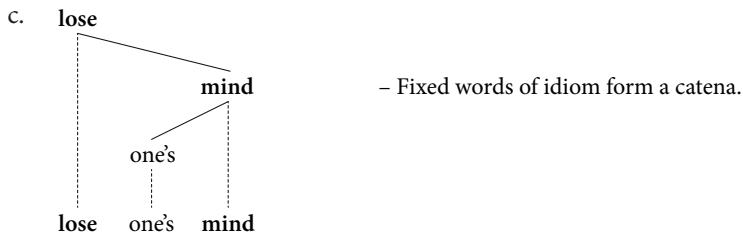
Idiom catenae

The third observation that supports the NP-analysis over the DP-analysis comes from idioms. Idioms are stored as catenae.¹³⁵ Only the NP-analysis allows the fixed words of many idioms to remain as catenae.¹³⁶



¹³⁵ That idioms are stored as catenae was the original insight produced by O'Grady (1998) that revealed the importance of the catena unit. The same idea has been expressed by Holmes & Hudson (2005) and Hudson (2007: 156) in the dependency-based Word Grammar framework. The insight has also motivated the central claim concerning Construction Grammar and the catena unit, namely that *constructions are catenae*. The importance of the catena unit for the concept of constructions is dealt with at length in Osborne & Groß (2012a).

¹³⁶ The particular syntactic status of possessive 's is ignored here, since it is not important to the point at hand. Section 5.8 demonstrates that possessive 's is a clitic, and that as such, it receives a special status in the dependency tree.

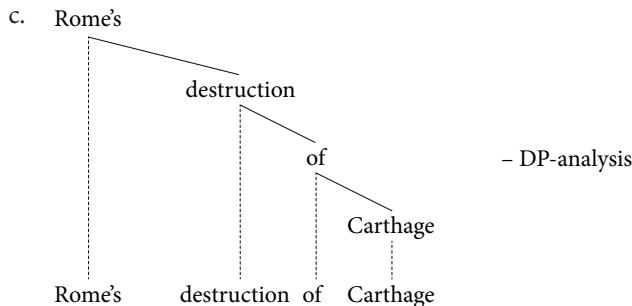


The fixed words of the idiom each time are in bold. The possessive determiner in each case is outside of the idiom proper. In the case of (27a–b), the possessive determiner will vary in order to agree in gender and number with the subject, and in (27c) the possessive determiner is free to choose its referent. The important aspect of these idioms is that the fixed words form a catena in each case and this catena excludes the possessive determiner. Only the NP-analysis allows the fixed words of the idiom to remain as a catena. On the DP-analysis, the fixed words would no longer form a catena.

Parallelism across clause and NP

On the NP-analysis of nominal groups, syntactic parallelism across clause and NP matches semantic parallelism, whereas on the DP-analysis, this parallelism is absent, e.g.

- (28) a.
-
- Structure of clause
- b.
-
- NP-analysis



The NP-analysis shown in (28b) maintains the parallelism in the syntax that is obviously present in the semantics across the clause and the nominal group.¹³⁷ In contrast, the parallelism disappears on the DP-analysis given in (28c). Thus, the NP-analysis has the advantage over the DP-analysis since its account is consistent across the two types of structures that are similar in meaning.

Four observations motivating NP over DP have just been produced. The extraction characteristics associated with determiners and attributive adjectives are another, a fifth, source of support for the NP analysis, although the data that illustrate this fact are not produced here (because the relevant account of extraction discontinuities is presented first in Chapters 8–9). In sum though, the four observations just produced suffice to motivate the stance that noun governs determiner, not vice versa.

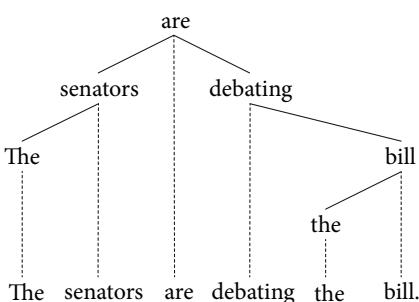
4.11 Governors vs. selectors

The terms *selector* and *selectee* were also defined in Section 4.3, but not illustrated or explained. This final section of the current chapter now considers the concept of selection, although a more thorough account of selection is postponed until the next chapter (Section 5.4). The goal here is restricted to establishing the distinction between government and selection. As just discussed in the preceding sections, government is a syntactic relationship between two words, whereby the one word licenses the appearance of the other. Selection, in contrast, is a semantic relationship between a predicate and its arguments, whereby the predicate influences the semantic content of its arguments. The predicate selects its arguments and is therefore a selector.

¹³⁷ This argument in favor of NP over DP, i.e. parallelism, is briefly acknowledged by van Langendonck (2003: 177). Engel (1994: 116) also acknowledge this parallelism between NPs and clauses.

The distinction between government and selection is perhaps most apparent with subjects and auxiliary verbs, e.g.

(29)



This structure is backed by the results of the standard diagnostics for constituents (see Sections 1.2 and 3.2). Topicalization, clefting, pseudoclefting, proform substitution, and answer fragments confirm that the subject NP *the senators*, the object NP *the bill*, and the VP *debating the bill* are indeed constituents, as shown in (29). The difficulty with the structure in (29) is that the main verb *debating* immediately dominates only the object NP *the bill*, not the subject NP *the senators* as well. It should be apparent, though, that the main verb *debating* is semantically influencing the content of the subject NP.¹³⁸ Sentences like *#The streets are debating the bill*, *#The interviews are debating the bill*, etc. are syntactically well-formed but semantically nonsensical. The content verb *debating* requires a subject NP that is capable of debate, namely (a) human(s). But consider the issue from the point of view of the subject NP *the senators*. Subjects can appear by virtue of the fact that a finite verb appears (here the auxiliary *are*), not by virtue of the fact that a nonfinite verb appears. What all this means is that the finite auxiliary verb is licensing the appearance of the subject, but the nonfinite content verb is semantically selecting the subject.

The current DG addresses these difficulties by distinguishing between government and selection. These two notions are defined here together as follows – the definition of government is repeated from Section 4.8 above:

Government

A word W_1 governs a word W_2 if W_1 licenses the appearance of W_2 .

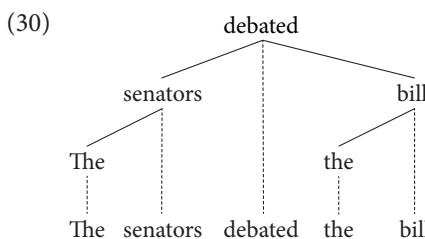
Selection

A predicate semantically selects its arguments, that is, it influences the semantic content of its arguments.

¹³⁸. That predicates influence the semantic content of their arguments, including their subject argument, is a point occurring frequently in the DG literature (e.g. Heringer et al. 1980: 213–4; Tarvainen 1981: 44; Heringer 1996: 63–4; Bröker 1999: 114).

Government is purely a syntactic relation, whereby a given word can appear by virtue of the appearance of another word. Selection, in contrast, is a semantic notion, whereby a predicate influences the semantic content of its arguments.

The special status of the subject in cases like (29) can now be acknowledged. The finite verb *are* governs the subject NP *the senators*, but the nonfinite verb *debating* provides the semantic content that determines selection. In other words, the governor of *the senators* in (29) is just *are*, whereas its selector is *debating*. Expressed from the inverse perspective, *the senators* is a governee of *are* and a selectee of *debating*. It should be apparent that in many cases, the governor of a given word is not necessarily the word that one sees as selecting it. In many other cases, however, the governor and selector of a given catena are one and the same word. Compare (29) in this regard with (30):



The content verb *debated* is now both the governor and the selector of the subject NP *the senators* (as well as of the object NP *the bill*). Furthermore, the subject noun *senators* is the governor and selector of its determiner *the*, and the object noun *bill* is the governor and selector of its determiner *the*.

Particular evidence that the nonfinite verb is influencing the semantic content of the subject and is thus the core of the main clausal predicate is seen with clausal subjects. Whether or not a clausal subject can appear is determined by the semantics of the nonfinite verb, not by the auxiliary, e.g.

- (31) a. That the Humongous was lying has surprised nobody.
 b. *That the Humongous was lying has screamed at nobody.

The contrast in acceptability between (31a) and (31b) is addressed in terms of the nonfinite verb. The content verb *surprise* is the core of the predicate and thus responsible for selecting a propositional argument as its subject, whereas the content verb *scream* cannot take a propositional subject argument. The auxiliary verb *has* influences this situation not in the least.

The concept of selection is taken up again in the next chapter (Section 5.4). The goal here has simply been to draw a line between government and selection. This line is very necessary, because failure to distinguish between the two notions can lead to inaccurate analyses of sentence structure.

Morphological, semantic, and prosodic dependencies

5.1 Overview

Theories of syntax seek to identify the combinatory potential of the parts of speech, and based upon this combinatory potential, they identify syntactic structure. Certain parts of speech tend to co-occur with other parts of speech: determiners co-occur with nouns; adverbs co-occur with verbs and adjectives; prepositions co-occur with nouns; adjectives co-occur with nouns and the auxiliary *be*; subordinators co-occur with finite verbs, etc. When one explores the co-occurrence patterns of the parts of speech, one is concerned with syntactic dependencies. When a given word can appear by virtue of the fact that it co-occurs with another word, it is syntactically dependent on that word. Most DGs (and most theories of syntax) focus on syntactic dependencies. In so doing, they are striving to identify co-occurrence patterns.

There are, however, at least three other dependency types that DGs acknowledge: *semantic*, *morphological*, and *prosodic* ones.¹³⁹ Semantic dependencies are understood in terms of predicates and their arguments; morphological dependencies are understood in terms of form determination; and prosodic dependencies are understood in terms of word status and word stress. While most of this book is concerned with syntactic dependencies, exposure to these other three types of dependencies is important insofar as failing to acknowledge their existence can lead to confusion about syntactic dependencies. In other words, failure to acknowledge the existence of semantic, morphological, and prosodic dependencies can lead to unwarranted conclusions about the nature of syntactic dependencies. In particular, the tendency is to misconstrue one of these other three dependency types as syntactic.¹⁴⁰

¹³⁹. Another type that is acknowledged in the literature is *logical* dependencies (e.g. Happ 1976: 100–9, 328–9). For all intents and purposes, the logical dependencies Happ discusses are the same as the semantic dependencies assumed here.

¹⁴⁰. Welke (1995: 166–8) provides a vivid discussion and illustration of this point. He demonstrates that if one fails to distinguish between syntactic and semantic dependencies, the analysis of syntactic structures is often forced to acknowledge multiple heads and interdependency. For instance, an attributive adjective must both govern its noun (semantic dependency) and be governed by its noun (syntactic dependency).

The following table summarizes the four dependency types:

Table 10.

Dependency type	Terminology employed to denote dependency type	Understood in terms of
syntactic	government (governor, governee)	licensing, co-occurrence
morphological	agreement	form determination
semantic	selection (selector, selectee)	predicates and their arguments
prosodic	prosodic (non)autonomy	clitics and their hosts

The concept of *government* denotes syntactic dependencies; the concept of *selection* denotes semantic dependencies; the concept of *agreement* denotes morphological dependencies; and finally, clitics are a manifestation of prosodic dependencies.¹⁴¹

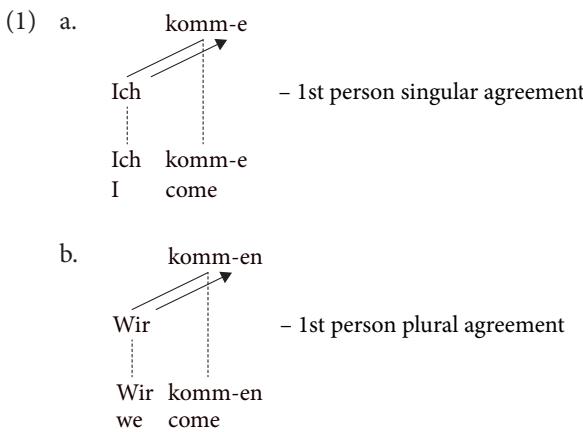
5.2 Morphological dependencies (agreement)

Agreement is traditionally taken to be a relation holding between two words, whereby the one word influences the form of the other word. Subject-verb agreement is the classic case. The semantic traits of the subject nominal determine the inflectional ending that appears on the finite verb. Since English has very little inflectional morphology, agreement is invisible or absent most of the time. It shows up, however, with third person singular subjects in present tense (e.g. *He work-s*, *She help-s*) and with the copula *BE* (e.g. *I am*, *you are*, *he/she/it is*, *we are*, *they are*). The subject nominal in these examples is influencing the form of the finite verb.

The important aspect of agreement in relation to government is that agreement often runs counter to government.¹⁴² That is, while government points down the syntactic hierarchy, agreement often points up the hierarchy. This fact is illustrated here with examples of subject-verb agreement from German: *ich komm-e* ‘I come’, *du komm-st* ‘you come’, *er komm-t* ‘he come-s’, *wir komm-en* ‘we come’, *ihr komm-t* ‘you guys come’, *sie komm-en* ‘they come’:

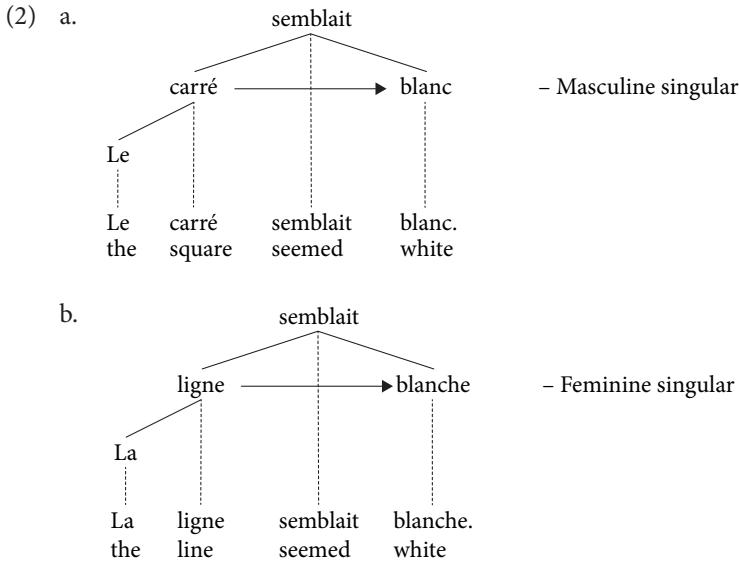
141. The distinction between syntactic, semantic, and morphological dependencies is established at length by Mel'čuk (1988: 106–28; 2003: 191–210). Indeed, the account of these three dependency types here has been inspired by Mel'čuk's work, although Jung (1995: 29–114) also discusses these distinctions at length. The account of prosodic dependencies, the fourth type of dependency, is based on Grof' (2014) work. See Osborne (2014a) for a similar, but briefer discussion of these dependency types.

142. This aspect of agreement – that it is directed, pointing from the subject to the finite verb – is acknowledged by others (e.g. Anderson 1997: 40; Uzonyi 2003: 232). Anderson characterizes subject-verb concord as an “anti-dependency” in this regard, since it points in the opposite direction from the syntactic dependency.



The solid dependency edges show normal government, whereby the finite verb governs its subject. The arrows pointing up the hierarchies indicate the direction of agreement. The inflectional ending on the verb varies according to the semantic traits of the subject. The subject is therefore determining the form of the verb.

Examples (1a–b) illustrate that standard subject-verb agreement points up the syntactic hierarchy. Agreement can also point across the hierarchy. Two examples from French illustrate this:¹⁴³

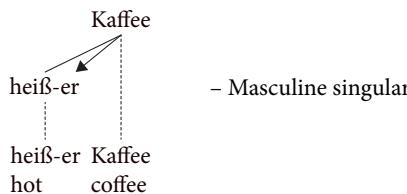


¹⁴³. Examples (2a–b) are taken from Mel'čuk (1988: 122). Tarvainen (1981: 11) produces similar examples, making a similar point.

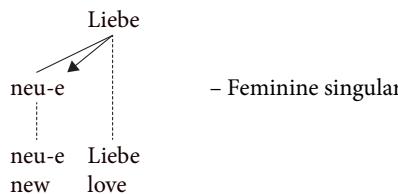
Notice the varying forms *blanc* vs. *blanche*. The grammatical gender of the subject influences the particular form that the predicative adjective assumes, yet there is no syntactic dependency connecting the two. Thus, agreement obtains in this case across sibling words.

Agreement points up the syntactic hierarchy in (2a–b) and across the syntactic hierarchy in (2a–b). Agreement can also point down the hierarchy. This occurs frequently in languages where nouns have grammatical gender (masculine, feminine, neuter). Agreement points down the hierarchy from noun to determiner and/or attributive adjective. The following examples from German have agreement pointing from noun down to the attributive adjective:

(3) a.



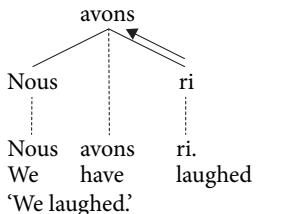
b.



The inflectional ending on the attributive adjective in each case is determined by the grammatical gender of the noun: the *-er* of *heiß-er* reflects that *Kaffee* is masculine, and the *-e* of *neu-e* reflects that *Liebe* is feminine. Agreement is therefore pointing from governor to governee in these cases.

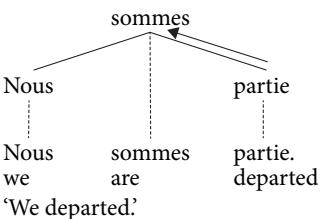
The picture of agreement that is emerging is that it is a varied phenomenon. It is a relation that holds between two words, whereby semantic traits (e.g. gender, number, person) of the one word influence the form of the other word, whereby “form” is manifest as specific inflectional endings. One question that arises in this area concerns these inflectional endings. Should agreement be understood entirely in terms of inflectional endings, or might the concept also be expanded to allow for broader form determination? Examine the following examples from French and German involving an auxiliary verb of perfective aspect:

(4) a.



– Content verb *ri* chooses auxiliary *avons*.

b.

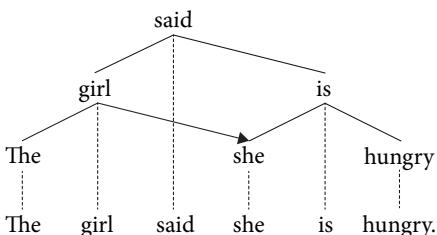


– Content verb *partie* chooses auxiliary *sommes*

The auxiliary verb that immediately dominates the active perfective participle in French is determined by the semantic content of the participle.¹⁴⁴ Most active perfective participles are licensed by the auxiliary *avoir* ‘have’, but unaccusative verbs are licensed by the auxiliary *être* ‘be’.¹⁴⁵ Thus the semantic content of the participle is determining the particular auxiliary verb that immediately dominates it. A broad understanding of agreement might include such examples, in which case agreement points up the hierarchy from participle to auxiliary as shown.

Another area where one might see agreement concerns the form of pronouns. Pronouns in many languages take a form that reflects the person, number, and natural and/or grammatical gender of their antecedents, e.g.

(5)



– The pronoun *she* agrees with its antecedent *girl*.

The form of the pronoun *she* must reflect the person, number, and natural gender of its antecedent *girl*. Thus, *girl* is determining the form of *she*. An objective analysis

¹⁴⁴ The issue of auxiliary selection and its impact on the understanding of dependencies is mentioned by Hudson (1984: 123–4) and discussed by Starosta (1988: 22).

¹⁴⁵ A verb is unaccusative if it is intransitive and its subject is not an agent, e.g. *It fell*, *The plant is growing*, *The cup broke*.

might therefore address this influence between a pronoun and its antecedent in terms of agreement.

Examples like (1)–(5) illustrate a source of confusion for dependency grammars. If aspects of agreement, and of form determination in general, are acknowledged as playing a role in government, it becomes difficult to say anything with certainty about government hierarchies, since as Examples (1)–(5) demonstrate, form determination can point most any which way. The means to overcome this difficulty is to distinguish between syntactic dependencies (government) and morphological dependencies (agreement). Agreement is, namely, a manifestation of morphological dependency, not of syntactic dependency.¹⁴⁶

5.3 Case government

Given the distinction between selection, government, and agreement currently being established, the nature of traditional case government is in question. The difficulty is that if agreement is to be understood in terms of form determination as suggested in the previous section, then one might interpret traditional case government as a form of agreement, for traditional case government certainly involves form determination.¹⁴⁷ A verb, preposition, or adjective determines the morphological case of its object(s), which means that it is determining its form. Traditional case government is, however, widely assumed to be distinct from agreement. This situation presents the current DG with a dilemma. If traditional case government is thrown in the same pot as agreement, confusion is generated because a terminology becomes necessary that is contrary to common usage. If traditional terminology is maintained, whereby a clear distinction is drawn between agreement and case government, then the generalization that both phenomena involve form determination is largely lost. The approach pursued here is that the latter option generates fewer difficulties.

The traditional distinction between case government and agreement is maintained going forward. In order to distinguish between the various notions, the following classification is assumed:

¹⁴⁶ Note that while the current discussion of dependency types (semantic, syntactic, morphological) has been inspired by Mel'čuk's account, Mel'čuk's system differs crucially from the one here in the area of government. For Mel'čuk (2003: 194–7), government is case government (see the next section), whereas government (more generally) in the current system follows Tesnière's understanding of governor (Fr. *régissant*) and subordinate (Fr. *subordonné*) (1959/2015: Chapter 2), and is thus understood in terms of licensing and corresponds directly to syntactic dependencies.

¹⁴⁷ For some discussion of the distinction between traditional agreement and case government as well as the difficulties discerning between the two, see Miller (2011: 44–5).

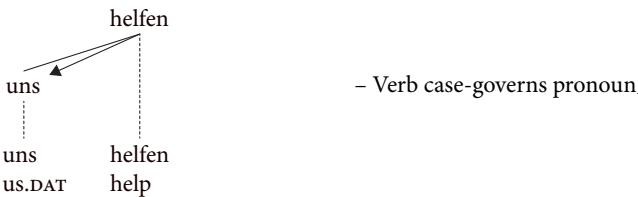
Table 11.

Dependency types			
Semantic (selection)	Syntactic (government)	Morphological (form determination)	Prosodic (clitics)
		Case government	

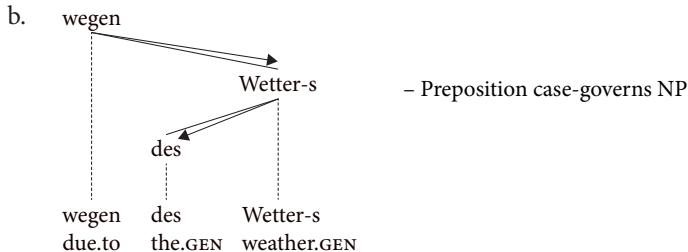
This table lists the same four dependency types given in Table 10 above, but it draws attention to the status of case government with respect to the four dependency types. Case government manifests both syntactic dependencies in terms of government and morphological dependencies in terms of form determination. The aspect of this classification that makes it defensible is that case government, with few exceptions, points down the syntactic hierarchy.¹⁴⁸

Our modern understanding of case government stems from medieval grammars. Case government obtains when a verb, preposition, or adjective determines the morphological case of its child nominal.¹⁴⁹ The following examples from German illustrate case government:

(6) a.

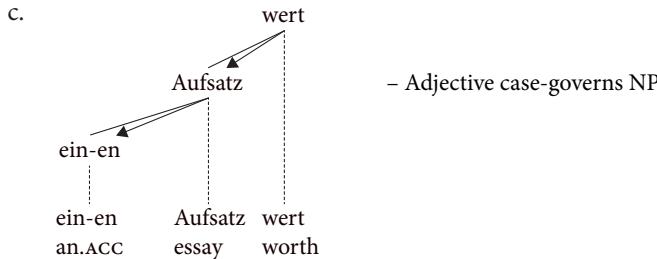


b.



148. One noteworthy exception to the claim that case government always points down the government hierarchy occurs in certain raising structures in certain languages. For instance, in Icelandic, e.g. *Ég tel honum líka þeir bílar* 'I believe him-DAT to.like those cars', the dative *honum* 'him' is arguably a child of *tel* 'believes', yet it receives case from its sibling *líka* 'to like'. See Anderson (2006: 124–5) for some discussion.

149. Baum (1976: 29–31) discusses the concept of dependency in medieval grammars. He observes (p. 30) that the “oblique cases” were construed as depending on the/a verb or preposition.



The verb *helfen* ‘help’ assigns dative case to its object *uns* ‘us’; the preposition *wegen* ‘due to’ assigns genitive case to its object noun *Wetter* ‘weather’, which transfers the genitive case to its determiner *des* ‘the’; and the adjective *wert* ‘worth’ assigns accusative case to its noun *Aufsatz* ‘essay’, which transfers this case to its determiner *ein-en*. The important thing to acknowledge about these examples is that case government consistently points down the hierarchy.

The fact that case government points down the hierarchy overcomes the difficulty associated with the terminology. If a given word case-governs (form determines) one (or more) of its children, then it necessarily governs (licenses) this child as well. Confusion can arise when government obtains, but not case government. In other words, the statement that a given word governs another word does not entail that it case-governs it. Case government is a subtype of government. The claim underlying this analysis is that the form determination of case government points down the syntactic hierarchy. Excepting certain cases involving discontinuities, a word that bears morphological case always receives this case from above.¹⁵⁰ Verbs assign case downward, prepositions assign case downward, adjectives assign case downward, some adverbs assign case downward, and when one noun modifies another, the parent noun can be construed as assigning genitive case downward.

The greater insight here is that case government, although it is technically a type of morphological dependency, is also a reliable indication about the direction of government, that is, of syntactic dependency.

¹⁵⁰. But see footnote 148.

5.4 Semantic dependencies (selection)

The definition of selection given in Section 4.11 is repeated here:

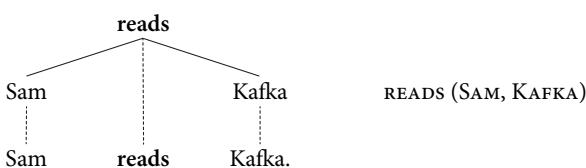
Selection

A predicate semantically selects its arguments, that is, it influences the semantic content of its arguments.

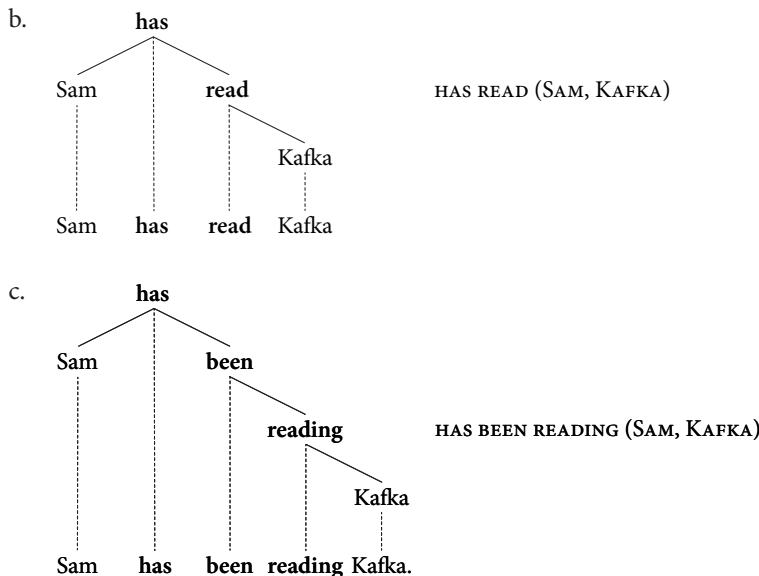
Selection is a semantic concept that is understood in terms of predicates and their arguments. The arguments of a given predicate semantically depend on that predicate. In particular, an important point about the syntactic status of selectors is that barring rare cases involving discontinuities, a given predicate is a catena in the syntactic structure, and its arguments too are catenae in the syntactic structure. The fact that selectors are catenae as opposed to just words is important. Unlike constituent-based syntax, catena-based syntax has the ability to acknowledge that predicates and arguments take on a concrete shape in syntactic structures. Barring discontinuities, predicates and their arguments are always catenae.

The extent to which predicates and their arguments are catena is discernible when considering the semantic status of function words as opposed to content words. Function words add functional meaning to predicates, whereas content words constitute the core of predicates. Function words are semantic satellites of content words. The content word and function word(s) constitute the predicate together.¹⁵¹ The most vivid illustration of this state of affairs occurs with auxiliary verbs. An auxiliary verb contributes functional meaning to its content verb. The following trees illustrate the manner in which auxiliary verbs combine with a content verb to form a single predicate:

(7) a.

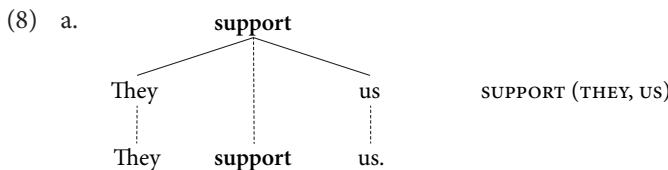


¹⁵¹. Although the terminology used to express the point varies, many DGs acknowledge that auxiliary verbs form a complex predicate with the content verbs that they govern (e.g. Kern 1888: 3; Tesnière 1959/2015: Chapter 23; Baum 1976: 122; Tarvainen 1981: 89; Weber 1992: 29; Heringer 1996: 70–2, 86; Bröker 1999: 114; Hyvärinen 2003: 743–4).

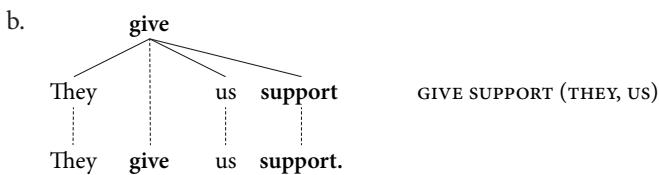


The core of the main predicate in each of these sentences is ‘*read*’, whereby the auxiliaries *has* and *been* merely contribute functional meaning to this core. Together the auxiliaries and *read* constitute a predicate, and this predicate selects its arguments *Sam* and *Kafka*.¹⁵² Notice that in each case, the words constituting the predicate (in bold) form a catena. This catena is the matrix predicate. Note as well that each argument of the matrix predicate, i.e. *Sam* and *Kafka*, is a (one-word) catena.

This understanding of predicates, arguments, and selection is beneficial because it allows the system to draw insightful comparisons across related constructions. There are, for instance, numerous light verb constructions (see Section 6.12) where the matrix predicate extends down to include a nominal expression, e.g.



¹⁵². Tesnière (1959/2015: Chapter 23) employed the term **dissociated nucleus** to characterize the manner in which auxiliary verbs combine with content verbs to form a semantic/syntactic unit.



- (9) a.
-
- ```

graph TD
 conversed[conversed] --- I[I]
 conversed --- with[with]
 with --- Bill[Bill]
 I --- IText[I]
 conversed --- conversedText[conversed]
 with --- withText[with]
 Bill --- BillText[Bill.]

```
- CONVERSED (I, WITH BILL)
- b.
- 
- ```

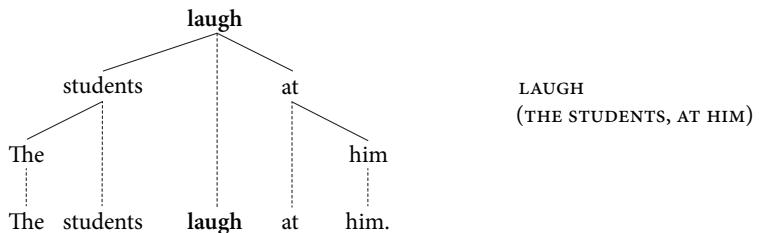
graph TD
    had[had] --- I[I]
    had --- conversation[conversation]
    conversation --- a[a]
    conversation --- with[with]
    a --- conversationText[conversation]
    with --- Bill[Bill]
    I --- IText[I]
    had --- hadText[had]
    a --- aText[a]
    conversation --- conversationText[conversation]
    with --- withText[with]
    Bill --- BillText[Bill.]
    
```
- HAD A CONVERSATION (I, WITH BILL)

Each b-sentence is almost synonymous with its a-counterpart. The light verbs *give*, *had*, and *take* are semantically impoverished (although not empty). These verbs combine with nouns to form predicates, whereby the noun is semantically loaded. The arguments across the a- and b-sentences remain consistent. Each predicate and the arguments of each predicate are catenae.

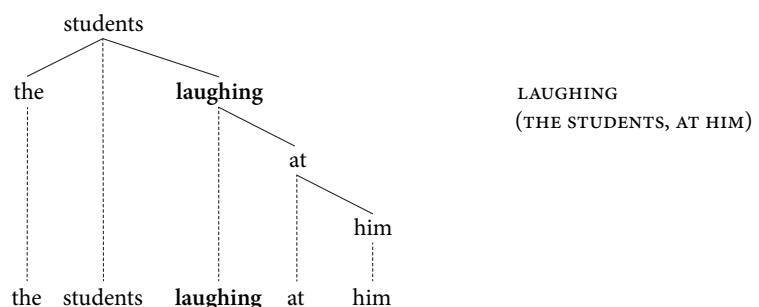
The pertinent observation is that the one-word predicates in the a-sentences (in bold) are semantically almost equivalent to the catenae in bold in the b-sentences, which means that these catenae are predicates, too. The catena therefore allows structural similarity to go hand in hand with semantic similarity. The predicates across the a- and b-sentences are almost equivalent regarding semantic contribution and the arguments that they select. An important aspect of this analysis is that while the light verbs in the b-sentences contribute little in the way of content, they are semantically not completely empty. One can therefore not view just the bolded nouns in the b-sentences as constituting the entire predicate, but rather the predicate in each case is the sum of the bolded words.

The flexibility of the catena allows one to acknowledge both structural and semantic similarity in surprising ways and allows for a consistent analysis of selection, e.g.

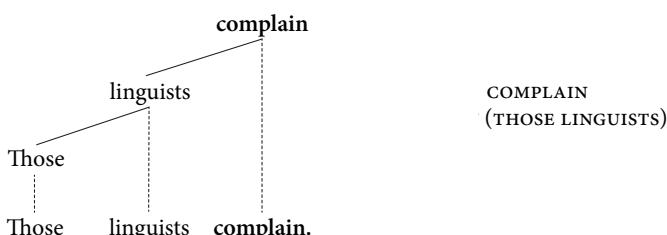
(10) a.



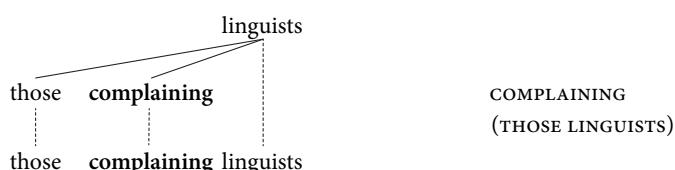
b.



(11) a.



b.



The relevant predicates are again in bold. Each of these one-word predicates takes the same argument across the a- and b-examples. The predicate *laugh/laughing* takes the arguments *the students*, and *at him*, and the predicate *complain/complaining* takes the argument *those linguists / those...linguists*. Observe that while *the students* in (10b) and *those...linguists* in (11b) are not constituents, they are catenae. Hence the message is again that predicates select arguments, whereby both the predicate and its arguments are catenae.

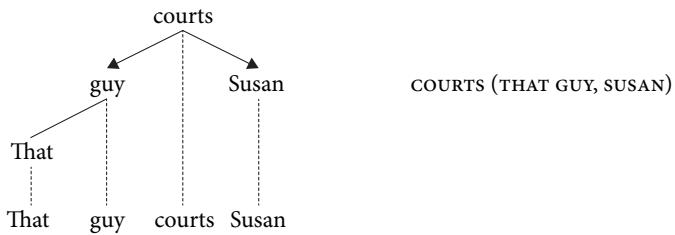
Many further cases could be produced that illustrate the ability of catena-based analyses to show how predicates and arguments are relized in syntactic structures. The predicates and arguments of semantics are, barring discontinuities, always catenae in syntax.

5.5 Adjunct arrows

An important trait of dependency structures is that the arguments and adjuncts of a predicate often appear as equi-level dependents. This situation obscures the fact that arguments and adjuncts differ in their contribution to the semantics and syntax of the structure in which they appear. For this reason, the current DG now introduces a visual convention into the dependency trees that identifies adjuncts. An arrow that points up the hierarchy away from the adjunct will be used.¹⁵³

When predicates select their arguments, selection points from the predicate to its arguments,¹⁵⁴ e.g.

(12)

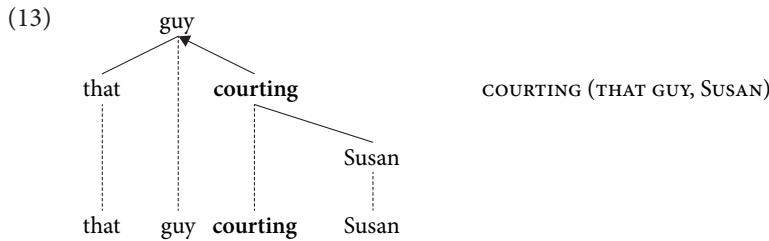


The two arrow dependency edges are intended to show that the predicate *courts* is semantically selecting its arguments *that guy* and *Susan*. The tree shows what can be considered the normal situation: predicates often govern the arguments that they select. In such cases, including the arrows on the dependency edges would be redundant; it is, rather, easier to assume that the default situation is for selection to point down the syntactic hierarchy and to therefore omit the arrows in such cases.

When an adjunct is present, however, the situation is different, since selection now points up the syntactic hierarchy. Compare tree (12) with the following tree:

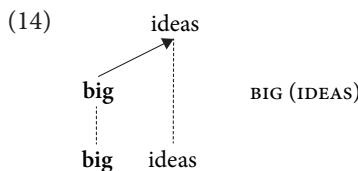
¹⁵³ As done here, a number of DGs employ a simple visual convention in dependency trees to identify adjuncts (see Tesnière 1959/2015: 36; Baum 1976: 79; Tarvainen 1981: 61; Engel 1994: 44; Jung 1995: 111–6; Eroms 2000: 85–6; Uzonyi 2003: 237).

¹⁵⁴ Bröker (1999: 67–9) discusses the manner in which adjuncts select their governors. He employs a special term, i.e. “Vakanz”, to denote the fact that selection is pointing opposite normal. The graphic convention he employs is, however, much different than the arrows employed here. He actually positions the adjunct above its governor in the dependency tree.

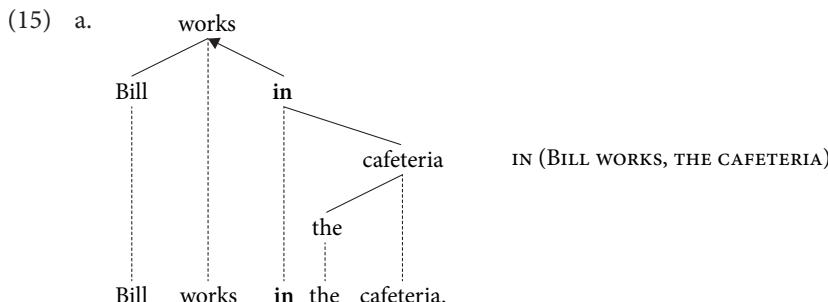


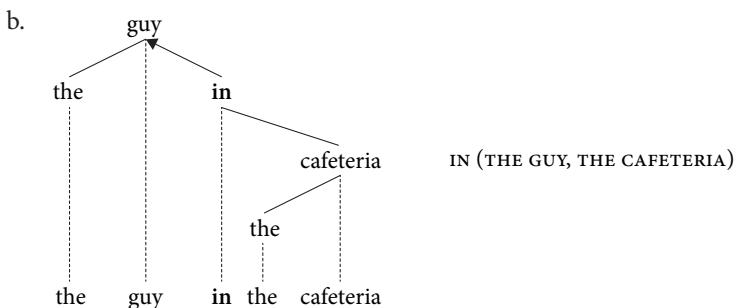
The predicate *courting* in this example is like the predicate *courts* in the previous example insofar both are semantically selecting two arguments. However, the hierarchical organization of the predicate *courting* in relation to its first argument *that guy* is different. The arrow showing that *courting* selects *the guy* as its first argument points up the hierarchy instead of down it. The difference in the direction of selection is due to the distinct syntactic organization of the categories involved. Present participles (here *courting*) can function essentially as adjectives modifying a noun, and when they do so, they are syntactically dependent on the noun.

Attributive adjectives also select their head nouns:



Adjectives constitute predicates, and as predicates, they take one or more arguments. The adjective *big* in this case represents a property that is assigned to the entity represented by the noun *ideas*. In other words, the adjective *big* is a predicate that takes the noun *ideas* as its one argument. Locative and temporal prepositions often behave in a similar way. They are predicates that take two arguments, e.g.





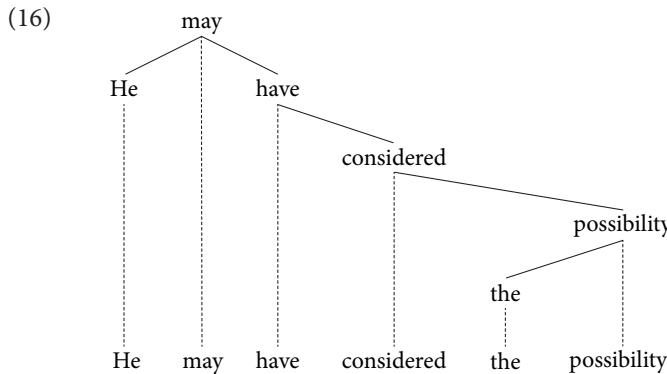
The location preposition *in* in (15a) establishes a relation between the main clause *Bill works* and the NP *the cafeteria*, i.e. it is selecting these two units as arguments. Accordingly, the one arrow points from the predicate *in* up the hierarchy to the first argument *Bill works*, since *in* is selecting *Bill works*. Similarly, the preposition *in* in (15b) establishes a relation between *the guy* and *the cafeteria*. Since *in* selects *the guy*, the one arrow points up the syntactic hierarchy from *in* to *the guy*.

Since arrows point from predicates to the arguments that they select, function words, since they alone do not qualify as predicates, do not give rise to selection arrows. Thus, word combinations such as *will go*, *the day*, and *of Susan* are not connected by arrow dependency edges. As function words, the auxiliary verb *will*, the definite article *the*, and the empty preposition *of* do not select arguments, so they do not give rise to a selection arrow. The same is true of other function words in general.

The arrow edges introduced in this section are henceforth used consistently throughout this book to mark adjuncts. However, one should note that when an arrow edge is absent, one cannot necessarily conclude that one is dealing with an argument, but rather one can only conclude that one is not dealing with an adjunct.

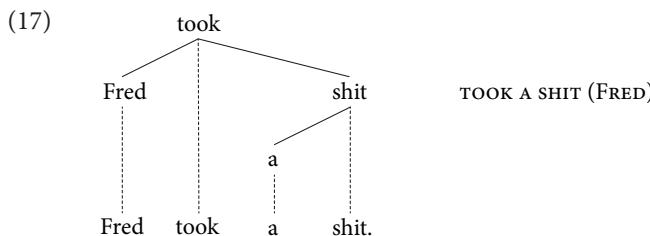
5.6 Idiom selectors

The understanding of selection being established is contrary to common practice in theoretical linguistics. Since phrase structure theories have not to date acknowledged catenae, their understanding of predicates and selection is challenged. Instead of viewing predicates/selectors as catenae, they tend to view individual words as predicates/selectors, in particular lexical verbs. For example, given a structure like the following one, which contains two auxiliary verbs, the lexical verb *considered* alone is deemed to be the matrix predicate:



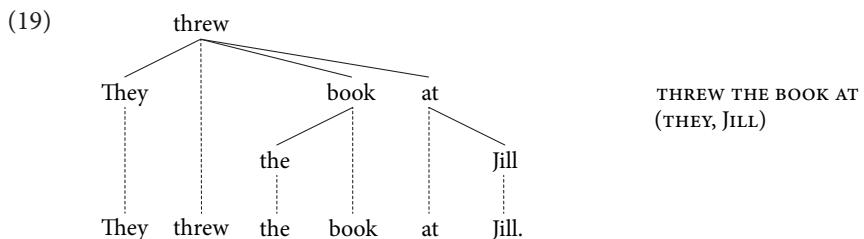
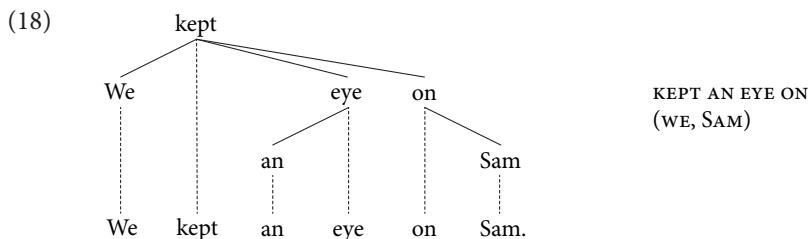
The current catena-based theory, in contrast, views the catena *may have considered* as the matrix predicate that selects arguments. Thus, the selector consists of two function verbs, *may* and *have*, and the one content verb, *considered*. In contrast, the traditional understanding of predicates views just *considered* as the selector; this is consistent with the fact that the lexical verb *considered* is the only verb with full semantic content. This semantic content influences the semantic nature of the arguments *He* and *the possibility*.

But there is a major problem with the traditional understanding of selection. This problem has to do with idiosyncratic meaning. The traditional understanding of selection cannot accommodate idiosyncratic meaning in its various forms. To illustrate the point, the following sentence is an example that one is not likely to quickly forget:



Of course, this sentence does not mean that Fred picked up a piece of shit and departed with it. One therefore cannot locate the power of selection in the finite verb *took* alone, nor in the NP *a shit* alone, but rather the two together constitute the matrix predicate that selects the subject argument *Fred*.

The next two examples further illustrate the point:

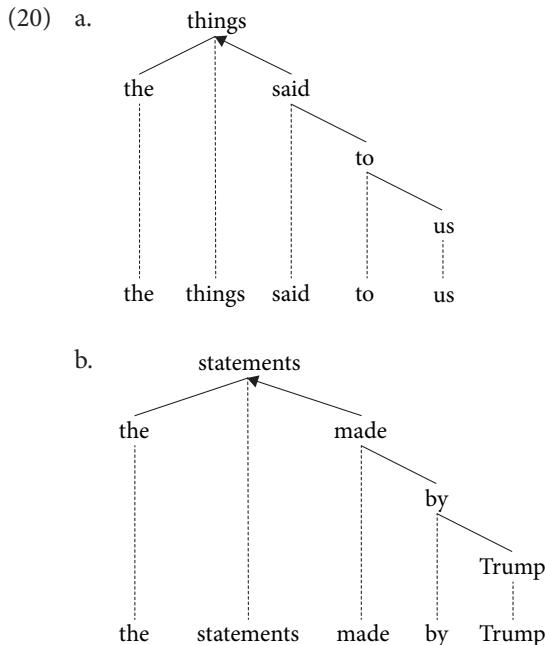


These sentences contain the idioms *keep an eye on* and *threw the book at*. If one attempts to locate the power of selection in the verbs *kept* and *threw* alone, one loses the idiomatic readings. Sentence (18) would have to mean that we literally put an eye onto Fred and kept it there, and sentence (19) would have to mean that they literally hurled a book at Jill. The idiomatic readings, in contrast, cannot locate the power of selection in a single word, but must view the word combinations *kept an eye on* and *threw the book at* as the predicates that select the arguments *We* and *Sam* in (18) and *they* and *Jill* in (19), respectively. Note that these word combinations all qualify as catenae.

In sum, the current catena-based theory of sentence structure succeeds at granting selectors and selectees a concrete status in actual sentence structure as catenae. The ability to show predicates and their arguments in syntactic structures is further solidified.

5.7 Predicates vs. predication

An adjunct as a whole is a predication over its “subject” argument, whereby many adjuncts can be further divided into a predicate and that predicate’s “non-subject” argument(s). This situation is illustrated well with the participles associated with reduced relative clauses, e.g.



All relative clauses are adjuncts, thus the reduced relative clauses *said to us* and *made by Trump* are adjuncts on their nouns *things* and *statements*, respectively. Taken as wholes, these adjuncts are predication over the *things* and the *statements*. Examining the parts of these adjuncts, though, further division is possible. The participles *said* and *made* are predicates that each take two arguments. The predicate *said* takes the arguments *the things* and *to us*, and the predicate *made* takes the arguments *the statements* and *by Trump*.

The current account of adjuncts distinguishes between predicates and predication. These concepts are defined as follows:

Predicate

An atomic semantic unit that serves to assign a property to an argument or that relates arguments to each other

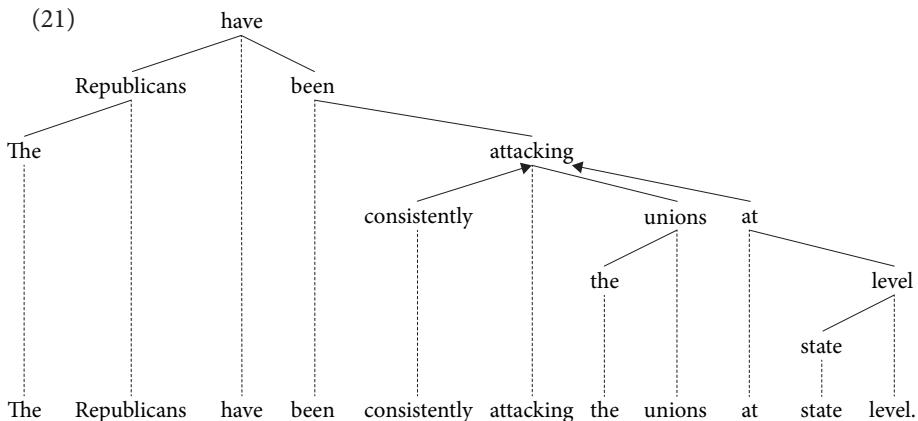
Predication

A property that is assigned to an argument

The current catena-based system sees both predicates and predication as catenae (in continuous structures). For each argument of a predicate-argument structure, there is a predication over that argument. Consider the simple SVO sentence *Fred drinks coffee* in this regard. The sentence contains the predicate *drinks* and the arguments *Fred* and *coffee*. For each of these arguments, there is a predication over it.

The catena *drinks coffee* is a predication over the argument *Fred*, and the catena *Fred drinks* is a predication over the argument *coffee*. In other words, ‘drinking coffee’ is viewed as a property that is predicated of ‘Fred’, and ‘Fred drinking’ is viewed as a property that is predicated of ‘coffee’.

This sort of analysis is applicable to much more complex structures, e.g.



For each argument that one identifies, the rest of the sentence is a predication over that argument. Thus, the catena *have been consistently attacking the unions at the state level* is a predication over *The Republicans*, and the catena *The Republicans have been consistently attacking...at the state level* is a predication over *the unions*, and the catena *The Republicans have been consistently attacking the unions at* is a predication over *the state level*.

Given this distinction between predicates and predication, the role of full relative clauses in predicate-argument structures can be characterized. Compare the following reduced relative clause with its full counterpart:

- (22) a. The woman drinking wine...
 b. The woman who is drinking wine...

The predicate *drinking* in the reduced relative clause *drinking wine* in (22a) takes two arguments, *the woman* and *wine*, and at the same time the entire adjunct *drinking wine* is a predication over the argument *the woman*. In contrast, the predicate *is drinking* in (22b) takes the two arguments *who* (not *the woman*) and *wine*. This situation thus raises a question about the status of the entire full relative clause to its head nominal expression *the woman*. Given the current distinction between predicates and predication, this relation can be characterized in a coherent manner: the full relative clause *who is drinking wine* is a predication – although it is not

a predicate – over *the woman* just like the reduced relative clause *drinking wine* in (22a) is a predication over *the woman*.¹⁵⁵

This distinction between predicates and predication allows the current DG to accommodate the strong inclination encountered in most phrase structure grammars to grant the finite VP string the status of a clear unit of sentence structure. This inclination is accommodated here in the current DG in terms of predication. A finite VP string in a simple sentence such as *Fred drinks coffee* does in fact enjoy a concrete status as a semantico-syntactic unit: *drinks coffee* is a predication (although it is not a predicate).

5.8 Prosodic dependencies (clitics)

In addition to the three dependency types already discussed above, some recent work in DG is now acknowledging a fourth type of dependency, i.e. prosodic dependencies.¹⁵⁶ A prosodic dependency exists between two elements when the one element takes the other as its *host* in prosodic structure. Prosodic dependencies are a manifestation of word stress; they are associated above all with clitics. A clitic is a syntactically autonomous element that is prosodically dependent on another element. In other words, a clitic is an element that by itself cannot be viewed as constituting a word but must rather be seen as forming a greater word with some other element, i.e. with its host. Examples of clitics are the abbreviated forms of certain auxiliary verbs *have*, *would*, *will*, which are reduced to 've, 'd, and 'll, respectively. Another prominent example of a clitic in English is the so-called Saxon genitive's used in NPs to indicate a possessor.

Clitics like 've, 'd, and 'll, and 's cannot be viewed as words, since they do not bear a word stress. Instead, they attach to an adjacent word, which is their host. They form a greater word together with their host, whereby there is a single main word stress for the clitic and its host together. Forms like *should've*, *she'd*, *he'll*, *Tom's*, etc. qualify as single words, but they consist of (at least) two elements, each of which is syntactically autonomous because it is fulfilling a syntactic role in the greater structure in which it appears. To represent clitics in the current DG, unique conventions are employed. A hyphen appears on the side of the clitic where its host is located. The clitic has normal dependency edges extending to it and away from

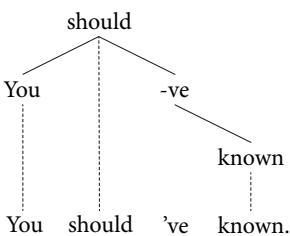
¹⁵⁵. The insight that relative clauses as a whole are predication over their head nominals is expressed by Jung (1995: 109).

¹⁵⁶. The notion of prosodic dependencies and the account of clitics presented here follows Groß (2014).

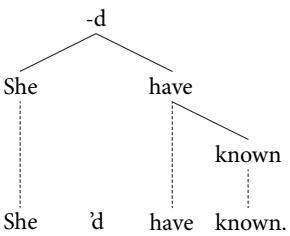
it, but it lacks a vertical dotted projection line. These conventions are intended to indicate the primary trait of clitics, namely that they are syntactically autonomous but prosodically dependent on a host.

Examples of auxiliary verbs as clitics are illustrated with the following trees:

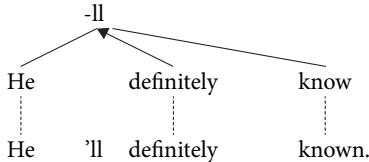
(23) a.



b.



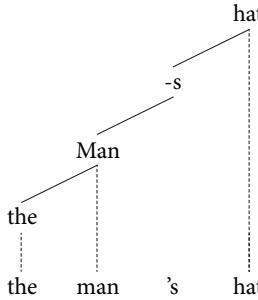
c.



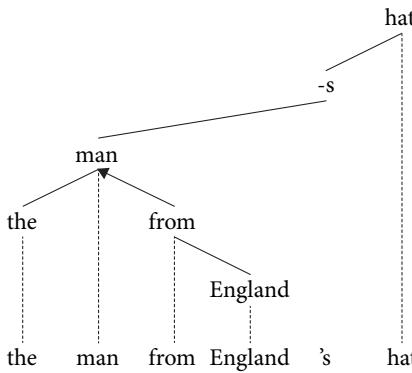
The hyphen on the clitic indicates in each case that the clitic attaches to and forms a single word with the pronoun that immediately precedes it in the string. The lack of a dotted vertical projection line helps show that the clitic alone is not a word. The fact that solid dependency edges extend to and away from a clitic in the normal fashion is intended to indicate that the clitic is performing the standard syntactic role that one associates with its word class. Note that the word that a clitic attaches to prosodically can be its parent as in (23a) or its child as (23b–c), or it can be neither its head nor its dependent as will be illustrated shortly.

The necessity to acknowledge prosodic dependencies and the intermediate status of clitics is perhaps most visible with the Saxon genitive's. This element has frustrated theories of syntax, since a naïve account might judge it to be a suffix, whereas a more detailed analysis quickly reveals that it cannot be a standard suffix, since it is combining with entire phrases, as opposed to with just single words, e.g.

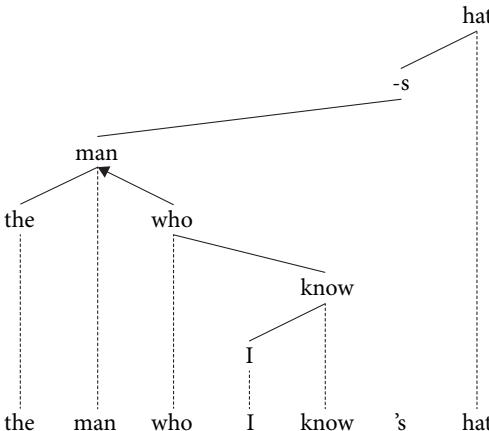
(24) a.



b.



c.



Given an example like (24a), one might take the Saxon 's as a suffix, i.e. as a morphological part of the word *man*. Examples (24b) and (24c), however, demonstrate that the Saxon 's can combine with entire phrases. The current analysis of the 's as a clitic accommodates these facts.¹⁵⁷ Noteworthy is the observation that the 's is neither the parent nor the child of its host *England* in (24b) and neither the parent nor the child of its host *know* in (24c). Clitics attach to an adjacent word, often regardless of the syntactic status of that word with respect to the clitic.

By way of several illustrative examples, the current section has demonstrated how clitics are addressed in the current DG. Clitics are syntactically autonomous elements that are prosodically dependent on a host. The prosodic dependencies associated with clitics are located entirely in the horizontal dimension. A clitic is always prosodically dependent on a word that appears immediately next to it. Syntactic dependencies, in contrast, exist in the vertical dimension, and semantic and morphological dependencies are largely independent of the two ordering dimensions.

157. The analysis of the Saxon genitive 's here as the root of a determiner phrase (DP) stands in contrast to Mel'čuk and Pertsov's analysis (1987: 408). Mel'čuk and Pertsov take 's to form a single node in the syntax with its host word.

CHAPTER 6

Valency

6.1 Overview

Sections 1.5–1.9 and 5.4–5.7 introduced concepts of predicate–argument structures. This chapter now returns to predicates and arguments, whereby the emphasis is on the combinatory potential of individual predicates. The key term here is *valency*. Valency is the notion that content verbs and other types of predicates have combinatory potential; they tend to combine with a certain number of other linguistic units of a certain type. Valency is in part a semantic concept, for predicates are viewed as opening slots for their arguments. Valency is not, though, purely a semantic concept, but rather it is also a syntactic notion. Indeed, the account of valency presented in this chapter focuses more on the syntactic aspects of valency than on the semantic ones.

By focusing more on the syntactic notion of valency, verbs of every type can be deemed to have valency. Indeed, the key message developed below is that the combinatory potential of all verbs, regardless of whether they have semantic content or not, can be investigated and understood in terms of valency. Pure function verbs (auxiliary verbs), light verbs, and full content verbs all have combinatory potential that one can characterize in terms of valency.

The key distinctions drawn below are listed here first to provide an overview of the chapter:

1. Finite vs. nonfinite forms
2. Active vs. passive forms
3. Control verbs
4. Raising verbs
5. Auxiliary verbs
6. Light verbs

In addition to the investigation of the valency patterns of these verb types, the notion of valency is also extended to nouns, prepositions, and beyond. The combinatory potential of most word categories can be explored in terms of valency.

6.2 Tesnière's metaphor

Lucien Tesnière, the father of modern DGs (see Sections 2.1, 3.7, and 3.9), borrowed the valency metaphor from chemistry, where atoms are understood to have combinatory potential.¹⁵⁸ An oxygen atom O, for instance, has the potential to attract and combine with two hydrogen atoms H, creating the molecule H₂O. Tesnière extended this concept of combinatory potential to content verbs of natural language. A given content verb attracts syntactic units of certain types and combines with them.

The passage where Tesnière directly characterizes the valency notion is given here:

The verb may therefore be compared to a sort of atom, susceptible to attracting a greater or lesser number of actants, according to the number of bonds the verb has available to keep them as dependents. The number of bonds a verb has constitutes what we call the verb's *valency*.¹⁵⁹ (Tesnière 1959/2015: Chapter 97, § 3)

Tesnière employed the term *actant* (Fr. *actant*) to denote what many modern theories call an *argument*, and he used the term *circumstant* (Fr. *circonstant*) to denote what many modern theories of syntax call an *adjunct*.¹⁶⁰ Thus the distinction Tesnière drew between actants and circumstancials is closely similar to the distinction that modern terminology draws between arguments and adjuncts.

Tesnière posited four basic levels of valency according to the number of actants the verb attracts and binds; a verb can be *avalent*, *monovalent*, *divalent*, or *trivalent*, e.g.

- | | |
|-----------------------------------|---------------------------------|
| (1) a. <i>Pluit. 'It rains.'</i> | – Aalent |
| b. <i>They slept.</i> | – Monoalent (i.e. intransitive) |
| c. <i>We discussed the issue.</i> | – Divalent (i.e. transitive) |
| d. <i>Sam gave them a pie.</i> | – Trivalent (i.e. ditransitive) |

¹⁵⁸ Tesnière was actually not the first to characterize the combinatory potential of verbs with the valency metaphor. Korhonen (1977: 85) and Schubert (1987: 26–7, 61–2) mentions other linguists who preceded Tesnière in using the term *valency*. Tesnière nevertheless rightly receives credit for introducing the notion because he developed the concept extensively.

¹⁵⁹ See Starosta (1988: 1) for another example of this valency metaphor.

¹⁶⁰ Most theories of valency have not adopted Tesnière's terminology of *actants* and *circumstancials*. Most prefer the terms *arguments* or *complements* (in place of *actants*) and *adjuncts* (in place of *circumstancials*). Starosta (1988: 120) is an exception, since he prefers to write of *actants* rather than of *arguments*. See Schubert (1987: 61–2) for the use of the term *complements* instead of *arguments* or *actants*.

The Latin verb *pluit* ‘rains’ is avalent because it takes no actant at all. In contrast, the English counterpart *rains* is monovalent, because it requires the presence of the dummy pronoun *it*. The verb *sleep* is monovalent because it usually takes just a single argument (here *they*). The verb *discuss* is divalent because it usually takes two arguments (here *we* and *the issue*). And the verb *give* is trivalent because it often takes three arguments (here *Sam*, *them*, and *a pie*). Alternative designations for the latter three types of verbs are *intransitive*, *transitive*, and *ditransitive*.

In addition to discerning the number of arguments that predicates take, the valency concept also acknowledges the type of arguments. Tesnière distinguished between three basic types of actants: first, second, and third. A monovalent verb like *slept* in (1b) takes a first actant; a divalent verb like *discuss* in (1c) takes a first actant and a second actant, and a trivalent verb like *give* in (1d) takes a first actant, a second actant, and a third actant. Many modern theories of syntax distinguish between these actant types in terms of syntactic function. Tesnière’s first actant is denoted as the *subject*, his second actant as the *first object* (or *direct object*), and his third actant as the *second object* (or *indirect object*). With the exception of some third actants, which can be introduced by a preposition (e.g. *to* in English), Tesnière took actants to be nouns, pronouns, noun phrases, or the equivalents of noun phrases. Circumstants, in contrast, are identifiable in part because they are often introduced by a preposition or subordinator (or followed by a postposition).

Tesnière also explored the various mechanisms of syntax that alter the basic valency of verbs. He distinguished between types of (what he called) *diathesis*: *active*, *passive*, *reflexive*, *reciprocal*, *recessive*, and *causative*. The simple active diathesis is the default, whereas the other types of diathesis alter the valency of the default. The passive, for instance, promotes a second actant to a first actant and demotes the first actant to a circumstant (introduced by *by* in English). The recessive reduces the number of actants by one by rendering the second actant as a purely functional element that often appears in the form of a reflexive pronoun. The causative introduces a new first actant and in so doing demotes the former first actant to a second actant.

An interesting development concerning Tesnière’s concept of valency is that valency has been adopted and is built on by other modern theories of syntax. This is noteworthy in part because many modern theories that build on the concept are phrase structure grammars. As discussed in Section 2.3, phrase structure is in a sense the opposite of dependency and it is therefore the opposite of what Tesnière understood syntactic structure to be. The current theory also adopts and builds on the notion of valency, although in the interest of making the theory more accessible to a modern audience, the terms *argument* and *adjunct* are employed instead of Tesnière’s terms *actant* and *circumstant*. More importantly, the current theory draws an additional distinction that is not due to Tesnière, namely that between arguments and valents.

6.3 Semantic vs. syntactic valency

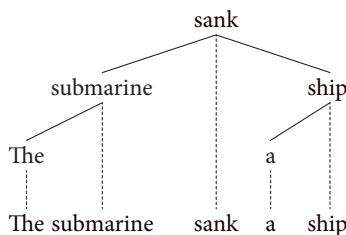
While the current DG employs the more modern terms *argument* and *adjunct* instead of Tesnière's terms *actant* and *circumstant*, it also draws a further distinction. It distinguishes between the semantic and syntactic combinatory potential of valency-bearing words, that is, between semantic and syntactic valency.¹⁶¹ If one is striving to be exact, the concepts of predicate and argument actually reside more in semantics than in syntax (see Sections 4.11, 5.4, and 5.6). This point is illustrated with the following examples:

- (2) a. The submarine sank a ship.
 b. A ship was sunk by the submarine.
 c. the sinking of a ship by the submarine
 d. the submarine's sinking of a ship
 e. a ship's sinking by the submarine
 f. the submarine sinking a ship
 g. the submarine having sunk a ship
 h. a ship having been sunk by the submarine

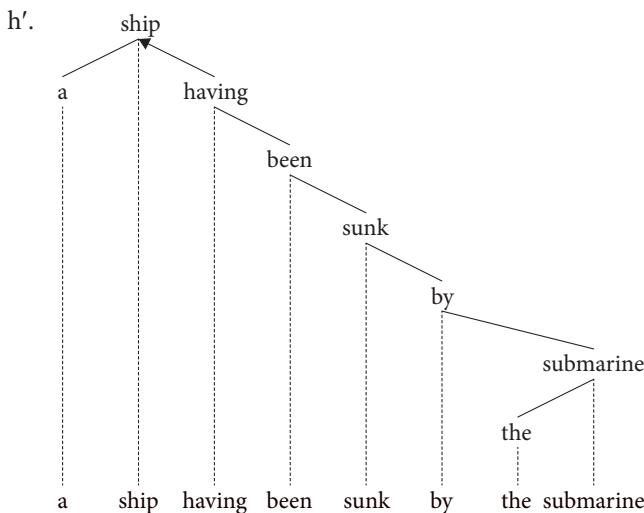
Despite the varying syntactic structures in which the predicate SINK (henceforth simply *sink*) appears in these examples, the arguments of *sink* remain consistent. The predicate *sink* in its various forms is combining with its two arguments *the submarine* and *a ship*.

Quite obviously, however, the syntactic structures in which the predicate *sink* and its arguments *the submarine* and *a ship* appear in (2a–h) vary significantly from the one example to the next. This fact is most apparent when one compares the syntactic structures of these examples. The structure of (2a), for instance, is much different than the structure of (2h):

- (2) a'.



¹⁶¹. The account here is following others in distinguishing between various notions of valency (e.g. Happ 1976: 133–46, 324–5; Korhonen 1977: 98–108, 175–7). What are being called semantic dependencies here are also known as *logical dependencies*.

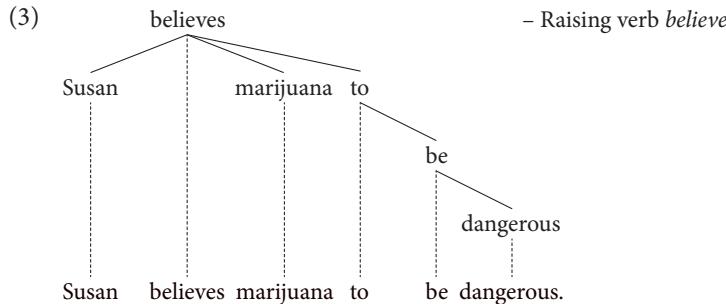


The root of the structure in the clause in (2a') is *sank*, whereas it is the noun *ship* in the NP in (2h'). The verb *sank* dominates both its arguments *the submarine* and *a ship* in (2a'), whereas this verb appears as *sunk* in (2h'), where it is dominated by its argument *a ship*. What can be concluded from these observations is that the actual combinatory potential of verbs in syntax is manifest in varying ways. The semantics of predicates, however, remains consistent almost regardless of the structures in which the predicates appear.

In order to accommodate these observations, the current system distinguishes between *semantic valency* and *syntactic valency*.¹⁶² The semantic valency of a given content word remains consistent even as the form of the content word and the syntactic structures that contain it vary in significant ways. In contrast, the syntactic valency of the content word does vary according to these criteria. The main difference is that the syntactic valency of content verbs, such as *sink* when it appears in finite form (*sink*, *sinks*, *sank*), is different from the syntactic valency of the same content verb when it appears in non-finite form (*sink*, *sinking*, *sunk*). By distinguishing between semantic and syntactic valency, it also becomes possible to explore the combinatory potential of control verbs, raising verbs, and auxiliary verbs in terms of valency. The concept of syntactic valency is liberated from the semantic concepts of predicate and argument in order to focus on the combinatory potential of all types of verbs, not just content verbs.

¹⁶². The distinction between semantic and syntactic valency is established in various places (e.g. Tarvainen 1981: 15–9).

So-called *raising verbs* provide a particularly strong reason for distinguishing between semantic and syntactic valency. A raising verb such as *believe* does not semantically select one of its dependents, e.g.¹⁶³



The raising verb *believes* here does not semantically select its object *marijuana*. We know that it does not select *marijuana* because it is not the case that Susan believes marijuana. What she believes is, rather, that marijuana is dangerous. Since *believes* does not select its object *marijuana*, *marijuana* cannot be construed as an argument of *believes*. But if it is not an argument of *believes*, then what is it? Answer: a *valent*. The discussion returns to raising verbs like *believe* in Section 6.9 below.

Example (3) reveals a fundamental problem with approaches to valency that acknowledge just predicates, arguments, and adjuncts. Such approaches are not nuanced enough to distinguish between semantic and syntactic valency. They cannot discern dependents of predicates that are neither arguments nor adjuncts, such as with *marijuana* in (3). The valent notion takes care of this problem. Semantic valency continues to be understood in terms of the arguments of predicates, whereas syntactic valency is understood in terms of the valents of verbs and other valency-bearing units. A valent of a given word may or may not be an argument of that word (assuming the word is a predicate). A valent is thus a non-adjunct dependent of that word. The terminology is summarized with the following table:

Table 12.

	Semantic valency	Syntactic valency
Part of core meaning	Argument	Valent
Additional meaning	Adjunct	Adjunct

163. Example (3) involves an ACI construction (accusativus cum infinito). Kunze (1975: 111–2), Schubert (1987: 94–6) and Heringer (1996: 76–7) provide some discussion of such structures. The noun *marijuana* is shown as a dependent of *believes* (and not of *to* or of *be*) due to various considerations, e.g. objective case (*Susan believes him/*he to be dangerous*), reflexives (*Susan₁ believes herself₁/*her₁ to be dangerous*), and ability to passivize (*Marijuana is believed to be dangerous*).

Henceforth in this chapter the discussion concentrates on the nature of syntactic valency.

6.4 Valency frames

The syntactic valency of content verbs is lexical information, that is, information that is stored in the mental lexicon of the speakers of a language community. Since this information is mostly the same across the speakers of the language community, the combinatory potential of valency-bearing units is mostly fixed and therefore predictable. Following much work in DG and valency theory, the combinatory potential of verbs and other valency-bearing words will now be explored in terms of *valency frames*. The valency frame of a valency-carrier lists the valents that that valency-carrier can or must take. It shows the combinatory potential of that valency-carrier generalized across the language community.

Examples of syntactic valency frames for standard monovalent, divalent, and trivalent verbs are now listed:

(4)	Sentence	Valency frame	Designation
a.	They slept.	SLEEP _f [N _a]	– Monovalent
b.	We discussed the issue.	DISCUSS _f [N _a , N _a]	– Divalent
c.	Sam gave them a pie.	GIVE _f [N _a , N _a , N _a]	– Trivalent
d.	Tom put money in the box.	PUT _f [N _a , N _a , → _a]	– Trivalent

Valency frames are given with square brackets, whereby the valency-carrier is positioned to the immediate left of the brackets, similar to how the predicates and arguments of predicate logic are shown (see Section 1.7). The N symbol stands for noun, pronoun, noun phrase, or an otherwise noun-like word or phrase. The → marks a valent that indicates direction and goal (here *in the box*). The valents of valency-carriers within the brackets are always listed in the left-to-right order that reflects the following ranking: SUBJECT > FIRST OBJECT > SECOND OBJECT > PREPOSITIONAL OBJECT.¹⁶⁴ A valent that is an argument of the valency-carrier is indicated with the _a subscript.

A number of aspects of the syntactic valency of verbs and other valency-bearing units are examined in the following sections. Basic valency frames like the ones just illustrated with Examples (4a–d) are augmented in various ways to accommodate aspects of syntactic valency that are important for establishing a solid

164. This hierarchy of valents is similar to Keenan and Comrie's (1977: 66) *accessibility hierarchy*: subject > direct object > indirect object > oblique object > genitive object > object of a complement. The accessibility hierarchy ranks the NPs across languages according their accessibility to relativization.

understanding of the syntax of English (and other languages).¹⁶⁵ The following table lists all the symbols that appear in valency frames below, and in so doing, it provides an overview of the content presented in the following sections:

Table 13.

Symbols	What the symbols mean
A	Adjectival valent (word or phrase)
Adv	Adverbial valent (word or phrase)
C	Valent that can appear in nominal or clausal form
D	Determiner valent
E _{it} , E _{there}	Expletive valent, <i>it</i> or <i>there</i>
I	Bare infinitive valent (word or phrase)
N	Nominal valent (word or phrase)
P	Prepositional valent (particle or prepositional phrase)
Pa	Past participle valent (word or phrase)
Pr	Present participle valent (word or phrase)
S	Subordinator valent (clause)
T	Particle <i>to</i> -infinitive valent (phrase)
R	“Raised” valent; the valent is unrestricted in syntactic category.
V	verbal valent (a clause minus the subordinator), the verb is finite
←, →	Indicates a source or goal, used to mark arguments that can be manifest in various ways, mainly in terms of a preposition that indicates direction (<i>from</i> , <i>in</i> , <i>on</i> , <i>under</i> , etc.)
forN, atN, withN, ...	A specific preposition that obligatorily introduces a given valent is placed immediately in front of that valent.
VERB _f , VERB _{nf} , VERB _{imp}	Subscripts _{fin} , _{nonfin} , and _{imp} indicate whether the valency frame given is valid for finite, nonfinite, or imperative forms of that verb
N _a , C _a , T _a , ...	Subscript _a marks that valent as an argument of the valency carrier
N ₁ , N ₂ , N ₃	Indices indicate shuffling of the default organization of valents, used with passive and ergative forms.
<u>N</u> , <u>C</u> , <u>U</u> , ...	Single underline marks that valent as the subject argument of a lower predicate.
<u><u>N</u></u>	Double underline marks that valent as the object argument of a lower predicate.
N↑, C↑, ...	Up-arrow marks a valent that is not a dependent of the given valency-carrier.
N/C/A...	Slash means ‘or’, i.e. it helps indicate flexibility in how the valent is realized
[...]	Square brackets enclose valents
(...)	Curved brackets indicate optionality

¹⁶⁵. The system for representing word valency in this chapter is valid for English. The system would have to be augmented to accommodate the morphological case of argument NPs in languages that have robust case systems. Since English lacks morphological case almost entirely, the system for representing valencies can ignore case.

This table is intended as a quick reference guide to the valency frames produced below.

One particular aspect of the valency frames in this chapter must be emphasized. Each valency frame shown gives just the one valency frame of that valency-carrier as it appears in that example sentence to the left. In this regard, particular attention is paid to whether the valency carrier is a finite or nonfinite verb. The valency frames produced are intended to reflect the combinatory potential of the lexical item at hand. Most verbs can appear in varied environments, which means they accept multiple distinct valency frames.¹⁶⁶ Furthermore, the valency frames do not and cannot accommodate aspects of syntax such as ellipsis and null anaphora (e.g. pro-drop).

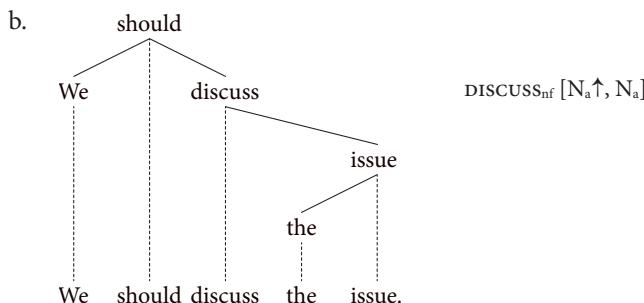
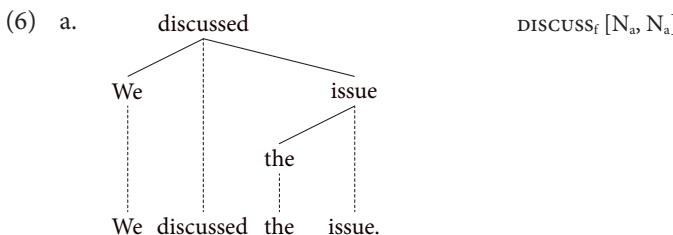
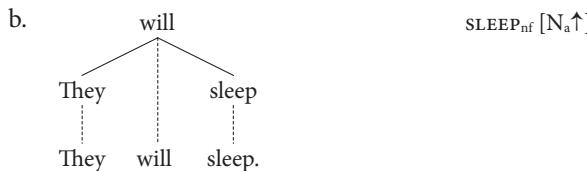
6.5 Finite vs. nonfinite verbs

As with most theories of syntax, the distinction between finite and nonfinite verbs is crucial to the current DG. Finite verbs enjoy a special status in two areas: the first is that finite verbs are the locus of morphological markers of number, person, gender, tense, mood, and voice in languages that have such morphology, whereas nonfinite verb forms (infinitive, past/pассив participle, progressive participle, gerund) usually lack (most of) these markers; and the second is that the finite verb is the root of all clause structure. Numerous mechanisms of syntax are sensitive to the finite verb's prominent status. In the current context of valency frames, finite verbs are unlike nonfinite verbs insofar as they usually have a subject dependent, whereas nonfinite verbs usually lack a subject dependent.

To indicate the distinction between the valents of finite and nonfinite verbs, a subject valent that is not a dependent of a given nonfinite verb is identified with an up-arrow ↑. The up-arrow signifies that that the subject valent appears elsewhere, often as the subject valent of another valency-carrier that is higher in the structure,¹⁶⁷ e.g.

¹⁶⁶. Tarvainen (1981: 22–4, 102–12) gives extensive examples of the multiple valency frames associated with verbs in German.

¹⁶⁷. Heringer (1996: 44) employs a similar convention in his valency frames to indicate that a subject valent does not appear as a dependent of a nonfinite verb; he views the subject as “blocked”. In a similar vein, Starosta (2003a: 275–6) posits a lexical feature that appears on nonfinite verbs; this feature then blocks the verb from taking a “nominative dependent”.



The relevant difference across these a- and b-trees concerns the status of the subject in relation to the main content verb. The subject is always a dependent of the finite verb regardless of whether the finite verb is an auxiliary or content verb. This fact is shown in the valency frames using the up-arrow; a subject argument that is not a dependent appears with the arrow. Hence the valency frames for nonfinite verb forms typically have the subject valent taking the up-arrow.

Imperative mood presents a challenge to the analysis of valency frames in terms of finite and nonfinite forms. On the one hand, imperative forms of verbs in English are finite-like insofar as they appear as the root of the sentence like normal finite verbs, but on the other hand, they usually lack an overt subject, e.g. *Stop!*, *Listen!*,

Help!. Consider, however, that the 2nd person singular subject *you* can appear for emphasis, e.g. *You stop!*, *You listen!*, *You help!* The valency frames can accommodate these facts by using the parenthesis, e.g.

- (7) Stop!, You stop!

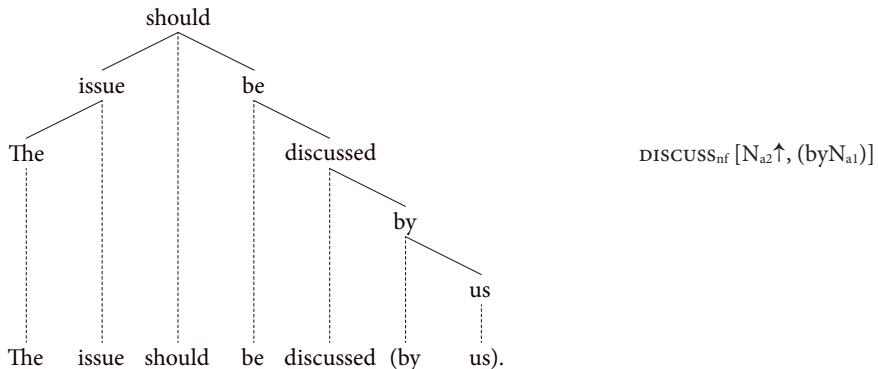
STOP_{imp} [(N_a)]

This valency frame shows that the subject valent *you* appears optionally. Parenthesis indicate optionality.

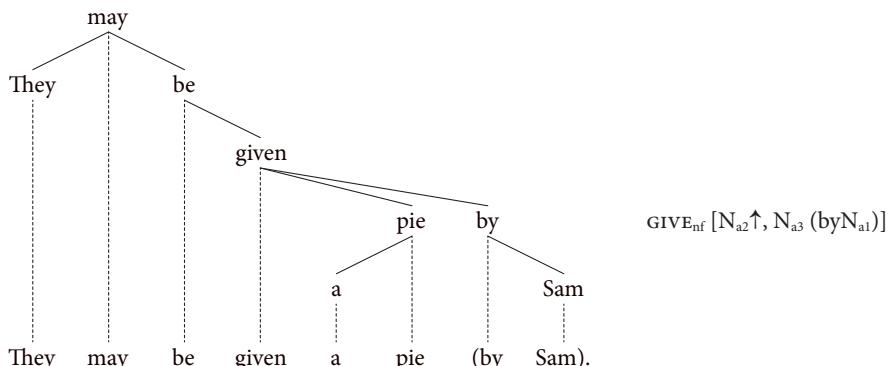
6.6 Passive participles and ergative verbs

The valency frames employed here also reflect the active-passive distinction. Passive participles can have valency frames like the following ones:

- (8) a.



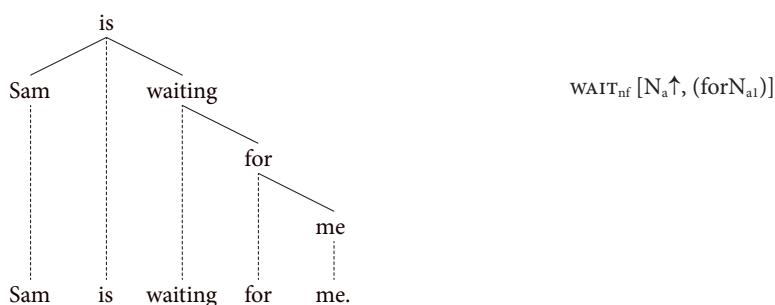
b.



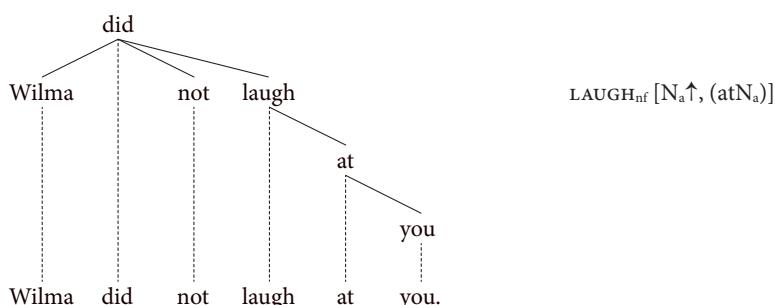
The indices are employed to reflect the shuffling of valents that occur in relation to the simple active forms of the verbs.¹⁶⁸ When the indices are not given, the verb form is active, and when the indices appear, the verb form is passive or ergative. Hence the active is deemed to be the default for the organization of valents in valency frames. The passive involves changing an object of the active (N_{a2}) to the subject, and the subject of the active (N_{a1}) to the object of the preposition *by*. Again, the ()-brackets are employed to enclose optional valents. Indeed, in most instances of the passive, the agent argument introduced by *by* is omitted.

Notice that the preposition *by* is included in the valency frames in the two Examples (8a) and (8b). Its inclusion points to a solid trait of valency. Many verbs have a valency such that a preposition is required to introduce one (or two) of the object valents.¹⁶⁹ In such cases, the preposition is included in the valency frame. The following examples further illustrate the inclusion of prepositions in valency frames:

(9) a.

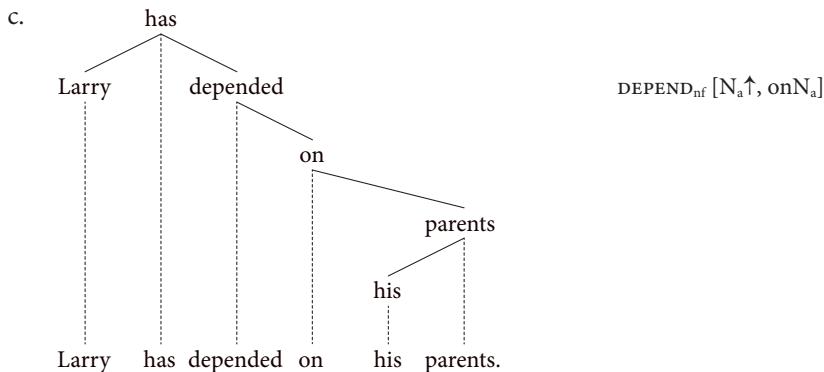


b.



¹⁶⁸. Mel'čuk and Pertsov (1987: 318–21) use a similar numbering convention for distinguishing between the combinatory potential of passive and active forms of verbs.

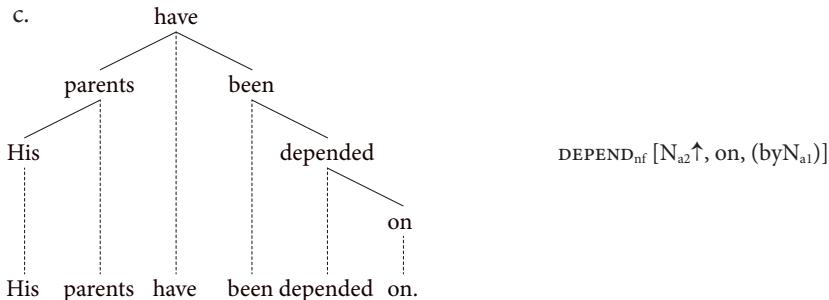
¹⁶⁹. The inclusion of specific prepositions in valency frames is not uncommon (e.g. Tarvainen 1981: 22–3; Loblin 1993: 21).



The PPs *for me*, *at you*, and *on his parents* are valents of the verbs *waiting*, *laugh*, and *depended*, respectively. We know that they are valents because the diagnostics that identify arguments/valents tell us so. For instance, they can be passivized (e.g. *I am being waited for by Sam*), and when the PP appears as the predicate of a relative clause, the result is bad, e.g. **Wilma laughed, which occurred at you*, (see Section 1.8).

An interesting aspect of the passive in English occurs when a preposition that introduces the object in the active form as in Examples (9a–c) is *stranded*. The phenomenon is known as the *pseudopassive*. The preposition remains in postverbal position despite the fact that its object has become the subject. The passive counterparts to Examples (9a–c) are therefore as follows:

- (10) a.
-
- WAIT_{nf} [N_{a2}↑, for, (byN_{a1})]
- I am being waited for.
- b.
-
- LAUGH_{nf} [N_{a2}↑, at, (byN_{a1})]
- You were not laughed at.



The indices again identify the nonfinite verbs as passive participles. The thing to observe here is that the preposition remains in the valency frame, but it now lacks its complement, because its complement has become the subject. The preposition is therefore “bare”. This trait of passive participles is unique to those languages that allow preposition stranding (see Section 9.3). If a language does not allow preposition stranding, the valency frames will never contain bare prepositions.¹⁷⁰

Ergative verbs are similar to the active and passive forms of verbs regarding the distribution of semantic roles. Ergative verbs can be either intransitive or transitive, but when they are used intransitively, the subject is a patient or theme, not an agent. The object of the transitive version of an ergative verb becomes the subject in the intransitive use of that verb, e.g. *She opened it* vs. *It opened*. Alternations like this one have the following valency frames: OPEN_F [N_a, N_a] vs. OPEN_F [N_{a2}]. The ergative verb *open* can be transitive or intransitive, whereby the object in the transitive sentence has become the subject in the intransitive sentence. The index ₂ on the argument in the one valency frame marks that argument as a patient that corresponds to what would be the object in the transitive version of that verb. The true agent responsible for opening the door is either not known or unimportant. Unlike with passive participles, there is no lexicalized means for expressing the agent in such cases, i.e. nothing like the *by*-phrase of the passive.

This section has demonstrated how the active-passive distinction and the transitive and intransitive uses of ergative verbs are analyzed in the current DG. Noteworthy is the extent to which the account is lexical, not syntactic. The current DG, like most DGs, is strongly lexical. Distinctions that some phrase structure grammars locate in the syntax are located here in the lexicon instead. The active and passive forms of verbs are related to each other in terms of valency frames and the shuffling of indices, rather in terms of transformations in the syntax.

¹⁷⁰ Mel'čuk and Pertsov (1987: 124–5) emphasize that the preposition of pseudopassives is *stranded*; it is not *dangling*. According to Mel'čuk and Pertsov, a dangling preposition is one the object of which is has been fronted, e.g. *Who did you talk to?*, whereas a stranded preposition occurs with pseudopassives as in Mel'čuk and Pertsov's distinct use of the terms *stranding* and *dangling* in this area has not been adopted generally in linguistics.

6.7 Clausal valents

Some predicates can or must take clausal valents, whereas others cannot,¹⁷¹ e.g.

- (11) a. Jill thinks that it's too hot.
- b. *Jill avoids that it's too hot. (compare: *Jill avoids the heat.*)

The predicate *thinks* in (11a) takes an object valent that has the syntactic status of a clause, whereas the predicate *avoid* in (11b) can hardly take a clausal object valent. Typical verbs that can take clausal object valents are those of saying and thinking (e.g. *acknowledge*, *claim*, *discuss*, *imagine*, *maintain*, *observe*, *ponder*, *promise*, *say*, *see*, *tell*, etc.). Similarly, some verbs can take a clausal subject valent, whereas many others cannot, e.g.

- (12) a. That they did that upset us.
- b. ??That they did that reached us.

The so-called *psychological verbs*, or just *psyche verbs* (e.g. *anger*, *annoy*, *disgust*, *frustrate*, *impress*, *please*, *upset*, *scare*, *surprise*, etc.), are a large class that can take clausal subject valents. Raising verbs and adjectives (see Section 6.9 below) can also take clausal subject valents (e.g. *appear*, *seem*, *have*, *easy*, *hard*, *likely*, *tough*, *unlikely*, etc.).

Verbs that can take clausal valents behave in ways that distinguish them from verbs that cannot. In particular, the former allow *it*-extraposition, a frequently occurring mechanism of syntax that positions informationally heavy units on the right periphery of the clause,¹⁷² e.g.

- (13) a. That he exaggerates so much is annoying.
- b. It is annoying that he exaggerates so much.

The informationally heavy valent *that he exaggerates so much* is placed at the right periphery of the clause in (13b), whereby the cataphoric pronoun *it* occupies the canonical subject position. If a verb does not allow a clausal valent, *it*-extraposition is impossible, e.g.

- (14) a. *That he exaggerates so much is reducing.
- b. *It is reducing that he exaggerates so much.

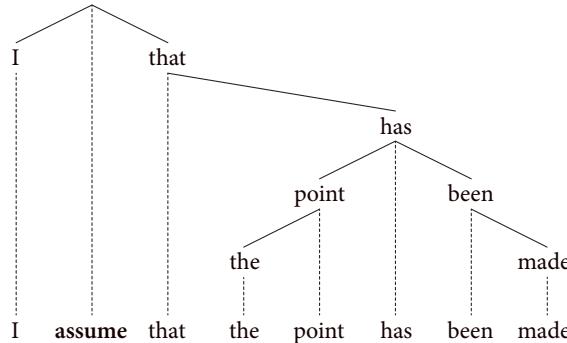
It-extraposition fails in this case because the verb *reducing* cannot take a clausal valent.

171. Heringer et al. (1980: 217–8) observe that some verbs select clausal subjects. The example they use is Ger. *erinnern* ‘remember’: *Dass es schneit, erinnert an Weihnachten* ‘That is snowing reminds one of Christmas’. Mel’čuk and Pertsov (1987: 219–24) provide more information about the predicates that can take clausal subject valents.

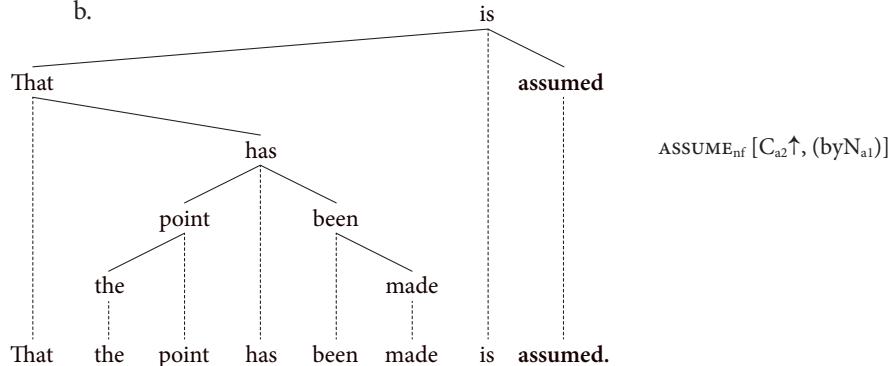
172. This positive correlation is noted by Mel’čuk and Pertsov (1987: 221), that is, that the predicates that can take clausal valents are exactly the ones that frequently occur with *it*-extraposition.

Extraposition in general occurs to avoid center embedding and thus aid processing. Sentence structures that extend down to the right are easier to process in English than sentences that are front- or center-heavy. Due to its frequent occurrence in English and related languages, extraposition is a prominent mechanism of syntax. The current account acknowledges the importance of this mechanism in part by indicating the valent(s) of predicates that can or must be clausal. The symbol C (clause) is used in valency frames to mark these valents, e.g.

- (15) a. **assume** ASSUME_f [N_a, C_a]



- b.



The C in the valency frames marks the valent in each case that can be clausal. Note that extraposition is also possible in cases like (15a), with the *it* in object position: *I believe it that the point has been made.*

The predicates that can or must take a clausal valent usually also allow an N valent in the relevant position(s), e.g. *I assumed the worst*, *Two things were assumed*, *His exaggerations are annoying*, *Their actions upset us*. They also of course allow other clause-like valents, such as to-infinitive and gerund phrases. The appearance of C in the valency frame indicates merely that that valent has the option to appear as a full clausal valent.

6.8 Control

A large class of verbs, adjectives, nouns, and other categories take a verbal valent in addition to one or two nominal valents. One can distinguish between two broad types of expressions in this area: *control* predicates vs. *raising* expressions. Control predicates semantically select all their valents, whereas raising expressions have a valent that they do not semantically select.¹⁷³ This section introduces the analysis of control predicates, and raising expressions are examined more generally in the next section.

Four types of control predicates can be acknowledged:

1. S-S (subject to subject) control,
2. S-O (subject to object) control,
3. O-S (object to subject) control, and
4. O-O (object to object) control.

The first letter in each designation indicates the dependent of the matrix predicate that is implicated, and the second letter indicates the “missing” dependent of the embedded predicate. An S-S control predicate designates its subject valent as the subject argument of the embedded predicate; an S-O control predicate designates its subject valent as the object argument of the embedded predicate; etc.

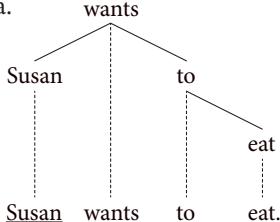
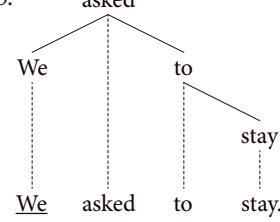
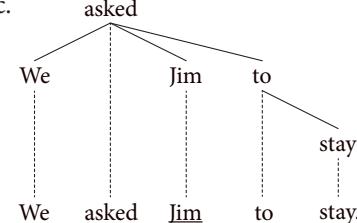
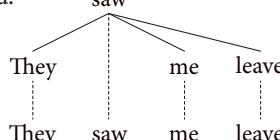
Examples of these four types of control predicates are listed next:

Table 14.

Control predicates	
S-S	ask, attempt, available, begin, crazy, eager, enjoy, fit, a fool, get, go, happy, in a position, modal auxiliaries used non-epistemically (be, can, could, dare, may, must, need, shall, should), on hand, refuse, reluctant, start, stop, threaten, try, too/available+ADJECTIVE, willing
S-O	appeal, ask, block, bring, build, call, encourage, find, force, hear, help, hire, listen, motivate, name, persuade, prevent, produce, prompt, receive, rent, see, send, stop, take, tell, train
O-S	at one's disposal, available, a beauty, delicious, demand, deserve, fit, fragrant, heavy, a hornet's nest, light, on hand, a marvel, melodious, merit, a pigsty, pretty, pungent, ready, rich, slippery, soft, tasty, ugly, unavailable, too+ADJECTIVE, warrant
O-O	borrow, bring, build, buy, choose, create, dice, find, give, keep, lend, loan, look for, produce, receive, rent, seek, send, take, use, write

¹⁷³. The term *expression* is often used here as an umbrella term for the verbs, adjectives, nouns, and other categories that can be analyzed in terms of raising. The term *predicate* is used when discussing control because control expressions are always predicates. In contrast, the term *expression* is preferred when discussing raising because many expressions that license raising cannot be construed as predicates.

Some typical S-S and O-S control predicates are given and illustrated as follows:

- (16) a.  WANT_f [N_a, T_a] – Subject control (S-S)
- b.  ASK_f [N_a, T_a] – Subject control (S-S)
- c.  ASK_f [N_a, N_a, T_a] – Object control (O-S)
- d.  SAW_f [N_a, N_a, (I)] – Object control (O-S)

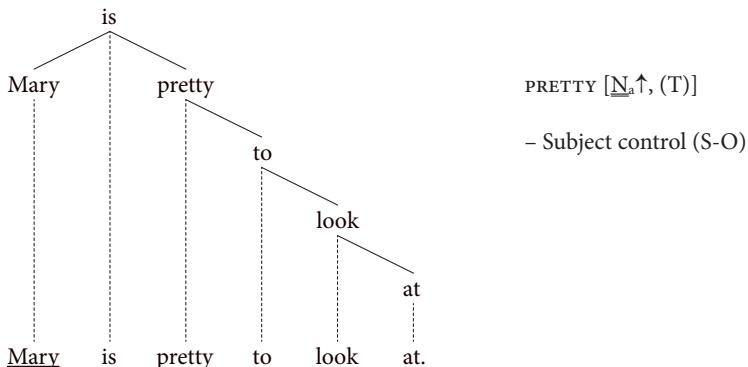
A main trait of control predicates is that they take a verbal valent; this valent often takes one of three verbal forms: *to*-infinitive (T), bare infinitive (I), or present participle (Pr). While the actual form of the three possibilities is an idiosyncratic trait of the control verb at hand, a majority of control verbs take a *to*-infinitive valent. The number of control verbs that can take a bare infinitive valent (e.g. *hear*, *help*, *make*, *see*, *sense*) or a present participle valent (e.g. *begin*, *hear*, *see*, *sense*, *start*, *stop*) is relatively small. This verbal valent represents an additional separate predicate that has its own valency.

Examples (16a–b) illustrate S-S control; the subject of the matrix verb is the subject argument of the nonfinite *to*-infinitive. Examples (16c–d) illustrate O-S

control; the object of the matrix verb is the subject argument of the nonfinite verb. The terms *subject control* and *object control* are used to denote the relationship. Subject control obtains in cases of S-S/O control, and object control obtains in cases of O-S/O control. The two types of control, subject and object, are identified in valency frames by marking the controller using the underline. For instance, the underline under the N in the valency frame of *want* in (16a) indicates that the subject *Susan* is the subject argument of the verbal valent *to eat*, and as such it is selected by *to eat*. Similarly, the underline under the second N in the valency frame of *ask* in (16c) indicates that *Jim* is the subject argument of the lower predicate *to stay*, and as such it is selected by *to stay*.

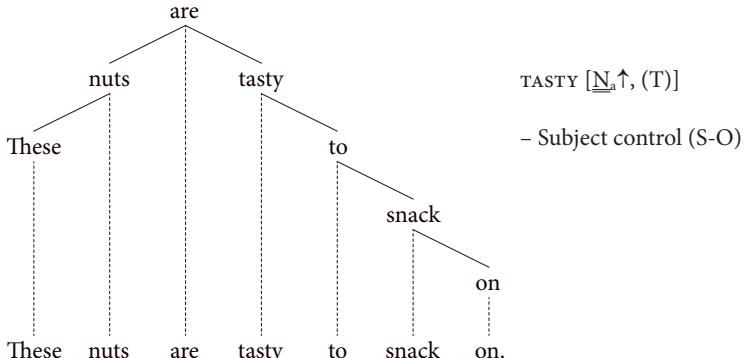
Most accounts of control phenomena focus on straightforward cases of subject and object control like those illustrated in (16a–d). There are, however, two further types of control predicates. A number of predicates, in particular certain adjectives, involve S-O control. These predicates are known of the rubric of *tough-movement*, a term from transformational syntax from the 1970s, e.g.

(17) a.



b. *It is pretty to look at Mary.

(18) a.

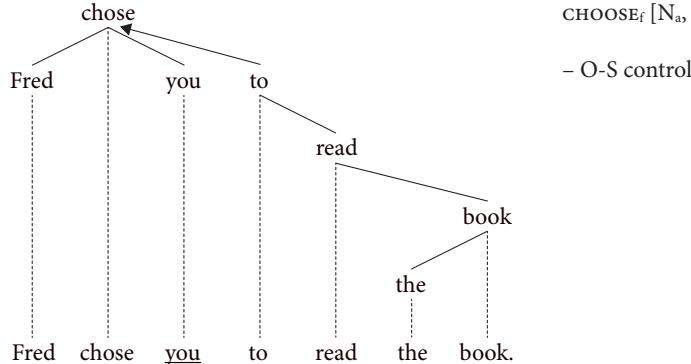


b. *It is tasty to snack on these nuts.

The subject of the matrix predicate in these cases is necessarily interpreted as the (prepositional) object of the embedded predicate. The double underline, as opposed to the single underline, is employed in the valency frames to indicate that that valent serves as the object of the/an embedded predicate. The b-sentences are included to illustrate an important fact about these cases. This fact is that *pretty* and *tasty* cannot be interpreted as raising expressions (see the next section), because if they were raising expressions, the b-sentences would be acceptable. This means that the analysis here in terms of control is plausible.

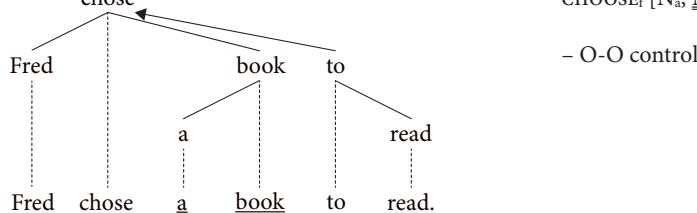
The fourth type is O-O control. O-O control occurs with so-called *purpose clauses*, which are viewed as, and called, phrases here.¹⁷⁴ Purpose phrases also occur with S-O control. The following examples illustrate purpose phrases allowing both O-S and O-O control:

- (19) a. CHOOSE_f [N_a, N_a]



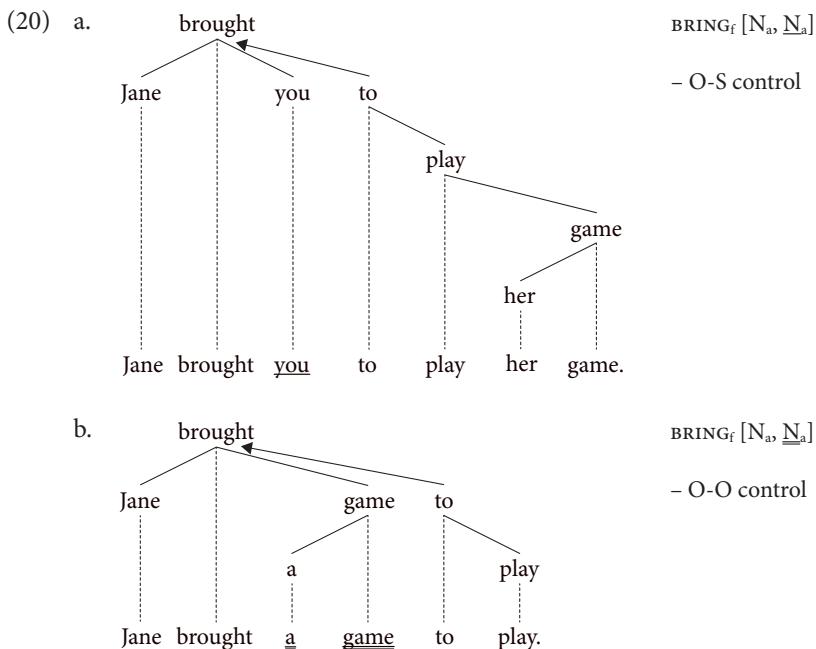
– O-S control

- b. CHOOSE_f [N_a, N_a]



– O-O control

¹⁷⁴. Purpose clauses/phrases have been discussed in detail in the generative literature. See for instance Faraci (1974), Jones (1991), and Whelpton (1995).



These analyses show that purpose phrases are deemed to be adjuncts here. The reason for this is that they can be omitted and do not seem to be necessary to complete the meaning of the matrix predicate. They have the status of secondary predication and hence function like depictive and resultative adjectives, e.g. *Frank scrubbed the sink clean*. They are *participant-oriented adjuncts*.¹⁷⁵ As such, purpose phrases are not valents and are hence not included in valency frames. Despite this fact, the matrix predicate nevertheless marks one of its valents as being capable of serving as the subject or object of a potential purpose phrase.

The adverbs *enough* and *too* (and perhaps other degree adverbs such as *awfully*, *pretty*, *terribly* as well) play a particularly important role in the theory of control.¹⁷⁶ The appearance of *enough* or *too* can render most any adjective a control adjective. Most adjectives do not involve control when they appear, and in fact they alone are

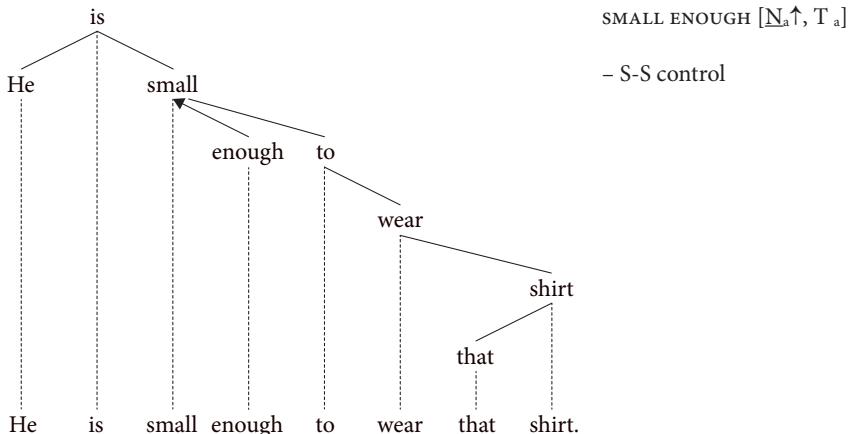
¹⁷⁵. One can draw a broad distinction between *event-oriented* and *participant-oriented adjuncts*. Event-oriented adjuncts are canonical, being identifiable via the tests for adjuncts presented in Section 1.8. Participant-oriented adjuncts, in contrast, are not identifiable by the tests discussed in Section 1.8. They are, rather, predication over one of the participants in the matrix clause, and they hence have unique properties that obscure their status as adjuncts.

¹⁷⁶. Mel'čuk and Pertsov (1987: 237), citing Bolinger (1961), produce examples that have the degree adverbs *terribly*, *pretty*, and *awfully* seemingly licensing a *to*-infinitive: *It's terribly late to go out now*, *It's pretty cold to expect the snow to melt today*, *You are awfully small to say things like that*.

incapable of licensing control. But if they are modified by *enough* or *too* to express a sufficient or over quantity, they necessarily become control predicates. They become either S-S or S-O control predicates, e.g.

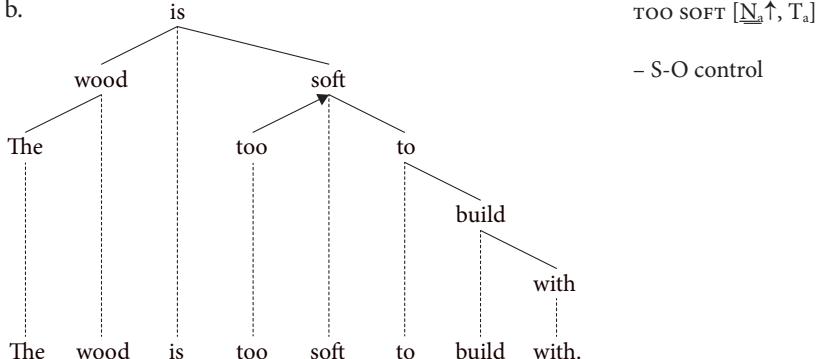
- (21) a. *He is small to wear that shirt.

b.¹⁷⁷



- (22) a. *The wood is soft to build with.

b.



The adjective *small* is an example of an adjective that does not typically license control as illustrated with (21a), but if it is modified by *enough*, then it becomes a

¹⁷⁷ The analysis shown in (21b) and (22b) may be incorrect because it does not show rising (Section 7.10). It may, namely, be the case that *too* is the governor of the *to*-phrase, which would mean that the *to*-phrase has in fact risen to become a dependent of the adjective. This remains an open issue.

S-S control predicate as shown with (21b).¹⁷⁸ Similarly, the adjective *soft* does not typically license control as illustrated in (22a), but when it is modified by *too*, it becomes a S-O control predicate as demonstrated in (22b). Apparently, most adjectives can be coerced by *enough* and *too* into becoming control predicates, whereby the coercion at times results in an S-S control predicate and at other times in an S-O control predicate. Further investigation is needed (but not produced here) to discern what the inherent trait of adjectives is that determines whether the coercion results in S-S or S-O control.

Many control verbs have flexible valency insofar as they allow both subject control and object control, e.g. *He asked to stay* (subject control) vs. *He asked us to stay* (object control). Separate valency frames are necessary to accommodate this flexibility. This observation is actually important for the greater exploration of valency frames. Many if not most predicates can vary insofar as their valency varies, meaning that often more than one valency frame is needed to accommodate their combinatory properties.

6.9 Raising

There are four types of raising, and they mirror the four types of control discussed in the previous section:

1. S-S (subject from subject) raising,
2. S-O (subject from object) raising,
3. O-S (object from subject) raising, and
4. O-O (object from object) raising.

The central trait of each of these types of raising is that (at least) one of the valents of the raising expression at hand is not an argument of that expression. This valent is identified by the absence of the _a subscript in the valency frames. A non-argument valent that serves as the subject of an embedded predicate receives the normal single underline, indicating that it serves as an argument of the embedded predicate, and a valent that serves as the object of the embedded predicate receives the double underline.

¹⁷⁸. The analyses shown in the trees (21b) and (22b) take *small enough* and *too soft* to be complex predicates, each consisting of two words. An alternative analysis might view *enough* and *too* as predicates in their own right, as just suggested in the previous note. Such an account would then have to assume a discontinuity and rising (Section 7.10) along the lines of extraposition (Section 8.6).

Raising expressions can be verbs, adjectives, or nouns (or adverbs). Like most control predicates, raising expressions often take a *to*-infinitive valent. Examples of the four types of raising expressions are given in the following table:

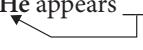
Table 15.

Raising expressions

S-S	<i>appear, apt, be, begin, cease, come, happen, likely</i> , modal auxiliaries used epistemically (<i>can, could, dare, may, might, must, need, will, would, shall, should</i>), pure auxiliaries (<i>be</i> of voice, <i>be</i> of aspect, dummy <i>do</i> , <i>have</i> of aspect), <i>seem</i> , semi-auxiliaries (<i>come, going to, have to, used to, supposed to</i>), <i>a sure bet, tend, threaten, unlikely, start, stop</i> ,
O-S	<i>assess, believe, consider, deem, judge, make, need, prevent, see, stop, view, want</i>
S-O	<i>bad, be, best, a bitch, cost, difficult, easy, fun, good, hard, merit, a pain in the ass, a snap, take, tough, worst</i>
O-O	<i>be, have, get</i>

The same sort of relationship between valents encountered with control predicates is present with raising expressions. An S-S raising expression sees what would normally be a subject of the lower predicate raising to become the subject of the higher expression; an O-S raising expression sees what would normally be a subject of the lower predicate raising to become the object of a higher expression; etc.

The term *raising* itself stems from the late 1960s during the heyday of transformational grammar. It is a reference to the analysis proposed at that time that saw the relevant argument as being raised out of an embedded clause into the matrix clause. This traditional analysis is illustrated with the following examples, one of S-S raising and the other of S-O raising:

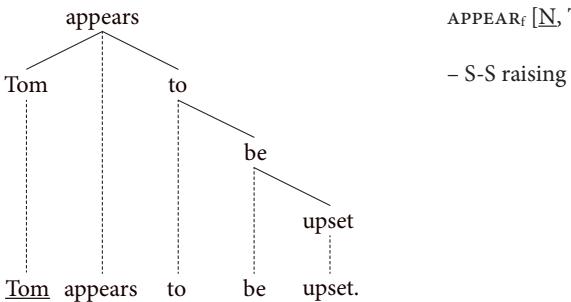
- (23) a. It appears that **he** lied.
 b. He appears  to have lied. – S-S raising
- (24) a. We assume that **they** did it.
 b. We assume **them**  to have done it. – O-S raising

The a-sentences illustrate the verbs with a clausal valent, and the b-sentences are the same basic sentences but with raising. It appears as though the subject of the embedded clause has been raised into the matrix clause. While the original analysis of these predicates is no longer widely assumed, the terminology has survived. The analysis provided here uses the traditional terminology as well, but with a significant deviation. The original designations have been changed to be more transparent. What is called a *S-S raising* here was originally called a *subject-to-subject raising*,

and what is called an O-S raising here was originally called a *subject-to-object* raising. The use of terminology here is better because it allows generalizations to be expressed across control and raising predicates (compare Tables 14 and 15).

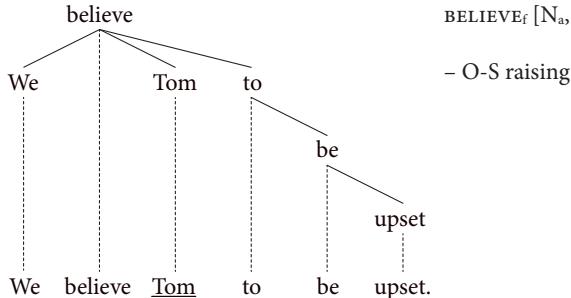
S-S and O-S raising expressions are illustrated first:

- (25) a.



- b. It appears that Tom is upset.

- (26) a.



- b. We believe that Tom is upset.

Comparing the a-sentences with the b-sentences, the motivation for the terminology of raising should be evident. In (25a) it appears as though the subject *Tom* of the extraposed clause in (25b) has been raised to become the matrix subject. Similarly, in (26a) it appears as though the subject *Tom* in the object clause in (26b) has been raised to become the matrix object.

The key trait of raising predicates is apparent in the valency frames by the absence of the _a subscript. The absence of this subscript on N in the two valency frames in (25)–(26) hence indicates that that valent is not an argument of its parent verb, but rather it is an argument of some other predicate, often of the lower predicate in the same clause. As with control, the single underline marks that valent as the subject valent of the lower predicate. Thus, N in the valency frame of *appears* indicates that *Tom* is the subject argument of the lower predicate *to be upset*. Similarly, the N in the valency frame of *believe* indicates that *Tom* is the subject argument of *to be upset*.

The fact that the underlined valent is indeed not an argument of the raising expression becomes visible with the *there*-diagnostic. The expletive *there* is devoid of semantic content, which means it can appear as a valent only if that valent is not semantically selected by its governor, e.g.

- (27) a. ***There** refused to be a problem.
- b. **There** appears to be a problem.
- (28) a. *I told **there** to be sufficient reason.
- b. I deem **there** to be sufficient reason.

The a-sentences are bad because the control verb each time is semantically selecting both its valents, restricting the semantic content they express. The raising predicates in the b-sentences, in contrast, do not semantically select their nominal object valent, which means they allow the semantically empty *there* to appear in that position.

Explorations of raising phenomena have focused primarily on the first two types of raising, S-S and O-S raising. The latter two types, i.e. S-O and O-O, have been explored to a lesser extent and their properties remain somewhat mysterious. In this area, S-O raising has been discussed under the rubric of the so-called *tough-constructions* or *tough-movement*, a reference to the status of the adjective *tough* as a canonical adjective that licenses the construction, and concerning O-O raising, its existence has not been acknowledged by the syntax community. Indeed, raising from object challenges the theory of valency in general.

The next two trees illustrate raising from object, as opposed to raising from subject:

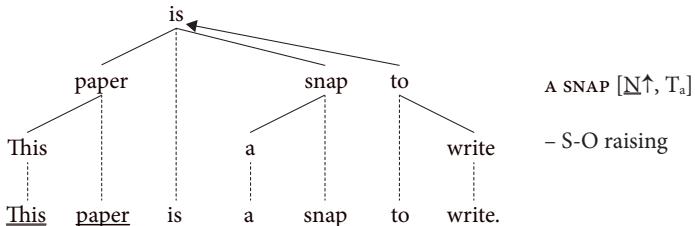
- (29) a.
- ```

graph TD
 is[is] --- Susan1[Susan]
 is --- easy[easy]
 easy --- to[to]
 easy --- admire[admire]
 to --- admire
 admire --- Susan2[Susan]

```

EASY [N↑, T<sub>a</sub>]  
– S-O raising
- b. It is easy to admire Susan.

(30) a.

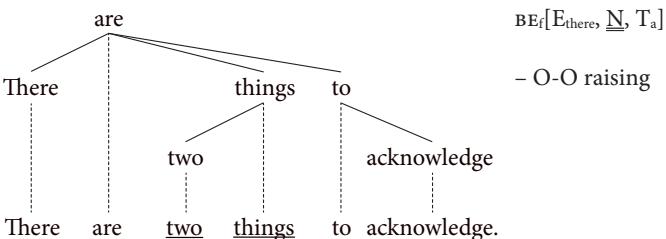


b. It is a snap to write this paper.

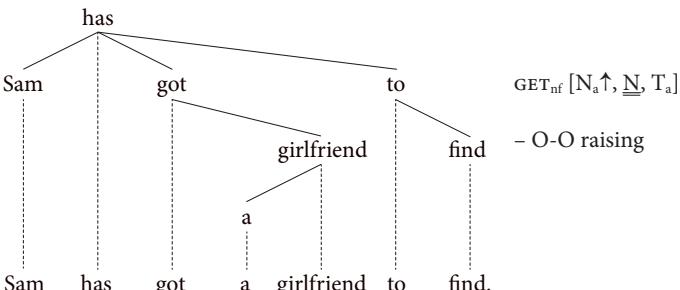
Comparing the a- and b-sentences, the terminology of raising should again be apparent. In each case, it appears as though the object in the b-sentence has been raised to become the subject in the a-sentence. The valent that is an argument of the embedded predicate is again underlined, but this time using the double underline to indicate that that valent is an object of the lower predicate (as opposed to a subject thereof).

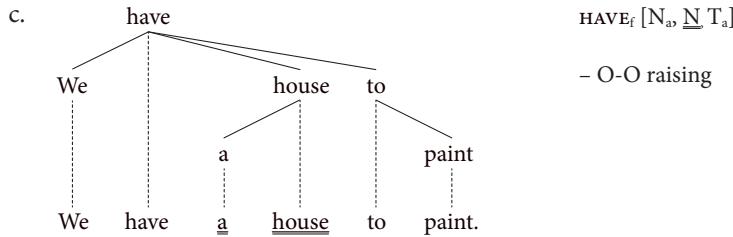
The final type of raising to be considered is O-O raising. The class of expressions that can license this type of raising seems quite limited. Just the verbs (*there*) *be*, *get*, and *have* appear to be capable of licensing this type of raising, e.g.

(31) a.



b.

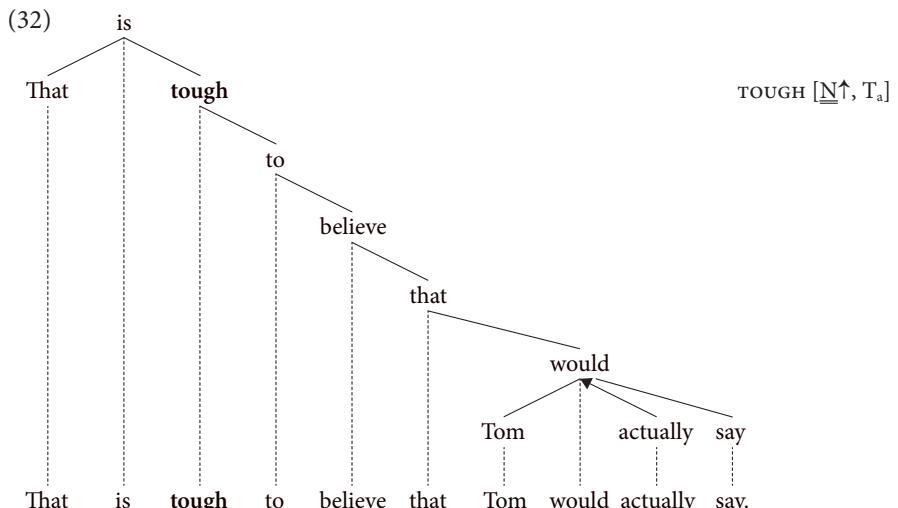




The aspect of these cases that suggest an analysis in terms of raising (instead of in terms of control) has to do with the inability of the sentence with the T valent to entail the same sentence without the T valent. The truth of the sentence *Sam has got a girlfriend to find* does not entail the truth of the sentence *Sam has a girlfriend*. Similarly, the sentence *We have a house to paint* does not entail the truth of the sentence *We have a house*. In contrast, cases of O-O control do see entailment across such pairs of sentences. For instance, the truth of the sentence *Fred chose a book to read* (cf. Example (19b)) entails the truth of the sentence *Fred chose a book*, and the truth of the sentence *Jane brought a game to play* (cf. Example (20b)) entails the truth of the sentence *Jane brought a game*.

## 6.10 Missing objects

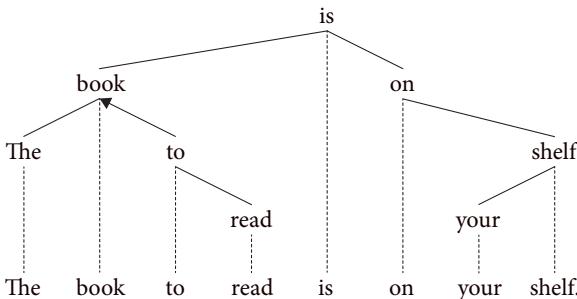
A missing object in the absence of passive morphology challenges syntactic theory. Observe the following sentence containing the S-O raising adjective *tough* in this regard:



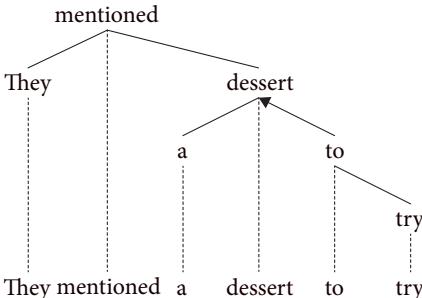
The adjective *tough* is the core of the matrix predicate. The surprising aspect of this sentence is the fact that the subject *That* is semantically the object of the embedded infinitive *say* at the other end of the sentence. The verb *say*, however, is normally transitive and thus it should take an object dependent. In this case, however, *say* lacks an object dependent entirely; its object has “gone missing”.

The same sort of difficulty occurs in cases of S-O and O-O control and in cases of O-O raising, all of which are illustrated above. Furthermore, the problem can occur when a *to*-infinitive phrase modifies a noun in the absence of a control or raising predicate entirely. Such cases are known as *infinitival relative clauses*, e.g.

(33) a.



b.

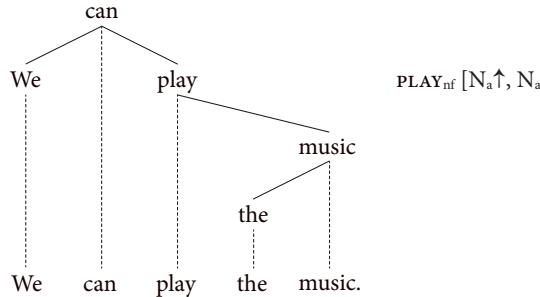


The infinitives *read* and *try* are active forms of transitive verbs and should therefore take object dependents, yet they lack these object dependents. Of course, the expressions that serve as their object arguments are the nouns above.

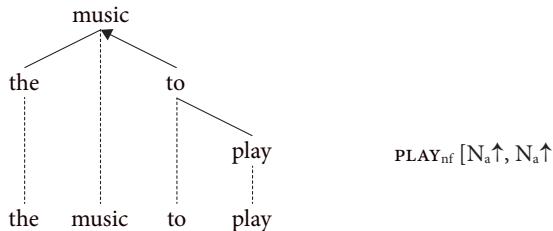
To address this phenomenon of “missing objects”, an alternative valency pattern must be acknowledged for transitive verbs in general. Verbs that are normally transitive and thus take an object dependent at times allow an alternative valency realization in which their object argument appears elsewhere in the structure, usually higher up.<sup>179</sup> The default and alternative realizations of the valency pattern are illustrated as follows:

<sup>179</sup> This approach in terms of an alternative valency realization that involves a “missing actant” is suggested by Starosta (1988: 240).

(34) a.

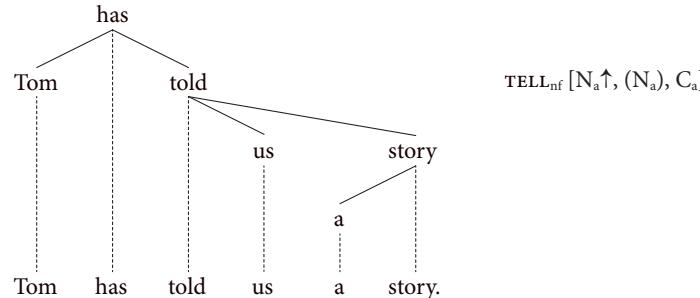


b.

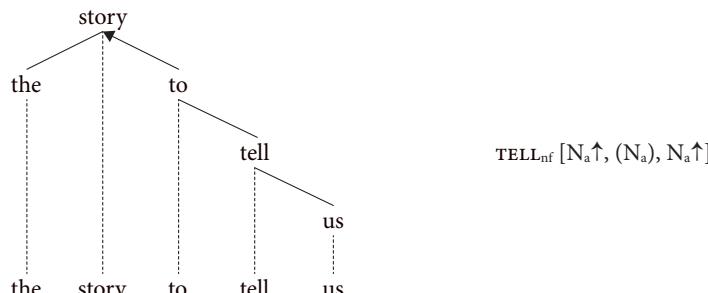


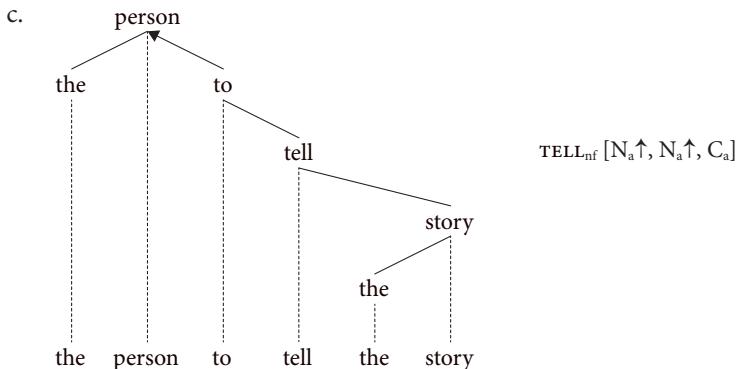
Most of the time, *play* occurs with the valency pattern illustrated in (34a); the alternative valency pattern in (34b) is, though, also possible. The following three examples illustrate the alternative valency realizations further:

(35) a.



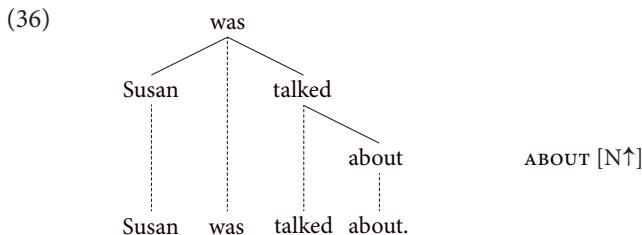
b.





The ditransitive verb *tell* usually has the valency pattern illustrated in (35a); it can, however, also occur with the valency frames shown in (35b) and (35c), where the *to*-infinitive serves to modify the noun that serves as one of its object arguments.

One final point about missing objects concerns prepositions. Examples (10a–c) above in Section 6.6 illustrated that prepositions can at times appear stranded, which means their complement has gone missing in a sense. To accommodate stranded prepositions, the current approach in terms of missing objects is extended to prepositions. Prepositions can at times appear without their complement, in which case their valency frame includes an up arrow, e.g.



The preposition *about* is like any other preposition insofar as it usually takes a nominal dependent. In this case involving what is known as the pseudopassive, however, its complement has become the subject, so it appears bare. The ability to appear bare like this is only a trait of prepositions in (the few) languages that allow preposition stranding (see Section 9.3).

The criteria that must be met in order for the alternative valency pattern to obtain are not explored further here. The point has merely been that the current theory of valency can accommodate the missing objects. What is clear about the general approach is that there is an emphasis on the combinatory traits of words.

## 6.11 Auxiliaries

So far, the discussion has explored the valency mostly of some key types of content verbs and adjectives. The discussion is in line with most accounts in this regard, insofar as the concept of valency is applied mainly to content verbs and adjectives. However, since the current account distinguishes between semantic and syntactic valency and since the valency frames have been augmented to distinguish between valents that are and are not semantically selected by their governor, the account of valency can be extended to function verbs, that is, to auxiliaries and light verbs. This section examines auxiliaries. The auxiliary verb *do*, the auxiliary *have* of perfect aspect, the auxiliary *be* of progressive aspect, the auxiliary *be* of passive voice, and the modal auxiliaries (*can*, *could*, *dare*, *may*, *might*, *must*, *need*, *ought*, *shall*, *should*, *will*, *would*) can all be viewed as valency bearing verbs.

First, the valency of copular *be* is examined. Copular *be* is semantically empty, which means it does not semantically select its valents, and as far as the syntactic category of its valents goes, it is very flexible. Finite forms of *be* place few syntactic restrictions on their subject and complement valents; these valents can be nouns, adjectives, prepositions, adverbs, or subordinators, e.g.

- (37) a. James is a plumber. – NP valent
- b. James is industrious. – Adjective valent
- c. James is in the cellar. – PP valent
- d. The renovation is soon. – Adverb valent
- e. The cellar is where the problem is. – Clausal valent

To show this flexibility in valency frames, the slash / is used. The valency frame of the finite form of the copula for these sentences is hence: BE<sub>f</sub> [R, N/A/P/ADV/S].<sup>180</sup> The R in this valency frame indicates that the copula BE<sub>f</sub> can take a subject valent that is necessarily “raised”, meaning the copula places no syntactic restrictions on that valent; it can be a noun, adjective, preposition, adverb, or subordinator. The finite form of *be* semantically selects neither of its valents, a fact that is indicated by the complete absence of the <sub>a</sub> subscript.

The combinatory potential of some similar verbs, which have erroneously been deemed copular, is much more restricted, e.g.

---

<sup>180</sup>. This flexibility of the copula to take most syntactic categories as its complement is noted by Anderson (2006: 249).

(38)

- 
- ```

graph TD
    tastes[tastes] --- That[That]
    tastes --- good[good]
    That --- That[That]
    good --- good[good]
  
```
- a. That tastes good. TASTES_f [N_a, A]
 b. They look funny. LOOK_f [N_a, A]
 c. It sounds useless. SOUND_f [N_a, A]
 d. Nothing feels right. FEEL_f [N_a, A]

The verbs *taste*, *look*, *sound*, and *feel* are among the verbs that behave similar to copular *be* insofar as they take a predicative adjective as their second valent, just as the copula *be* often takes an adjectival valent. These verbs are, however, more unlike copular *be* than they are like it. They semantically select their subject valent, a fact that is clear when one probes with the *there*-diagnostic (see Section 6.9, Examples (27)–(28)), e.g. **There tastes good*, **There look funny*, etc. Based on this observation, one should conclude that these verbs are not copular verbs in the sense that *be* is a copular verb. They are, rather, content verbs. What is unusual about them is simply the necessity for them to take an adjective or adverbial valent.

The standard auxiliary verbs (dummy *do*, *have* of perfect aspect, *be* of progressive aspect, and *be* of passive voice) have the following valency frames:

(39)

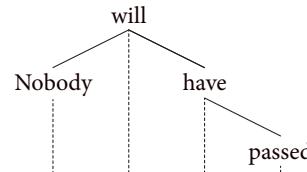
-
- ```

graph TD
 does[does] --- Someone[Someone]
 does --- not/not
 does --- care/care
 Someone --- Someone[Someone]
 not --- not/not
 care --- care/care

```
- a. Someone does not care. DO<sub>f</sub> [R, I] – Dummy do  
 b. Nobody has passed. HAVE<sub>f</sub> [R, Pa] – Aux. of perfect aspect  
 c. They are working. BE<sub>f</sub> [R, Pr] – Aux. of progressive aspect  
 d. That was done. BE<sub>f</sub> [R, Pa] – Aux. of passive voice

The designation Pa stands for *past participle* (passive or active), the designation Pr for *present participle*, and the designation R (= “raised”) indicates that the valency carrier places no particular syntactic restrictions on the syntactic form of the subject valent. When auxiliary verbs appear in nonfinite form, their valency frames are as follows, e.g.

(40)

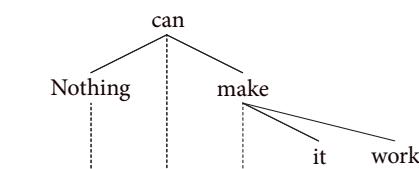


- a. Nobody will have passed. HAVE<sub>nf</sub> [R↑, Pa]  
 b. They have been working. BE<sub>nf</sub> [R↑, Pr]  
 c. That should be done. BE<sub>nf</sub> [R↑, Pa]

The subject valent of these nonfinite forms are necessarily unrestricted in syntactic category and they appear elsewhere in the syntactic structure. The complement valent they take is a nonfinite verb form.

Modal auxiliaries have valency frames that are the same as the valency frame for dummy *do*. When used epistemically, they do not select their subject valent. They do, however, require their second valent to be a bare infinitive, e.g.

(41)



- a. Nothing can make it work. CAN [R, I]  
 b. That might help. MIGHT [R, I]  
 c. When could it happen? COULD [R, I]  
 d. It will suffice. WILL [R, I]  
 e. What would do it? WOULD [R, I]

How exactly each of the modal verbs is used is of course subject to many nuances of meaning. Most modal auxiliaries have both epistemic and deontic or dynamic uses. These nuances are not of direct interest here. What is of interest is the combinatory potential of these verbs. They do not syntactically select their subject when used epistemically as indicated by the R valent, and they do not semantically select either of their valents as indicated by the absence of the <sub>a</sub> subscript. Their second valent is always a bare infinitive.<sup>181</sup> An important characteristic of modal auxiliaries is that they are defective; their form is fixed and they are always finite-like insofar as they

<sup>181</sup>. Used deontically or dynamically, modal verbs can be construed as predicates that take two arguments, e.g. *He can swim*, *You may stay*, etc. In such cases, the valency frame is different, since it contains an argument: CAN [N<sub>a</sub>, I<sub>a</sub>], MAY [N<sub>a</sub>, I<sub>a</sub>]. This aspect of modal verbs is as acknowledged

must be the root verb of the clauses in which they appear. This trait distinguishes modal auxiliaries in English from modal verbs in other, related languages.

### 6.12 Light verbs

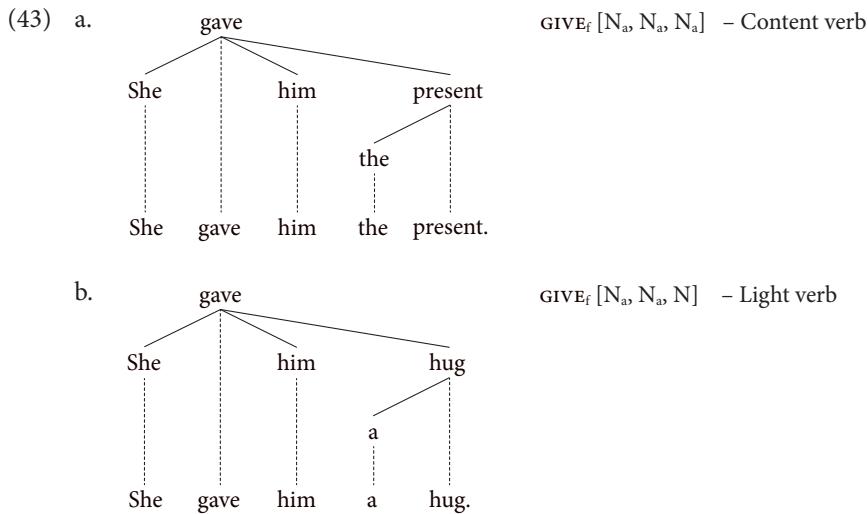
Verbs such as *give*, *have*, *take* often occur as *light verbs*.<sup>182</sup> The distinguishing trait of light verbs is that they are light on semantic content. They look like content verbs, but they actually cannot be construed as content verbs because they alone lack the necessary content of a predicate. They actually form a predicate with a child noun. Many light verb predicates correspond to a single content verb, e.g. *bathe* ↔ *take a bath*, *discuss* ↔ *have a discussion*, *hug* ↔ *give a hug*, *kiss* ↔ *give a kiss*, *shower* ↔ *take a shower*, *smoke* ↔ *have a smoke*, *walk* ↔ *take a walk*, etc.

The current theory of valency can accommodate the central trait of light verbs in the valency frames. The light verb takes an object valent that it does not semantically select. In other words, the valent is not an argument of the light verb. Compare the following correspondences:

- (42) a.
- 
- SMOKE<sub>f</sub> [N<sub>a</sub>, N<sub>a</sub>] – Content verb
- 
- b.
- 
- HAVE<sub>f</sub> [N<sub>a</sub>, N] – Light verb

and discussed in various places (e.g. Korhonen 1977: 236; Tarvainen 1981: 37–8; Labin 1993: 58–9; Hyvärinen 2003: 745–7; Järventausta 2003: 722).

<sup>182</sup> In the German literature on valency, light verb constructions are similar to what is known as *Funktionsverbegfüge* ‘function verb construction’ (see for instance Korhonen 1977: 245–6; Labin 1993: 48–9; Eroms 2000: 162–70, 2003: 268).



The aspect of light verbs that distinguishes them from the corresponding full content verbs is apparent by the absence of the <sub>a</sub> subscript on the relevant valent in the valency frames. The valent that appears without the <sub>a</sub> subscript cannot be construed as an argument of the light verb. The other valent(s) of the light verb, in contrast, can be viewed as its arguments. The light verb constructions involve complex predicates: *have a smoke* and *give...a hug* are the matrix predicates, and these predicates then take one and two arguments, respectively.

The discussions in this section and in the previous three have demonstrated the ability of the current DG to accommodate both semantic and syntactic traits of varying types of verbs (control verbs, raising verbs, auxiliary verbs, and light verbs). The valency frames help to make the combinatory potential of these verb types more transparent.

### 6.13 Beyond verb valency

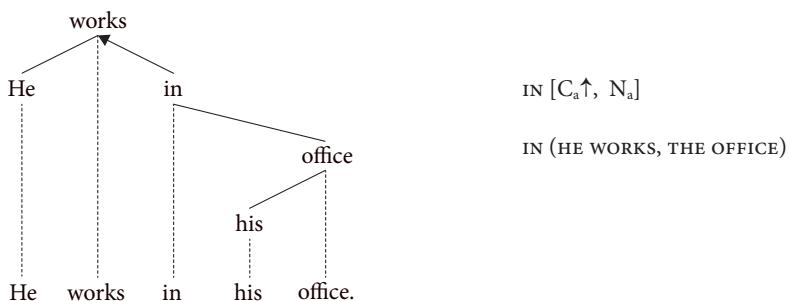
The valency concept is associated most with verbs and adjectives. It is, however, not restricted to these word categories. One can of course also explore the valency of prepositions, subordinators, adverbs, nouns and other parts of speech.<sup>183</sup> Indeed, the current valency frames can be employed to examine the combinatory potential

<sup>183</sup> Jung (1995: 124–9) provides insightful discussion and historical background concerning the extent to which the valency concept is applicable to other parts of speech (beyond just verbs). See also Korhonen (1977: 93–8, 170–4).

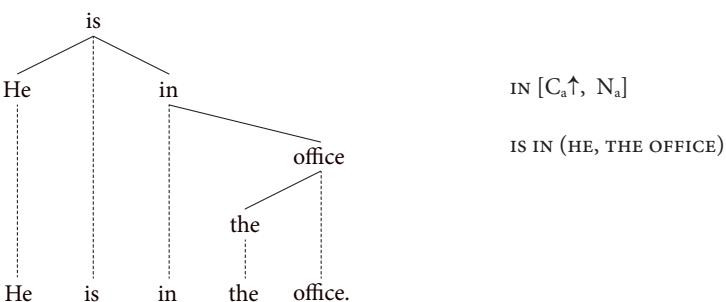
of most word categories. In particular, the ability of the current conventions to acknowledge valents that are and are not arguments is beneficial, since there are numerous dependents that cannot be construed as an argument of the valency bearer at hand for one reason or another.

Consider the valency potential of locative and temporal prepositions. These words are bivalent predicates. Their valency pattern is similar to that of divalent nonfinite verbs, e.g.

(44) a.



b.

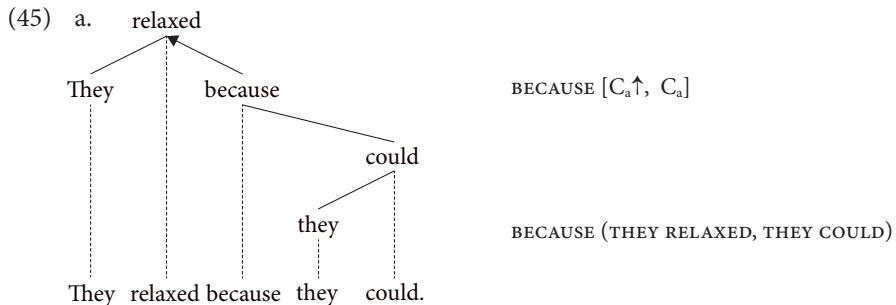


The locative preposition *in* in these sentences is a predicate that takes two arguments, as indicated with both the predicate-argument structures on the right, and it is a valency-carrier, also as indicated with valency frames. Observe that the valency frame for *in* is consistent despite the fact that *in the office* is an adjunct in (44a), but a predicative expression in (44b).

Many subordinators have valency frames that are similar to those of locative and temporal prepositions, e.g.<sup>184</sup>

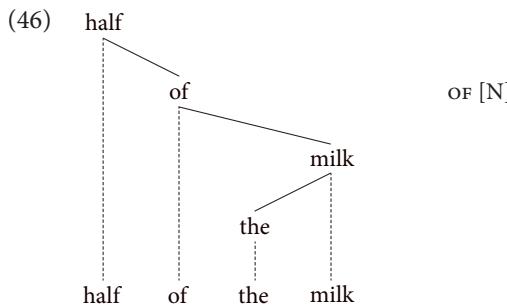
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<sup>184</sup>. Example (45a) contains VP-ellipsis, which is not shown. But see Section 12.9.



The valency frame for the subordinator *because* is similar to that for the locative preposition *in* Examples (44a–b). A noteworthy aspect of this example is the object valent C<sub>a</sub>; it marks a clausal valent the root of which can be a finite verb.<sup>185</sup>

Prepositions that lack semantic content entirely and are thus pure function words also have valency, e.g.

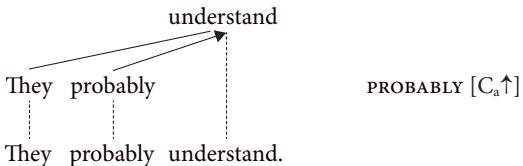


The valency frame of the function preposition *of* is simple; it takes a single valent. This analysis turns on the fact that *of* cannot be viewed as a predicate; it therefore cannot take a subject argument.

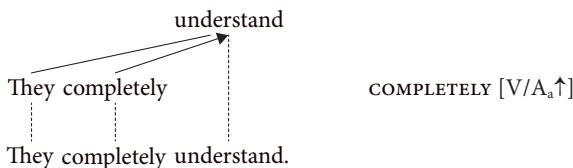
Adverbs have valency, and depending on the type of adverb at hand, the valency frame can vary significantly, e.g.

<sup>185</sup>. Mel'čuk and Pertsov (1987: 347–8) observe that subordinators like *because* can, when used as the matrix predicate, license *it* expletives (see Section 7.8), e.g. *It was because of the weather that they left*. This ability is a telltale indication that subordinators take a clausal subject argument.

(47) a.



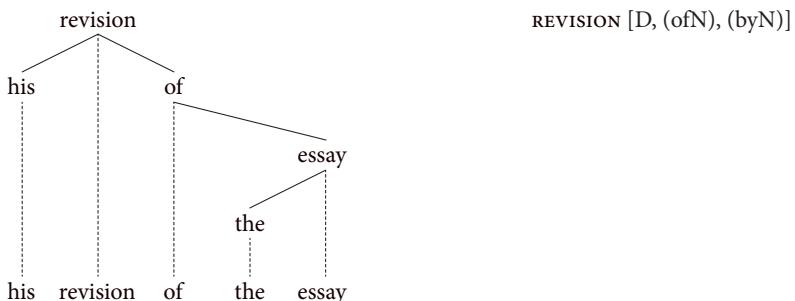
b.



The modal adverb *probably* typically modifies an entire clause, hence C<sub>a</sub> in the valency frame.<sup>186</sup> In contrast, the measure adverb *completely* takes just a verb or adjective as its one argument.

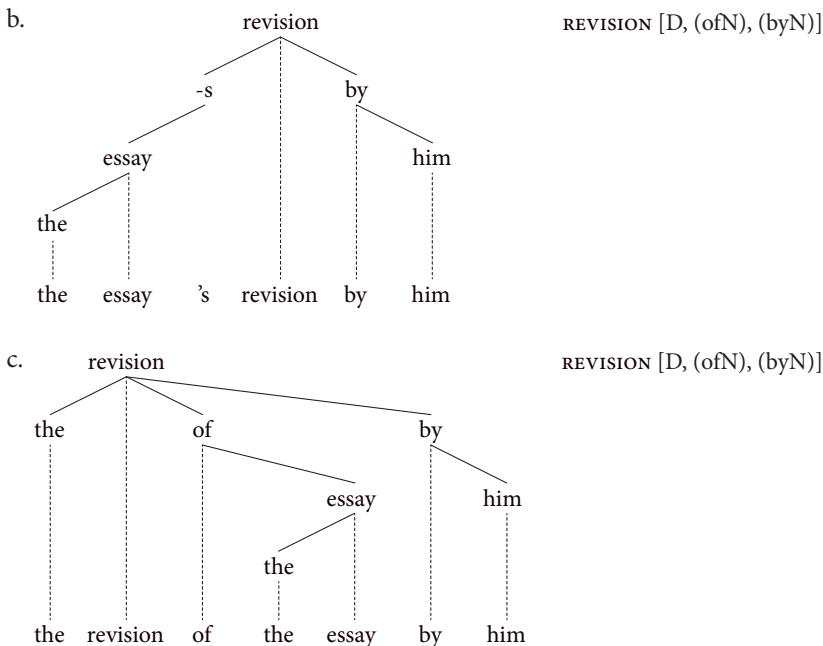
The combinatory potential of nouns is a large area of valency theory. Here the intent is to merely briefly sketch a couple of issues that come up when exploring noun valency. Most dependents of nouns are optional, so the ( )-brackets indicating optionality occur frequently in the valency frames of nouns.<sup>187</sup> The argument vs. adjunct distinction breaks down when exploring the valency of nouns, since it is difficult to view nouns, which often function as arguments of predicates, as syntactic predicates themselves. For this reason, the account here does not employ the <sub>a</sub> subscript and hence avoids classifying the dependents of nouns into argument and nonargument valents. Some examples are next:

(48) a.



<sup>186</sup>. Following Kunze (1975: 94), the analysis of modal adverbs assumed here positions them as immediate dependents of the finite verb, independent of whether the finite verb is a function verb or a content verb, e.g. *[They] will [probably] [understand]*. Other types of adverbs are, in contrast, consistently dependent on the content verb, e.g. *[They] will [[completely] understand]*.

<sup>187</sup>. Tarvainen (1981: 78) also calls attention to the optional status of all arguments in NPs.



Of the dependents of the noun *revision*, only the determiner D appears obligatorily.

The variation in the distribution of the arguments in (48a–c) illustrates the flexibility of analysis that is necessary if one wishes to acknowledge the combinatorial potential of nouns. The arguments of nouns can clearly appear in various guises. Crucially, however the distribution of arguments in NPs is not arbitrary. There is a hierarchy of a sort insofar as a determiner argument must outrank an *of*-argument, and a *by*-argument must outrank both a determiner argument and an *of*-argument, e.g.

- (49) a. \*the essay's revision of him/his  
      b. \*the revision of him by the essay  
      c. \*his revision by the essay

The *by*-argument must be the agent, and if the determiner argument is a theme, then the *of*-argument cannot appear. These examples therefore illustrate that there is a hierarchy of argument roles that influences the realization of these arguments within NPs.

As a closing note, it must be emphasized that the goal of this chapter has been merely to illustrate the valency concept and to introduce a system of valency frames for representing and recording valency. The most important concept in the approach is the distinction between argument and valent. By basing the account of valency on the valent notion, it has become possible to extend the analysis of valency beyond content verbs and adjectives to most all word categories.

## CHAPTER 7

# Word order

### 7.1 Overview

DGs approach word order from different directions. The theory has to acknowledge and build on various factors that interact to determine which word orders are and are not possible. What follows is a list of the factors discussed in this chapter that account for word order:

#### **Projectivity**

Dependents generally appear near to their heads. The relevant principle is known as *projectivity*. When projectivity is violated, a *discontinuity* obtains.

#### **Head-dependent ordering**

Dependents can either precede or follow their head. Rules that express whether a given type of dependent must precede or follow its head are called *head-dependent ordering rules* here.

#### **Shifting**

Two or more sibling constituents that appear on the same side of their head are called as *co-siblings*. The semantic content and/or relative weight of co-sibling constituents can influence their order with respect to each other. This aspect of word order is addressed in part in terms of shifting.

#### **Inversion**

Inversion is the mechanism that alters word order by positioning a dependent on the other side of its head. Inversion swaps the positions of head and dependent for discourse reasons.

#### **Rising**

The conceptual basis established here for the analysis of discontinuities (due to *wh*-fronting, topicalization, scrambling, extraposition) is *rising*. Rising sees a given dependent attaching higher up in the syntactic structure, taking a word as its head that is not its governor.

The discussion of discontinuities and the theoretical means for addressing them are the most noteworthy areas of content covered in this chapter.

Discontinuities involve deviation from normal word order, as illustrated next.

- (1) Someone who you know will give up syntax.
- a. What will someone who you know give up?
  - b. ...but syntax someone who you know will give up.
  - c. Someone will give up syntax who you know.
- No discontinuity  
 – Discontinuity (*wh*-fronting)  
 – Discontinuity (topicalization)  
 – Discontinuity (extraposition)

Sentence (1) is a normal declarative sentence, and as such it contains standard word order, so no discontinuity is present; the subject precedes the finite verb and the object follows the verbs. Sentences (1a–c), in contrast, each have a word order that deviates from normal, and each deviation is due to a mechanism of syntax that focuses a given expression in one way or another. Accounting for these deviations requires a comprehensive approach to word order. This chapter presents the conceptual notions for a theory of discontinuities.

## 7.2 Monostratal syntax

Before beginning with the various aspects of the current DG account of word order, some comments about the stance toward word order that many DGs have traditionally adopted are warranted. These comments are intended more for the reader who already has exposure to dependency syntax. For those readers who lack this exposure, this section can be skipped.

Tesnière's view of syntax was that hierarchical order precedes linear order in the mind of a speaker, but that linear order precedes hierarchical order in the mind of a listener.<sup>188</sup> Hence Tesnière separated linear order from hierarchical order, viewing them as distinct principles of syntactic organization. He then mostly ignored linear order in his major oeuvre *Elements of Structural Syntax*, concentrating on hierarchical order instead. He produced 366 stemmas, tree-like diagrams, most of which abstract away from linear order, giving just the hierarchy of words.

Many DGs that followed Tesnière adopted a similar stance, that is, they have chosen to focus mainly just on hierarchical order. The most vivid illustration of this fact is the numerous tree diagrams in books on DG that do not reflect actual

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<sup>188</sup>. Tesnière discusses the status of linear and hierarchical order in relation to each other in Chapter 6 of his book (1959/2015).

word order.<sup>189</sup> At times, statements are even made to the effect that word order is not of direct interest.<sup>190</sup> Given that syntax is understood to be the study of how words are organized in sentences, the DGs that focus on hierarchical order alone would seem to be ignoring or playing down a central desideratum of the study of syntax in general. This desideratum is the goal of accounting for the word orders in natural languages that are and are not possible. Indeed, the stance adopted in the current DG is that dependency syntax can and should focus on actual word order. Accordingly, most every tree produced in this book encodes actual word order. In fact, the approach to syntax currently being pursued is *monostratal* in syntax, which means no abstract or deep level of syntactic representation is assumed that encodes hierarchical order only. Linear order and hierarchical order have “equal rights” in the current system (see Section 2.2).

It is insightful to consider how word order relates to the distinction between dependency and phrase structure grammars. Early attempts to characterize the distinction made reference to *contiguity*.<sup>191</sup> Phrase structure was deemed to necessitate the contiguity of the words that constitute constituents, whereas dependency was seen as being free of this necessity. The current DG views this characterization of the dependency vs. phrase structure distinction as mistaken. Contiguity does not help distinguish between the two; dependency and phrase structure are equally capable of characterizing the (non)contiguity of the words that form constituents.

Concerning the non-importance of contiguity, compare the following two trees:

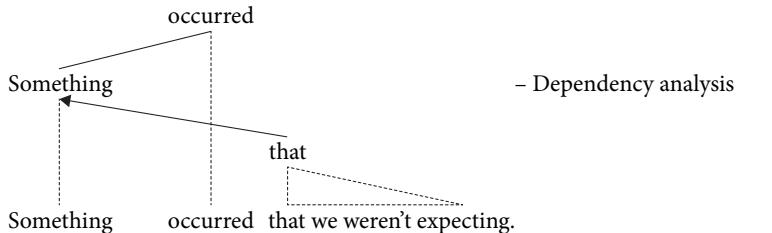
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<sup>189.</sup> Many prominent DGs that have preferred to produce tree diagrams that abstract away from actual word order are listed next (e.g. Kern 1883; Baum 1976; Schubert 1987; Maxwell & Schubert 1989; Weber 1992; Lobin 1993; Engel 1994; Jung 1995). Other DGs prefer to focus on word order and they therefore produce dependency diagrams that encode word order (e.g. Matthews 1981; Hudson 1984; Starosta 1988; Hudson 1990; Heringer 1996; Groß 1999; Hudson 2007; 2010).

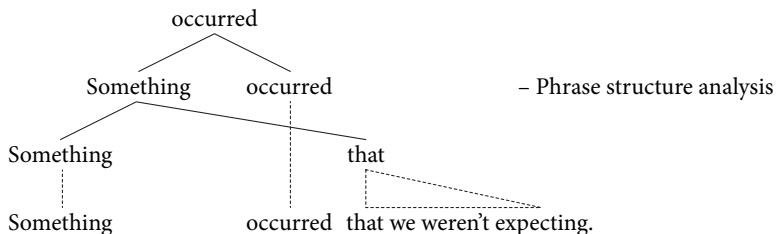
<sup>190.</sup> For a vivid examples of the willingness among some DGs to view word order as secondary, see Mel'čuk and Pertsov (1987: 7), Schubert (1987: 103), Engel (1994: 22–3), Eroms (2000: 75), Anderson (1997: 33; 2006: 39–45; 2011: 93). The latter of these, i.e. Anderson, calls the unordered trees “wild trees”, a term from Staal (1967).

<sup>191.</sup> The notion that the (non)contiguity of words that form constituents is key to characterizing the dependency vs. phrase structure distinction may be due originally to Baumgärtner (e.g. Baumgärtner 1970: 53). As mentioned in Section 2.10, numerous linguists point to the contiguity of phrases as a key criterion distinguishing between dependency and phrase structure, (e.g. Korhonen 1977: 31; Schubert 1987: 63; Jung 1995: 16; Tarvainen 1981: 13; Hudson 2010: 170–2; Müller 2016: 360–1).

(2) a.



b.



These two trees contain a discontinuity resulting from extraposition. The extraposed relative clause is not contiguous to its governor *something*. Crossing lines obtain in the tree regardless of whether one assumes dependency or phrase structure. The point, then, is that dependency and phrase structure grammars have always been equally as capable of acknowledging continuous and discontinuous constituents.<sup>192</sup> Phrase structure and dependency are defined reliably in terms of the number of groupings of words as characterized by the word-to-node ratio (see Section 2.3 and 2.10), not in terms of contiguity.

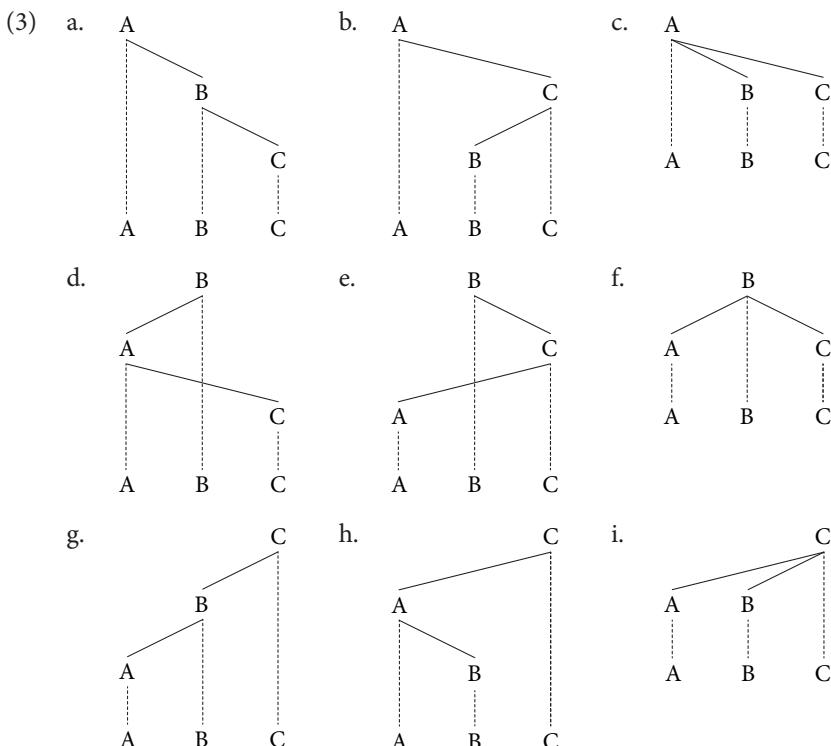
The current author views this attempt to characterize the distinction between dependency and phrase structure grammars in terms of contiguity as misplaced and erroneous. In fact, it may be due to the perception that DGs ignore or play down the importance of word order that dependency syntax has occupied a peripheral position in the study of syntax in general. In this regard, the message developed in this chapter and the next two is that a monostratal dependency approach to syntax is just as, if not more, capable than phrase structure systems of accounting for the word orders that natural languages do and do not allow.<sup>193</sup>

<sup>192</sup>. For a clear example of the willingness of some phrase structure grammars to acknowledge discontinuous constituents, see McCawley (1982) and Müller (2016: 391).

<sup>193</sup>. Korhonen (1977: 80) also makes statements to this effect, namely that DG is just as capable of addressing word order as phrase structure grammars.

### 7.3 Projectivity

The structures and example sentences examined in previous chapters have almost all been linearly continuous. A continuous structure has each governed word in a position that allows a direct dependency to its governor. Some sentences of English (and of most languages in general), however, contain *discontinuous structures*. A discontinuous structure is one in which the word order is such that one or more governees are separated from their governor by one or more words that dominate their governor. This situation results in *crossing lines* in the tree. Examine the following nine dependency trees in this respect:



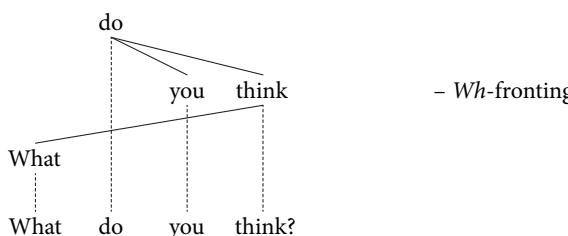
Given standard assumptions about dependency hierarchies, the trees (3a-i) show all nine of the possible structures that one can assign to the string ABC. Trees (3d) and (3e) are the interesting ones; those two trees contain crossing lines. The dependency edge connecting A and C crosses the projection line for B. When crossing lines occur like this, DGs state that the property of *projectivity* has been violated. If a tree contains no such crossing lines, in contrast, it is said to be

*projective*. Thus trees (3a–c) and (3f–i) are all projective, whereas trees (3d) and (3e) are *nonprojective*.<sup>194</sup>

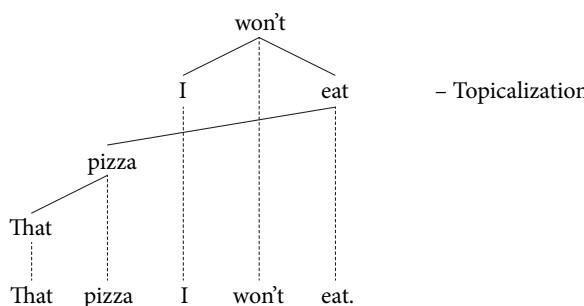
The terminology employed to discuss projectivity varies. Perhaps the most widespread terms to denote projectivity violations are *discontinuity* and *discontinuous*. Trees (3d) and (3e) contain discontinuities because they contain a discontinuous dependency. Another term employed in the area is *displacement*. Trees (3d) and (3e) each contain a displaced constituent. The constituent C in (3d) and the constituent A in (3e) are displaced because they are separated from their governors. Any time a word is separated from its governor by one or more words that dominates its governor, a displaced unit is present.

Discontinuities are a common occurrence in everyday language. The literature on discontinuities in English acknowledges at least three mechanism of syntax that can or must generate a discontinuity: *wh-fronting*, *topicalization*, and *extraposition*. An example of each of these discontinuity types now follows:

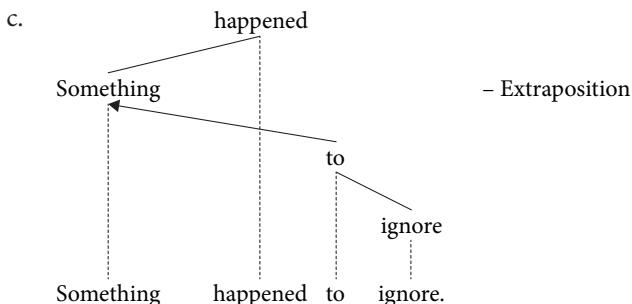
(4) a.



b.

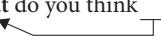


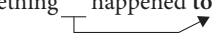
<sup>194</sup>. The formal and informal properties of projectivity have been explored in great detail in the DG literature (e.g. Hays 1964; Gaifman 1965; Robinson 1970; Mel'čuk 1988: 35–8; Heringer 1996: 243–6; Hudson 2000; Bröker 2003; Eroms 2000: 311–3; Eroms & Heringer 2003; Groß 1992; 1999; 2003; Groß & Osborne 2009).



The crossing lines identify the projectivity violations, that is, the discontinuities. The example of *wh-fronting* has the fronted object *what* in a position that is separated from its governor *think*; the example of *topicalization* has the topicalized object *That pizza* in a position that is separated from its governor *eat*; and the example of *extraposition* has the extraposed *to*-infinitive *to ignore* separated from its governor *something*.

Many theories of syntax examine discontinuities like those illustrated in (4a–c) in detail. One prominent way to understand them is to assume that *movement* actually occurs, e.g.

- (5) a. What do you think ?  

- b. That pizza I won't eat .  

- c. Something happened to ignore.  


The displaced constituent is assumed to have moved out of its “base” position to its “surface” position, as indicated by the arrows. In the history of syntactic theory, this sort of approach has been favored. The notion of movement enjoys a prominent tradition in the study of syntax.<sup>195</sup>

There is, however, an alternative way to understand discontinuities. The account assumes some sort of *feature passing* mechanism instead, whereby information about the displaced unit is passed down or along the hierarchy to the governor of the displaced constituent. The current DG pursues this sort of approach to discontinuities. Information about the displaced expression, is passed along the catena that connects the displaced expression to its governor. Differences between the discontinuity types are then explored in terms of these catenae, which are called *rising catenae*.

<sup>195</sup>. The notion of movement is associated most with the central works of Government and Binding Theory from the 1980s, e.g. Chomsky (1981; 1986).

There are a couple of important aspects of the theory of discontinuities presented in this chapter and the next two that should be acknowledged from the start. The first is that since DGs are limited in the amount of structure they can posit, DG structures are usually flatter than the corresponding phrase structures. The flatter dependency structures present fewer opportunities for discontinuities. This fact can be seen with trees (3c, f, i). Since these trees contain two layers only, a discontinuity cannot occur. In other words, if a given tree contains two layers only, that tree is necessarily projective.<sup>196</sup> What this means is that the more layered phrase structures often assume projectivity violations where the corresponding (flatter) dependency structures see no such violations. This point becomes clear in the sections below on shifting and inversion. The second important aspect of the theory of discontinuities presented here concerns the status of the displaced expression. Often when a discontinuity occurs, the displaced expression is a constituent. At times, however, the displaced expression will not be a constituent. In such cases, it is always a catena, though (see Sections 4.2 and 4.6). By assuming that displaced expressions must be catenae but not necessarily constituents, the current DG gains some freedom. Two general types of discontinuities can be acknowledged depending on whether the displaced catena is a constituent or not.

Before examining these means of accounting for discontinuities, however, aspects of word order are addressed that do not involve discontinuities. The next subsections examine head-dependent ordering, shifting, and inversion.

#### 7.4 Head-dependent ordering

With the insight that dependents generally appear near to their head (as just characterized in terms of projectivity),<sup>197</sup> the analysis of word order can consider whether dependents must precede or follow their head.<sup>198</sup> Determiners, for instance, are always pre-dependents of their head noun, and when a PP modifies a noun, it is always a post-dependent of that noun, e.g.

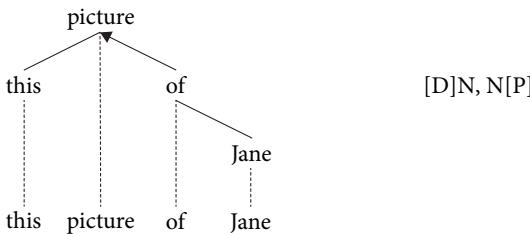
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196. Kunze (1975: 17) expresses this aspect of dependency trees in terms of *depth* (Ger. *Tiefe*). The root of dependency tree is at depth 0, and the children of the root are at depth 1. Thus, a dependency tree that does not exceed depth 1 is always necessarily projective.

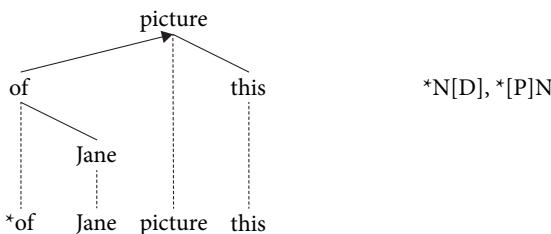
197. Hudson (2003: 524) states that in sample texts, 70% of dependents have been revealed to appear adjacent to their head.

198. While the conventions and terminology employed vary, head-dependent ordering statements are frequent in DGs (e.g. Starosta 1988: 56–60; 2003b: 544; Heringer 1996: 37–8; Hudson 2007: 131–50; 2010: 169–70).

(6) a.



b.



The rules to the right give the ordering restrictions. Dependents are enclosed in more brackets than their head (see Examples (26a) and (28a) in Section 2.9). The rule [D]N states that a determiner can precede its head noun, and the rule N[P] states that a preposition can follow its head noun. Example (6b) is doubly bad because as the rules \*N[D] and \*[P]N state, a determiner cannot follow its head noun and a preposition cannot precede its head noun.

Generalizations about the position of a given word with respect to its head are possible by acknowledging syntactic categories. The following table summarizes obvious ordering rules for English in this regard. Each word category is classified with respect to its position in relation to its head.

Table 16.

| Category  | Head-dependent orderings that the grammar of English allows                    | Examples                                                                                                                                                                                   |
|-----------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Adjective | $V_{\text{fin}}[A]$ ,<br>$[A]V_{\text{fin}}$<br>$V_{\text{nonfin}}[A]$         | ...is fun,<br>...fun it is<br>Bill has been kind.<br>They will arrive drunk.                                                                                                               |
| Adverb    | $[A]N$<br>$N[A]$<br>$[Adv]V$<br>$V[Adv]$<br>$[Adv]A$<br>$N[Adv]$<br>$[Adv]Adv$ | happy men<br>men happy with it<br>noisily eats,<br>noisily eat<br><i>eats noisily</i> ,<br><i>eat noisily</i><br><i>completely crazy</i><br><i>the problem here</i><br><i>very quickly</i> |

(continued)

Table 16. (continued)

| Category                            | Head-dependent orderings that the grammar of English allows                                       | Examples                                                                                                                                                                                       |
|-------------------------------------|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Determiner                          | [D]N                                                                                              | <i>the man, Jill's excuse</i>                                                                                                                                                                  |
| Noun                                | [N]V <sub>fin</sub> ,<br>V <sub>fin</sub> [N]<br>V <sub>nonfin</sub> [N]<br>[N]N<br>P[N]<br>[N]'s | <i>Jim visits...</i><br><i>...visits Jim</i><br><i>...visit Jim</i><br><i>car tire</i><br><i>with Jim</i><br><i>Jim's car</i>                                                                  |
| Preposition                         | V <sub>fin</sub> [P]<br>[P]V <sub>fin</sub><br>V <sub>nonfin</sub> [P]<br>A[P]<br>N[P]            | <i>He sleeps in the morning,</i><br><i>In the morning he sleeps</i><br><i>work at home</i><br><i>angry at it</i><br><i>people from Texas</i>                                                   |
| Finite verb                         | V <sub>fin</sub><br>[V <sub>fin</sub> ]V <sub>fin</sub><br>V[V <sub>fin</sub> ]                   | <i>(root of sentence)</i><br><i>"I know" said Bill.</i><br><i>...says she knew,</i><br><i>...say she knew</i>                                                                                  |
| Nonfinite verb                      | V[V <sub>nonfin</sub> ]<br>[V <sub>nonfin</sub> ]N<br>N[V <sub>nonfin</sub> ]                     | <i>...has arrived,</i><br><i>...have arrived</i><br><i>laughing men</i><br><i>men laughing at it</i>                                                                                           |
| Particle of a phrasal verb          | V[Pa]                                                                                             | <i>gives up,</i><br><i>give up</i>                                                                                                                                                             |
| Particle <i>to</i> of an infinitive | V <sub>fin</sub> [to],<br>[to]V <sub>fin</sub><br>V <sub>nonfin</sub> [to]<br>N[to]               | <i>...tries to stay,</i><br><i>...to stay he tries...</i><br><i>...try to stay</i><br><i>the attempt to stay</i>                                                                               |
| Subordinator                        | V <sub>fin</sub> [S],<br>[S]V <sub>fin</sub><br>V <sub>nonfin</sub> [S]<br>A[S]<br>N[S]           | <i>She arrives before it happens,</i><br><i>Before it happens she arrives</i><br><i>arrive before it happens</i><br><i>happy because it rained</i><br><i>the discussion before it happened</i> |

Observe the division of verbs into finite and nonfinite. Finite verbs have a combinatory potential that is quite distinct from that of nonfinite verbs. A number of generalizations should be apparent in the rules. For instance, prepositions and subordinators have the same basic distribution: they are usually post-dependents, and they can appear as predependents only in case their head is a finite verb (in which case topicalization or fronting has occurred). Similarly, the particle *to* that introduces an infinitive usually follows its head. Verb chains in English branch down to the right, meaning nonfinite verbs usually follow their head verbs. The

head of an adjective must be a verb or a noun. The head of a verb must be another verb or a noun.

The statements just listed in the table above give many of the head-dependent orderings that English allows. However, it is actually more insightful to consider the head-dependent orderings that English does not allow, e.g.

Table 17.

| Category                            | Some head-dependent orderings that the grammar of English does not allow | Examples                                                                                  |
|-------------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Adjective                           | *[A]V <sub>nonfin</sub>                                                  | * <i>happy be</i> , e.g.<br>* <i>They will happy be</i> .                                 |
| Adverb                              | *[Adv]N                                                                  | * <i>a happily man</i> ,<br>* <i>the probably weather</i>                                 |
| Determiner                          | *N[D]                                                                    | * <i>man the vs. the man</i><br>* <i>excuse Jill's vs. Jill's excuse</i>                  |
| Noun                                | *[N]V <sub>nonfin</sub>                                                  | * <i>beer drink vs. drink beer</i> ,<br>* <i>politics discuss vs. discuss politics</i>    |
| Preposition                         | *[P]A                                                                    | * <i>with the music satisfied</i><br>vs.<br><i>satisfied with the music</i>               |
|                                     | *[P]N                                                                    | * <i>the on the desk book</i><br>vs.<br><i>the book on the desk</i>                       |
| Finite verb                         | *[P]V <sub>nonfin</sub>                                                  | * <i>at home work vs. work at home</i>                                                    |
|                                     | *[V <sub>fin</sub> ]V <sub>nonfin</sub>                                  | * <i>He will he is hungry say</i> .<br>vs.<br><i>He will say he is hungry</i> .           |
| Nonfinite verb                      | *[V <sub>nonfin</sub> ]V <sub>nonfin</sub>                               | * <i>He will eaten have</i> .<br>vs.<br><i>He will have eaten</i> .                       |
| Particle of a phrasal verb          | *[Pa]V                                                                   | * <i>up get vs. get up</i><br>* <i>on take vs. take on</i>                                |
| Particle <i>to</i> of an infinitive | *[to]V <sub>nonfin</sub>                                                 | * <i>to sleep try vs. try to sleep</i>                                                    |
| Subordinator                        | *[S]A                                                                    | * <i>because they won content</i><br>vs.<br><i>content because they won</i>               |
|                                     | *[S]N                                                                    | * <i>the after they left discussion</i><br>vs.<br><i>the discussion after they left</i>   |
|                                     | *[S]V <sub>nonfin</sub>                                                  | * <i>He will that he is hungry say</i> .<br>vs.<br><i>He will say that he is hungry</i> . |

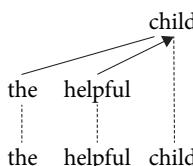
This list is also obviously not exhaustive. The list does, however, help reveal some further strong tendencies about English word order. Above all, it helps show that a majority of head-dependent orderings in English are head-initial. Nonfinite verbs in English rarely take pre-dependents. In fact, nonfinite verbs in English do not take adjectives, nouns, prepositions, or subordinators as pre-dependents.<sup>199</sup> Similarly, prepositions and subordinators are, barring instances involving topicalization, required to be post-dependents.

Beyond the statements in the two tables, there are numerous special cases that require attention. The idiosyncratic ordering traits of many individual words require focused study. For instance, the distribution of the negation *not*, of focus particles such as *just* and *only*, of the adverb/particle *enough*, of the postposition *ago*, etc. are to a greater or lesser extent idiosyncratic. More importantly, the head-dependent ordering statements in the tables leave many aspects of word order unaddressed.

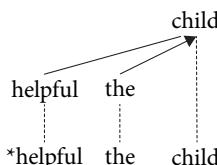
## 7.5 Co-sibling ordering

The head-dependent orderings discussed in the previous section are simple rules formulated in terms of the syntactic category of heads and their dependents. Such rules do not provide a basis for addressing the ordering of many sibling constituents, however. Examine the following examples in this regard:

(7) a.

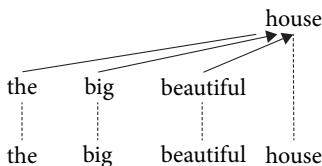


b.

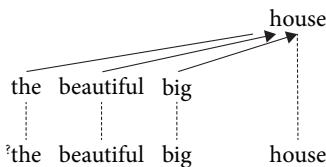


<sup>199</sup>. Exceptions to this statement involve compounding, e.g. *a beer-drinking fool*, where *beer* has become a predependent of the nonfinite verb *drinking*. Since such cases involve compounding, though, they veer into morphology and therefore do not involve pure head-dependent ordering in the purely syntactic sense.

(8) a.



b.



Examples (7a–b) demonstrate that when a determiner appears, it initiates its NP, and hence when a determiner co-occurs with an attributive adjective in an NP, the determiner must precede the adjective. In contrast, Examples (8a–b) illustrate that there is some flexibility in ordering among the adjective dependents of a noun, although alternative orders can correlate with nuanced meaning differences.

Observe that the head-dependent ordering rules considered in the previous section say nothing about the relative order of the sibling constituents in (7)–(8). The determiner *the* and the adjective *helpful* are both pre-dependents of *child* in (7a–b), just as the relevant head-dependent ordering restrictions require: [D]N, \*N[D] and [A]N, \*N[A]. The same is true of *big* and *beautiful* in (8); they are both pre-dependents of *house* in both trees. The DG theory of word order currently being developed must therefore produce the conceptual basis for addressing the order of sibling dependents like those in (7)–(8). This is accomplished in part by acknowledging *co-siblings*:

### Co-siblings

Two or more sibling constituents are co-siblings if they appear on the same side of their head.<sup>200</sup>

This concept allows the current DG to efficiently express generalizations about linear order involving sibling constituents. For instance, determiners in English precede their adjective co-siblings. Apparent exceptions to this rule involve quantifiers and quantifier-like expressions such as *all*, *such*, and *many*, e.g. *all the houses*, *such a house*, *many a huckster*; these expressions are, though, not adjectives. Focus particles also do not constitute exceptions such as *not*, *only* and *just*, e.g. *not the children*, *only the big house*, *just the child*, since focus particles too are not adjectives.

<sup>200</sup>. The term *co-sibling* is inspired from Osborne (2007), although the original term was *co-sister*. Hudson (2007: 134) uses the similar notion of *codependents*.

There are (at least) two factors that influences the relative order of co-sibling pre-dependents of nouns: *scope* and *semantic contribution*. The importance of scope is suggested in cases that involve distinct readings based on the relative order, e.g. *the first two trains* vs. *the two first trains*. Semantic contribution is more important for determining the relative order of co-sibling adjectives, though. There is a natural order of content, e.g. size – age – color – material. Adjectives that denote size tend to precede adjectives that denote color, e.g. *the big brown house* vs. ??*the brown big house*; adjectives that denote age tend to precede adjectives that denote material, e.g. *the old leather jacket* vs. \**the leather old jacket*; etc.

A more important issue involving co-siblings has to do with co-sibling post-dependents of verbs and nouns. There is, namely, a tendency among post-dependent co-siblings for arguments to precede adjuncts, e.g.

- (9) a. She reviews articles often  
b. ??She reviews often articles
- (10) a. the discussion of politics after class  
b. ?the discussion after class of politics

The argument *articles* strongly prefers to precede its adjunct co-sibling *often* in (9), and the argument of *politics* prefers to precede its adjunct co-sibling *after class* in (10). An interesting aspect of this tendency is that it seems to be similar among pre-dependents insofar as arguments tend to precede adjuncts, despite the fact that the argument then appears further removed from its predicate head, e.g.

- (11) a. She probably knows.  
b. Probably she knows.
- (12) a. Her complete knowledge  
b. \*Complete her knowledge

In (11a–b), there is a slight preference for the argument *she* to precede the adjunct *probably*. In (12a–b), in contrast, the argument determiner *her* necessarily precedes its adjunct co-sibling *complete*.

Apparently, there are idiosyncratic traits of the constituents involved that influence the ordering of co-sibling dependents. However, the observation that among co-sibling constituents, arguments tend to precede adjuncts is valuable as an orientation point. Cases that deviate from this norm are, then, worthy of investigation. One robust source of deviation from the norm involves shifting.

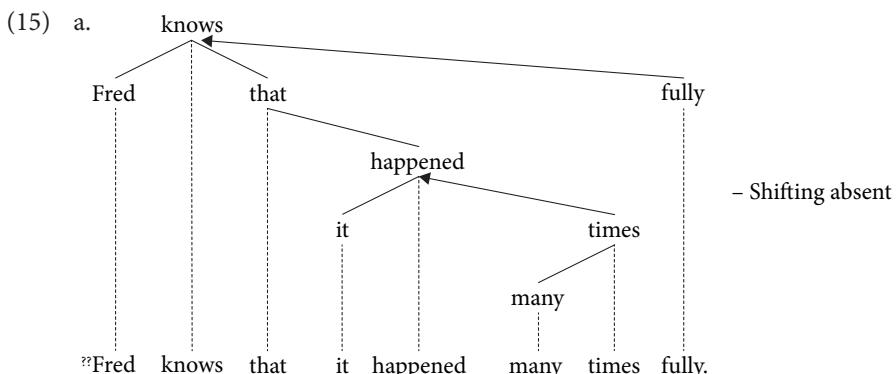
## 7.6 Shifting

Shifting in English was briefly discussed in Section 3.8 (see Examples (35)–(36) there). It occurs when a relatively heavy constituent “switches” positions with a lighter constituent. Shifting is motivated by a general trait of sentence structure (in English) that prefers lighter constituents (fewer words) to precede heavier constituents (more words).<sup>201</sup> Shifting is present in the following c-sentences:

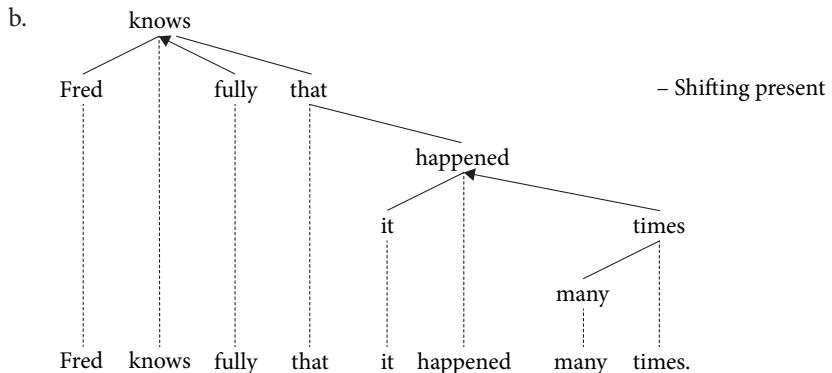
- (13) a. Fred knows that fully.
  - b. <sup>?</sup>Fred knows that it happened many times fully.
  - c. Fred knows fully that it happened many times.
- (14) a. Sam picked her up.
  - b. <sup>?</sup>Sam picked the very eager and motivated student up.
  - c. Sam picked up the very eager and motivated student.

The a-sentence contain what can, as established in the previous section, be viewed as normal word order, insofar as the object precedes the adjunct. The b- and c-sentences illustrate that when the object becomes heavy, acceptability can decrease if the order remains the same. Often shifting occurs, which means the heavy constituent shifts rightward, and the lighter constituent shifts leftward.

The motivation for shifting has to do with production and processing. Syntactic structures are often easier to produce and process if lighter constituents precede heavier ones. For English, which has a large number of head-initial structures, this means that trees often grow down to the right. This aspect of English sentence structure is illustrated with the trees of (13b–c), given here as (15a–b):



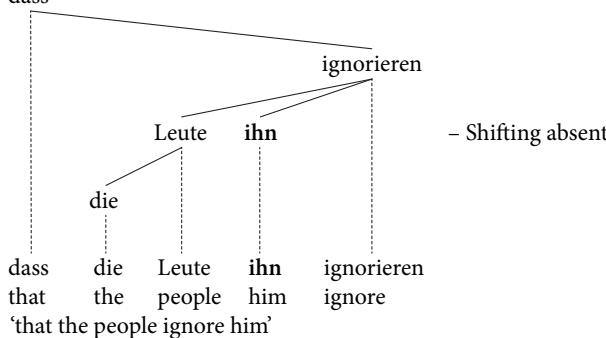
<sup>201</sup> The understanding of shifting presented follows Groß & Osborne (2009: 66–71). See also Mel’čuk and Pertsov (1987: 227).



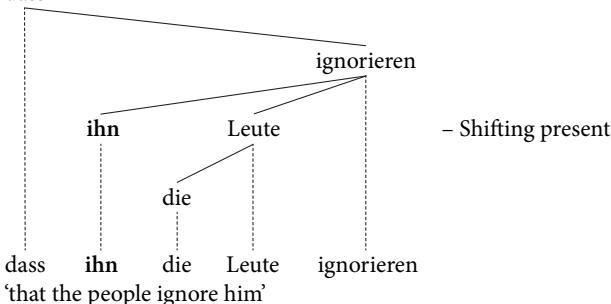
In (15a), where shifting has not occurred, the structure seems flatter. The sentence-final position of *fully* makes the structure appear flatter and the sentence itself is quite marginal. In (15b) where shifting has occurred, in contrast, the tree extends down to the right more consistently. This aspect of tree structures helps motivate heavy constituent shift.

Shifting in English is limited insofar as it occurs primarily in the post-verb domain. In other languages however, shifting occurs more frequently. The verb-final trait of many verb phrases and subordinate clauses in German, for instance, provides an environment for shifting to occur among pre-dependents. In particular, the freer word order of German has definite pronouns frequently shifting leftward, e.g.

(16) a. dass



b. dass



The unstressed definite pronoun *ihm* is very light. This lightness motivates shifting in the b-example – the word order in (16b) is preferred over that in (16a), although both orders are acceptable. An important thing to acknowledge about such examples is that no discontinuity occurs; there is no projectivity violation. Shifting is often responsible for variation in word order, whereby a discontinuity need not be involved.

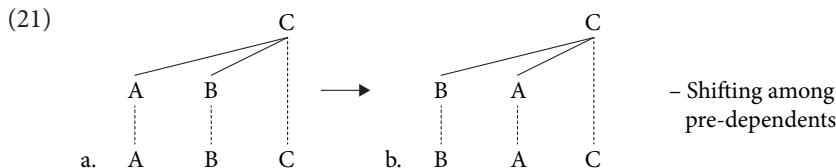
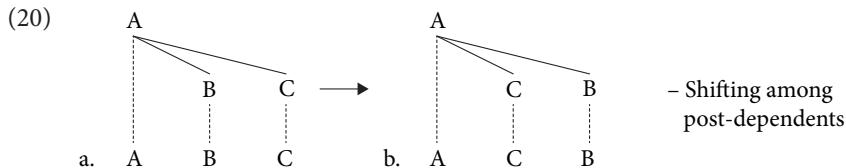
Various terms are used to denote the phenomenon of shifting in general, e.g. *heavy NP shift*, *particle shift*, and *dative shift*. Each of these types of shifting is illustrated next:

- (17) a. I told **an interesting and very creative story** to him.  
b. I told to him **an interesting and very creative story** – Heavy NP shift
- (18) a. We told off **the guys blocking our way**.  
b. We told **them off**. – Particle shift
- (19) a. She told the story **to us**.  
b. She told **us** the story. – Dative shift

Heavy NP shift occurs when shifting is motivated by the relative weight of an NP; a heavy NP shifts rightward as illustrated in (17b). When shifting involves a particle as in (18b), the term *particle shift* is sometimes used; the particle shifts to the right of the lighter definite pronoun.<sup>202</sup> Dative shift occurs when what would be a dative-marked noun or noun phrase in a language with case shifts to the left of a heavier noun or NP as in (19b). While the terminology of shifting is varied, the phenomenon itself is straightforward. Shifting occurs to position lighter constituents to the left of heavier sibling constituents.

The key trait that all types of shifting share is that the constituents involved are co-siblings. The following trees illustrate shifting schematically:

<sup>202</sup> Mel'čuk and Pertsov (1987: 325–7) illustrate and discuss shifting involving the particles of a phrasal verbs, although they do not use the term *shifting* to denote the phenomenon.



These schemas illustrate the manner in which shifting can occur among post-dependent co-siblings as well as among pre-dependent co-siblings. When shifting occurs is now apparent:

### Shifting

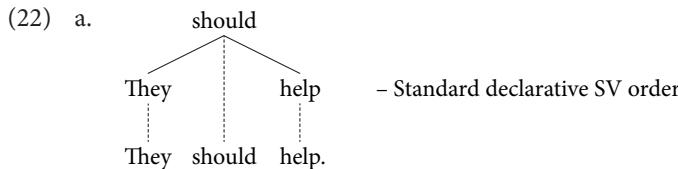
Shifting occurs among co-sibling constituents in order to place the heavier constituent(s) to the right of the lighter constituent(s).

The fact that shifting is understood in terms of co-sibling constituents is what distinguishes it from inversion.

To summarize shifting, the current system does not acknowledge a discontinuity when shifting occurs. This is due to the relatively flat dependency structures. These flat structures understand shifting in terms of co-sibling constituents.

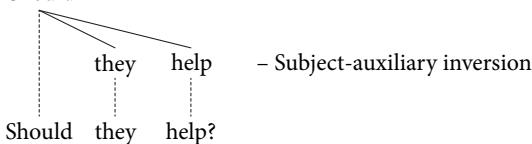
## 7.7 Overview of inversion

Like shifting, inversion too does not involve a discontinuity. Inversion occurs when a constituent that normally appears on one side of its head switches to the other side in a related structure.<sup>203</sup> An example involving the subject-auxiliary inversion of a yes-no question in English illustrates the classical case:



<sup>203</sup>. The DG understanding of inversion presented here appears first in Groß & Osborne (2009: 64–6). Heringer et al. (1980: 256–7) also discuss inversion in German from a DG perspective.

b. Should

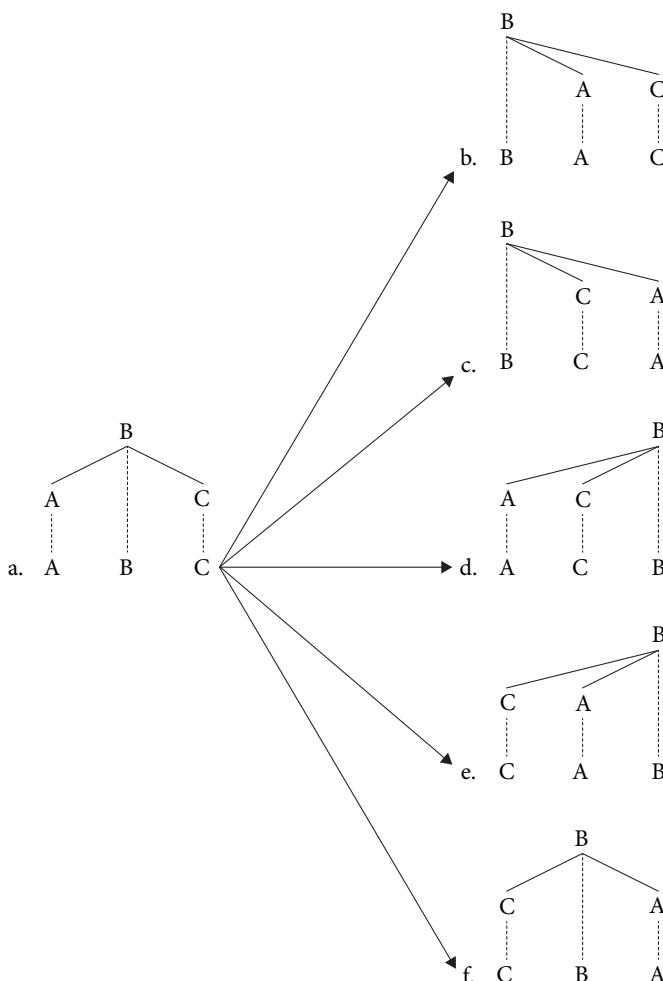


- Subject-auxiliary inversion

Sentence (22a) illustrates standard SVO order. Inverting the subject and the finite verb generates a yes/no-question. Note that no discontinuity arises as one switches from (22a) to (22b). The subject simply switches to the other side of the auxiliary verb, which is its head.

A schematic overview of the types of related structures that can be analyzed in terms of inversion is next:

(23)



Taking (23a) as the canonical or “normal” order, then inversion can be acknowledged in each of (23b–f). In each of those trees, A or C or both has switched to the other side of its head B. Inversion can thus be acknowledged any time a pre-dependent becomes a post-dependent or a post-dependent becomes a pre-dependent.

What is actually acknowledged as inversion in English tends to be rather specific cases, though. In particular, inversion is seen as involving the subject and finite verb. There two broad categories of inversion in this regard depending on whether the verb involved must be an auxiliary or not: *subject-auxiliary inversion* and *subject-verb inversion*. The following table provides an overview of these types of inversion:

Table 18.

| Types of inversion in English involving the subject and the finite verb |                    |                       |                        |                     |                     |
|-------------------------------------------------------------------------|--------------------|-----------------------|------------------------|---------------------|---------------------|
| Subject-auxiliary inversion                                             |                    |                       | Subject-verb inversion |                     |                     |
| Interrogative inversion                                                 | Negative inversion | Conditional inversion | Locative inversion     | Directive inversion | Quotative inversion |

Each of the six types of inversion listed in this table involves both the subject and the finite verb. The primary division concerns the status of the finite verb, that is, whether or not it must be an auxiliary. The three types of subject-auxiliary inversion listed require the presence of an auxiliary verb, whereas the three types of subject-verb inversion occur with content verbs too, not just with auxiliary verbs. The following two sections examine each of these types of inversion.

## 7.8 Subject-auxiliary inversion

There are at least three types of subject-auxiliary inversion: 1. interrogative inversion (polar inversion and *wh*-inversion), negative inversion, and conditional inversion. Of these three types, interrogative inversion is by far the most frequently occurring. In fact, a central trait of interrogative inversion provides an important clue about the basic nature of discontinuities and word order possibilities in English.

Interrogative inversion occurs to form a question. There are two subtypes of interrogative inversion that can be acknowledged, polar inversion and *wh*-inversion. Polar inversion occurs to form a yes/no-question, and *wh*-inversion occurs to front a *wh*-element, thus forming a question, e.g.

- (24) a. Tom will help tomorrow.
- |   |   |
|---|---|
| S | V |
|---|---|
- b. Will Tom help tomorrow?
- |   |   |
|---|---|
| V | S |
|---|---|
- c. When will Tom help?
- |   |   |
|---|---|
| V | S |
|---|---|
- Standard declarative SV order
- Polar inversion
- *Wh*-inversion

Subject-auxiliary inversion is present in both the instance of polar inversion and the instance of *wh*-inversion. The subject and auxiliary verb invert in order to give the utterance interrogative force.<sup>204</sup> Polar inversion involves simple subject-auxiliary inversion, whereas *wh*-inversion involves both subject-auxiliary inversion and *wh*-fronting.

A central aspect of *wh*-inversion provides an important, overarching clue about the nature of sentence structure and word order in English. Standard *wh*-questions necessitate inversion unless the subject is questioned. Examine the following data set in this regard:

- (25) a. Bill can give candy to colleagues at work tomorrow.
- b. Who can give candy to colleagues at work tomorrow?
- |   |   |
|---|---|
| S | V |
|---|---|
- c. What can Bill give to colleagues at work tomorrow?
- |   |   |
|---|---|
| V | S |
|---|---|
- d. To whom can Bill give candy at work tomorrow?
- |   |   |
|---|---|
| V | S |
|---|---|
- e. Where can Bill give candy to colleagues tomorrow?
- |   |   |
|---|---|
| V | S |
|---|---|
- f. When can Bill give candy to colleagues at work?
- |   |   |
|---|---|
| V | S |
|---|---|

When the subject is questioned as in (25b), inversion does not occur. If an object or an adjunct is questioned as in (25c–f), in contrast, inversion must occur. The data therefore reveal that the canonical position of the subject is in front of the finite verb in English, whereas the canonical position of object and adjuncts follows the finite verb. Inversion must occur in case a constituent is questioned, the canonical position of which follows the verb. In other words, subject-auxiliary inversion helps to reveal the canonical positions of major constituents.

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<sup>204</sup>. Starosta (1988: 69, 2003: 274–5) states this aspect of subject-auxiliary inversion as a lexical feature associated with auxiliary verbs. If the auxiliary verb has interrogative status, the subject must become a postdependent.

Negative inversion is a second type of subject-auxiliary inversion. It occurs when a non-subject negative expression initiates the clause, e.g.

- (26) a. He **should** go there on no occasion.  
 b. On no occasion **should** he go there.  
 c. \*On no occasion, **he should** go there.
- (27) a. She **has** scarcely been helping us.  
 b. Scarcely **has** she been helping us.  
 c. \*Scarcely **she has** been helping us.
- (28) a. She **will** hug only Sam.  
 b. Only Sam **will** she hug.  
 c. \*Only Sam **she will** hug.

The subject again switches to the other side of the finite verb to accommodate the presence of the negative expression. Typical negative expressions are those containing words such as *never*, *no*, *nobody*, *nothing*, *only*, *scarcely*, etc. The acceptability contrast across the b- and c-sentences demonstrates that negative inversion must occur if the negative expression precedes the subject and finite verb.

Conditional inversion is a third, rarely occurring type of subject-auxiliary inversion.<sup>205</sup> The modern form of this type of inversion occurs almost exclusively with the forms *be*, *had*, *should*, and *were*. Inversion occurs to express a condition that is more commonly expressed with the subordinator *if*:

- (29) a. If I had money, I would buy something to eat.  
 b. **Had I** money, I would buy something to eat.
- (30) a. If they were our friends, we would help them.  
 b. **Were they** our friends, we would help them.

Inversion in the b-sentences accomplishes the same thing as the subordinator *if* in the a-sentences. It helps express a condition that must obtain in order for the content expressed in the main clause to hold. The fact that conditional inversion in English is limited to a few auxiliary forms reveals that it is indeed a very limited type of inversion. It is likely a remnant of a more productive mechanism that was present in earlier stages of English.

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<sup>205</sup> Mel'čuk and Pertsov (1987: 285–6) briefly acknowledge conditional inversion, although they do not use the term *inversion* to denote the phenomenon. Their dependency analysis is the one preferred here: the inverted auxiliary is the root of the subordinate clause and directly dependent on the root of the matrix clause.

## 7.9 Subject-verb inversion

The term *subject-verb inversion* also denotes inversion involving the subject and the finite verb. In cases of subject-verb inversion, however, the finite verb involved need not be an auxiliary verb; it can also easily be a content verb. There are at least three types of subject-verb inversion: 1. *locative inversion*, 2. *directive inversion*, and *quotative inversion*. In each of these cases, there is an expression that precedes the subject and finite verb, allowing the two to invert. Interestingly, subject-verb inversion occurs optionally. This is unlike subject-auxiliary inversion, which is more appropriately construed as occurring obligatorily.

The three types of subject-verb inversion are illustrated next:

- (31) a. **The cat sat** at the top of the stairs.  
b. At the top of the stairs **sat the cat**. – Locative inversion
- (32) a. **The cat bounded** down the stairs.  
b. Down the stairs **bounded the cat**. – Directive inversion
- (33) a. **Fey said** “I’m hungry”.  
b. “I’m hungry”, **said Fey**. – Quotative inversion

Locative inversion can occur when a phrase of location precedes the subject and finite verb, as illustrated in (31b). Directive inversion is closely similar to locative inversion; it can occur when a phrase giving the goal of movement precedes the subject and finite verb, as illustrated in (32b). And quotative inversion can occur when direct speech precedes a verb of speaking or thinking, as in (33b). Note that each of the verbs involved in (31)–(33) is a content verb.

The following trees illustrate normal order and the corresponding order with locative inversion:

- (34) a.
 

```

graph TD
 swarmed[swarmed] --> bees1[bees]
 swarmed --> above1[above]
 bees1 --> Many1[Many]
 bees1 --> bees2[bees]
 above1 --> us1[us]
 Many1 -.- Many2[Many]
 bees2 -.- bees3[bees]
 swarmed -.- swarmed3[swarmed]
 above1 -.- above3[above]
 us1 -.- us3[us]

```

– Standard SV order
- b.
 

```

graph TD
 swarmed[swarmed] --> Above1[Above]
 swarmed --> bees1[bees]
 Above1 --> us1[us]
 bees1 --> many1[many]
 bees1 --> bees2[bees]
 us1 -.- us3[us]
 swarmed -.- swarmed3[swarmed]
 many1 -.- many3[many]
 bees2 -.- bees3[bees]

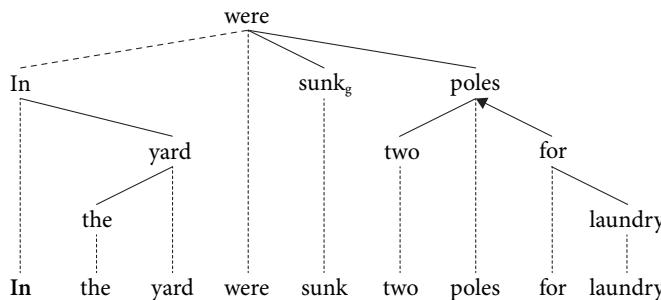
```

– Locative inversion

An interesting aspect of the three types of subject-verb inversion is that the subject cannot be a definite pronoun, e.g. \**Under the tree relaxed he/him*, \**Above us swarmed they/them*. Furthermore, in the case of locative and directive inversion, the initial expression must give a location; it cannot, for instance, be a temporal adjunct, e.g. \**After class relaxed Bill*.

A particularly noteworthy aspect of subject-verb inversion is that the subject can even invert (and shift) to the other side of a nonfinite verb, e.g.

(35)



We see that in this case, the subject *two poles for laundry* appears after the passive participle *sunk*. The verb catena *were sunk* cannot be interrupted by the subject, e.g. \**In the yard were two poles for laundry sunk*. The dashed dependency edge and <sub>g</sub> subscript in this example are the conventions introduced below for the analysis of discontinuities.

The examples considered in this section and the previous three demonstrate that shifting and inversion do not necessitate analyses in terms of discontinuities. An important aspect of both, though, is that they actually often do co-occur with a discontinuity for reasons that are largely independent of their natures. The appearance of dummy-*do* in many cases of inversion, for instance, adds an extra layer to the structure which results in the presence of a discontinuity.

## 7.10 Rising

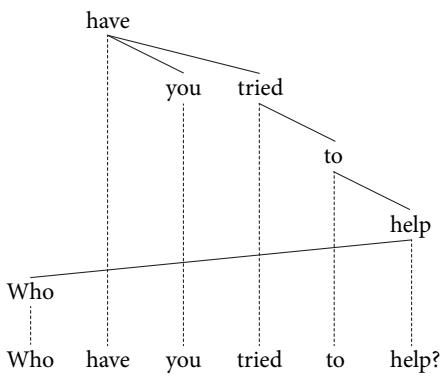
With an understanding of shifting and inversion established, the discussion can now turn to the current DG's account of discontinuities like those illustrated in Section 7.3. Such discontinuities are addressed in terms of *rising*. The displaced catena is assumed to rise, which means that it attaches to a word that dominates its governor.<sup>206</sup> The idea behind rising is that a flattening of structure occurs in order

<sup>206</sup>. The concept of rising has been proposed and/or pursued by a number of DGs in various forms (e.g. Schubert 1987: 190; Lobin 1993: 31–5; Heringer 1996: 261; Bröker 1999: 55–9;

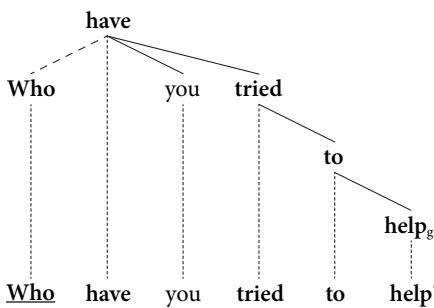
to overcome the discontinuity. An important point about rising is that nothing actually ‘rises’. The notion is understood metaphorically. The term *rising* simply denotes a constellation where a governor fails to immediately dominate one or more of its governees.

Typical *wh* fronting discontinuities are now employed for the first illustration of rising. Two *wh*-discontinuities are shown in the a-trees, and the manner in which the current system addresses these discontinuities, i.e. rising, is illustrated in the b-trees:

- (36) a.

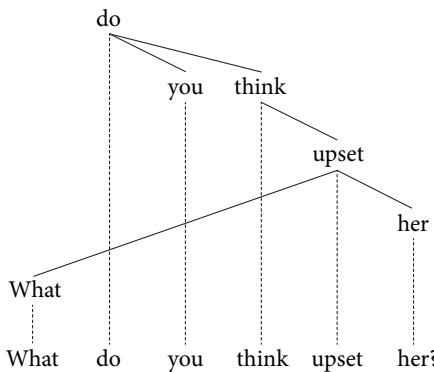


- b.

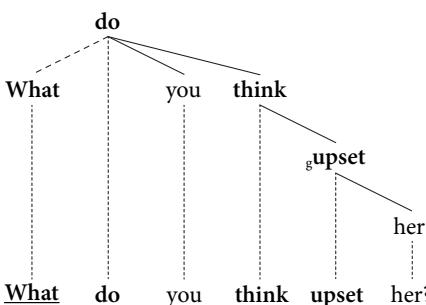


2003: 294; Eroms & Heringer 2003: 26; Hellwig 2003: 622; Starosta 2003a: 276–9; Groß & Osborne 2009). The terminology employed by these linguists certainly varies, but the idea is consistent. This idea is that a flattening of structure occurs to accommodate the discontinuity. The rising notion pursued here is developed most extensively in Groß & Osborne (2009) and Osborne (2014b).

(37) a.



b.



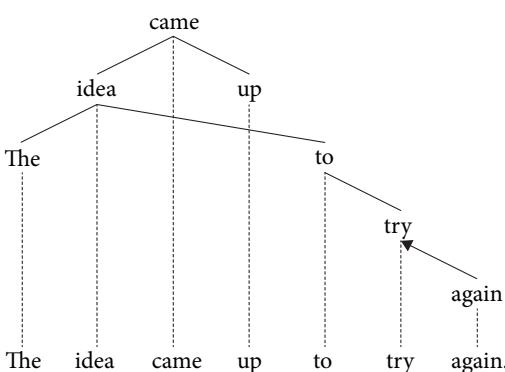
The crossing lines in the a-structures, which identify projectivity violations, are overcome by assuming that the displaced catena attaches to a word that is not its governor.<sup>207</sup> The head and the governor of the displaced catena are now separate words. The dashed dependency edge indicates the presence of rising; the underline marks the *risen catena* (the catena that takes a word as its head that is not its governor); the <sub>g</sub> subscript marks the governor of the risen catena; and the words in bold identify the *rising catena* (the minimal catena that includes the root of the risen catena and the governor of the risen catena).<sup>208</sup> The risen catena in (36b) is *who* and the rising catena is *who have...tryed to help*, and the risen catena in (37b) is *What* and the rising catena is *what do...think upset*.

<sup>207</sup> The a-trees are those of a *non-projective DG* (projectivity violations actually occur), whereas the b-trees are those of a *projective DG* (projectivity is never really violated). DGs can be classified according to this distinction. For instance, Word Grammar and Meaning-Text Theory are two prominent non-projective DGs.

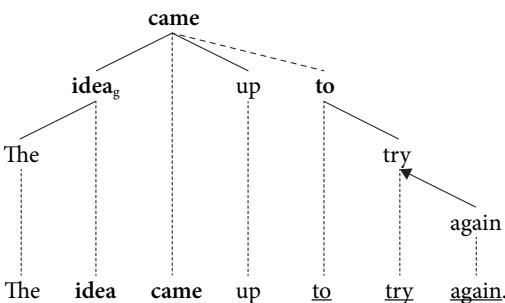
<sup>208</sup> The unit designated as a rising catena here is also acknowledged by Bröker (1999: 57), although Bröker does not use the designation *rising catena*.

Examples (36)–(37) contain discontinuities due to *wh*-fronting, which is just one type of discontinuity. Extraposition is another common source of discontinuities. Examples (38a–b) illustrate extraposition:

(38) a.



b.



The conventions are consistent. The dashed dependency edge again indicates the presence of rising, the underline identifies the risen catena, the <sub>g</sub> subscript marks the governor of the risen catena, and the bold script shows the rising catena. Note that *to try again* is a complement (of the noun *idea*), not an adjunct.

The examples just produced illustrate two frequently occurring types of rising, due to *wh*-fronting and extraposition. *Wh* fronting occurs when an expression is focused in terms of a *wh*-word (*who*, *whom*, *whose*, *what*, *where*, *when*, *why*, etc.). *Wh*-words are typically associated with interrogatives as discussed, but they also occur as relative proforms, e.g. *the politicians who we support*, and in other contexts. Extraposition occurs when a specifying constituent (i.e. a constituent that specifies its governor) appears to the right of and separated from its governor. *Wh*-fronting and extraposition are two (of four) sources of discontinuities in English. The other two types are topicalization and NP-internal fronting. These discontinuity types are presented first in the next section, and each of the four discontinuity types is examined in some detail in the next chapter.

### 7.11 Constituent vs. non-constituent rising

The instances of rising illustrated with the previous examples show the risen catena as a constituent. There are other cases of rising where the risen expression is a non-constituent catena. In such cases, rising of a different sort has occurred. Thus, a distinction between two types of rising is important. These two rising types are called *constituent rising* and *non-constituent rising*, depending on whether the risen catena is a constituent or not.<sup>209</sup> The instances of rising in the last section are all cases of constituent rising because the risen catena has the status of a constituent. In contrast, indirect questions, relative clauses, and certain cases of NP-internal fronting necessitate an analysis in terms of non-constituent rising because the risen catena is not a constituent. This section establishes the distinction between the two types of rising.

The distinction between constituent and non-constituent rising is illustrated well by contrasting direct questions with indirect ones:

- (39) a.
- 
- ```

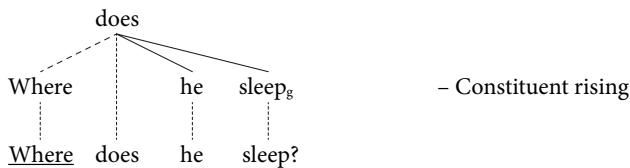
graph TD
    do[do] --- Who[Who]
    do --- you1[you]
    do --- think[think]
    think --- they1[they]
    think --- sawg[sawg]
    sawg --- they2[they]
    sawg --- saw[?]
    Who --- Who1[Who]
    do --- do1[do]
    you1 --- you2[you]
    think --- think1[think]
    they1 --- they2[they]
    they2 --- they3[they]
    sawg --- saw1[saw.]
  
```
- Constituent rising
- b.
-
- ```

graph TD
 wonder[wonder] --- I[I]
 wonder --- who[who]
 who --- think[think]
 think --- you1[you]
 think --- they1[they]
 think --- sawg[sawg]
 you1 --- you2[you]
 think --- they2[they]
 they2 --- they3[they]
 sawg --- saw1[saw.]

```
- Non-constituent rising

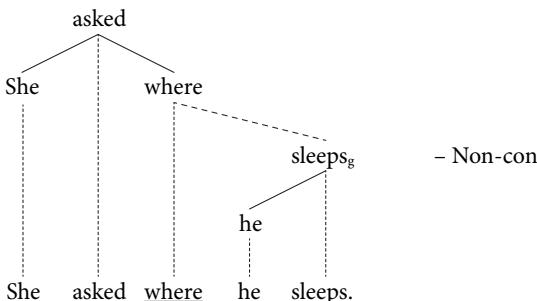
<sup>209</sup>. The distinction between constituent and nonconstituent rising is established at length in Groß & Osborne (2009) and Osborne (2014b). The terms that Groß & Osborne originally used to denote the distinction were *type 1 rising* (constituent rising) and *type 2 rising* (nonconstituent rising). The terms *constituent* and *nonconstituent* are introduced here for the first time and are, due to increased transparency, used in place of the terms *type 1* and *type 2*.

(40) a.



– Constituent rising

b.

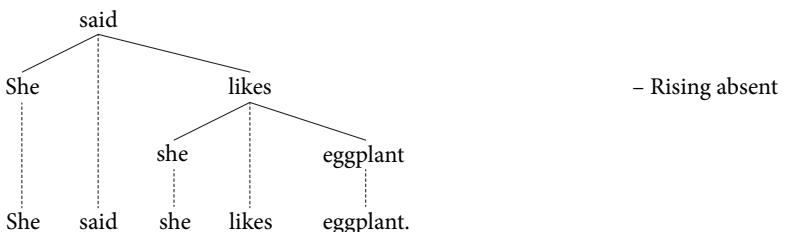


– Non-constituent rising

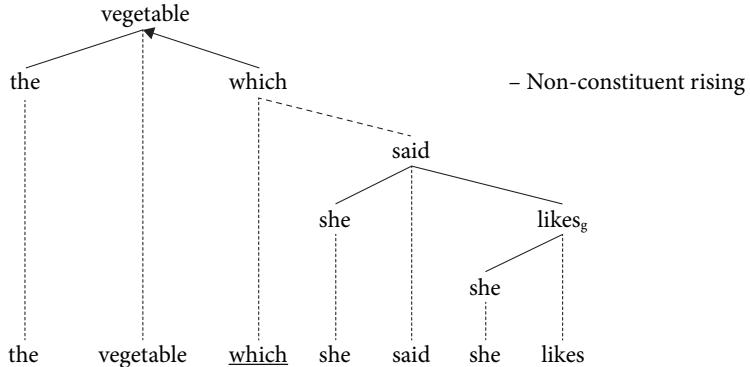
The hierarchical position of the risen catena (underlined) is what is important. The direct questions in the a-examples have the *wh*-element as a dependent of the finite auxiliary, whereas the indirect questions of the b-examples show the *wh*-element as the root of the entire subordinate clause. The distinct analyses are motivated by systematic word order differences across matrix and subordinate clauses and by the presence/absence of the auxiliary verb. At present the important thing to note is that the distinction at hand focuses on the status of the risen catena, i.e. whether or not it is a constituent.

Non-constituent rising is also a standard trait of relative clauses:

(41) a.

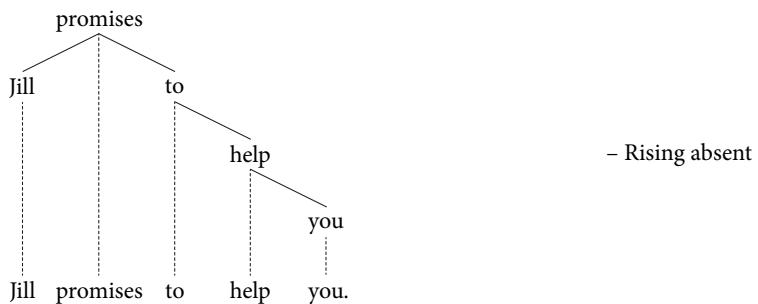


– Rising absent

b.<sup>210</sup>

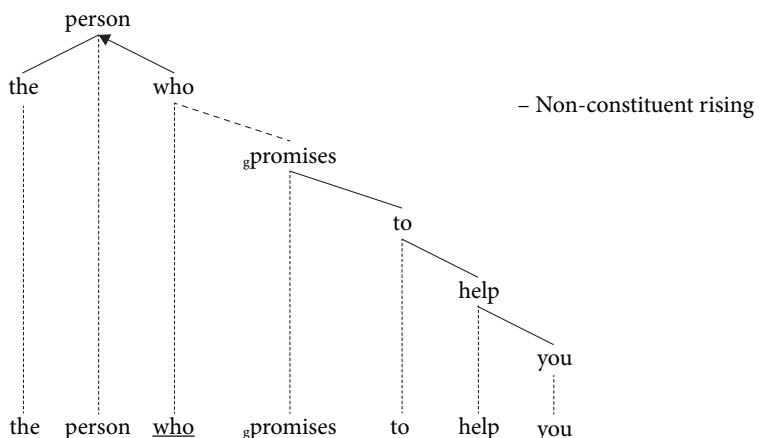
– Non-constituent rising

(42) a.



– Rising absent

b.



– Non-constituent rising

<sup>210</sup>. The analysis in tree (41b) uses *which* instead of *that*, although *that* would sound more natural. The analysis here is that when *that* introduces a relative clause, it is a subordinator but not a relative pronoun.

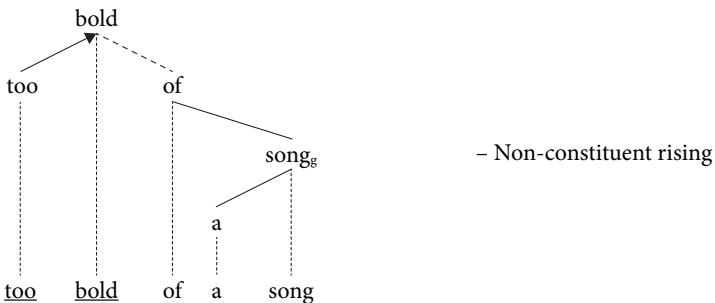
The relative pronouns in the relative clauses in the b-trees have risen to become the roots of the relative clauses, which means they are not constituents.<sup>211</sup> Notice that the risen catena again dominates its governor in each case.

Another environment where non-constituent rising occurs is inside indefinite NPs. When an adjective is focused by certain adverbs (e.g. *how*, *too*, *that*), the adjective gains the status of a noun and then precedes the determiner:

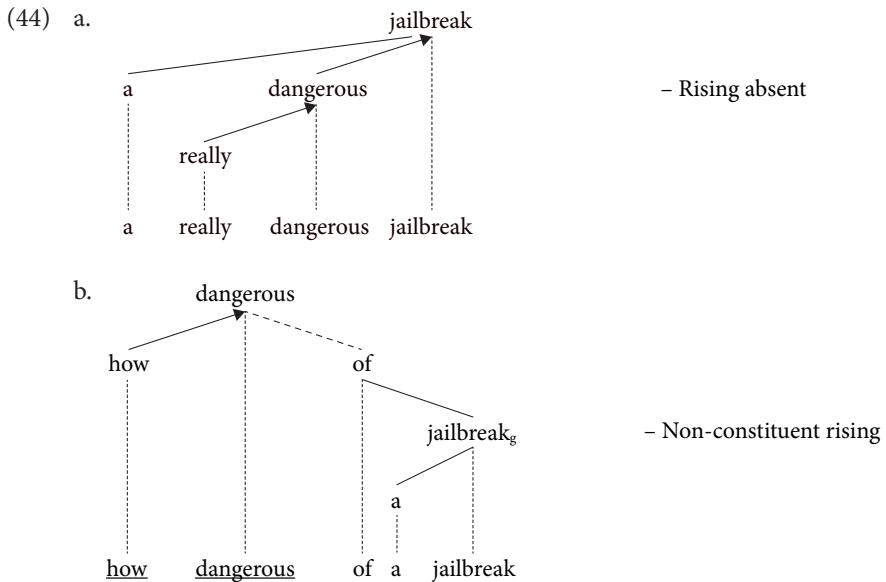
(43) a.



b.



<sup>211</sup> The analysis of relative pronouns shown here in trees (41b) and (42b) is just one of three possible ways to approach the syntactic status of relative proforms in a DG. In contrast to the analysis here, Tesnière (1959/2015: Chapter 251) split the relative pronoun, positioning it in two spots – see also Baum (1976: 130) and Weber (1992: 114). Lobin (1993: 31) and Van Langendonck (2003: 184–5) assume analyses similar to the one Tesnière proposed: the relative proform and the finite verb in the relative clause are deemed interdependent. Others assume (what is essentially a) constituent rising analysis of relative proforms (e.g. Bröker 1999: 120–2), and yet others assume that rising does not occur at all, which means the projectivity is often violated (e.g. Kunze 1975: 129–30; Mel'čuk & Pertsov 1987: 395–401; Heringer 1996: 219–21), but rather they assume that the displaced relative proform violates projectivity.



The adjective plus adverb in each a-example corresponds to the fronted expression in the corresponding b-example. The adverb on the adjective somehow focuses the adjective, forcing it to appear as the root of the entire NP. Interestingly, the adjective in the b-clauses adopts the status of a nominal, as the appearance of the preposition *of* indicates. The important aspect of these cases is that they must be analyzed as instances of non-constituent rising because the risen catena is not a constituent.

## 7.12 The Rising Principle

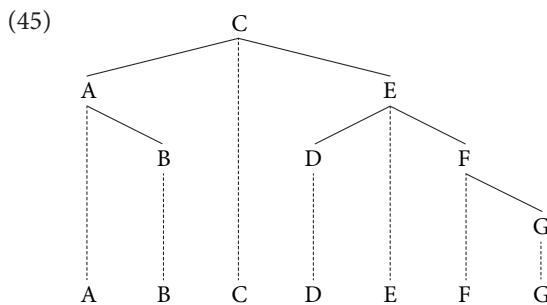
The key trait that all instances of rising obey is the Rising Principle:

### Rising Principle

The head of the risen catena must dominate the governor of the risen catena.

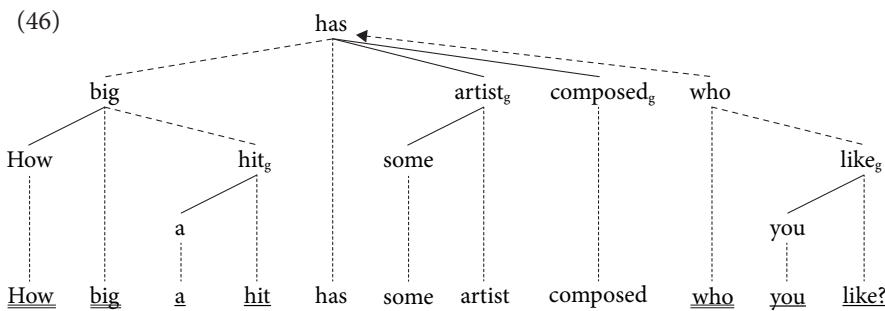
If one examines the examples in the previous two sections, one sees that each instance of rising has the head of the risen catena dominating the governor of the risen catena. In cases of constituent rising, just the head of the risen catena dominates the governor of the risen catena, whereas in cases of non-constituent rising, both the head of the risen catena and the risen catena itself dominate the governor of the risen catena.

The Rising Principle is the guiding concept underlying all discontinuities. When combined with a theory of islands (see Chapter 9), it significantly limits the discontinuities that can occur. The extent to which this principle limits discontinuities is illustrated with the following abstract structure:



Focusing on G, the Rising Principle can allow G to rise to attach to E or C, but the principle forbids G from attaching to A, B, or D (because A, B, and D do not dominate F, the governor of G). Similarly, the Rising Principle can allow B to rise to attach to C, but it forbids B from attaching to D, E, F, or G.

The following sentence contains four instances of rising, two instances of constituent rising and two instances of non-constituent rising:



The constituents *how big a hit* has constituent risen (*wh*-fronting), *composed* being its governor. The constituent *who you like* has constituent risen (extraposition), *artists* being its governor. The catena *how big* has non-constituent risen (NP-internal fronting), *hit* being its governor. And *who* has non-constituent risen (relative pro-form fronting), *like* being its governor. These instances of rising all obey the Rising Principle. Either the root of the risen catena or its head dominates the governor of that catena.

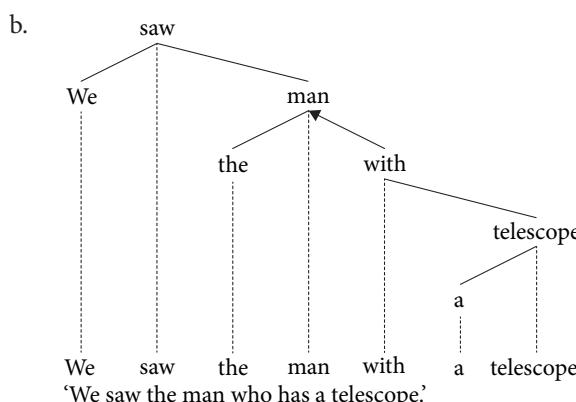
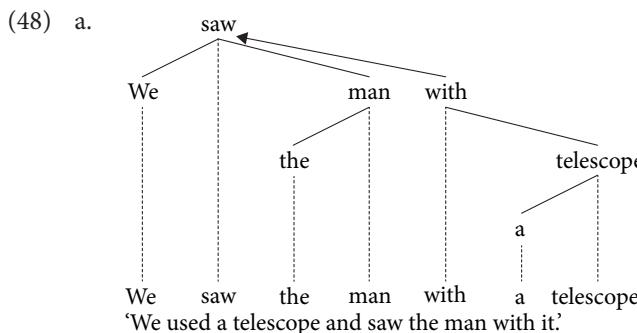
### 7.13 Motivating rising

A theory of syntax has to address discontinuities. Rising is the concept that the current DG employs to accomplish this task. In this regard, however, one should question whether empirical evidence exists to support the concept of rising put forward here. Is there anything “real” about rising, or is it merely an *ad hoc* concept? This section presents empirical observations that suggest that rising (or something akin to rising) is indeed real. The presence of rising in certain structures helps explain empirical facts that would otherwise remain mysterious.

The nature of ambiguity is an area that provides empirical support for rising. Consider the following well-known instance of ambiguity that results from varying structural analyses:

- (47) We saw the man with a telescope.  
 a. ‘We used a telescope and saw the man with it.’  
 b. ‘We saw the man who had a telescope.’

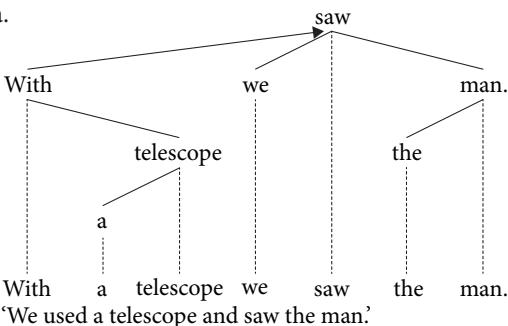
Sentence (47) is ambiguous, as indicated by the competing a- and b-readings. The ambiguity is captured in terms of varying attachment points of *with a telescope*:



The ambiguity is a function of the attachment point of *with a telescope*.

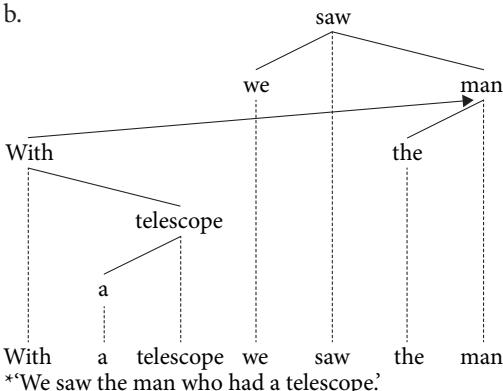
The support for rising that such cases deliver occurs with topicalization. The ambiguity disappears when the adjunct is topicalized: *With a telescope we saw the man* – only the first reading is available. Observe the following two analyses:

- (49) a.



– Correct analysis

- b.



– Incorrect analysis

The second reading, the one indicated in (49b), is not available. If projectivity violations were possible, there is no clear reason why the associated reading should be absent. The theory of rising proposed here accommodates the absence of the second reading because it states that projectivity is actually never violated, but rather what looks like a projectivity violation actually involves rising. Given that rising necessarily occurs, the absence of the second reading is predictable because rising sees the adjunct *with a telescope* attaching to *saw*, a situation that forces the first reading and blocks the second reading.

A second area of empirical support for the rising concept has to do with subcategorization restrictions. Without rising, the following data set would be much more difficult to account for:<sup>212</sup>

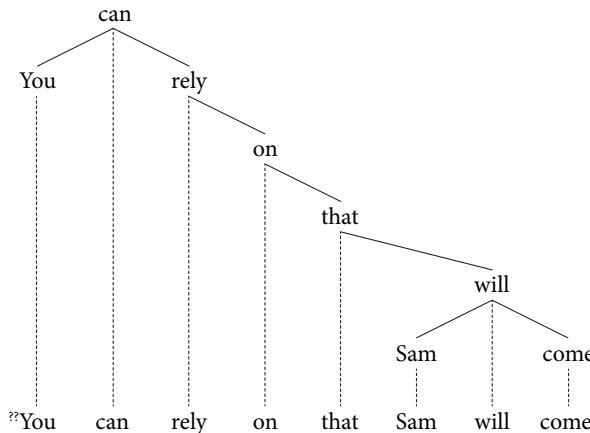
<sup>212.</sup> Examples similar to (50a-d) are discussed by Bresnan (2001: 17).

- (50) a. You can rely on Sam.  
 b. ??You can rely on that Sam will come.  
 c. ...and Sam, you can rely on.  
 d. ...and that Sam will come, you can rely on.

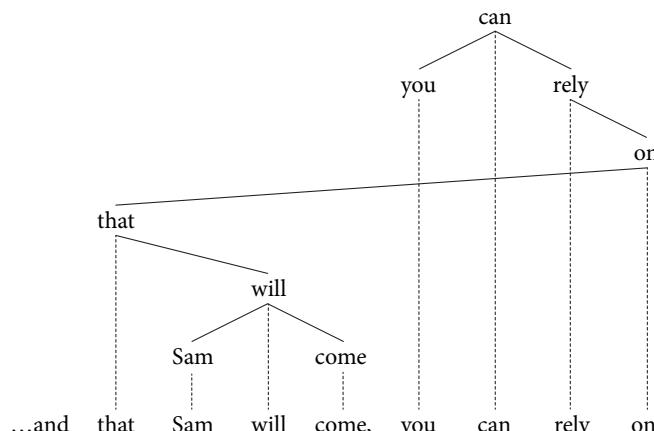
Sentence (50a) demonstrates that the preposition *on* can easily take the noun *Sam* as its dependent. In contrast, sentence (50b) shows that *on* cannot take the *that*-clause *that Sam will come* as its dependent. When topicalization occurs as in (50c) and (50d), we see that both sentences are acceptable. The acceptability contrast across (50b) and (50d) is noteworthy.

The acceptability contrast in (50) can be accommodated in terms of rising. The position of the *that*-clause in (50d) necessitates a rising analysis. Observe the structural analyses of sentences (50b) and (50d):

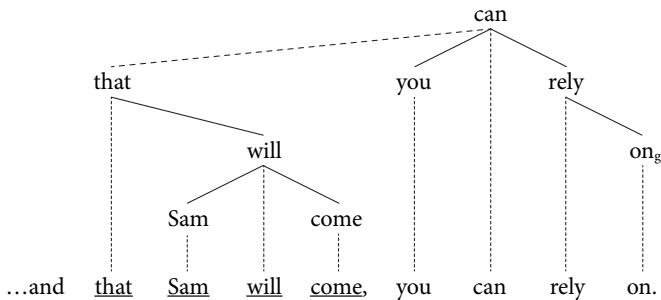
- (50) b'.



- d'.



d".



The badness of (50b') is explained in terms of the subcategorization traits of *on*. This preposition cannot take a *that*-clause as its complement. The rising analysis shown in (50d") overcomes the problem because the *that*-clause is no longer a dependent of *on*. Apparently, rising can loosen subcategorization requirements. Without rising, the data in (50) would again be difficult to accommodate.

This section has considered two sources of empirical support for rising: certain ambiguities and the loosening of subcategorization requirements. The distribution of nominative and accusative case in languages with case is another area of support, but has not been discussed here.

#### 7.14 Motivating non-constituent rising

Section 7.11 distinguished between two types of rising, constituent and non-constituent. This section examines the support for this distinction; in particular, it motivates non-constituent rising. Word order variation across matrix and embedded interrogative clauses constitutes the key empirical insight.<sup>213</sup>

When interrogative *wh*-fronting occurs in matrix clauses, subject-auxiliary inversion is obligatory. In embedded clauses, however, subject-auxiliary does not occur – at least not in written English<sup>214</sup> – when a *wh*-word is fronted, e.g.

<sup>213</sup> The observations and reasoning that motivate nonconstituent rising are presented and discussed in detail in Osborne (2014b). Worth stating again is that Groß & Osborne (2009) and Osborne (2014b) originally called constituent rising *type 1 rising* and nonconstituent rising *type 2 rising*. See the first footnote 209.

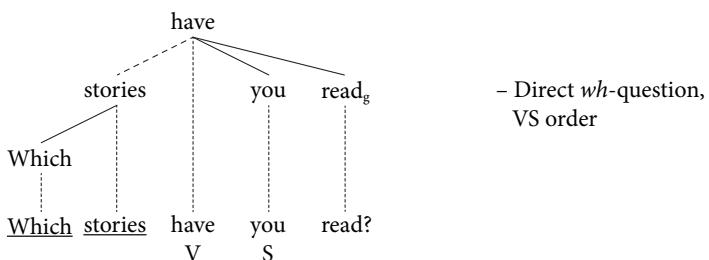
<sup>214</sup> Miller (2011: 4–8) demonstrates that in spoken English, subject-auxiliary inversion in embedded *wh*-clauses is actually a common occurrence.

- (51) a.
- 
- Direct *wh*-question, VS order
- b.
- 
- Indirect *wh*-question, SV order
- (52) a.
- 
- Direct *wh*-question, VS order
- b.
- 
- Indirect *wh*-question, SV order

The instances of *wh*-fronting in the matrix clauses have VS order. In order to accommodate the fronted *wh*-expression, subject-auxiliary inversion is obligatory. Subject-auxiliary inversion does not occur in the corresponding embedded clauses, however. The difference is systematic, and it is described well in terms of the contrast between VS and SV order.

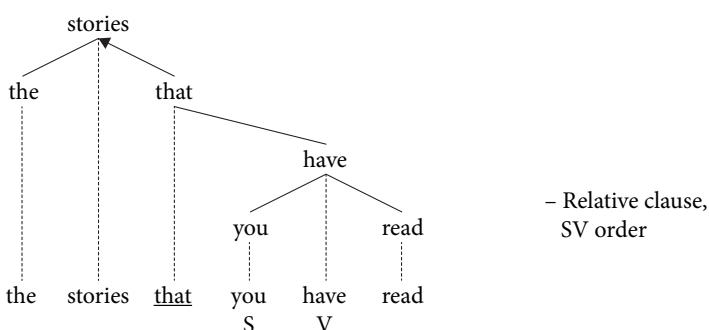
The contrast just illustrated across matrix and embedded interrogative clauses is repeated across matrix interrogative and embedded relative clauses:

(53) a.



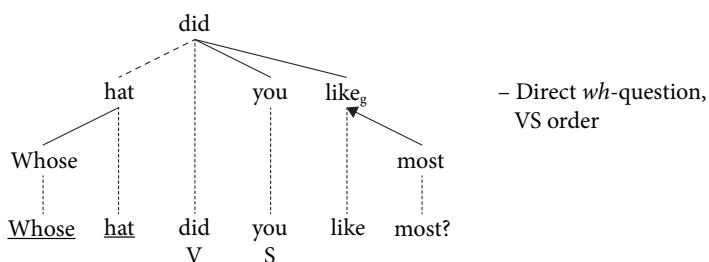
– Direct *wh*-question,  
VS order

b.



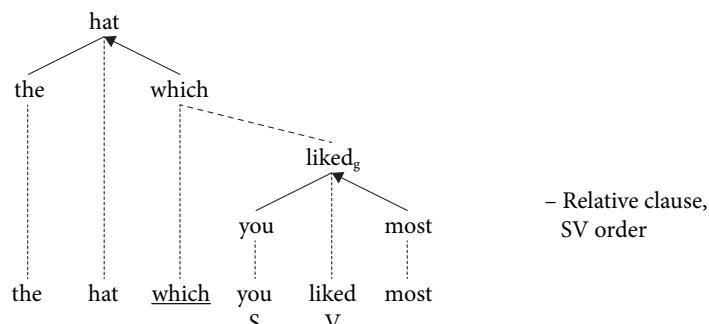
– Relative clause,  
SV order

(54) a.



– Direct *wh*-question,  
VS order

b.

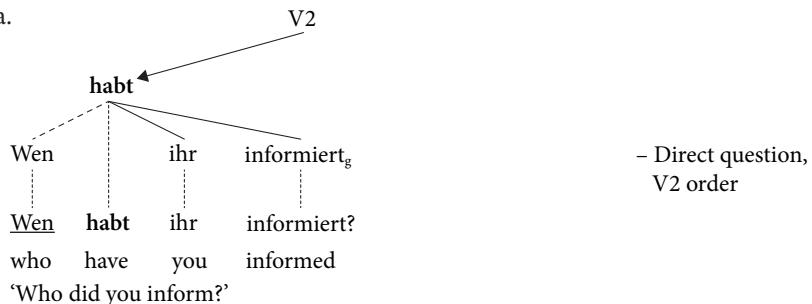


– Relative clause,  
SV order

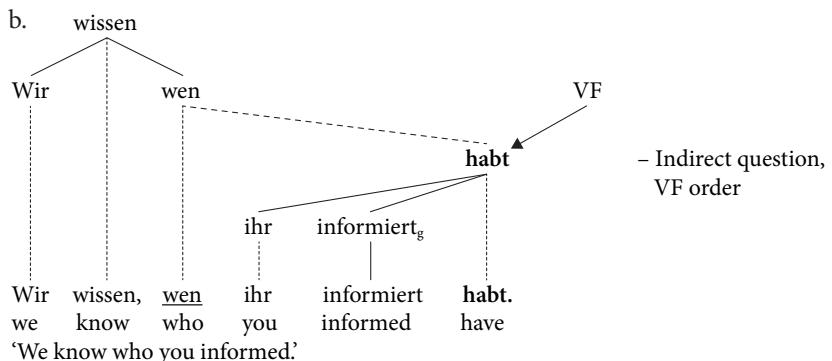
The matrix interrogative clauses demonstrate VS order again, whereas the embedded relative clauses again have SV order.<sup>215</sup> The distinction between constituent and non-constituent rising allows for a principled account of these word order differences. VS order in matrix clauses is associated with constituent rising, and SV order in embedded clauses with non-constituent rising. Without the distinction between the two types of rising, the VS vs. SV distinction across these clauses would be difficult to accommodate in a principled manner.

German provides similar motivation for non-constituent rising. V2 (verb second) order is dominant in matrix clauses in German, but VF (verb final) order occurs in embedded clauses:

(55) a.

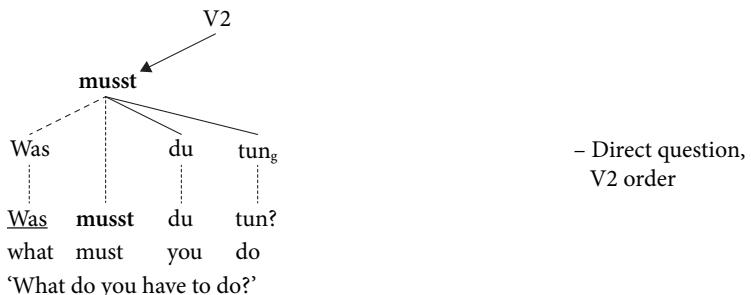


b.

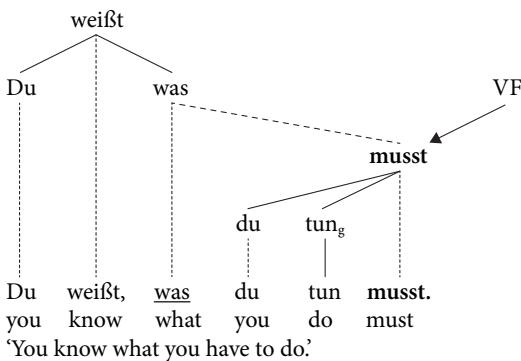


<sup>215</sup>. The analysis of standard relative clauses here can be extended to free relative clauses, e.g. *What he said surprised us*. The relative proforms that occur in free relative clauses (*what*, *whoever*, *whenever*, etc.) are the root of the free relative clause.

(56) a.

– Direct question,  
V2 order

b.

– Indirect question,  
VF order

The V2 principle of matrix clauses is addressed by positing that the finite verb must have one and only one pre-dependent, and the VF principle of subordinate clauses is addressed by positing that (most) dependents of the finite verb in embedded clauses must be pre-dependents. The systematic contrast between V2 and VF order can again be addressed in terms of constituent and non-constituent rising. Constituent rising is associated with V2 order, whereas non-constituent rising is connected to VF order. Without the distinction between the two types of rising, these word order differences would again be difficult to accommodate in a principled manner.

Subordinators (e.g. *bvor* ‘before’, *dass* ‘that’, *wenn* ‘when/if’, *weil* ‘because’, etc.) in German are directly responsible for evoking VF order. When an embedded clause appears that is not introduced by a subordinator, VF order is absent. Observe the contrast across the following a-, b-, and c-examples in this regard:

- (57) a. Man sagt, dass das geschehen ist. – VF order  
      one says that that happen is  
      ‘One says that that happened.’
- b. Man sagt, \*das geschehen ist. – VF order  
                   das ist geschehen. – V2 order

- (58) a. Du denkst, dass wir abfahren **sollten**. – VF order  
           you think that we depart should  
           ‘You think that we should depart.’
- b. Du denkst, \*wir abfahren **sollten**. – VF order  
           wir **sollten** abfahren. – V2 order

These data demonstrate that the subordinator *dass* ‘that’ in the a-sentences is directly responsible for evoking VF order in the embedded clauses. In this regard, most DGs see the subordinator as the root of the clauses that it introduces. Given this state of affairs, *dass* in each a-sentence is the root of the embedded clause, and its appearance forces VF order. If it is absent as in the b-c clauses, the embedded clauses necessarily have V2 order.

Given that subordinators like *dass* are directly responsible for evoking VF order in German, the current system must assume non-constituent rising in order to accommodate the following parallelism in word order across the two clauses containing *wenn/wann* ‘if/when’:

- (59) a.
- 
- *wenn* evokes VF order.
- b.
- 
- *wann* evokes VF order.

The subordinator *wenn* ‘if/when’ in (59a) evokes VF order. Similarly, the interrogative adverb *wann* ‘when’ in (59b) also evokes VF order. Since a subordinator like *wenn* is widely viewed as the root of the clause that it introduces, the system must assume that *wann* is also the root of the clause it introduces. In other words, non-constituent rising of the interrogative *wann* must be assumed in (59b) if the parallelism in word order across (59a) and (59b) is to be accommodated.

This section has considered the primary motivation for the distinction between constituent and non-constituent rising, and in so doing, it has motivated the analysis of non-constituent rising. This motivation comes in the form of systematic word order differences across matrix and embedded clauses in English and German. In order to accommodate these differences, the distinction between constituent and non-constituent rising is necessary. Further support for the distinction is present in the overarching discussion and analysis of discontinuities in the next two chapters. Much of the theory would collapse without the distinction.



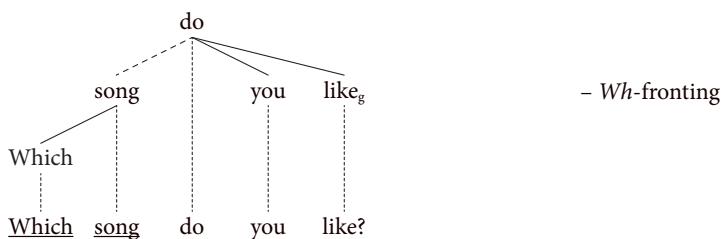
## CHAPTER 8

# Types of discontinuities

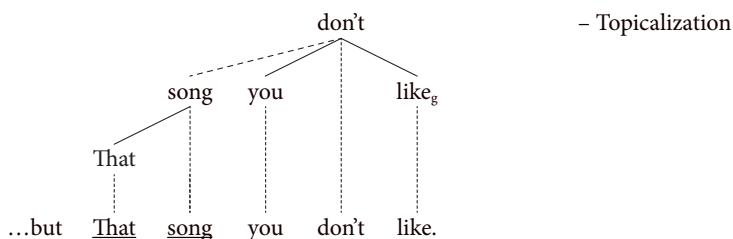
### 8.1 Overview

The five major discontinuity types discussed in this chapter are illustrated here first for orientation:

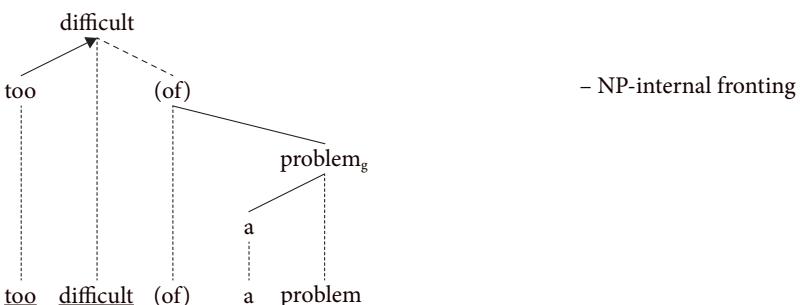
(1)



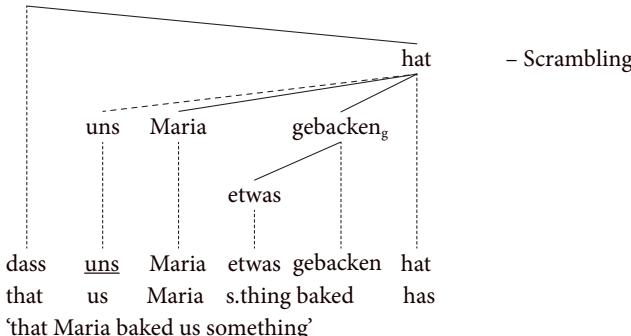
(2)



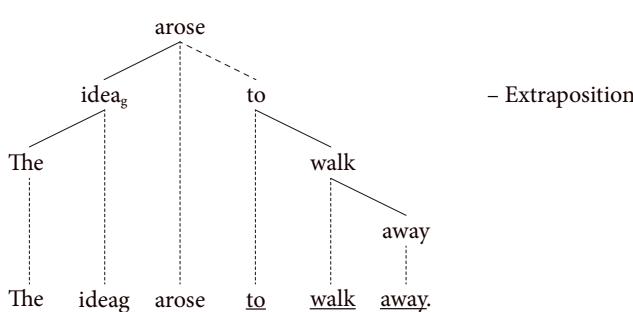
(3)



(4) dass



(5)



These examples exhaust the discontinuity types that are widely acknowledged in the literature on discontinuities in English and related languages.

There are a number of generalizations that can be drawn from Examples (1)–(5). First, topicalization rising, scrambling rising, and extraposition are always constituent rising; second, *wh*-fronting can involve constituent or non-constituent rising, depending on whether it occurs in a matrix or embedded clause; and NP-internal fronting is always non-constituent rising. One should also note that *wh*-fronting has the displaced component preceding its governor, whereas the displaced constituent always follows its governor in instances of extraposition. Scrambling, in contrast, allows the displaced constituent to precede or follow its governor.

The direction of the discontinuity at hand is important because it influences the islands and barriers for that discontinuity type. That is, the islands and barriers that limit the distribution of *wh*-fronting and topicalization are for the most part the same ones, whereas the islands and barriers that limit the distribution of extraposition are quite different. And scrambling is limited by yet other islands and barriers. The following classification provides an overview of the five discontinuity types:

Table 19.

| Types of discontinuities                |                |                      |            |                                             |
|-----------------------------------------|----------------|----------------------|------------|---------------------------------------------|
| Dislocated catena precedes its governor |                |                      |            | Dislocated constituent follows its governor |
| Wh-fronting                             | Topicalization | NP-internal fronting | Scrambling | Extraposition                               |

Each of these discontinuity types is discussed in the following sections. Islands are then explored in the next chapter, Chapter 9.

## 8.2 Wh-fronting

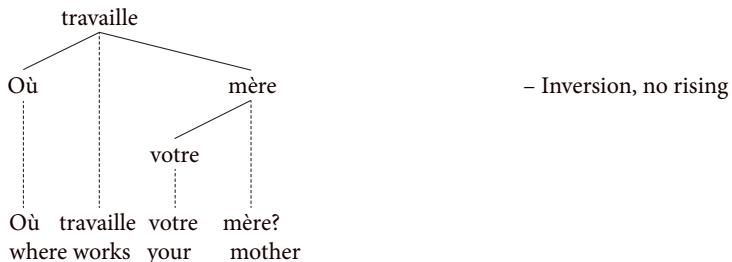
Wh-fronting occurs in order to focus a constituent, often with the goal to form an interrogative sentence or clause, that is, to form a question. The focused constituent appears at the front of the sentence or clause, this initial position being prominent. Wh-fronting occurs frequently in English, and indeed in most European languages, although many other languages lack wh-fronting entirely, e.g. Chinese and Japanese. Some languages such as French employ wh-fronting at times, whereas at other times, the interrogative element (wh-element) remains in situ. The frequency of occurrence and flexibility of wh-fronting in English have made it perhaps the most widely explored type of discontinuity. In this regard, the discussion here only touches on some of the major traits of wh-fronting. These traits are listed here first to provide an overview:

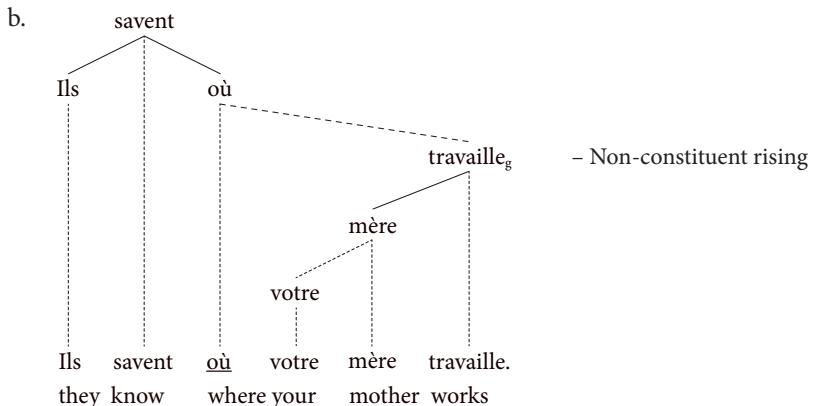
1. Wh-fronting can involve constituent or non-constituent rising.
2. Wh-fronting in matrix clauses requires subject-auxiliary inversion in English.
3. Only a single wh-element may be fronted in many languages.
4. The superiority phenomenon is explained in terms of processing load.

These four traits are examined each in turn in the following paragraphs.

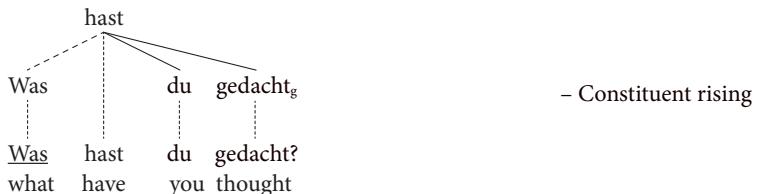
The following a-sentences illustrate the constituent rising of wh-fronting in interrogative matrix clauses, and the b-examples the non-constituent rising of wh-fronting in interrogative embedded clauses. French and German examples are employed first; English examples appear further below:

(6) a.

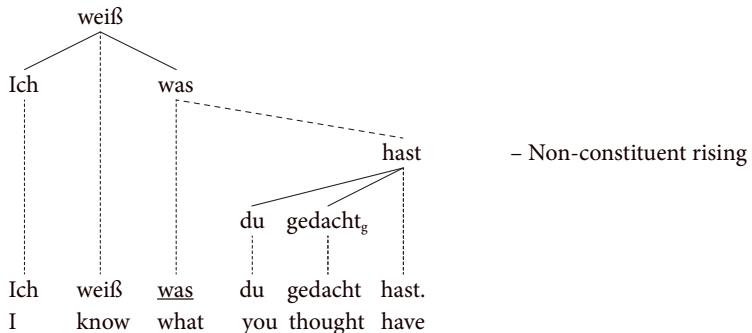




(7) a.



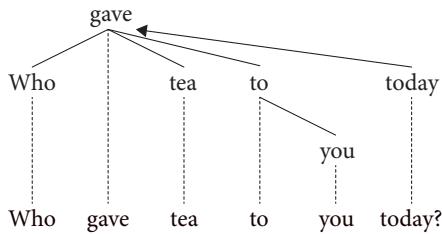
b.



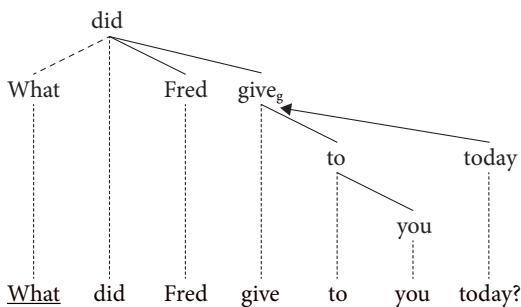
In each matrix clause, V2 order obtains, whereby the risen *wh*-element in (7a) has constituent risen to become a pre-dependent of the finite verb, and in (6b) and (7b), the interrogative element has non-constituent risen, becoming the root of the embedded clause. The distinction between constituent and non-constituent rising in such cases is motivated by systematic word order differences across matrix and embedded clauses, as discussed above in Section 7.14.

When something other than the subject is questioned in English, subject-auxiliary inversion must occur, which means that often an auxiliary verb must appear. The auxiliary *do* is introduced in such cases to enable inversion (subject-verb inversion does not require an auxiliary in French, nor in German):

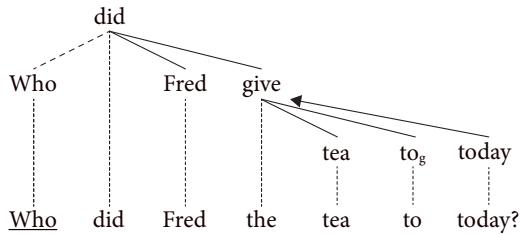
(8) a.



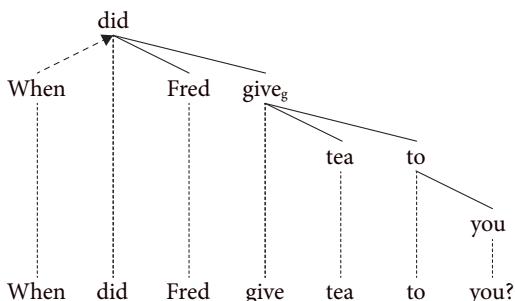
b.



c.



d.

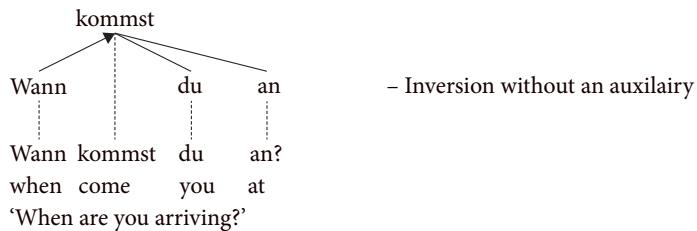


When the subject (here *Fred*) is questioned as in (8a), subject-auxiliary inversion does not occur, which means there is no need to introduce an auxiliary. When something other than the subject is questioned as in (8b)–(d), an auxiliary must appear, in this case *did*.

Subject-verb inversion in German does not require the presence of an auxiliary,

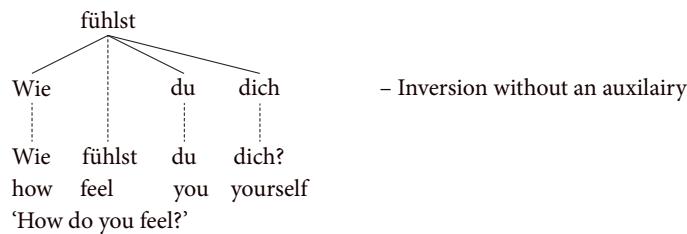
e.g.

(9) a.



– Inversion without an auxilairy

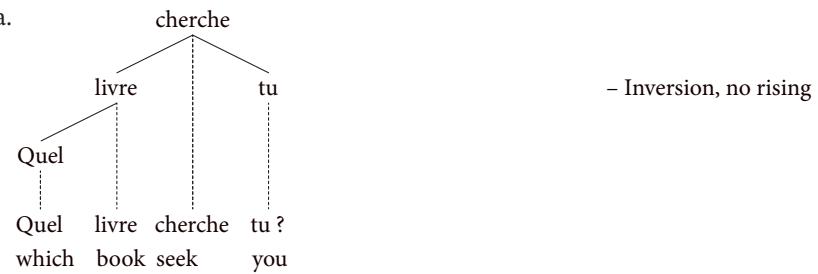
b.



– Inversion without an auxilairy

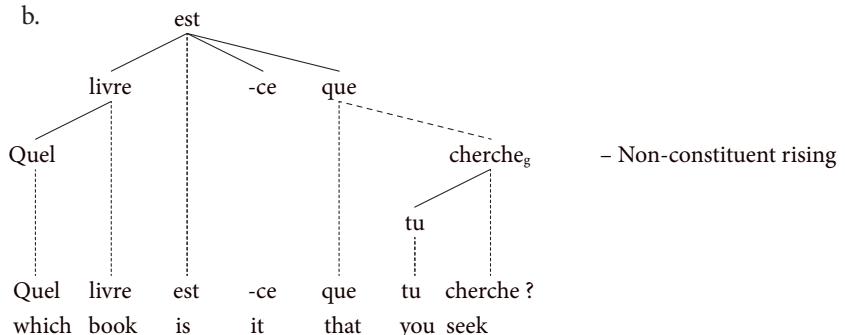
Note that these instances of inversion do not result in rising. The subject and interrogative adverb simply invert. Direct questions in French are formed in a number of ways. Subject-verb inversion can occur without an auxiliary, but often the special interrogative expression *est-ce que* is introduced to form a question, e.g.

(10) a.



– Inversion, no rising

b.



– Non-constituent rising

There is no discontinuity in (10a), i.e. no rising, but rather just inversion occurs. In (10b) in contrast, the relative pronoun *que* non-constituent rises in the relative clause. Concerning the lack of a projection line for *-ce*, see Section 5.8 about clitics.

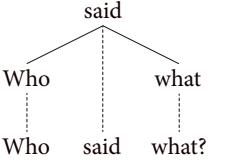
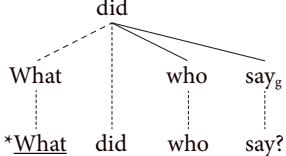
Only a single *wh* expression can be fronted in English, French, and German. When one attempts to front more than one *wh*-expression, the result is quite bad:

- (11) a. \*Where what did you buy?
- b. \*Quand que est-ce que tu as acheté?  
        when what is it that you have bought  
        ‘When what did you buy?’
- c. \*Warum was kaufst du?  
        why what buys you?  
        ‘Why what are you buying?’

Such data can be explained by the assumption that these languages have only a single focus position that precedes the finite verb. Other languages, in contrast, are much more flexible in this regard, such as Russian:

- (12) Kto komu chto kupil?  
    Who whom what bought?  
    ‘Who bought what for whom?’

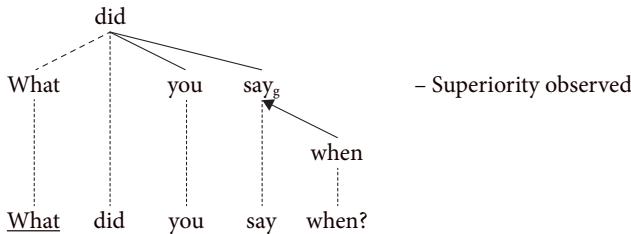
Since English (and French and German) cannot front more than a single *wh*-expression, one or more *wh*-words must remain in situ in sentences that contain two or more of them. This situation gives rise to two ordering constraints. The phenomenon is known as *superiority*.<sup>216</sup> Superiority is illustrated as follows:

- (13) a.  – Superiority observed
- b.  – Superiority violated

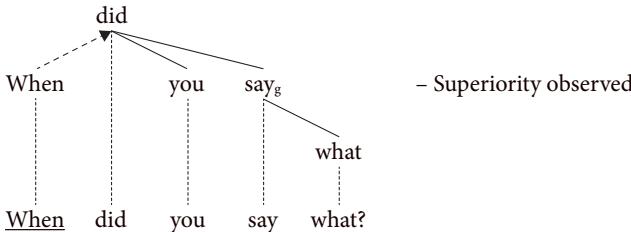
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<sup>216</sup> Concerning the superiority phenomenon, see Chomsky (1973).

(14) a.



b.



There is a clear acceptability contrast across (13a) and (13b). When both the subject and object are *wh*-expressions, the subject *wh*-expression must initiate the sentence. The subject is said to be “superior” to the object. The clear acceptability contrast disappears in (14a–b), however, where one *wh*-expression is an object, and the other an adjunct.

The current system explains the contrast in terms of rising catenae (see Sections 7.10 and 9.2). Sentence (13a) does not contain a rising catena (because rising is not present), whereas sentence (13b) does. *Ceteris paribus*, the assumption is that sentences that contain rising catenae are cognitively more expensive than sentences that do not. Furthermore, a shorter rising catena is preferred over a longer one. Given these assumptions, sentence (13a) is much better than sentence (13b) because sentence (13a) lacks a rising catena altogether, and sentences (14a) and (14b) are about equal in acceptability because the rising catena is the same for both. What one can take away from Examples (13)–(14) is therefore that superiority facts can be explained in a straightforward manner by the rising catenae that are (or are not) involved.

Many further aspects of *wh*-fronting are considered in Chapter 9, where additional limitations on rising catenae are examined.

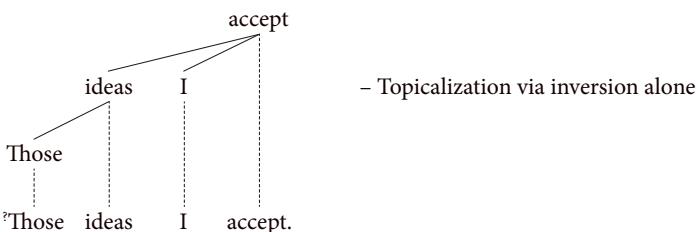
### 8.3 Topicalization

Topicalization occurs when a constituent is fronted in order to establish its contribution as the sentence topic. Topicalization usually involves constituent rising, but it can also occur in the absence of rising entirely, which means just inversion has

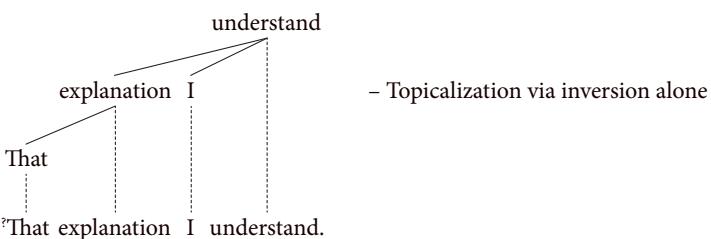
occurred. It is possible to topicalize more than one adjunct, but topicalization of more than one argument is very unlikely. Topicalization occurs primarily in matrix clauses, but it is also possible in subordinate clauses.

The following examples illustrate topicalization via inversion, in the absence of rising:

(15)



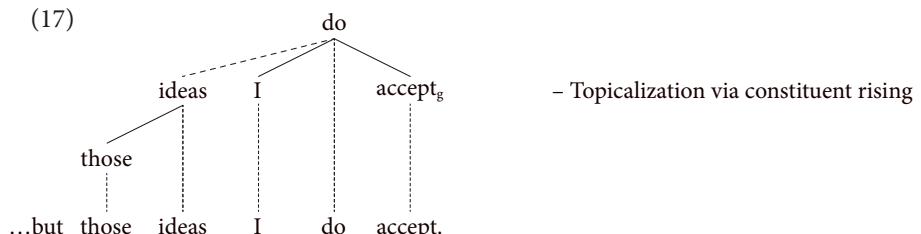
(16)



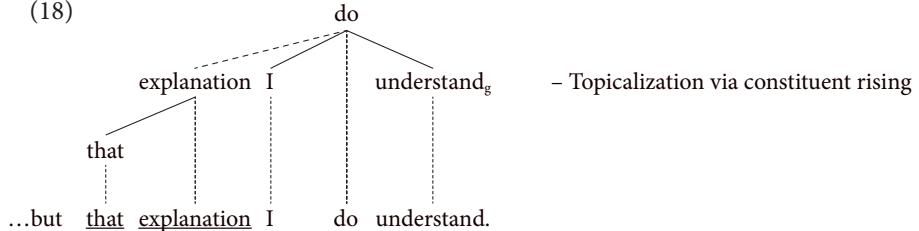
The NPs *those ideas* and *that explanation* have been topicalized. These instances of topicalization lack rising entirely; they occur instead via inversion alone, that is, the verb and object NP have inverted with respect to each other. In this regard, these instances of topicalization are similar to subject-auxiliary inversion, which also occurs without rising (see Section 7.8).

Topicalization in (15)–(16) is viewed as marginal here, since when taken out of context, topicalization seems less than fully acceptable. To remove the marginality, a context implying a contrast can be suggested by including *and/but...*, e.g. ...*but those ideas I accept*. Another means of overcoming the marginality is by including auxiliary *do* for emphasis.

(17)



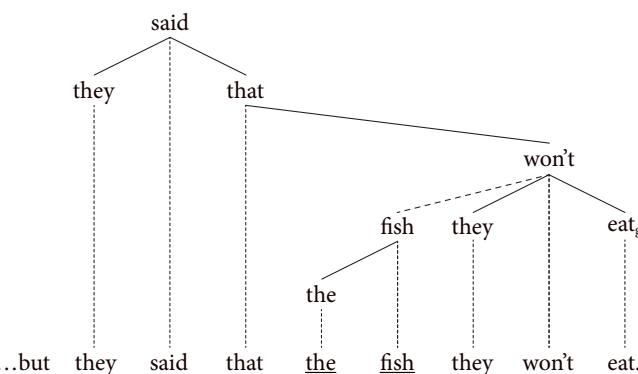
(18)



The inclusion of *but* and the auxiliary verb *do* establish the presence of contrastive focus with the preceding context. This contrastive focus motivates the fronting of the contrasted expression. Note that due to the presence of the auxiliary *do*, rising is necessary.

Topicalization is associated primarily with matrix clauses, but it is also possible in subordinate clauses, as the following example illustrates:

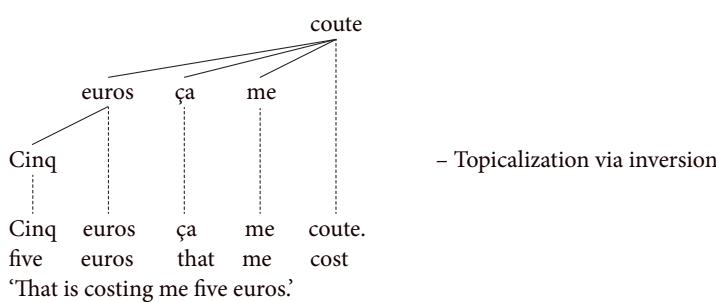
(19)



The NP *the fish* is topicalized within the embedded object clause. As with the previous example, this example employs topicalization to help establish contrastive focus. The constituent *the fish* is being contrasted with an expression in the preceding context.

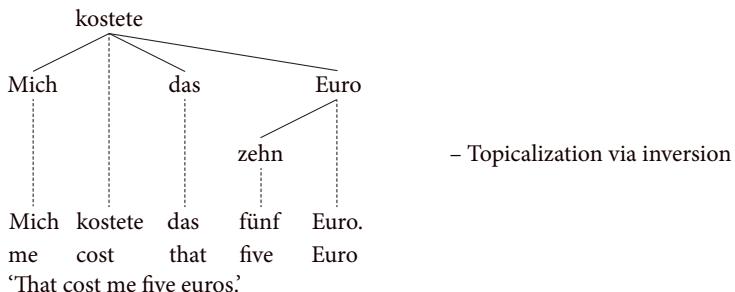
Topicalization occurs in other languages of course. The following examples illustrate topicalization in French and German:

(20)



'That is costing me five euros.'

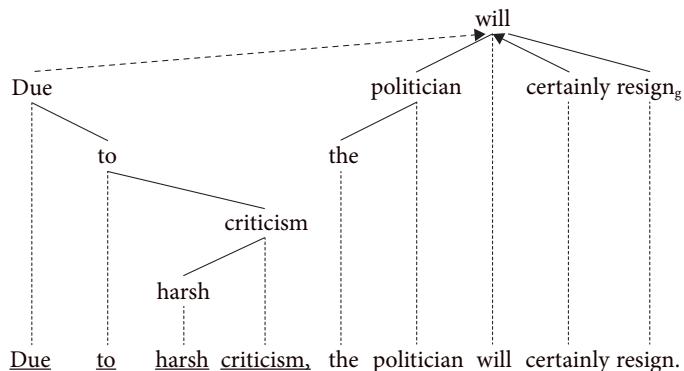
(21)



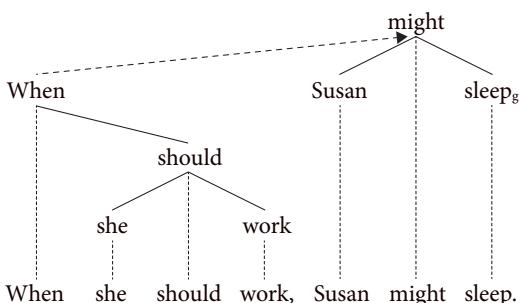
The NP *cinq euros* has been topicalized in (20), and the pronoun *mich* in (21). These instances of topicalization lack rising and are therefore addressed purely in terms of inversion, i.e. the object inverts to the left side of the finite verb. Note as well that French topicalization maintains the canonical SV order, whereas German topicalization results in VS order. The V2 principle of German necessitates that the finite verb remain in second position, which means that subject-verb inversion must occur.

The examples of topicalization in (15)–(21) all involve a fronted object nominal. Object topicalization is, however, a comparatively rare occurrence. Topicalization of an adjunct is, in contrast, frequent, e.g.

(22)



(23)

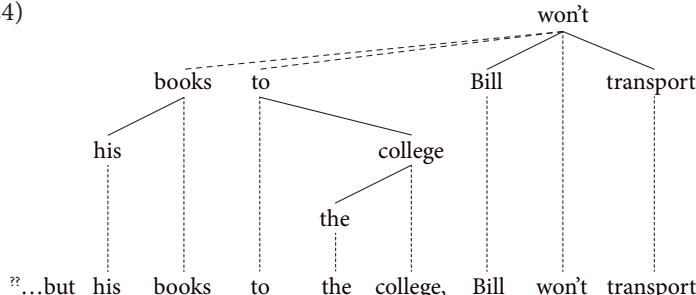


The causal adjunct *Due to harsh criticism* has been topicalized in (22), and the temporal adjunct *When she should work* has been topicalized in (23). By topicalizing these adjuncts, the situational context for the matrix clause is established.

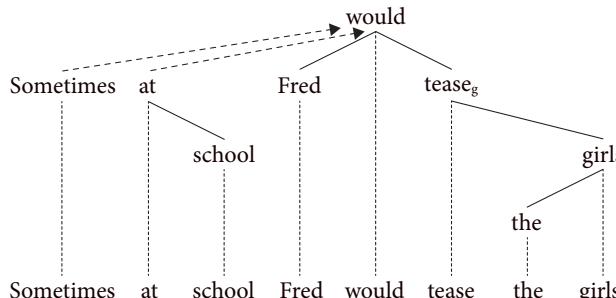
Observe that topicalization in (22)–(23) involves rising; the governor of the adjunct in each case is the main verb. We know that these structures are correct – that is, that the main verb is indeed the adjunct's governor – because main verb and adjunct can form a constituent, e.g. *He will resign due to criticism, but she won't do that, She might sleep when she should work, but he won't do that*. The fact that the underlined strings can be replaced by the proform *do that* reveals that the main verb and the adjunct are forming a constituent in such cases.

Topicalization of more than one argument is very unlikely, whereas topicalization of two (or more) adjuncts is easily possible, e.g.

(24)



(25)

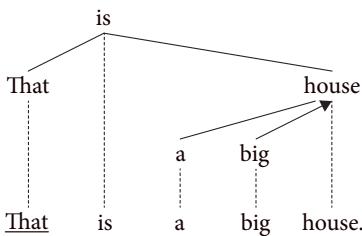


The attempt to topicalize both the object nominal and the directive PP in (24) results in questionable acceptability. Topicalizing the two adjuncts in (25), in contrast, results in an acceptable sentence. The reason for this difference is unclear. Chapter 9 has more to say about topicalization.

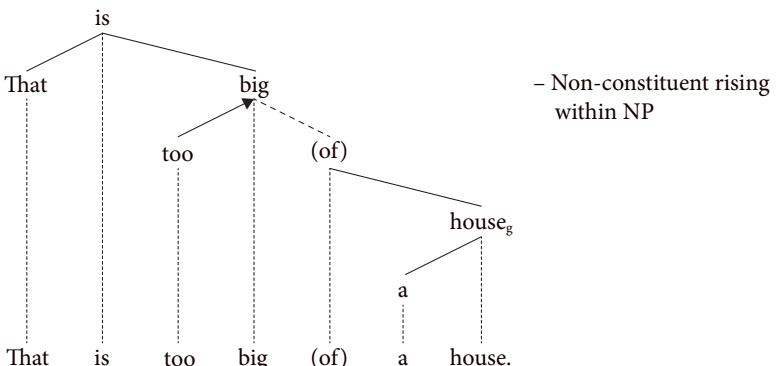
## 8.4 NP-internal fronting

NP-internal fronting occurs when an attributive adjective is focused by a focus adverb (e.g. *how*, *more*, *not very*, *so*, *too*, *that*).<sup>217</sup> The focus adverb and adjective undergo non-constituent rising within the NP. The primary indicator that non-constituent rising has occurred in such cases is the optional appearance of the preposition *of*, e.g.

(26) a.

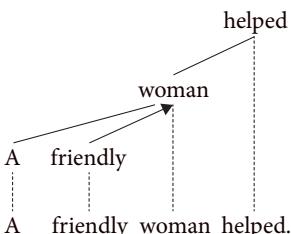


b.



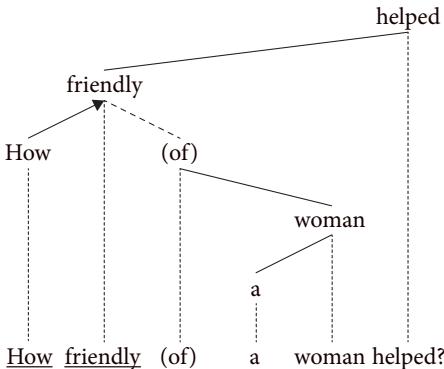
c. \*That is a too big house.

(27) a.



<sup>217</sup> The phenomenon is known as *the big mess construction* (BMC), a term from Berman (1974). Standard accounts of the BMC are all based in phrase structure (e.g. Van Einde 2007; Kim & Sells 2011), so the DG analysis here is quite unlike these previous accounts.

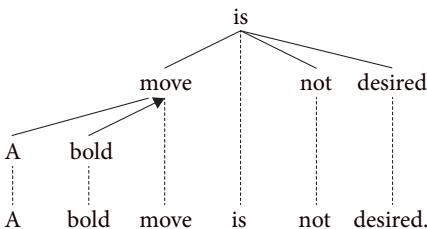
b.



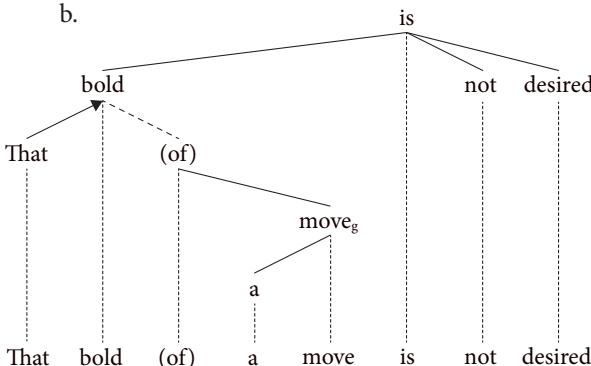
- Non-constituent rising  
within NP

c. \*A how friendly woman helped?

(28) a.



b.



- Non-constituent rising  
within NP

c. \*A that bold move is not desired.

The focus adverb and attributive adjective in each of the b-sentences has non-constituent risen to become the root of the NP. The c-sentences demonstrate that this rising can be obligatory when the focus adverb appears on the adjective. Observe that the appearance of the preposition *of* is optional, whereby British varieties of English tend to avoid its appearance, whereas varieties of American English are more permissive, accepting its presence more readily.

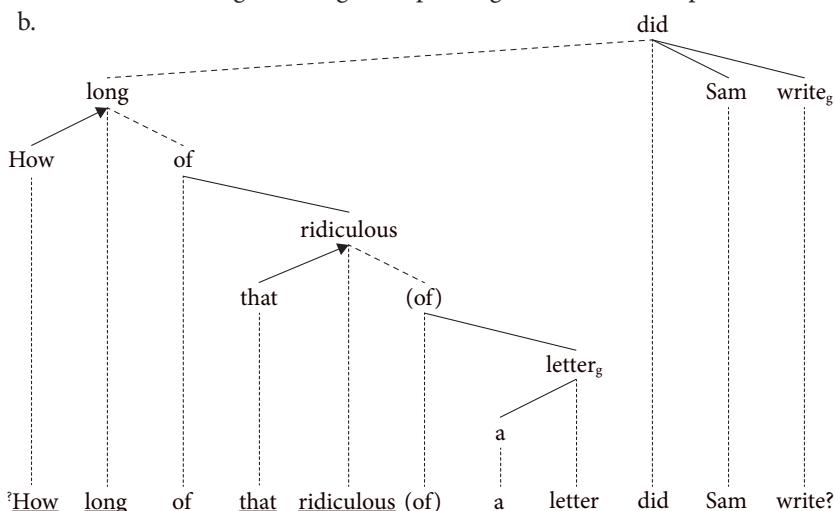
NP-internal fronting occurs with indefinite NPs only. If a definite article appears, fronting fails, e.g. \**too big (of) the house*, \**How friendly (of) the woman...*,

\**That bold (of) the move....* Furthermore, the fronting is reliant on the appearance of the indefinite article *a*. If an indefinite plural noun appears, rising is impossible, e.g. \**too big (of) houses*, \**How friendly (of) women*..., \**That bold (of) moves*.... An obvious aspect of NP-internal fronting is that the risen adjective must take on nominal status; only by doing so can the distribution of such expressions be accommodated, for they distribute like NPs, not like APs. NP-internal fronting is a limited construction; it has a narrow distribution in English and is absent from related languages, e.g. German.

Interestingly, it is (at least marginally) possible for NP-internal fronting to occur twice in a single NP, e.g.

- (29) a. Sam wrote a long flattering letter praising the dean's accomplishments.

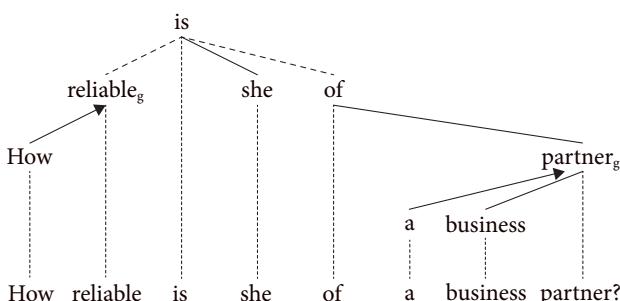
b.



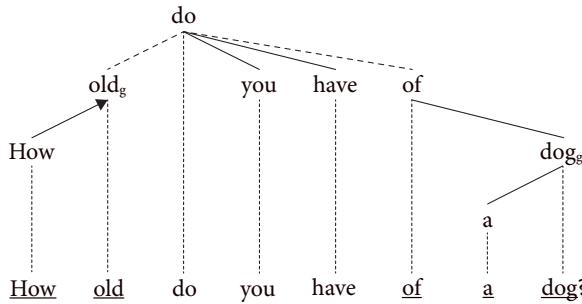
The sarcastic implication in the question is that the dean has not achieved any significant accomplishments. This example shows two instances NP-internal fronting; both *how long* and *that ridiculous* have been fronted, whereby the former dominates the latter.

Observe next that extraposition out of the fronted expression can occur:

- (30)



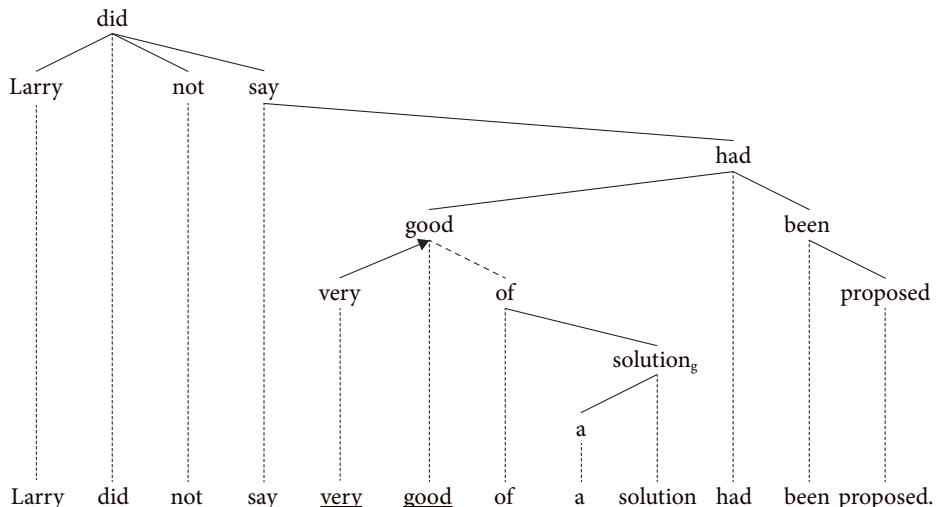
(31)



The PPs *of a business partner* and *of a dog* have been extraposed out from under *How reliable* and *How old*, respectfully, whereby the non-extraposition versions are of course also possible, e.g. *How old of a dog do you have?* While Examples (29b) and (30)–(31) are unusual, nothing about them challenges any aspect of the current theory of discontinuities. The Rising Principle is obeyed in each case, since the head of the risen catena dominates that catena's governor.

One particularly mysterious trait of NP-internal fronting occurs when the negation *not* is involved.

- (32) a. Larry said a very good solution had been proposed.  
 b. ??Larry said very good of a solution had been proposed.  
 c. Larry said not very good of a solution had been proposed.  
 d.



Sentences (32b–c) demonstrate that the degree adverb *very* alone does not license NP-internal fronting, but when combined with *not*, the combination *not very* does.

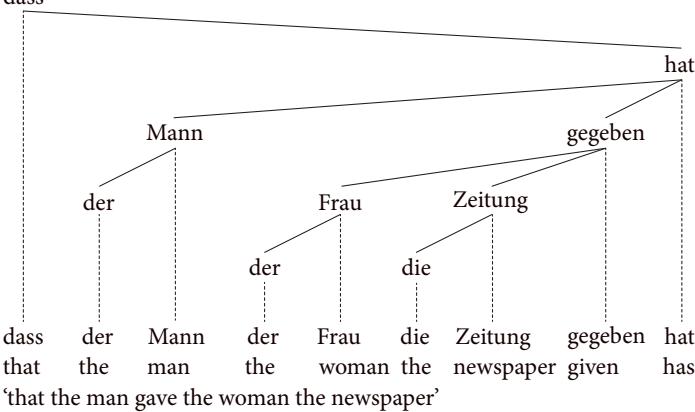
Example (32d) is the mysterious structure: even when the negation appears in the matrix clause, it can still help license the NP-internal fronting that occurs within the subject NP of the embedded clause. Apparently, the negation has the ability to focus subconstituents within its scope.

These brief observations and comments about NP-internal fronting are all that are offered here. The intent has been merely to provide a general impression of the phenomenon.

## 8.5 Scrambling

A widely studied discontinuity type is scrambling, although English does not have/allow scrambling. The lack of scrambling discontinuities in English means that the discussion here must turn to another language, to German, where scrambling is frequent. The following examples from German deliver a sense of scrambling discontinuities:

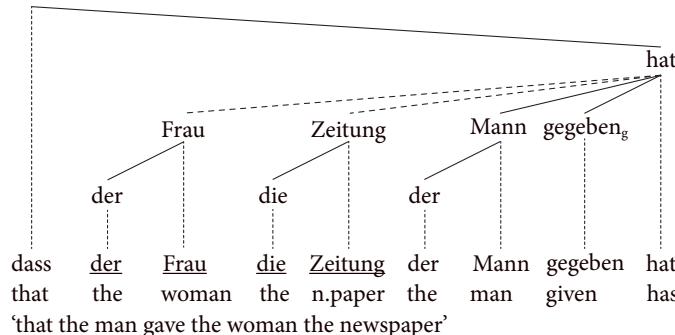
- (33) a. dass



- b. ... der Mann die Zeitung der Frau ...
- c. ... der Frau der Mann die Zeitung ...
- d. ... der Frau die Zeitung der Mann ...
- e. ... die Zeitung der Mann der Frau ...
- f. ... die Zeitung der Frau der Mann ...

All six orders are acceptable, although there are pragmatic differences between them. This flexibility is primarily due to the possibility of scrambling rising. Since the subject NP is always directly governed by the finite verb, scrambling rising must occur in each of (33c-f), as illustrated here with Example (33d):

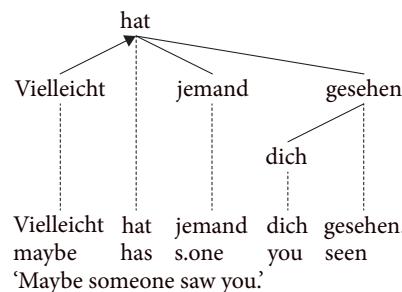
(33) d'. dass



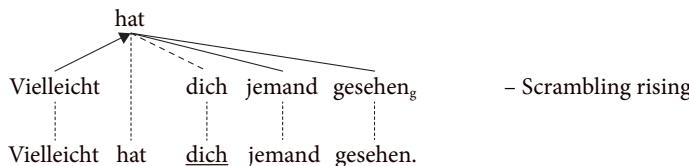
Both *der Frau* and *die Zeitung* have scrambling risen. The presence of scrambling rising in German is largely responsible for rendering the word order of German much freer than the word order of English.

Scrambling rising is always constituent rising. It often occurs in order to accommodate the information contribution of the constituents involved. Constituents that contribute old information (information that has already been established in context) tend to appear to the left, whereas constituents contributing new information (information that has not yet been established in context) strive rightward. Since definite pronouns usually represent old information, they often undergo scrambling rising in order to appear further to the left, e.g.

(34) a.



b.



- c. Hat
- 
- dich jemand gesehen?  
Hat dich jemand gesehen?
- Scrambling rising
- 
- d. dass
- 
- dass dich jemand gesehen hat  
dass dich jemand gesehen hat
- Scrambling rising

The definite pronoun *dich* ‘you’ in (34b–d), which represents old information, has scrambling risen in order to appear further to the left.

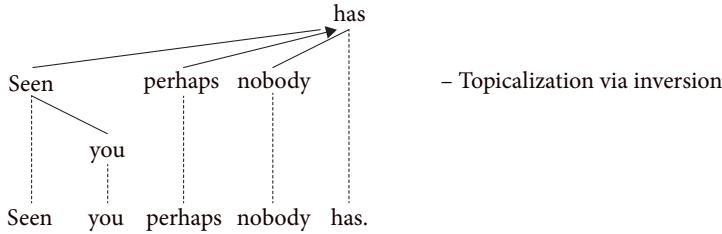
These examples have the risen constituent preceding its governor. The following example has the risen constituent following its governor:

- (34) e.
- 
- Gesehen hat dich vielleicht keiner.  
seen has you maybe nobody  
'Seen you perhaps nobody has.'

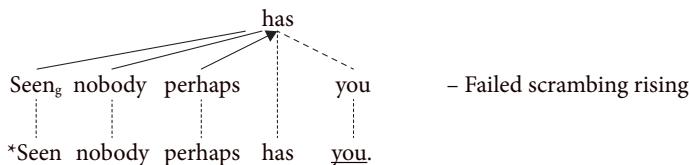
The object *dich* has again undergone scrambling rising, but this time to the right (not to the left). Worth noting in this area is that *dich* in (34e) has not been extraposed. We know that it has not been extraposed because light constituents (such as unstressed definite pronouns) cannot be extraposed. Also, worth noting is that the participle *gesehen* ‘seen’ has not, although it appears in initial position, undergone rising, but rather it has simply inverted to the left of its governor *hat* ‘has’.

An important observation concerns the corresponding English equivalent of (34e). While it is possible to topicalize VPs in English, the object of the verb cannot rise to the right, e.g.

(35) a.



b.



The VP *seen you* in (35a) has undergone topicalization, whereby rising is not involved, but rather just inversion. The badness of (35b) illustrates two points: first, that extraposition cannot extrapose unstressed definite pronouns (because they are too light) and second, that English does not allow scrambling. The acceptability contrast across (34e) and (35b) is explained, namely, in terms of scrambling. Since scrambling rising is frequent in German and since a scrambled constituent can both precede or follow its governor, the rising analysis for (34e) is plausible. Scrambling is absent from English entirely, however, which helps explain why (35b) is bad. The definite pronoun *you* cannot be scrambled out from under its governor *seen*.

The examples discussed in this section have delivered a sense of how the current DG theory of rising can accommodate the comparatively free word orders of many languages. Many seemingly discontinuous structures can be insightfully addressed in terms rising, the result being that there is in fact no discontinuity in surface syntax. A word of caution is warranted, however, since there are certainly phenomena of syntax that appear to incur discontinuities but that cannot be addressed in terms of rising.<sup>218</sup>

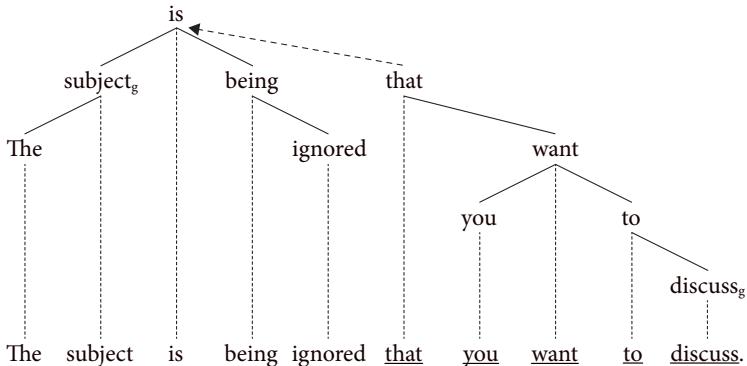
<sup>218</sup>. The so-called *discontinuous NP* in German is a case in point, e.g. *Ein neues Auto kann ich mir keines leisten*, lit. 'A new car can I for myself afford none', that is, 'I cannot afford a new car'. Rising does not help when confronted with such data, for the non-rising variant of the NP is not possible to begin with: \**Ich kann mir kein ein neues Auto leisten*, lit. 'I can for myself no a new car afford'.

## 8.6 Extraposition

Extraposition occurs when a relatively heavy constituent appears separated from, and to the right of, its governor or its canonical position. The extraposed constituent should be heavy, which means that light constituents, e.g. definite pronouns, do not extrapose, but clauses, *to*-phrases, and heavy PPs do undergo extraposition.<sup>219</sup> Extraposition occurs frequently in many languages. It seems to be motivated by processing constraints. Structures that grow down to the right are generally easier to process than structures that grow down to the left.<sup>220</sup> Extraposition also often functions to further specify an expression, clearly helping to pick out that expression's referent in context. Extraposition involves constituent rising, whereby the governor of the extraposed constituent precedes that constituent. Thus, extraposition is unlike three of the previous types of rising (*wh*-fronting, topicalization, and NP-internal fronting), which have the risen catena preceding its governor.

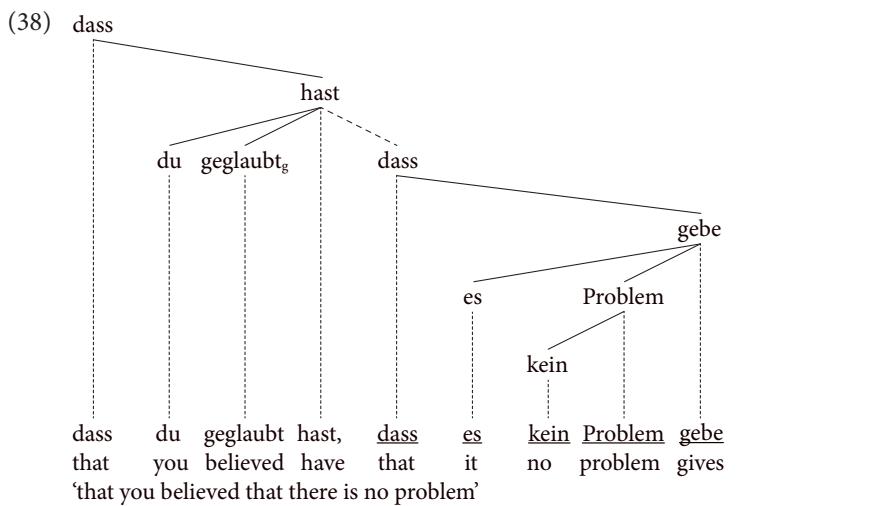
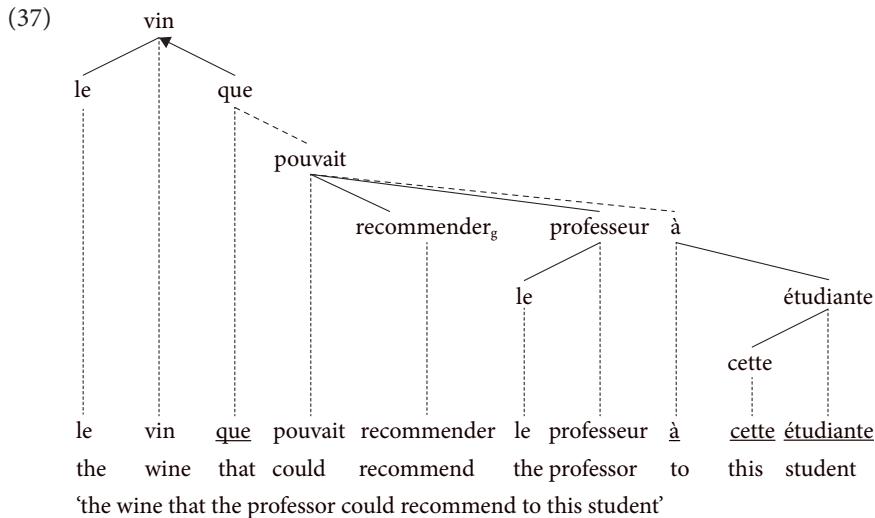
Extraposition is a frequent occurrence in many languages. The following examples illustrate extraposition in English, French, and German:

(36)



<sup>219</sup>. See Bröker (1999: 119) for examples from German illustrating that extraposed constituents are relatively heavy.

<sup>220</sup>. See Heringer et al. (1980: 188–9) for a vivid illustration and some discussion of the extent to which structures that extend down to the right are easier to process than structures that extend down to the left.



These instances of extraposition all have in common that the extraposed constituent has risen to the right of its governor. Extraposition can occur out of subject NPs as in (36), out of infinitive phrases as in (37), and out of participle phrases as in (38). Both arguments and adjuncts can be extraposed. The extraposed constituents in (37) and (38) are arguments, whereas the extraposed constituent in (36) is an adjunct. Each of these sentences grows down to the right. This is a consistent aspect of extraposition. By extrapositing relatively heavy constituents, the resulting sentence is easier to process.

Attempts to extrapose relatively light constituents often fail:

- (39) a. That story about you was funny.  
      b. ??That story was funny about you.  
      c. That story that everyone has been talking about was funny.  
      d. That story was funny that everyone has been talking about.
- (40) a. The claim by you upset everyone.  
      b. \*The claim upset everyone by you.  
      c. The claim that the economy was improving was ridiculous.  
      d. The claim was ridiculous that the economy was improving.

Extrapositing the PPs in the b-clauses fails because these PPs are too light to motivate extraposition. When the extraposed constituents are clauses, however, as in the d-sentences, extraposition is acceptable. Based on such data, one can conclude that clauses (e.g. relative clauses, content clauses, object clauses) are the most readily extraposed constituents. PPs and to-infinitive phrases can also be extraposed, if they are heavy enough. Simple NPs and single adverbs, however, are rarely extraposed.

One particular type of extraposition is extremely frequent. Due to their substantial semantic and pragmatic meaning contribution, comparative expressions (introduced by *than* or *as* in English) are particularly heavy. These expressions are therefore often extraposed, seemingly regardless of whether they are phrasal or clausal.

- (41) a.
- 
- ```

graph TD
    decided --- men
    decided --- to
    decided --- than
    men --- More_g
    men --- men
    to --- order
    to --- than
    order --- wine
    than --- women
    
```
- More men decided to order wine than women.

b. More men than women decided to order wine.

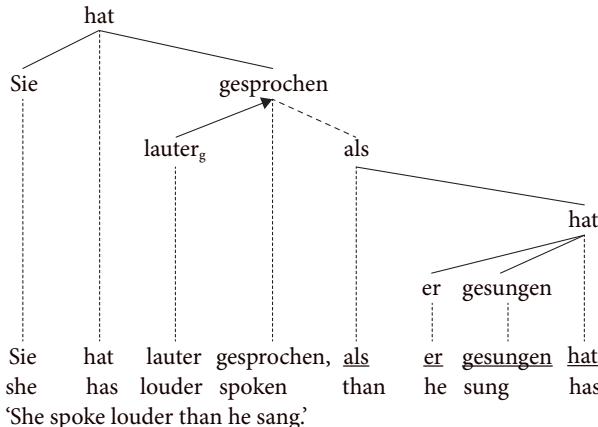
- (42) a.
-
- ```

graph TD
 etaients --- moins
 etaients --- que
 moins --- de
 moins --- poissons
 de --- moins_g
 de --- de
 que --- des
 que --- pecheurs
 des --- des
 des --- pecheurs

```
- Moins de poissons étaient présents que des pêcheurs.  
 'Fewer fish were present than fishermen.'

b. Moins de poissons que des pêcheurs étaient présents.

(43) a.

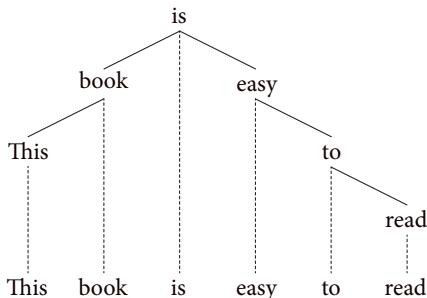


b. Sie hat lauter als er gesungen hat gesprochen.

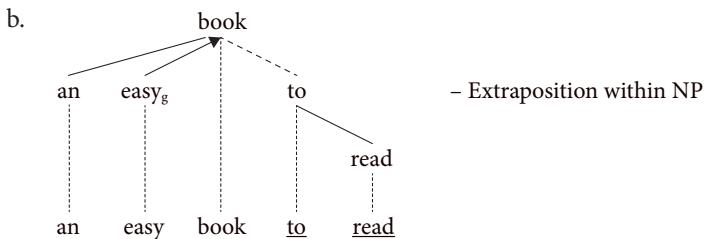
These comparative expressions in the a-sentences have all been extraposed. Due to the contrastive meaning, the extraposed expressions receive contrastive focus and are thus quite heavy, which motivates extraposition. Note, however, that as with the examples above, extraposition is often optional, as the b-examples demonstrate. There are a number of aspects about these sentences involving comparatives that have been taken for granted here. The syntax of comparatives is examined in some detail in Chapter 14.

The examples of extraposition produced so far are occurring within the clause. Data like the following demonstrate that extraposition also occurs within NPs:<sup>221</sup>

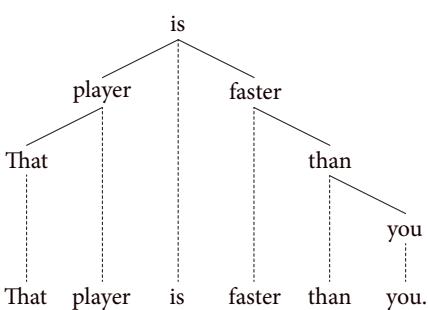
(44) a.



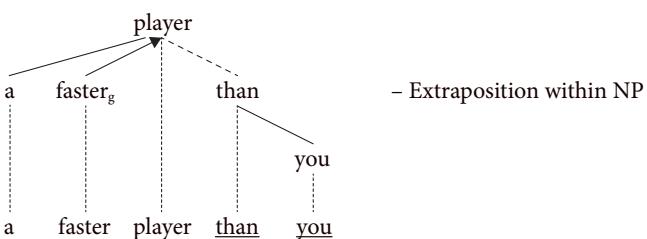
<sup>221</sup>. Aspects of extraposition occurring within NPs are discussed at length from a DG perspective in Osborne (2003).



(45) a.



b.



The a-sentences show *easy* and *faster* as the governors of *to read* and *than you*, respectively. Given the a-analyses, the b-structures are warranted, where the expressions *to read* and *than you* have undergone extraposition within NP. No attempt is made here to systematically identify the factors that motivate NP-internal extraposition, but rather it suffices to acknowledge that extraposition is a varied phenomenon that can occur at the clause level and within NPs. Extending the analysis to APs (e.g. *more intelligent than him*) and to AdvPs (e.g. *more carefully than that*) is a given.



## CHAPTER 9

# Islands

### 9.1 Overview

This chapter is concerned with *islands* to discontinuities. The island notion stems from the 1960s; it designates syntactic categories and configurations that block long distance dependencies from occurring. There are approximately one-half dozen commonly-acknowledged types of islands. The island types examined in this chapter are all briefly illustrated here now first:

- (1) a. Jim buys and sells **old** cars.  
b. \*Which does Jim buy and sell cars?  
c. \*...and **old** Jim does buy and sell cars. – Left branch island  
– Left branch island
- (2) a. Susan revised that paper on **ellipsis**.  
b. \*What did Susan revise that paper on.  
c. \*..but **ellipsis** Susan did revise that paper on. – Specified NP island  
– Specified NP island
- (3) a. The praise from **the Dean** was great.  
b. \*Who was the praise from great?  
c. \*..and **the Dean** the praise from was great. – Subject island  
– Subject island
- (4) a. She left because she has to drive to **Denver**.  
b. \*Which city did she leave because she has  
to drive to?  
c. \*...but **Denver** she did leave because she has  
to drive to. – Adjunct island  
– Adjunct island
- (5) a. We wonder what can save **the oak trees**?  
b. \*Which **trees** do we wonder what can  
save?  
c. ...but **the oak trees** we do wonder what  
can save. – Wh-island  
– But topicalization possible
- (6) a. Fixing **the cars** they own is expensive.  
b. \*Fixing is expensive **the cars** they own. – Right roof island

The b- and c-sentences are all bad because there is an island present that blocks the attempt at the type of discontinuity present (*wh*-fronting, topicalization, or extraposition).

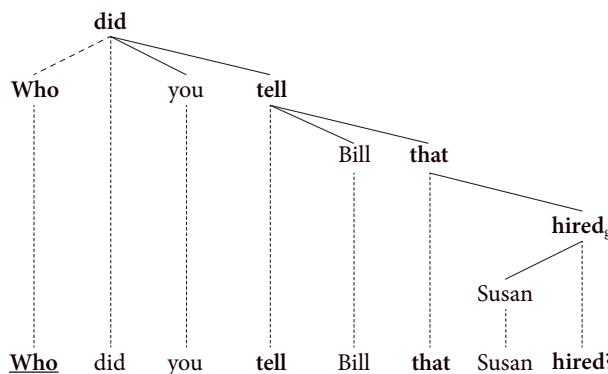
The island types just illustrated are explored here in terms of rising catenae. By examining the rising catena each time, one can identify the relevant traits of *wh*-fronting, topicalization, and extraposition that help predict when they can occur.

## 9.2 Risen and rising catenae

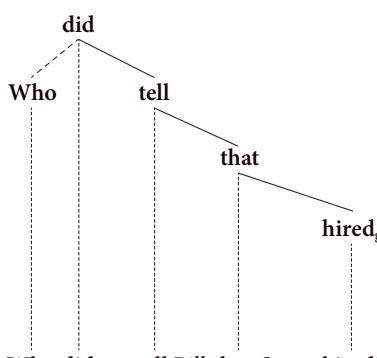
The *risen catena* and *rising catena* units were introduced in Section 7.10. Of these two units, the rising catena has not yet played much of a role in the account of discontinuities. That now changes, since both the risen catena and the rising catena are key units in the current DG for the identification of the constraints on discontinuities. To repeat the definitional statements from Section 7.10, a risen catena is a *catena that takes on a word as its head that is not its governor* and a rising catena is the *minimal catena that includes the root of a risen catena and the governor of that catena*. The convention employed frequently in this chapter below shows a risen catena with an underline and a rising catena with bold script.

The following examples emphasize the presence of rising catenae:

(7) a.



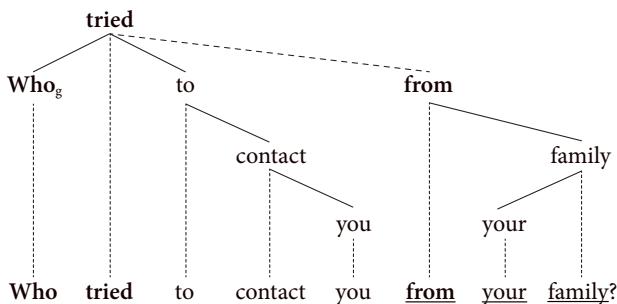
b.



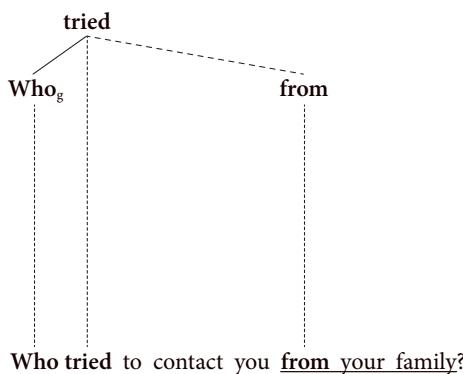
Example (7a) is a standard tree containing a *wh*-fronting discontinuity; the risen catena is underlined and the rising catena is in bold. Tree (7b) emphasizes the rising catena by omitting the words from the tree that are not included in that rising catena. Every discontinuity has a rising catena.

The following trees further illustrate rising catenae, but this time using an instance of extraposition:

(8) a.



b.



Example (8a) is a standard tree containing an extraposition discontinuity. All the words that are not included in the rising catena have again been removed from the structure in (8b), only the rising catena itself remaining. No matter the discontinuity at hand, it is possible to discern a catena that connects the risen catena to its governor.

Risen catenae and rising catenae play a central role in the efforts below to identify the limitations on discontinuities. There are a couple of aspects of risen and rising catena that are pertinent. The first is the syntactic category of the links, i.e. the words, that form a risen catena or rising catena and the second is the grammatical relations of the dependencies that connect the words of a rising catena to each other. Some limitations on discontinuities can be characterized by acknowledging the nature of the words and dependencies that form risen and/or rising catenae.

### 9.3 Preposition stranding

One obvious aspect of the syntax of English that distinguishes English from many related languages concerns preposition stranding (henceforth **p-stranding**). P-stranding is a frequent occurrence in English, whereas it is (mostly) absent from many related languages, such as from German, e.g.

- (9) a. Who did you speak with?  
 b. the person who you spoke with  
 c. Fred has been spoken with.
- (10) a. \*Wem hast du mit gesprochen?  
 whom have you with spoken  
 b. \*der Mensch dem du mit gesprochen hast  
 the person whom you with spoke have  
 c. \*Fritz ist mit gesprochen worden.  
 Fritz is with spoken become

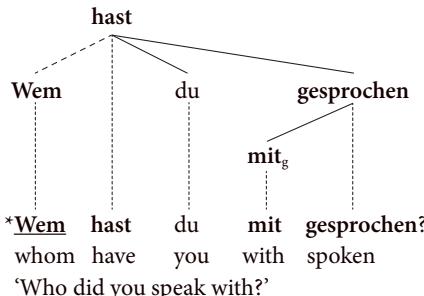
The preposition *with* in (9a–c) is “stranded”, that is, it appears alone at the end of the sentence without its object. Similar attempts to strand the preposition *mit* ‘with’ in (10a–c) in German fail terribly. While p-stranding occurs frequently in English, and it occurs in certain other Germanic languages (the Scandinavian languages), it does not occur in most other languages that are, to a greater or lesser degree, related to English. For instance, p-stranding does not occur in standard varieties of the Romance languages.

The following trees illustrate failed attempts at p-stranding in French and German:

- (11) a.
 

\*Qui est -ce que tu as parlé avec?  
 'Who did you speak with?'
- b. Avec qui est-ce que tu as parlé ?

(12) a.



b. Mit wem hast du gesprochen?

The attempts to strand the prepositions in the a-examples fail because the prepositions are barriers. This aspect of French and German (and all those languages that prohibit p-stranding) is acknowledged and expressed in terms of the rising catena involved. These sentences are bad because a link in the rising catena, a terminal link, is a preposition.

The observation is formalized as the ban on p-stranding:

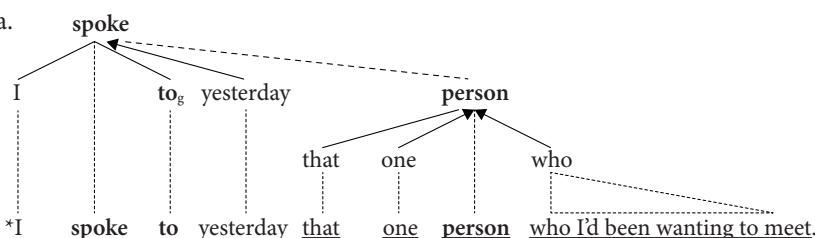
### Ban on p-stranding

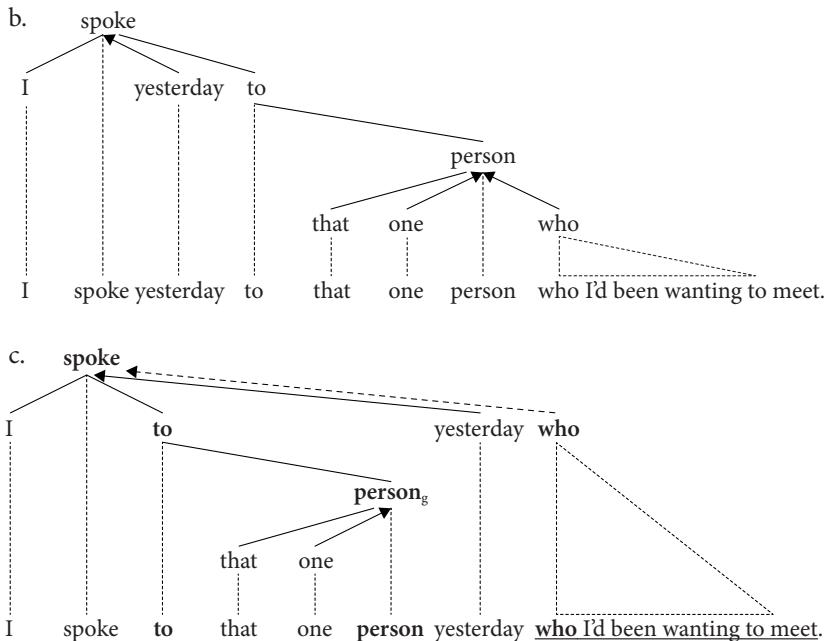
A preposition must immediately dominate its object.

The ban is in force in many languages, e.g. French and German, but it is absent from those languages that allow p-stranding, e.g. English and the Scandinavian languages. Exactly what motivates the ban and why it should be in force in certain languages but largely or entirely absent from related languages is a mystery. Note that when p-stranding occurs in the languages that allow it, the relevant preposition is usually a terminal link in the rising catena involved.

An interesting aspect of p-stranding (in those languages that allow it) is that it occurs forwards only. That is, the risen catena (when rising is involved) must precede its preposition governor. If p-stranding occurs backwards, that is, if the risen catena follows its preposition governor, the attempt at stranding fails. What this means is that extraposition cannot strand a preposition, e.g.

(13) a.





Sentence (13a) fails because extraposition has resulted in p-stranding (whereby the stranded preposition precedes its object). Sentence (13b) does not contain a discontinuity, but rather just shifting has occurred (see Section 7.6); the adverb *yesterday* has shifted leftward. Sentence (13c) illustrates that if p-stranding is not involved, extraposition is possible in that configuration.

A final aspect of p-stranding in English mentioned here concerns the fact that not all prepositions allow p-stranding. P-stranding seems to occur most felicitously with frequently occurring prepositions that consist of one or two syllables (*about*, *against*, *at*, *for*, *from*, *in*, *of*, *on*, *over*, *to*, *under*, *with*, etc.). In contrast, some complex prepositions, or preposition-like expressions, due not (readily) allow stranding (*because of*, *due to*, *except for*, *for the sake of*, *in spite of*, *since*, *with respect to*).

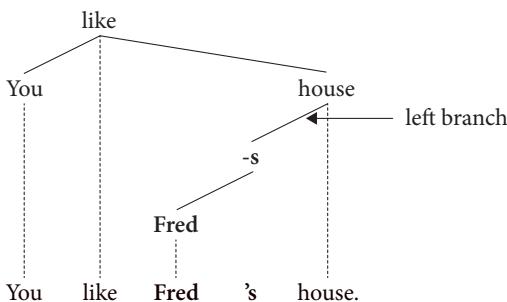
#### 9.4 Left branch islands

Determiners, attributive adjectives, and degree adverbs, all of which typically appear on a left branch extending down from a noun, adjective, or adverb cannot alone be *wh*-fronted, topicalized, or extraposed.<sup>222</sup> Such left branches are deemed

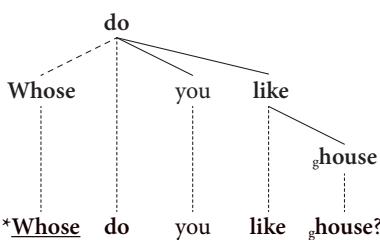
<sup>222</sup>. That left branches under nouns can be islands to extraction was first established by Ross (1967). See also Grosu (1974) and Corver (1990).

to be islands in English and many related languages. The possessive determiner *Fred's* in (14a) is on such a left branch:

(14) a.



b.



Example (14b) has attempted to question *Fred's* in (14a), but the attempt fails because *Fred's* is on a left branch underneath a noun and such left-branch constituents cannot be separated from their governors in English.

Left branch islands occur underneath nouns, adjectives, and adverbs, as the following examples illustrate:

- (15) a. Sam likes **fluffy** dogs.  
 b. \***Which** does Sam like dogs?

- (16) a. Larry has **two** cats.  
 b. \***How many** does Larry have cats?

- (17) a. Jim is **completely** gregarious.  
 b. \***How** is Jim gregarious?

- (18) a. Eric talks **extremely** fast.  
 b. \***How** does Eric talk fast?

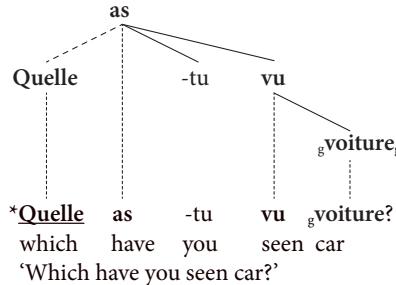
The b-sentences are attempts to question the expression in bold in the a-sentences. These questions fail because each word in bold in the a-sentences appears on a left branch underneath a noun, adjective, or adverb.<sup>223</sup> Left branch islands typically

<sup>223</sup>. Examples (17b) and (18b) can of course be acceptable, but the reading is different from the one indicated in the comparison with the a-counterparts.

prevent determiners, attributive adjectives, and degree adverbs from being separated from their governors.

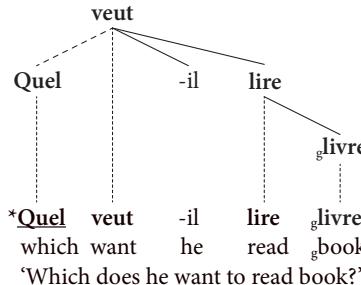
Left branches are also islands in other languages, as the following examples from French and German demonstrate:

(19) a.



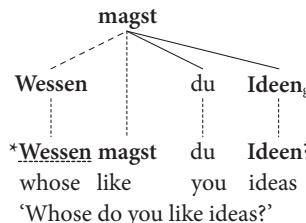
- b. Quelle voiture as-tu vu? – Pied-piping present  
 ‘Which car have you seen?’

(20) a.



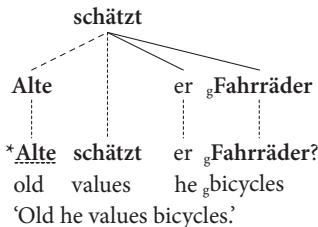
- b. Quel livre veut-il lire? – Pied-piping present  
 ‘Which book does he want to read?’

(21) a.



- b. Wessen Ideen magst du? – Pied-piping present  
 ‘Whose ideas do you like?’

(22) a.



- b. Alte Fahrräder schätzt er. – Pied-piping absent  
 'Old bicycles he values.'

Examples (19a) and (20a) illustrate that the attempt in French to front the interrogative determiners *quelle* and *quell* alone fail. Similarly, when one attempts to front the interrogative determiner *wessen* or the attributive adjective *alte* alone in German, the result is bad. The b-examples illustrate that when such fronting occurs, *pied-piping* is necessary (see the next section, Section 9.5); the interrogative word must pied-pipe its noun to the front of the sentence. These data are explained in terms of left branch islands.

To solidify these observations concerning left branch islands, the current account assumes that determiners, attributive adjectives, and degree adverbs cannot be the root of a risen catena. The following definitions and the statement about left branch islands capture the facts:

#### Left branch islands

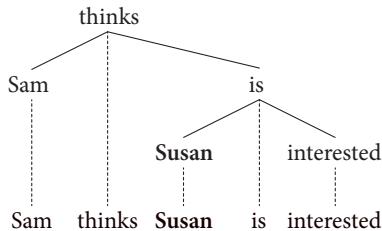
The root of a risen catena may not be a determiner, attributive adjective, or degree adverb.

The stereotypical rising catenae associated with left branch islands have the determiner, attributive adjective, or degree adverb on the left in terms of *wh*-fronting, topicalization, or scrambling. In addition, though, the constraint also prevents the determiner, attributive adjective, or degree adverb from appearing to the right in terms of scrambling or extraposition.

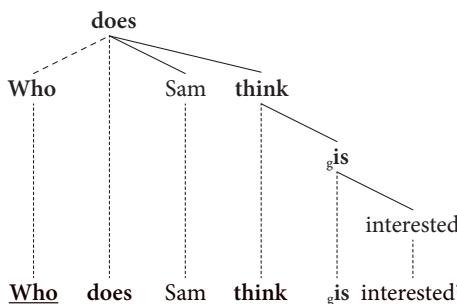
A potential objection to this analysis points to NP-internal fronting (see Section 8.4), e.g. *He owns too big of a house*. In such cases, it appears as though the adjective that has been fronted inside the NP (here *big*) has undergone rising, which should not be possible according to the analysis of left branch islands just produced. However, such cases are misleading due to the fact that the adjective involved in NP-internal fronting is reanalyzed as a noun (because it is the root of a constituent that has the distribution of a noun) and it therefore no longer qualifies as an attributive adjective.

An interesting and important aspect of left branch islands is that left branches are islands underneath nouns, adjectives, and adverbs, but not underneath verbs, e.g.

(23) a.



b.



The noun *Susan* is on a left branch underneath the copula *is* in (23a). This noun can be questioned (and thus fronted), as Example (23b) demonstrates. Hence nouns are not blocked from appearing as the root of a risen catena in the manner that determiners, attributive adjectives, and degree adverbs are blocked from doing so.

A phenomenon that is associated with the ability to front subjects out of embedded clauses as in (23b) is known as the *that-trace effect*. The *that*-trace effect is illustrated with the following acceptability contrast:

- (24) a. I think (that) Bill understands.
  - b. Who<sub>i</sub> do you think t<sub>i</sub> understands?
  - c. \*Who<sub>i</sub> do you think that t<sub>i</sub> understands?
- (25) a. She stated (that) Christine was hungry.
  - b. Who did she state t<sub>i</sub> was hungry?
  - c. \*Who did she state that t<sub>i</sub> was hungry?

The appearance of the subordinator *that* is optional in the a sentences, but in the b- and c-sentences, its appearance is prohibited. This aspect of *wh*-fronting has led some accounts of discontinuities to posit that *wh*-fronting must leave a **trace** behind (as indicated by the *t<sub>i</sub>*) and that only by virtue of the presence of this trace can one address the inability to front the embedded subject. A constellation where

a trace immediately follows the subordinator *that* is blocked, hence we have the designation *that-trace effect*.

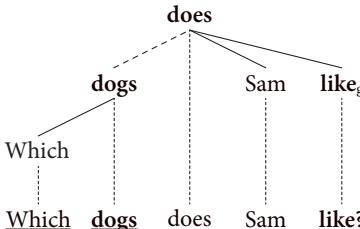
Since the current theory does not acknowledge traces, it seeks an alternative explanation of the *that*-trace phenomenon. An obvious alternative explanation assumes that when the subject of the embedded clause is absent from the embedded clause, the subordinator *that* is misinterpreted as a subject relative operator. This line of reasoning addresses the badness of the c-sentences in (24)–(25) in terms of vacuous quantification. Since *that* in such cases is reinterpreted as the subject of the embedded clause, the fronted *wh*-element becomes semantically vacuous, since neither the matrix predicate nor the embedded predicate has a semantic role that could be assigned to it. While this line of reasoning seems promising, it provides only a partial explanation for the underlying phenomenon. The deeper question concerns the fact that the subordinator *that* is obligatorily reinterpreted as a subject relative pronoun. Why does this reinterpretation occur? The answer to this question is not evident.

## 9.5 Pied-piping

To overcome left-branch islands, *pied-piping* can occur. Pied-piping is present when the focused word (e.g. the *wh*-word) takes its governor (and potentially dependents of its governor as well) with it to the front of the sentence.

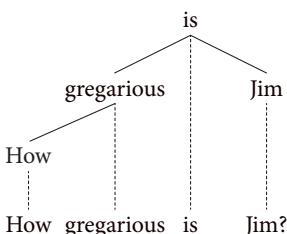
- (26) a. \*Which does Sam like dogs?

b.



- (27) a. \*How is Jim gregarious?

b.



The a-sentences illustrate left branch violations, and the b-sentences show how these violations are overcome. The *wh*-word *which* in (26b) pied-pipes its governor *dogs* to the front of the sentence, and the *wh*-word *how* in (27b) pied-pipes its governor *gregarious* to the front of the sentence. Pied-piping in such cases overcomes left branch islands by dragging the entire encompassing phrase to the front of the sentence. Notice that no discontinuity actually obtains in (27b), but rather just inversion has occurred.

Pied-piping is also the means the grammar employs to overcome other constraints on rising catenae (other than left branch islands). For instance, the preposition-like expressions that do not allow p-stranding can be fronted with their complements, e.g.

- (28) a. ??Which party did Tom skip class because of?
- b. Because of which party did Tom skip class?
- (29) a. ??Which objection did they proceed in spite of?
- b. In spite of which objection did they proceed?

The preposition-like expressions *because of* and *in spite of* do not readily allow p-stranding, as demonstrated with the a-sentences. This inability is overcome by pied-piping, as shown with the b-sentences where the *wh*-expression has pied-piped the entire encompassing phrase with it to the front of the sentence.

Pied-piping is the general means by which many constraints on discontinuities can be overcome. A given limitation on rising catenae is avoided by fronting, topicalizing, scrambling, or extraposing an encompassing catena to the left or right of the clause or sentence at hand.

## 9.6 Specified NP islands

A widely acknowledged fact about fronting out of NPs is that definite NPs are resistant to such fronting, whereas indefinite NPs more readily allow fronting to occur out of them. Definiteness is influenced by the choice of determiner. A definite determiner (definite article, possessive, demonstrative) is likely to render the NP that it introduces specific enough so that that NP can pick a specific member of the set of entities denoted by the noun of the NP, whereas an indefinite determiner (indefinite article, indefinite quantifiers) does not do this. In terms of rising catenae, this means that rising catenae often cannot so readily reach into a definite NP.

The influence of definiteness on rising catenae is illustrated with the following examples:

- (30) a. I found those pictures of **Bill**.  
     b. ??Who did you find those pictures of?  
     c. Who did you find pictures of?
- (31) a. He took the shot at **Cooper**.  
     b. ??Who did he take the shot at?  
     c. Who did he take a shot at?
- (32) a. They produced criticism of **Bush**.  
     b. ??Who did they produce their criticism of?  
     c. Who did they produce criticism of?
- (33) a. You want to read a paper about **gapping**.  
     b. ??What do you want to read Sam's paper about?  
     c. What do you want to read a paper about?

*Wh*-fronting out of the indefinite NPs in the c-sentences is possible, whereas the attempts at *wh*-fronting out of the definite NPs in the b-sentences are not so good. The acceptability contrast is addressed in terms of definiteness and specificity. Rising catenae can easily reach into those NPs that do not clearly specify the entity or entities denoted by the NP, but they cannot reach into those NPs that do clearly specify the entity or entities denoted by the NP.

Some apparent counterexamples to this insight about definiteness and specificity are not really counterexamples, but rather they involve a different syntactic structure, one that is flatter, e.g.

- (34) a. Sam wrote his article about **oil prices**.  
     b. **What** did Sam write his article about?  
     c. Sam wrote his article about oil prices.  
     d. Same wrote it about oil prices.  
     e. ...and his article, Sam wrote about oil prices.
- (35) a. Tara sang her song about **love**.  
     b. **What** did Tara sing her song about?  
     c. Tara sang her song about love.  
     d. Tara sang it about love.  
     e. ...and her song, Tara sang about love.

The string *his article about oil prices* in (34a) and *her song about love* in (35a) appear to be definite NPs. As such they should resist the indicated fronting out of them in the b-sentences. The c-, d-, and e-sentences demonstrate, however, that the strings *his article about oil prices* and *her song about love* do not actually qualify as NPs, but rather they are strings, each consisting of an NP and a separate PP.

The varying accounts of these NPs are solidified with the following analyses and acceptability contrasts of Examples (30) and (34), repeated here in part as (36)–(37):

- (36) a.
- 
- ```

graph TD
    found[found] --- I[I]
    found -.-> pictures[pictures]
    found -.-> of[of]
    pictures --- those[those]
    pictures -.-> Bill[Bill]
    of --- Bill
  
```
- I found those pictures of Bill.
 I found those pictures of Bill.
- b.
-
- ```

graph TD
 did[did] --- who[Who]
 did --- did[did]
 did -.-> you[you]
 did -.-> find[find]
 find -.-> pictures[pictures]
 pictures --- those[those]
 pictures -.-> ofg[ofg?]

```
- "Who      did      you      find      those      pictures      of?  
       Who      did      you      find      those      pictures      of?
- c. \*I found            of someone  
 d. \*I found them of someone.  
 e. \*...and those pictures I found of someone.

- (37) a.
- 
- ```

graph TD
    wrote[wrote] --- Sam[Sam]
    wrote -.-> article[article]
    wrote -.-> about[about]
    article --- his[his]
    article -.-> oil[oil]
    about -.-> oil
    about -.-> prices[prices]
  
```
- Sam wrote his article about oil prices.
 Sam wrote his article about oil prices.
- b.
-
- ```

graph TD
 did[did] --- what[What]
 did --- what[What]
 did -.-> Sam[Sam]
 did -.-> write[write]
 write -.-> his[his]
 write -.-> article[article]
 write -.-> aboutg[aboutg?]

```
- What      did      Sam      write      his      article      about?  
       What      did      Sam      write      his      article      about?

- c. Sam wrote about oil prices.
  - d. Sam wrote it about oil prices.
  - e. ...and his article Sam wrote about oil prices.

Example (36b) illustrates the inability of the rising catena to reach into the definite NP *those pictures of*. Example (37b) does not contradict this observation, since the rising catena there does not reach into the definite NP *his article* to begin with.

The definiteness effect illustrated with the examples considered in this section so far is, though, merely a tendency. That is, definiteness is one factor that impacts when fronting can occur out of NPs, but it is certainly not the only factor. At certain times, definiteness actually seems to have no influence on the ability of fronting to occur, for instance when a partitive NP is involved. Specificity is actually more pertinent to determining when fronting can occur out of NPs, as the following acceptability contrast demonstrates:

- (38) a. Which house do you like the roof of?  
b. \*Which house do you like this roof of?

Fronting out of the definite NP *the roof of* in (38a) is fine, whereas the similar attempt at fronting out of the definite NP *this roof of* in (38b) fails. The acceptability contrast can be addressed in terms of specificity. The definite article *the* in (38a) renders the NP definite, but it alone does not specify which roof is meant. The demonstrative determiner *this* in (38b), in contrast, does specify which roof is meant, namely the one that the speaker is pointing to.

The importance of specificity for predicting when fronting can and cannot occur out of NPs is supported by the influence of context. Many attempts at fronting out of definite NPs seem dubious as illustrated above with Examples (30b), (31b), (32b), (33b), but those examples can improve markedly if context is added, e.g.



*Wh*-fronting in these cases seems much better than in the b-sentences in (30b)–(33b). The appearance of the interrogative determiner *which* each time implies a context in which there is more than one relative/journalist/politician/topic to choose from, rendering the NP non-specific each time.

The impact of specificity on the ability to *wh*-extract out of NPs is demonstrated further with the following example:

- (40) a. \*Who did Ashley read her book about?<sup>224</sup>

Taken out of context, fronting out of *her book about* seems bad. However, if a context is added that aids the reading and minor changes are made to the sentence that accommodate the context, fronting out of the definite NP is possible:

- (40) b. A: Ashley has a lot of books about famous politicians that she is continually reading.  
B: Which politician is she currently reading her book about?

Given the context established by A's statement in which Ashly has numerous books about famous politicians, *her book (about a famous politician)* alone does not specify which book is meant. This lack of specificity is then what allows the indicated fronting to occur.

Definiteness and specificity correlate positively, and this positive correlation is responsible for the tendency for extraction out of definite NPs to be marginal. Specificity, though, is actually the more promising concept for predicting when fronting can occur out of NPs. Fully specified NPs are islands to rising.

## 9.7 Subject islands

Subjects are, for the most part, islands to *wh*-fronting and topicalization; they are not islands to extraposition (see Section 9.10), though, and they may not be islands to scrambling.<sup>225</sup> That subjects are islands to *wh*-fronting and topicalization is illustrated with the following sentences:

- (41) a. The driver of the red car ignored the traffic light.  
b. ??Which car did the driver of ignore the traffic light?  
c. \*...but the red car the driver of ignored the traffic light.
- (42) a. Music at Bill's parties gets people up dancing.  
b. ??Whose parties does music at get people up dancing?  
c. \*...and Bill's parties music at gets people up dancing.

---

<sup>224</sup>. Example (40a) is taken from Davies and Dubinsky (2003: Example (3)). The acceptability judgement given is theirs.

<sup>225</sup>. The status of subjects as islands is acknowledged from a DG perspective by Bröker (1999: 58–9).

- (43) a. Proponents of alternative energy are ready to pay higher taxes.  
 b. ??What type of energy are proponents of ready to pay higher taxes?  
 c. \*...and alternative energy proponents of are ready to pay higher taxes.

The attempts to wh-front the expressions in bold in the b-sentences are strongly marginal at best, and the attempts to topicalize these expressions in the c-sentences just plain fail.

While topicalization out of subjects seems to be completely impossible, some attempts to *wh*-front out of subjects are not entirely bad, as the ?? for the b-sentences indicate. If the subject is a gerund, *wh*-fronting can be more possible, as the following c-sentences suggest:

- (44) a. That Jerry is going to buy gifts for Jill is obvious.  
 b. \*Who is that Jerry is going to buy gifts for obvious?  
 c. ?Who is buying gifts for easy?
- (45) a. That we have to drink cheap beer is a travesty.  
 b. \*What is that we have to drink a travesty.  
 c. ?What is having to drink a travesty?

*Wh*-fronting of the finite subject clauses in the b-sentences is not possible, but fronting out of the gerund subjects in the c-sentences seems somewhat possible. The clear badness of the b-sentences has to do with the presence of the finite verb in the subject clause. Islands to discontinuities are quite opaque if they contain a finite verb, whereas the opaqueness can be reduced if no finite verb is involved.

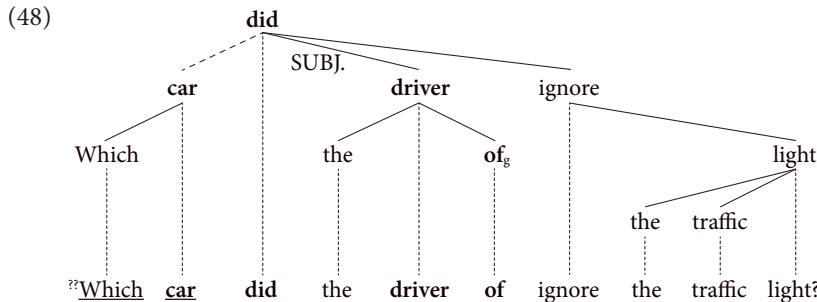
The semantic role that the subject bears also appears to influence the degree of opaqueness. *Wh*-fronting out of agent subjects seems to be less possible than *wh*-fronting out of theme or patient subjects:

- (46) a. Fans of your team trashed the stadium.  
 b. \*Whose team did fans of trash the stadium?  
 c. Fans of your team were encountered in the pub.  
 d. ??Whose team were fans of encountered in the pub?
- (47) a. Supporters of Sanders raised loud protest.  
 b. \*Who did supporters of raise loud protest?  
 c. Supporters of Sanders were forced out of the hall.  
 d. ??Who were supporters of forced out of the hall?

While the acceptability judgments in such cases are difficult to assess, *wh*-fronting out of the patient subjects in the d-sentences seems somewhat better than *wh*-fronting out of the agent subjects in the b-sentences.

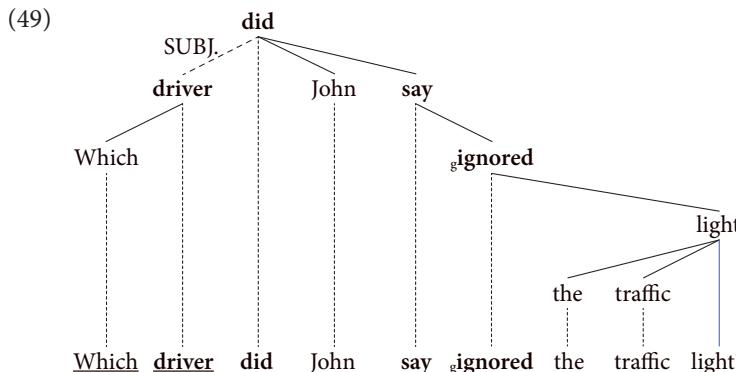
The fact that acceptability judgments are not always clear when *wh*-fronting occurs out of subjects suggests that the status of subjects as islands is not a hard and

fast constraint of grammar, but rather factors associated with ease of processing influence the extent to which a given subject is an island. In any case, the current approach to discontinuities in terms of risen and rising catenae simply notes that rising catenae reluctantly include a normal dependency that bears the subject grammatical function, e.g.



The rising catena in this case includes the dependency connecting *driver* to *did* and this dependency bears the subject relation. From a descriptive point of view, the inclusion of this subject relation in the rising catena is responsible for the strong marginality of the sentence.

Example (48) should be compared with the following sentence:



The rising catena in this case also contains a dependency that bears the subject relation, similar to the rising catena in (48). But the relevant dependency in this case, the dashed dependency edge, is that of the risen catena *which driver*. Note as well that this dependency is a terminal dependency, meaning that it connects to a terminal link of the rising catena (here to *driver*), whereas the relevant subject dependency in (48) is intermediate in the rising catena.

The examples considered in this section, sentences (41)–(49), have demonstrated that the rising catenae of topicalization cannot reach into a subject, and the

rising catenae of *wh*-fronting can also hardly reach into subjects. The discussion in Section 9.10 will demonstrate, in contrast, that the rising catenae of extraposition can easily reach into subjects.

## 9.8 Adjunct islands

Adjuncts have been widely viewed as islands, as with subjects. But unlike subjects, the extent to which adjuncts should be viewed as islands is more debatable, since it is easier to produce counterexamples. That is, it is relatively easy to produce examples that allow a rising catena to reach into an adjunct. This section examines some of the data concerning adjuncts in this regard. Finite adjunct clauses seem to be consistent islands to all discontinuity types, whereas the extent to which many phrasal adjuncts qualify as islands is not so clear.

First, observe that as with finite subject clauses, finite adjunct clauses are islands to *wh*-fronting and topicalization, and note further that clause-like gerunds are also islands to *wh*-fronting and topicalization:

- (50) a. They always argue before one of them cleans **the kitchen**.  
 b. \*What do they always argue before one of them cleans?  
 c. \*...and **the kitchen** they always argue before one of them cleans.  
 d. \*What do they always argue before cleaning?  
 e. \*...and **the kitchen** they always argue before cleaning.
  
- (51) a. They were happy after they tasted **the punch**.  
 b. \*What were they happy after they tasted?  
 c. \*...and **the punch** they were happy after they tasted.  
 d. \*What were they happy after tasting?  
 e. \*...and **the punch** they were happy after tasting.

The b-sentences show failed attempts to *wh*-front out of a finite adjunct clause, and the c-sentences show failed attempts to topicalize out of a finite adjunct clause. Similarly, the d-sentences illustrate failed attempts to *wh*-front out of a clause-like gerund phrase, and the e-sentences illustrate failed attempts to topicalize out of a clause-like gerund.

When just p-stranding is involved, however, *wh*-fronting and topicalization can occur out of some adjuncts, e.g.

- (52) a. Bill likes to work in **his Manhattan office**.  
 b. **Which of his offices** does Bill like to work in?  
 c. ...but **his Manhattan office** Bill does not like to work in.

- (53) a. She usually gets some sleep before French class.  
 b. Which class does she usually get some sleep before?  
 c. ...and French class she usually does get some sleep before.

*Wh*-fronting and topicalization are also possible out of some present participle adjuncts that are depictive predication over the subject, e.g.

- (54) a. Tom got angry trying to fix his bicycle.  
 b. What did Tom get angry trying to fix?  
 c. ...but his bicycle Tom did get angry trying to fix.
- (55) a. Tara enjoys lying in bed reading romance stories.  
 b. Which stories does Tara enjoy lying in bed reading?  
 c. ...but romance stories Tara does not enjoy lying in bed reading.

The relevant observation in these cases is that *wh*-fronting and topicalization are occurring out of non-finite adjuncts, that is, out of adjunct phrases rather than out of adjunct clauses.

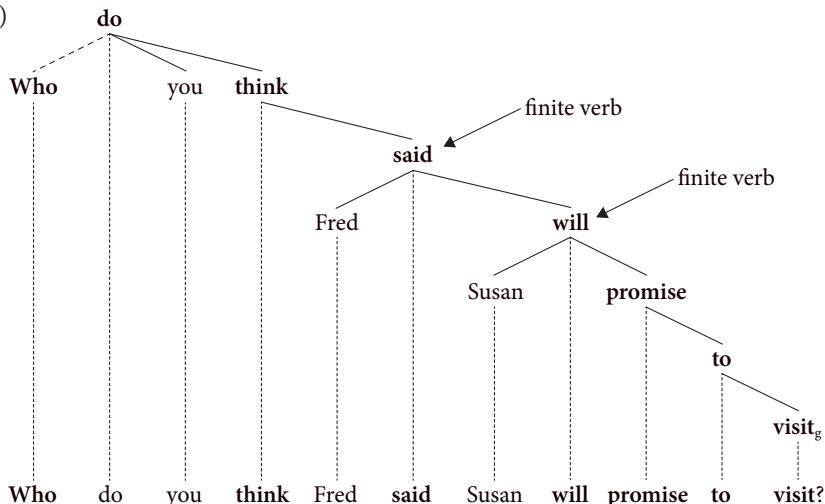
Adjuncts on nouns demonstrate a similar acceptability pattern, although the acceptability judgments can be less clear. If these adjuncts are finite clauses, they are robust islands to *wh*-fronting and topicalization, whereas if they are PPs, *wh*-fronting and topicalization out them can be marginally possible at times, e.g.

- (56) a. I have read all the books on the top shelf.  
 b. \*Which of these shelves have you read all the books that are on?  
 c. \*...but the top shelf I have read all the books that are on.  
 d. Which of these shelves have you read all the books on?  
 e. ?...but the top shelf I have read all the books on.
- (57) a. You like the couch that is in his Manhattan apartment.  
 b. \*Which one of his apartments do you like the couch that is in?  
 c. \*...but his Manhattan apartment I do like the couch that is in.  
 d. ?Which one of his apartments do you like the couch in?  
 e. \*...but his Manhattan apartment I do like the couch in.

While one can debate the acceptability of the d- and e-sentences, in which *wh*-fronting and topicalization have occurred out of adjunct PPs, those sentences are significantly better than their b- and c-counterparts, in which *wh*-fronting and topicalization have occurred out of adjunct clauses.

The importance of finite verbs and clause status for the theory of islands is becoming increasingly clear. Finite subject and adjunct clauses are usually robust islands. An interesting and seemingly contradictory observation concerning finite clauses, though, is that when the root finite verb belongs to a declarative object clause, that clause is not an island, e.g.

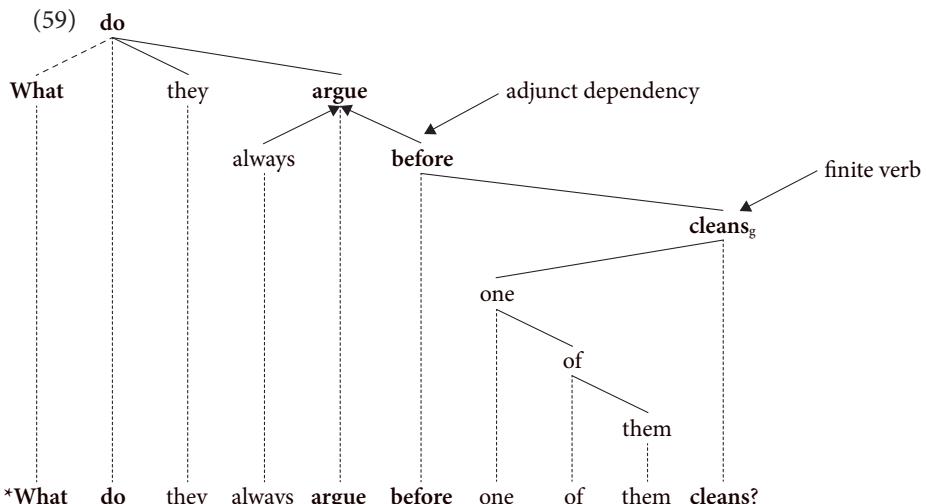
(58)



The rising catena here includes the two finite verbs *said* and *will*, each of which is the root of a declarative object clause. The rising catena in this case reaches into the deepest embedded object clause. Hence declarative object clauses are quite distinct from finite subject and adjunct clauses, and as will be established in the next section, from finite *wh*-clauses as well.

In order to determine what can be stated about the rising catenae that (attempt to) reach into adjuncts, one can focus on the hierarchical relationship between the adjunct dependency and the presence or absence of a finite verb in that same catena. Observe the following failed attempt (Example 50b above) at *wh*-fronting out of a finite adjunct clause in this regard:

(59)



This attempt at *wh*-fronting fails because the fronting would have to occur out of the finite adjunct clause *before one of them cleans*. The relevant observation about the rising catena is that the adjunct dependency connecting *before* to *argue* dominates the finite verb *cleans*. The following descriptive generalization expresses the insight:

### Finite adjunct islands

Within a rising catena, an adjunct dependency may not dominate a finite verb.

This descriptive generalization helps predict which rising catenae can reach into adjuncts. It is, however, merely a generalization that captures some of the behavior of adjuncts with respect to discontinuities.

## 9.9 Wh-islands

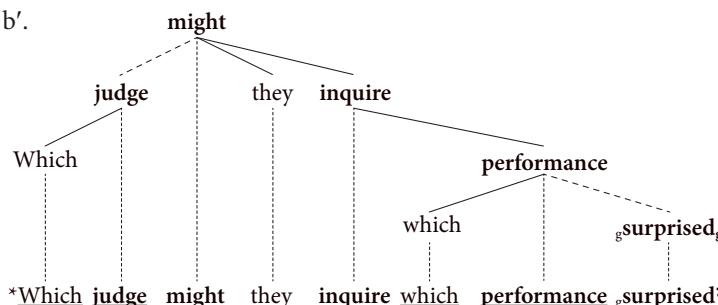
*Wh*-expressions are widely acknowledged to be islands to *wh*-fronting, as the following two example sets illustrate:

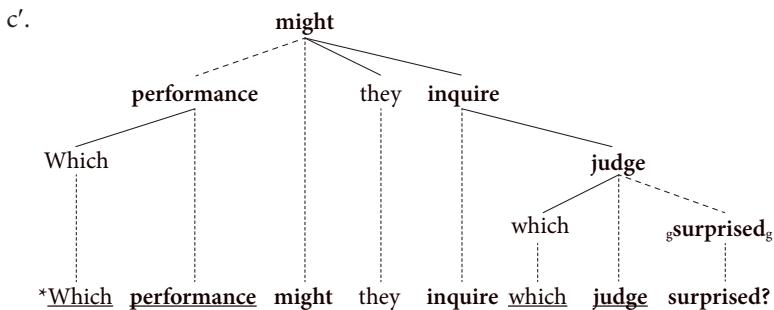
- (60) a. You are wondering which boy gave which girl a kiss.  
 b. \*Which girl are you wondering which boy gave a kiss?  
 c. \*Which boy are you wondering which girl gave a kiss?  
 d. \*Which boy are you wondering gave which girl a kiss?
- (61) a. They might inquire which performance surprised which judge.  
 b. \*Which judge might they inquire which performance surprised?  
 c. \*Which performance might they inquire which judge surprised?  
 d. \*Which performance might they inquire surprised which judge?

Each b- and c-sentence is bad because an attempt has been made to *wh*-front an expression out of an embedded interrogative clause. Note that the d-sentences are bad for a different reason: the embedded clauses there are, contrary to the subcategorization requirements of the matrix predicates, not marked as interrogative.

The sense in which *wh*-expressions are islands is visible in the rising catena. For instance, Examples (61b) and (61c) receive the following structural analyses:

- (61) b'.





The island violations here occur each time because the rising catena attempts to reach below the risen *wh*-expression *which performance* or *which judge*. The risen *wh*-expression in the embedded interrogative clause constitutes the island.

An interesting aspect of *wh*-islands is that they are islands to *wh*-fronting only, since it is possible to create examples in which topicalization has occurred out of an interrogative object clause, e.g.

- (62) a. I wonder what they said to the boys.  
b. ...but to the boys I do wonder what they said.
- (63) a. We don't know who could possibly have a crush on Jane.  
b. ...but on Jane we don't know who could possibly have a crush.

And it is easily possible to extrapose out from under a *wh*-word, e.g.

- (64) a. ?Who that you know would do such a thing?  
b. Who would do such a thing that you know?
- (65) a. ?What that had to be acknowledged came up?  
b. What came up that had to be acknowledged?

These examples therefore demonstrate that *wh*-islands are islands only to *wh*-fronting. The relevant constraint on rising must reference the rising catenae of *wh*-fronting only.

The failed attempts at *wh*-fronting out of an object clause produced so far all involve a finite interrogative clause, and the *wh*-expression is an argument. Interestingly, *wh*-fronting seems to be at least marginally possible when it occurs out of a non-finite interrogative clause in which the *wh*-expression is an adjunct, e.g.

- (66) a. You asked how to revise the paper on ellipsis.  
b. Which paper did you ask how to revise?  
c. ??Which paper did you ask how you should revise?
- (67) a. They know when to play their biggest hit.  
b. Which song do they know when to play?  
c. ??Which song do they know when they should play?

- (68) a. He is contemplating whether to get pizza.  
 b. What is he contemplating whether to get?  
 c. ??What is he contemplating whether he should get?

Acceptability judgements are difficult here, but the b-sentences, in which *wh*-fronting has occurred out of the non-finite interrogative clause seem passable. When the clause becomes finite as in c-sentences, acceptability is notched down, although again, acceptability judgements are difficult. The key observation concerning these examples, though, is that the root of the interrogative clause each time is a non-argument *wh*-expression rather than an argument. There is therefore a distinction to be drawn between argument and non-argument *wh*-expressions. *Wh*-fronting is marginally possible out from under non-argument *wh*-expressions, but not from underneath argument *wh*-expressions.

The importance of the argument vs. non-argument distinction for *wh*-fronting is illustrated further with the following two example sets:

- (69) a. You are wondering what to send to whom.  
 b. \*What are you wondering who to send to?  
 c. \*Who are you wondering what to send to?  
 d. You are wondering whether to send which present to Jane?  
 e. ?Which present are you wondering whether to send to Jane?
- (70) a. They know what to take from whom.  
 b. \*Who do they know what to take from?  
 c. \*What do they know who to take from?  
 d. They know when to take which gifts?  
 e. ?Which gifts do they know when to take?

The b- and c-sentences fail because the argument *wh*-word that is the root of the interrogative clause establishes that clause as a strong island to *wh*-extraction. The e-sentences, in contrast, are at least marginally acceptable, which demonstrates that non-argument *wh*-expressions (*whether, when*) do not constitute strong islands.

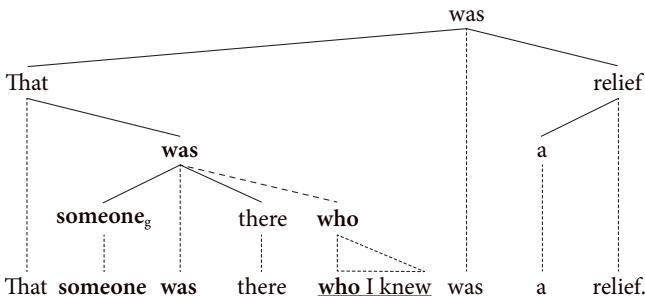
To summarize the insights about *wh*-islands, *wh*-expressions are islands to *wh*-fronting, but they are not islands to topicalization or extraposition. Argument *wh*-expressions establish strong islands to *wh*-fronting, whereas non-argument *wh*-expressions establish weak islands. Finiteness also appears to influence acceptability, although its influence is not as great as for subject and adjunct islands.

### 9.10 Right roof islands

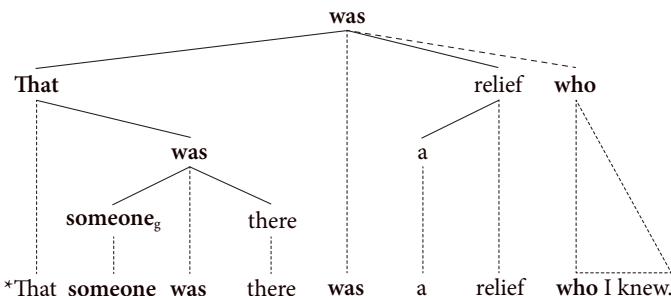
The final type of island examined in this chapter concerns extraposition. Extraposition is clause bound, which means it cannot occur out of a clause. The constraint is widely acknowledged in island studies; it is known as the **Right Roof Constraint**, e.g.<sup>226</sup>

- (71) a. That someone who I knew was there was a relief.

b.



c.



Extraposition is not present in sentence (71a); it is present in sentence (71b), however, although it has occurred there within just the subject clause. When the attempt is made to extrapose out of the subject clause as in (71c), the result is quite bad. The subject clause *that someone was there* forms a roof, out from under which extraposition cannot occur. Clauses are islands to extraposition.

The traditional explanation of this phenomenon in terms of movement stipulated that a constituent cannot be moved rightward out of a clause. The current account in terms rising catenae is much different. The rising catena in (71c) contains two finite verbs, *was* and *was*. Apparently, a rising catena of extraposition can

<sup>226</sup> Ross (1967) is generally acknowledged as the first to have identified the Right Roof Constraint. Most accounts of the constraint have been produced in phrase structure grammars, as with islands in generally. Bröker (1999: 103), a dependency grammarian, does acknowledge this constraint, although he does not use the term *right roof*.

contain only a single finite verb, and this finite verb must be the root of the rising catena, as it is in (71b).

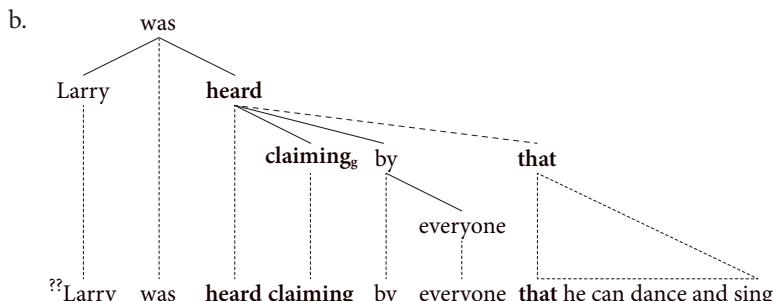
Probing further, it appears as though the presence of not just finite verbs can limit the potential of extraposition to occur, but rather non-finite verbs also influence whether extraposition can occur, e.g.

- (72) a. Music **that I like** was not played.
  - b. Music was not played **that I like**.
  - c. To play music **that I like** is easy.
  - d. \*To play music is easy **that I like**.
  - e. \*Playing music is easy **that I like**.
- (73) a. A talk **that was worth hearing** was not given.
  - b. A talk was not given **that was worth hearing**.
  - c. To give a talk **that is worth hearing** is difficult.
  - d. \*To give a talk is difficult **that is worth hearing**.
  - e. \*Giving a talk is difficult **that is worth hearing**.

The b-sentences illustrate that extraposition out from under a subject noun is easily possible. In contrast, the d- and e-sentences demonstrate that extraposition out from under an infinitive or a gerund is not possible. These examples therefore demonstrate perhaps that all verb forms in English can block extraposition from occurring. Interestingly, this is certainly not true of other languages, e.g. not of German and French.

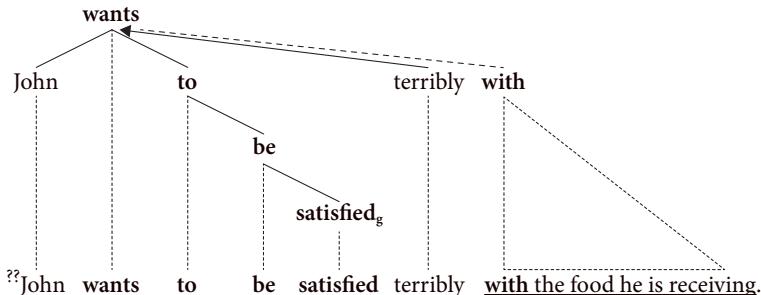
The approach here in terms of the presence of verbs in rising catenae is supported by cases in which the relevant verb appears after the root finite verb, e.g.

- (74) a. Larry was heard by everyone claiming that he can dance and sing.



- (75) a. John wants terribly to be satisfied with the food he is receiving.

b.



Each of these rising catenae includes two verbs: *heard* and *claiming* in (64b) and *wants* and *be* in (75b). The doubling-up of verbs in a rising catena of extraposition predicts that extraposition should fail.

Another interesting aspect of extraposition is that it readily occurs out from under a *wh*-fronted expression, whereas extraposition out from under a topicalized expression is less possible, e.g.

- (76) a. He is selling his old Porsche **that he's had for decades**.  
 b. Which old car is he selling **that he's had for decades**?  
 c. \*...but his old Porsche **he is selling that he's had for decades**.

- (77) a. You are quite angry **with the heavy traffic in this town**.  
 b. How angry are you **with the heavy traffic in this town**.  
 c. ??...and quite angry I certainly am **with the heavy traffic in this town**.

Extraposition out from under the *wh*-expressions in the b-sentences is natural, whereas the attempts to extrapose out from under the topicalized expressions in the c-sentences is marginal at best. This contrast may be attributable to the extent to which the fronted/topicalized expression is specific. *Wh*-expressions are by nature unknown and thus non-specific, whereas most topicalized expressions constitute old material that is known, so they are more specific (see Section 9.6 concerning specificity).

In sum, extraposition is clause bound. This limitation is characterized in the current system in terms of the number of verbs that appear in the rising catena. A rising catena of extraposition in English may not contain more than a single verb, and the verb that is present is the root of the rising catena. Extraposition readily occurs out from under a *wh*-fronted expression, but extraposition out from under a topicalized expression is unlikely.



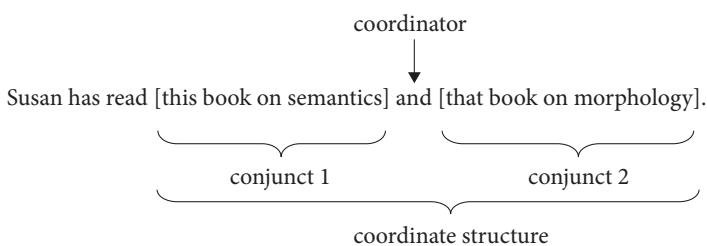
# Coordination

## 10.1 Overview

Coordination is one of the most intensely studied areas of theoretical syntax. The reason for the intense study has to do with the variability of coordinate structures and the difficulty of producing a theoretically consistent and satisfying account of the strings of material that can and cannot be coordinated. This chapter examines some basic issues concerning the nature of coordination and coordinate structures, and the next chapter then introduces specific aspects of the DG apparatus used to represent the structure of coordination and to explore its syntactic behavior.

Sentence (1) illustrates a typical instance of coordination in English:

(1)



The brackets mark the *conjuncts* of the coordinate structure. The *coordinate structure* is the entirety of words that appear between the left-most conjunct bracket and the right-most conjunct bracket. The *coordinator* *and* helps identify the presence of coordination (as opposed to subordination). The set of coordinators in English is restricted to a relatively small number of members (e.g. *and*, *or*, *but*, *as well as*, *then*). The coordinator of a coordinate structure typically appears between the conjuncts, or in the case of more than two conjuncts, it usually appears between the two right-most conjuncts.

Each of the following examples illustrates an important aspect of coordination that is addressed in this chapter:

(2) Phrasal conjuncts

- a. [This dog] and [that cat] like each other.  
Phrase structure is necessary
- b. [[[Bill] and [Fred]] or [Susan]] did it.

String coordination

- c. Sam eats [fruit at home] and [chips at work].

Gapping

- d. [Sam eats fruit], and [Bill eats chips].

Large conjuncts

- e. [Fred likes fruit] and [Sam like fruit].

– Incorrect analysis

Small conjuncts

- f. [Fred] and [Sam] like fruit.

– Correct analysis

Forward sharing

- g. old [men] and [women]

Backward sharing

- h. [men] and [women] with purchases

Each of these examples gives an aspect or type of data that occurs in cases of coordination. After reading this chapter, an understanding of these aspects of coordination will have been established, so that the particular DG apparatus for analyzing coordinate structures can be introduced in the next chapter.

## 10.2 Parallel strings

The following examples illustrate an easily observable fact about coordination. This fact is that most instances of coordination involve coordinated words or phrases of the same category:

- |                                                           |               |
|-----------------------------------------------------------|---------------|
| (3) a. Fred has [called] and [visited] Susan.             | – V + V       |
| b. Fred has [called Susan] and [spoken to Fred].          | – VP + VP     |
| (4) a. John spoke out [for] and [against] the deadline.   | – P + P       |
| b. John is [against the deadline] and [for an extension]. | – PP + PP     |
| (5) a. That is an [old] and [colorful] fish.              | – A + A       |
| b. That is a [very old] and [quite colorful] fish.        | – AP + AP     |
| (6) a. Bill works [irregularly] and [slowly].             | – Adv + Adv   |
| b. Bill works [too irregularly] and [too slowly].         | – AdvP + AdvP |

The conjuncts in each coordinate structure are parallel in syntactic category, a fact that matches intuition about coordination, namely that the coordinated units should be semantically and syntactically parallel. If all coordinate structures were as decidedly parallel as those in (3)–(6), producing a syntactic theory of coordination would not be difficult.

There are many coordinate structures that are opaque, however, insofar as the semantic and syntactic nature of the coordinated units is not clear. Examine sentences (7a–d) in this regard:

- |        |                                                          |                      |
|--------|----------------------------------------------------------|----------------------|
| (7) a. | Susan [has read] and [really likes] that book on syntax. | – Correct analysis   |
| b.     | Susan has [read] and [really likes] that book on syntax. | – Incorrect analysis |
| c.     | Susan has [read] and really [likes] that book on syntax. | – Incorrect analysis |
| d.     | Susan [has] read and really [likes] that book on syntax. | – Incorrect analysis |

Each of examples gives a conceivable analysis of the coordinate structure. The analysis in (7a) is the best. The problem with the analysis in (7a), though, is that the status of the conjuncts there is not so obvious, since the first conjunct contains two verbs but the second, just one (plus an adverb). This difficulty suggests that one should try either the analysis in (7b) or the one in (7c), where the conjuncts are parallel insofar as each conjunct contains a single verb. The problem with (7b–c), however, is that the verb in the initial conjunct is an infinitive, whereas the verb in the right conjunct is finite; that does not seem right. This difficulty might motivate the analysis in (7d), where the conjuncts are parallel insofar as each conjunct contains a single finite verb, but the obvious problem with (7d) is that the conjuncts are not adjacent, the string *read and really* separating them. The conjuncts should be adjacent, only the coordinator separating them. The best analysis is indeed the one in (7a), a fact that will be established as the discussion progresses.

That the theory of coordination is indeed going to be much less straightforward than a first impression suggests is reinforced by the great flexibility of the units that can be coordinated. This flexibility is illustrated with the following data:<sup>227</sup>

- (8) Fred ate lunch before work.
- a. [Fred] and [Sue] ate lunch before work.
  - b. [Fred prepared], and [Sue ate], lunch before work
  - c. [Fred ate lunch] and [Sue watched TV] before work.
  - d. [Fred ate lunch before], and [Sue watched TV after], work.
  - e. Fred [prepared] and [ate] lunch before work.
  - f. Fred [ate lunch] and [prepared dinner] before work.
  - g. Fred [ate lunch before], and [watched TV after], work.
  - h. Fred [ate lunch before work] and [watched TV after work].

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<sup>227</sup> Examples (8a–n) are taken from Osborne (2006a: 59).

- i. Fred ate [lunch] and [dinner] before work.
- j. Fred ate [lunch before], and [dinner after], work.
- k. Fred ate [lunch before work] and [dinner after work].
- l. Fred ate lunch [before] and [after] work.
- m. Fred ate lunch [before work] and [after training].
- n. Fred ate lunch before [work] and [training].

While many of the coordinate structures in (8a–n) are unusual and some of them require a unique intonation pattern, they can all be acceptable. The data illustrate that every left-to-right string in (8) can be coordinated. The difficulty with many of the coordinate structures, though, is that the material contained in the conjuncts fails to qualify as constituents. For instance, the coordinated strings *lunch before* and *dinner after* in (8j) can in no way be interpreted as constituents. The data in (8) challenge theories of syntax, and they are part of the reason that theories of coordination are innumerable.

One prominent means by which one has attempted to come to grips with non-constituent conjuncts is via ellipsis.<sup>228</sup> On an ellipsis analysis understood in terms of deletion, the underlying structure of (8j), for instance, might be as follows:

- (8) j'. Fred ate [lunch before ~~work~~] and [dinner after work].  
j''. [Fred ate lunch before ~~work~~] and [~~Fred ate~~ dinner after work].

The assumption is that non-constituent conjuncts are actually constituents at an abstract or deep level of syntax and that a deletion mechanism reduces the conjuncts down to their surface size. The conjuncts indicated in (8j') and (8j'') illustrate two possibilities in this area. The analysis in (8j') assumes that the underlying conjuncts are just big enough to allow the coordinated strings to qualify as constituents, in this case as PPs. The analysis in (8j'') sees the underlying conjuncts as being much larger, as entire sentences.

While there are certainly difficulties with the small conjuncts indicated in (8a–n), there are also major problems associated with the ellipsis mechanism associated with large(r) conjuncts like the ones in (8j') and (8j''). The difficulties with both the small-conjunct and large-conjunct approaches are the underlying reason for two contradictory aspects associated with theories of coordination. The first of these is that the number of theoretical explorations into the nature of coordination is large, as mentioned above. At the same time, the difficulties associated with coordination seem to have motivated many introductory grammar and syntax textbooks to either

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<sup>228</sup>. For DG accounts of nonconstituent conjuncts that assume ellipsis of some sort, see for instance Mel'čuk and Pertsov (1987: 156), Starosta (1988: 253), and Eroms (2000: 472).

overlook coordination almost entirely or to touch on it only briefly.<sup>229</sup> Considering the frequency of appearance of coordinate structures in the world's languages, the choice to overlook coordination or to touch on it only briefly is an indication that something fundamental has been misunderstood.

### 10.3 Dependency vs. phrase structure (again)

Many phrase structure grammars do not consider dependency as an alternative way to conceive of syntactic structures, and some dependency systems are vehement about the merits of dependency syntax and are therefore unwilling to consider the utility of phrase structure as an organizing principle. What this means for theories of coordination is that they are typically based either completely on phrase structure or completely on dependency.<sup>230</sup> The current approach, in contrast, sees the need to acknowledge both principles as contributing to the organization of syntactic structures. The case for dependency as the relevant principle organizing standard subordinate structures was made in Chapter 3 (in particular, see Section 3.3). Confronted with coordinate structures, however, it becomes apparent that phrase structure is the principle organizing conjuncts.<sup>231</sup>

The necessity for taking phrase structure as the principle organizing the conjuncts of coordinate structures is seen in the following data:

- (9) a. [Susan] and [Sam] and [Fred] have arrived.
- b. [[Susan] and [Sam]] or [Fred] have arrived.
- c. [Susan] or [[Sam] and [Fred]] have arrived.

<sup>229</sup>. Numerous linguistics and syntax textbooks have almost nothing at all to say about coordination (e.g. Emonds 1976; Borsley 1991; Napoli 1993; Haegeman 1991; and Kroeger 2005). Other linguistics and syntax textbooks touch on coordination only briefly (e.g. Allerton 1979; Matthews 1981; Radford 1988; Cowper 1992; Thomas 1993).

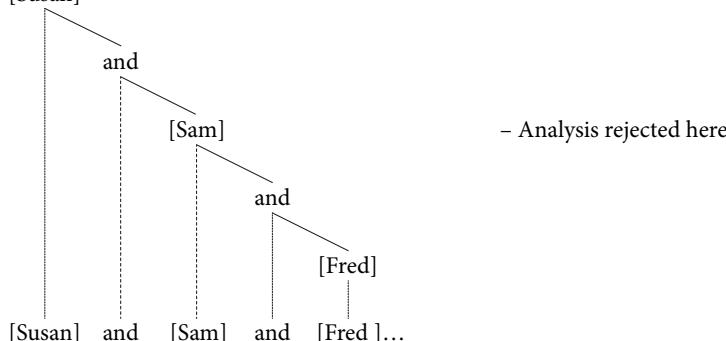
<sup>230</sup>. Meaning-Text Theory (MTT, Mel'čuk & Pertsov 1987; Mel'čuk 1988) is a good example of a DG that strives for strict dependency syntax. MTT even renders coordinate structures almost entirely in terms of dependency.

<sup>231</sup>. From the DG perspective, the insight that the conjuncts of coordinate structures are organized in terms of phrase structure (not dependency) is due mainly to Hudson (1980: 496–9; 1988: 315; 1990: 404–21). Interestingly, even MTT (Mel'čuk & Pertsov 1987: 74) concedes that a minor measure of phrase structure might be needed to address certain aspects of coordination.

The brackets indicate distinct groupings. The brackets in (9a) are appropriate for a context where Susan, Sam, and Fred each arrived separately; the brackets in (9b) can match a context where either Susan and Sam arrived together or Fred arrived; and the brackets in (9c) can be associated with a context where either Susan arrived or Sam and Fred arrived together.

Dependency is incapable of accommodating the ambiguity.<sup>232</sup> A dependency approach that sees the left-most conjunct as dominating the following conjuncts can perhaps accommodate the reading indicated in (9a).<sup>233</sup>

(9) a'. [Susan]



The hierarchy is perhaps consistent with the grouping indicated by the conjuncts because it can view all conjuncts as having equal status, the organization proceeding left-to-right in a neutral manner, left-to-right order correlating directly with top-down order. The hierarchy in (9a'), however, has no means of reflecting the readings indicated in (9b) or in (9c). That is, a hierarchy like the one (9a') cannot group *Susan* and *Sam* together to the exclusion of *Fred*, nor can it convincingly group *Sam* and *Fred* together to the exclusion of *Susan*.

Given the inability of a hierarchical analysis like the one shown in (9a') to accommodate all the intended groupings in (9a–c), one might try a different strategy. One might view a coordinator as the root of the coordinate structure and assume that the conjuncts are dependents of the coordinator. The following hierarchies would obtain:

<sup>232</sup>. Heringer (1996: 194) acknowledges the challenge that nested coordinate structures present to DG accounts of coordination. Heringer does not, however, pursue an analysis in terms of phrase structure, although he does pursue an account that acknowledges string coordination. The theory of coordination presented here has been influenced strongly by Heringer's account.

<sup>233</sup>. The analysis of coordinate structures given in (9a'), which has the initial conjunct dominating the coordinator and all non-initial conjuncts, is the one that Mel'čuk and Pertsov (1987: 64–5) assume in the Meaning-to-Text (MTT) framework.

- (10) a. ?  
 [Susan] and [Sam] and [Fred]
- b.
- 
- ```

graph TD
    and1[and] --- and2[and]
    and1 --- Fred1[Fred]
    and2 --- Susan1[Susan]
    and2 --- Sam1[Sam]
    Susan1 --- Susan2[Susan]
    Susan1 --- and3[and]
    and3 --- Sam2[Sam]
    and3 --- or1[or]
    Sam2 --- Sam3[Sam]
    Sam2 --- or2[or]
    or1 --- Fred2[Fred]
    or1 --- Fred3[Fred]
  
```
- c.
-
- ```

graph TD
 or1[or] --- Susan1[Susan]
 or1 --- and1[and]
 Susan1 --- Susan2[Susan]
 Susan1 --- or2[or]
 or2 --- Sam1[Sam]
 or2 --- and2[and]
 and2 --- Sam2[Sam]
 and2 --- Fred1[Fred]

```

The hierarchies in (10b) and (10c) correctly reflect the intended groupings (indicated by the conjunct brackets).<sup>234</sup> The problem now, however, is that this strategy is incapable of reflecting the intended grouping (to be more accurate, the non-grouping) indicated by the brackets in (10a). The problem in (10a) is that both coordinators would have to be positioned equi-level, which would result in a coordinate structure that lacks a clear root. Such a structure would not be a tree and would therefore contradict a fundamental assumption about sentence structure, namely that all structure is rooted.<sup>235</sup>

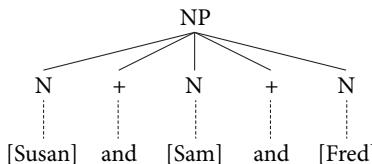
The conclusion to be drawn from the discussion so far is that dependency alone is hardly in a position to accommodate the groupings reflected by the brackets in (9) and (10). The difficulty for dependency in this area is due to the minimalism of dependency structures. Dependency hierarchies can posit no more structure than

<sup>234</sup>. Schubert (1987: 104–19; 2003: 647–8) pursues an approach to coordination along the lines of the analysis in (10b), with the coordinator as the root of the coordinate structure. Schubert's goal is automated translation, so his system is forced to make choices that enable practicable implementation.

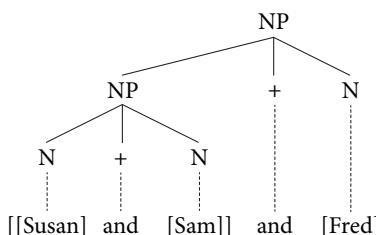
<sup>235</sup>. Heringer, Strecker, and Wimmer (1980: 145–6) discuss this difficulty, i.e. the nesting of conjuncts, facing dependency syntax when they critique Tesnière's approach to coordination. Citing Hudson (1984), Van Langendonck (2003: 178) also points to the nesting of conjuncts as a problem for dependency syntax. Like Hudson, Van Langendonck advocates an approach to coordination that assumes that the conjuncts of coordinate structures are organized in terms of phrase structure.

they have words. Phrase structure hierarchies, in contrast, are not limited in this respect. The number of nodes in phrase structure structures can and most often does outnumber the number of words, which means phrase structure can posit much more structure than dependency and can hence accommodate all three groupings. The following phrase structure hierarchies are possible:

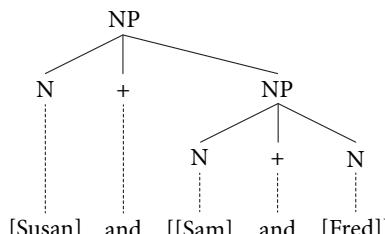
(11) a.



b.



c.



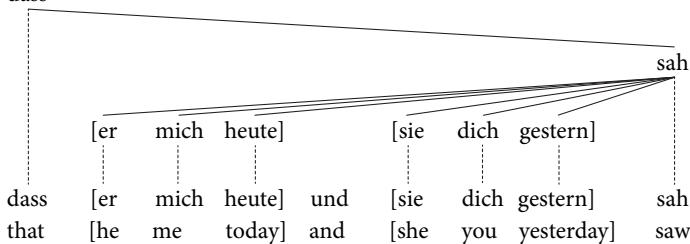
These trees demonstrate that phrase structure can easily produce a plausible analysis of all three groupings. The ability to add extra nodes provides a flexibility that pure dependency structures cannot match. These observations suggest that phrase structure (not dependency) is indeed the principle organizing the conjuncts of coordinate structures.

Another type of datum that supports phrase structure as the principle organizing coordinate structures is evident in the following example from German:

(12) dass [er mich heute] und [sie dich gestern] sah  
 that [he me today] and [she you yesterday] saw  
 'that he saw me today and she yesterday'

Due to the flat structure, these conjuncts each contain three unconnected words. This situation is challenging, since it is not clear what the dependency structure should be. One might try the following structure:

(12') dass



The status of the coordinator *und* is being ignored for the time being. This structure accommodates the basic facts about government, namely that the verb is licensing the appearance of the subjects *er* and *sie*, the objects *mich* and *dich*, and the temporal adjuncts *heute* and *gestern*. But therein also lies the problem. Under normal circumstances, the finite verb *sah* should govern just a single subject (not two) and just a single object (not two). Thus, in order to accommodate the coordinate structure, the approach would have to assume that coordination is somehow capable of tremendously augmenting the valency of words.<sup>236</sup>

An alternative analysis might assume large conjuncts that are reduced down to their surface size via a deletion mechanism, as mentioned at the end of the previous section, e.g.

(12'') dass [er mich heute sah] und [sie dich gestern sah]  
that [he me today saw] and [she you yesterday saw]

This analysis sees the example involving coordinated clauses, whereby the verb is deleted from the left conjunct. This sort of analysis is inconsistent with the current theory of syntax in two major ways. The first is that the current theory is representational, which means it rejects the existence of transformations like the one associated with the putative deletion mechanism. The second concerns a number of semantic and syntactic traits of coordinate structures. These traits undermine the deletion account. The presentation and discussion of these traits appears below in Section 10.5.

The difficulties just sketched should motivate a more flexible approach to coordination. This approach posits that dependency structures are augmented with phrase structure in order to accommodate the unique behavior of coordinate structures. Coordinators play an important role, since the appearance of a coordinator helps signal the presence of phrase structure. A theory of syntax that is based

<sup>236</sup>. Heringer, Strecker, and Wimmer (1980: 143) point to this problem when they critique Tesnière's account of coordination. The choice to extend the dependencies to each noun in cases of coordination was, namely, what Tesnière had done (1959: Chapters 143–7).

entirely on dependency or entirely phrase structure is going to be at a conceptual and/or empirical disadvantage in this regard. The dependency approach struggles when attempting to submit data like (9)–(10) to a pure dependency analysis, and the phrase structure approach is going to struggle when attempting to accommodate the unique behavior of coordinate structures in comparison with subordinate structures. But by allowing for a combination of dependency and phrase structure in the grammar, the curious traits of coordinate structures can be accommodated both conceptually and empirically.

The hybrid approach pursued here sees sentence structure being produced and processed earlier to later (left to right in languages that are written left to right and right to left in languages that are written right to left).<sup>237</sup> The structure of the non-initial conjuncts of a coordinate structure (i.e. not the left-most conjunct) is a reproduction of the structure of the initial conjunct, i.e. the left-most conjunct, but with different lexical items. This repetition of structure is possible due to the switch from dependency to phrase structure. Once the non-initial conjuncts have been generated, dependency takes over again as the organizing principle. This understanding of coordinate structures is represented schematically using example (12'') from German:

- (12'') dass [er mich heute]  
           und [sie dich gestern] sah  
  that       [he me today]  
  and [she you yesterday] saw  
  'that he saw me today and she saw you yesterday'

In the left-to-right generation of this clause, dependency organizes the words through the initial conjunct. Once the second conjunct is reached, the coordinator has already helped signal the presence of a coordinate structure and thus that phrase structure is present. The structure of the initial conjunct is reproduced in the non-initial conjunct using different lexical items, a situation that is indicated in (12'') by positioning the non-initial conjunct directly under the initial conjunct. Once the non-initial conjunct is complete, dependency takes over again to the completion of the sentence.<sup>238</sup>

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<sup>237</sup>. The emphasis here on the earlier-to-later production and processing of sentence structure as the conceptual basis for the theory of coordination follows Lobin (1993) and Heringer (1996: 198–216) in particular.

<sup>238</sup>. This understanding of how coordinate structures are produced is similar (although not identical) to Heringer's (1996: 198–216) and Groß' (1999: Chapter 8) DG approaches. Like all syntactic structures, coordinate structures are produced online, earlier to later.

## 10.4 String vs. gapping coordination

A primary distinction between types of coordinate structures is that between string and gapping coordination. This distinction is essential for determining when coordinate structures do and do not involve ellipsis.<sup>239</sup> *Gapping coordination* obtains when there is material shared by the conjuncts that appears inside the initial conjunct of the coordinate structure. In contrast, *string coordination* obtains when the shared material appears outside of the coordinate structure.

Examine the position of the material that is common to the coordinate structures in Examples (8a–n) from Section 10.2, which are reproduced here as (13a–n):

- (13) Fred ate lunch before work.
  - a. [Fred] and [Sue] ate lunch before work.
  - b. [Fred prepared], and [Sue ate], lunch before work
  - c. [Fred ate lunch] and [Sue watched TV] before work.
  - d. [Fred ate lunch before], and [Sue watched TV after], work.
  - e. Fred [prepared] and [ate] lunch before work.
  - f. Fred [ate lunch] and [prepared dinner] before work.
  - g. Fred [ate lunch before], and [watched TV after], work.
  - h. Fred [ate lunch before work] and [watched TV after work].
  - i. Fred ate [lunch] and [dinner] before work.
  - j. Fred ate [lunch before], and [dinner after], work.
  - k. Fred ate [lunch before work] and [dinner after work].
  - l. Fred ate lunch [before] and [after] work.
  - m. Fred ate lunch [before work] and [after training].
  - n. Fred ate lunch before [work] and [training].

Each coordinate structure is delineated in such a manner that the conjuncts are adjacent, separated only by the coordinator. The material that is in some sense common to both conjuncts appears outside of the coordinate structure. This material is called the *shared material* here, that is, it is shared by the conjuncts.

Compare the shared material in (13a–n) with the shared material in the following cases:

- (14) a. [I laughed at you], and [you \_\_\_ at me].
- b. [Dad gave me a nickel], and [Mom \_\_\_ a dime].
- c. [Should I call you], or [\_\_\_ you \_\_\_ me]?

---

<sup>239</sup> The distinction between string and gapping coordination is explored extensively in Osborne (2006a; 2006b; 2006c; 2008). Earlier DGs have also acknowledged and built on the distinction, e.g. Hudson (1988; 1989) and Groß (2003: 345–8), although the terminology employed varies. Other DGs pursue a unified account of these phenomena (e.g. Lobin 1993).

These examples are unlike (13a–n) insofar it is impossible to delineate the coordinate structures in such a manner that (all) the verbs appear outside of both conjuncts. In such cases, one or more gaps in the non-initial conjunct is/are assumed. This material is therefore said to have been *gapped* from the non-initial conjunct(s), and a conjunct that experiences gapping is called a *gapped conjunct*. When material is gapped in this manner, one acknowledges gapping, which is a type of ellipsis (see Section 12.7). There is therefore a major distinction between gapping coordination, that is, coordination involving the ellipsis mechanism of gapping, and string coordination, that is, coordination that does not involve the ellipsis of gapping.

To help distinguish between string and gapping coordination, gapped material is henceforth indicated with strikethroughs:

- (14') a. [I laughed at you], and [you ~~laughed~~ at me].
- b. [Dad gave me a nickel], and [Mom ~~gave me~~ a dime].
- c. [Should I call you], or [~~should~~ you call me]?

This convention indicates ellipsis; it is employed throughout Chapters 12 and 13 where ellipsis is explored in detail. The material inside a gapped conjunct that remains is characterized in terms of *remnants*. Each of the gapped conjuncts in (14a–c) contains two remnants, e.g. *you* and *at me* in (14a). The important thing to acknowledge at present is that gapped material has been elided, whereas the shared material of string coordination does not involve ellipsis. The distinction will now be motivated by considering five empirical differences between string and gapping coordination: (1) possibility of redundancy, (2) shared finite verb, (3) objective forms of pronouns, (4) gapped auxiliary verb alone, and (5) scope of negation.

### Possibility of redundancy

The first difference between string and gapping coordination is that string coordination allows a measure of redundancy across the conjuncts, whereas gapping does not, e.g.

- (15) a. She drank [wine today] and [beer yesterday].
  - b. She drank [wine TODAY] and [wine YESTERDAY].
  - c. <sup>?</sup>She drank [WINE today] and [BEER today].
- (16) a. [Wine she drank today], and [beer ~~she drank~~ yesterday].
  - b. \*[Wine she drank TODAY], and [wine ~~she drank~~ YESTERDAY].
  - c. \*[WINE she drank today], and [BEER ~~she drank~~ today].

The acceptability contrast across the b- and c-sentences is explained in terms of the position of the shared material. Given the appropriate intonation pattern (with emphasis on the contrasting words, as indicated by small caps), sentences (15b) and (15c) can pass. A unique intonation pattern does nothing for (16b) and (16c), however; those sentences are bad.

The same contrast occurs in German:

- (17) a. Sie hat [Wein heute] und [Bier gestern] getrunken.  
she has [wine today] and [beer yesterday] drunk  
'She drank wine today and beer yesterday.'
  - b. Sie hat [Wein HEUTE] und [Wein GESTERN] getrunken.
  - c. ?Sie hat [WEIN heute] und [BIER heute] getrunken.
- (18) a. [Wein hat sie heute getrunken], und [Bier ~~hat~~ sie gestern ~~getrunken~~].
  - b. \*[Wein hat sie HEUTE getrunken], und [Wein ~~hat~~ sie GESTERN ~~getrunken~~].
  - c. \*[WEIN hat sie heute getrunken], und [BIER ~~hat~~ sie heute ~~getrunken~~].

Sentences (17b) and (17c) again require a unique intonation pattern to be acceptable. Unique intonation does not help (18b) and (18c), however. This requirement on gapping that the remnants contrast is acknowledged in the literature on coordination and gapping.<sup>240</sup>

### Shared finite verb

A second empirical difference between string and gapping coordination occurs with subject-verb agreement and a shared/gapped finite verb. String coordination is strict insofar as both subjects must agree with the shared verb, whereas gapping is flexible in this regard:<sup>241</sup>

- (19) a. Has [he ordered his beef] and [she ordered her pork]?
- b. ??Has [he ordered his beef] and [you ordered your pork]?
- c. [Has he ordered his beef], and [have you ordered your pork]?

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<sup>240</sup>. The contrast requirement on the remnants of gapping is widely acknowledged (e.g. Kuno 1976: 309; Klein 1981: 73; van Oirschot 1987: 218; Hudson 1989: 67; Osborne 2006a: 46; 2008: 1118).

<sup>241</sup>. The flexibility in verb forms that gapping allows across the conjuncts is acknowledged in a number of places (e.g. Hudson 1989: 62; Heringer 1996: 211; Zoerner & Agbayani 2000: 551; & Osborne 2008: 1117).

The conjuncts in the instance of string coordination in (19b) can hardly share the finite verb because *has* does not agree with *you*. The instance of gapping in (19c), in contrast, does not have this problem because *has* is not shared, but rather *have* has been elided. Note that the medial position of the elided *ordered* in the second conjunct in (19c) is responsible for forcing the gapping analysis.

This same contrast is perhaps more easily illustrated using German examples due to the richer conjugation morphology and the more flexible word order of German:

- (20) a. Hat [er Fleisch] und [sie Fisch] bestellt?  
has [he meat] and [she fish] order  
'Did he order meat and did she order fish?'
- b. \*Hat [er Fleisch] und [die Kinder Fisch] bestellt?  
has [he meat] and [the kids fish] ordered  
'Did he order meat and the kids fish?'
- c. [Hat er Fleisch bestellt], und [haben die Kinder Fisch bestellt]?

The finite verb *hat* can be shared in (20a) because both subjects, i.e. *er* 'he' and *sie* 'she', are 3rd person singular and thus they both agree with *hat*. When the second subject changes to the 3rd person plural *die Kinder*, however, the finite verb can no longer be shared so that sentence (20b) fails. When an analysis in terms of string coordination is not possible as in (20c) due to the position of the verb *bestellt* and a gapping analysis is therefore forced, the second subject need no longer agree with *hat*, since it agrees with the elided *haben* instead.

### Objective forms of pronouns

A third difference between string and gapping coordination is evident with subject pronouns in English. String coordination requires the subjective form of a subject pronoun (*I, he, she, we, they*), whereas gapping is more flexible, allowing both the subjective or objective form (*me, him, her, us, them*):

- (21) a. Did [he see her] and [she/\*her see him]?
- b. [Did he see her], and [did she/her see him]?
- c. [He saw her], and [she/her saw him].
- (22) a. Should [you do this problem] and [I/\*me do that problem]?
- b. [Should you do this problem], and [should I/me do that problem]?
- c. [You should do this problem], and [I/me should do that problem].

The a-sentences demonstrate that in cases of string coordination, the subjective form of the subject pronoun must occur. In the b- and c-sentences however, gapping allows both the subject and the object form of the subject pronoun.<sup>242</sup> Note that the gapping cases that have the objective form of the subject pronoun are problematic for large conjunct theories of string coordination, since the underlying pre-deletion structure should be disallowed, e.g. *\*Should me do that problem?*. This observation requires that the analysis of gapping cannot be formulated in terms of a deletion mechanism.

### Gapped auxiliary verb alone

A fourth difference between string coordination and gapping occurs when just an auxiliary verb is shared/gapped. The conjuncts of string coordination can easily share just an auxiliary verb, whereas marginality occurs when gapping attempts to gap just an auxiliary verb:

- (23) a. Will [he exaggerate] and [she lie]?
- b. <sup>?</sup>[He will exaggerate] and [she will lie].

The same contrast occurs in German:

- (24) a. dass [er geblieben] und [sie gegangen] ist  
          that [he stayed] and [she gone] is  
          'that he stayed and she left'
- b. <sup>?</sup>[Er ist geblieben] und [sie ist gegangen].  
          [he is stayed] and [she is gone]

The marginality of (23b) and (24b) suggests that gapping prefers to gap the entire verbal predicate, rather than just the auxiliary part of the verbal predicate. While it is unclear why string coordination and gapping should behave differently in this area, it is clear that without the distinction between the two, the acceptability contrast would be more difficult to accommodate.

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<sup>242</sup>. The distribution of subjective and objective forms of pronouns in English is varied and unstable. The subjective forms appear to be reliant on the overt appearance of a finite verb, whereas the objective forms are preferred otherwise – see Anderson (2006: 215). Even so, the forms of pronouns that occur in coordinate structures is rather flexible, whereby acceptability judgments vary considerably, e.g. *Me and him went out* vs. *Him and I went out* vs. *He and I went out*, but *\*He and me went out* and *\*Me and he went out*.

## Scope of negation

A fifth and final difference mentioned here between string and gapping coordination concerns the scope of negation. A preceding negation can scope over both conjuncts of string coordination, but a negation cannot be interpreted as being part of the gap of gapping:

- (25) Fred did not order [wine today] and [beer yesterday].
  - (i) ‘Fred did not order wine today or he did not order beer yesterday.’  $\neg p \vee \neg q$
  - (ii) ‘Fred did not order wine today and he did not order beer yesterday.’  $\neg p \wedge \neg q$
- (26) [Fred did not order wine], and [Bill beer].
  - (i) ‘Fred did not order wine, or Bill did not order beer.’  $\neg p \vee \neg q$
  - (ii)\*\*‘Fred did not order wine, and Bill did not order beer.’  $\neg p \wedge \neg q$

Sentence (25) is ambiguous depending on whether the single or dual event reading is understood. The single event reading has the negation *not* scoping over the coordinator *and*, so that the (i)-reading obtains. The dual event reading, in contrast, has the coordinator *and* scoping over the negation *not*, so that the (ii)-reading obtains. Note that the (i)-reading is logically equivalent to  $\neg(p \wedge q)$  in accordance with De Morgan’s Law,  $\neg(p \wedge q) \equiv \neg p \vee \neg q$ . Comparing (26) with (25), the ambiguity is no longer present, only the (i)-reading is possible in (26). This lack of ambiguity can be addressed in part in terms of the distinction between string and gapping coordination. For some reason, gapping does not allow the coordinator to scope over the negation.

In sum, five differences have been produced that distinguish between string and gapping coordination. These differences are more easily accommodated if the two mechanisms are addressed in terms of ellipsis. Gapping involves ellipsis, whereas string coordination does not.

## 10.5 Large vs. small conjuncts

The previous section just demonstrated that there are significant empirical differences motivating the distinction between string and gapping coordination. It should now be clear in this area that the conjuncts associated with gapping are “large” conjuncts. These large conjuncts usually encompass entire clauses, whereby certain material, e.g. the verb, has been elided from the non-initial conjunct(s). In this regard, however, one might question whether certain instances of string coordination should not also be analyzed in terms of an ellipsis or deletion mechanism. This question is especially pertinent for those instances of string coordination

where the conjuncts do not appear as constituents, that is, in the cases involving *non-constituent conjuncts*.

Before turning to non-constituent conjuncts, however, the discussion can consider the large conjunct approach in its purest form. A strict interpretation of the large conjunct approach sees each and every conjunct as a complete sentence before it is reduced down to its surface form. Such an approach is quite implausible, though.<sup>243</sup> For instance, it cannot accommodate a basic ambiguity like the one in (27a):

- (27) a. [Bill] and [Fred] arrived.
- b. [Bill ~~arrived~~] and [Fred arrived].

Sentence (27a) is ambiguous, allowing the dual event reading ('Bill and Fred arrived separately') or the single event reading ('Bill and Fred arrived together'). The large conjunct analysis in (27b), in contrast, is non-ambiguous. If the verb is interpreted as having been deleted from the initial conjunct, only the dual event reading should be available. In this regard then, the large conjunct account fails because it is incapable of accommodating a basic ambiguity.

A similar problem facing a strict interpretation of the large conjunct approach becomes evident when a word appears that disambiguates the sentence, e.g. *together*:

- (28) a. I saw [Bill] and [Fred].
- b. I saw [Bill] and [Fred] together.
- c. \*[I saw Bill ~~together~~] and [~~I saw~~ Fred together].

The a-sentence is ambiguous, allowing both the single-event and dual-event readings. The appearance of *together* in (28b) blocks the dual event reading and thus forces the single-event reading. The large conjunct analysis of sentence (28b), which is shown in (28c), is implausible because the pre-deletion clauses could never occur on the surface, e.g. \**I saw Bill together*, \**I saw Fred together*. The large conjunct approach therefore makes an inaccurate prediction about the coordinate structures that should and should not be possible.

Another problem with a strict interpretation of the large conjunct approach becomes evident when two or more coordinate structures appear in a single sentence:

- (29) Bill and Fred ordered fish and salad (respectively).
- a. [Bill ordered fish] and [Bill ordered salad] and [Fred ordered fish] and [Fred ordered salad].
- b. [Bill ordered fish] and [Fred ordered fish] and [Bill ordered salad] and [Fred ordered salad].

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<sup>243</sup> Many DG accounts of coordination reject the large conjunct approach in its purest form for the same reasons given here (e.g. Schubert 1987: 107–8; Heringer 1996: 194–5).

The large conjunct analysis would have to start with the underlying sentences in (29a) or (29b). The difficulty in this area concerns the starting order: Should this starting order be as in (29a) or as in (29b)? It is also not at all clear how the deletion mechanism might succeed at reducing the multiple clauses down to the surface appearance. Finally, the mechanism would also have to be varied enough to allow the *respectively*-reading. Taken together, the difficulties associated with (27)–(29) render the large conjunct approach in its purest form strongly implausible.

The fact that a strict interpretation of the large conjunct approach is implausible does not discount a hybrid approach. A hybrid approach might, namely, posit small conjuncts whenever possible and large conjuncts (plus deletion) whenever non-constituent conjuncts appear to obtain.<sup>244</sup> While such a hybrid account may be more plausible than the purely large conjunct approach, there would still be many cases that seriously challenge the deletion mechanism, e.g.

- (30) a. [He has drafted], and [she has typed up], a long letter. – Probably one letter
- b. [He has drafted a long letter] and [she has typed up a long letter]. – Probably two letters
- (31) a. [Sam whistles] and [Larry hums] similar tunes.
- b. [Sam whistles similar tunes] and [Larry hums similar tunes].

The a-sentences show the small conjunct analysis and the b-sentences the corresponding large conjunct analysis. There is a semantic mismatch across (30a) and (30b). The large conjunct analysis shown in (30b) strongly prefers a reading where two letters were produced, whereas the small conjunct analysis in (30a) strongly prefers the reading where just a single letter was created. The problem with (31b) is similar, since the reading associated with the large conjuncts in (31b) cannot match the intended meaning, where Sam's and Larry's tunes are similar.

Examples (30)–(31) are instances of what has been called *right node raising* (RNR). Some derivational theories assume that the shared material on the right has been raised to the right out of the conjuncts, which means the RNR analysis of such data is a large conjunct approach.<sup>245</sup> The impact on the current discussion is that examples like (30)–(31) need not be viewed as challenging the large conjunct approach, but rather they might be addressed by acknowledging some peculiar

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<sup>244</sup>. Within the DG tradition, a hybrid approach to coordination is favored (e.g. Starosta 1988: 247–55; Heringer 1996: 193–216). Small conjuncts are assumed whenever possible, and large conjuncts are acknowledged when necessary. See Heringer's (1996: 195) comments in this regard.

<sup>245</sup>. The term *right node raising* is due to Postal (1974). Chaves (2014) examines the RNR phenomenon and the various theoretical accounts thereof in detail.

trait of RNR. In this regard however, the following data cannot be addressed in terms of RNR:

- (32) a. A girl sent [you flowers] and [me chocolates]. – Probably one girl
- b. [A girl sent you flowers] and [~~a girl sent me chocolates~~]. – Probably two girls
  
- (33) a. One guy told [you to stay] and [me to go]. – One guy
- b. <sup>?</sup>[One guy told you to stay] and [~~one guy told me to go~~]. – Probably two guys

The same sort of difficulty seen in (30)–(31) reappears here in (32)–(33), although (32)–(33) cannot be analyzed in terms of the RNR mechanism (because the shared material precedes the coordinate structure; it does not follow it). The large conjunct analysis either misrepresents the intended meaning and/or results in what would be a dubious sentence if deletion were not to have occurred.

This section has demonstrated that a purely large conjunct approach (to instances of string coordination) is easily discounted based upon the frequent mismatch between surface and deep meaning of the coordinate structures involved. A hybrid approach, which posits large conjuncts only when needed to overcome non-constituent conjuncts, is also faced with the same problem, since the surface and deep meanings of the coordinate structures again fail to match each other at times. The conclusion drawn here from the discussion is that small conjuncts should be preferred for all instances of string coordination. Gapping, however, is a different story, since large conjuncts are necessary to accommodate the semantics and syntax of the gapping mechanism.

## 10.6 Forward vs. backward string coordination

So far, a clear distinction has been drawn between string and gapping coordination. Gapping obtains when the material that the conjuncts have in common appears inside the initial conjunct, whereas string coordination is present in all other cases where the conjuncts have material in common. In addition to this primary division, a further division of phenomena is necessary. This section now demonstrates that there are concrete empirical differences between instances of string coordination where the shared material precedes the coordinate structure (forward string coordination) and those where it follows it (backward string coordination).

Examine the following sentences:

- (34) a. \*His [brother left] and [sister stayed].
- b. \*The king [of England laughed] and [of Spain frowned].
- c. \*The attempt to solve [this problem succeeded] but [that problem failed].

- (35) a. [He sat on], and [she sat under], the table.  
 b. [Fred always avoids], but [Susan really enjoys talking to], the new students.  
 c. '[The man with whom you], and [the woman with whom I], spoke know each other.

For a certain reason (to be established in Section 11.8), the coordinate structures in (34), where the shared material precedes the coordinate structures, fail, whereas the coordinate structures in (35), where the shared material follows the coordinate structures, are at least to an extent possible. There therefore appears to be a difference between forward string coordination in (34) and backward string coordination in (35).

That there is indeed a distinction to be drawn between forward and backward string coordination is particularly evident with the following acceptability contrast:

- (36) a. ?[The guy who likes], avoids [the guy who dislikes], this music.  
 b. \*The guy [who likes this music] avoids [who dislikes it].
- (37) a. [I always order], even though [I don't succeed at actually drinking], the beer.  
 b. \*I [always order the beer] even though [don't succeed at actually drinking it].

The acceptable a-sentences have the shared material following the conjuncts, whereas the shared material precedes the conjuncts in the unacceptable b-sentences. Actually, however, there is something very unusual about these examples: they do not involve coordination at all, since they lack coordinators entirely! The unacceptability of the b-sentences should therefore not be surprising, for the sharing of coordination is a trait of coordinate structures, not of subordinate structures. This observation inaccurately predicts, however, that the a-sentences should also be bad; though unusual, they are acceptable. We therefore again see a difference between forward and backward string coordination. Apparently, the sharing of backward string coordination can occur outside of coordination, whereas forward string coordination is possible only when a coordinate structure is present.

Yet a further difference between forward and backward string coordination occurs when the coordinate structure cuts into a word. The difference is vivid in German with its morphologically complex words:

- (37) a. [Vor-] und [Nach]teile  
 [ad-] and [dis] parts  
 'advantages and disadvantages'  
 b. [Nikotin-] und [Koffein]sucht  
 [nicotine] and [caffeine]addiction  
 'addiction to nicotine and caffeine'  
 c. [auf-] und [ab]laufen  
 [up-] and [down]run  
 'run up and down'

- d. [ein-] und [aus]gehen  
     [in-] and [out]go  
     ‘go in and out’
- (38) a. \*ver[fahren] und [-laufen]  
         astray[drive] and [-go]  
         ‘drive and go astray’
- b. \*zer[trennt] und [-splittert]  
         apart[divided] and [splintered]  
         ‘divided and splintered’
- c. \*auf[wachen] und [-stehen]  
         up[wake] and [-stand]  
         ‘wake and get up’
- d. \*an[reden] und [-machen]  
         at[speak] and [-make]  
         ‘address and come on to’

When the coordinate structure precedes the shared word part as in (37a–d), the result is good, in fact it’s stylistically excellent, whereas when the coordinate structure follows the shared word part as in (38a–d), the coordinate structure is unacceptable. These data illustrate therefore again that there are concrete differences between forward and backward string coordination.

## 10.7 String and/or gapping coordination

Section 10.4 established that the theory of coordination must distinguish between string and gapping coordination, and Section 10.6 has just demonstrated that there are concrete differences between forward and backward string coordination. An interesting observation in these areas is that backward string coordination and gapping can combine, whereas it is not immediately clear whether forward string coordination and gapping can do the same (across matrix clauses). Furthermore, there are certain structures that appear to permit an analysis in terms of both forward string coordination and gapping, whereby the analysis as string coordination is usually preferred.

One senses intuitively that the following sentences involve both gapping and string coordination:

- (39) [He told me], and [she ~~told~~ you], that something was going to happen.
- (40) [She tried to deny], and [he ~~tried~~ to hide], that there was disagreement.
- (41) [John always promises to draft], and [Susan ~~promises~~ to edit], their presentations.

These coordinate structures necessitate an analysis that combines both gapping and backward string coordination. An alternative analysis that assumes just gapping (and not backward string coordination as well) is implausible because of the trait of all ellipsis that requires the elided material to form a catena (see Section 12.3). This trait is established at length in Chapters 12 and 13.

Examples (39)–(41) illustrate that backward string coordination and gapping can easily combine across matrix clauses. This observation points immediately to a related question: Can forward string coordination and gapping also combine directly? The answer to this question is that they can, although producing data that clearly verify that they can is difficult to do. The following cases, however, require analyses in which both team up:

- (42) For [you to impress me], and [me to impress you], ...
- (43) That proposal [he is for], but [she is against].

The flatness of structure in these cases forces analyses that combine forward sharing and gapping. In (42), for instance, both *you* and *to impress me* are dependents of *for*. This fact requires that *you* and *me* be matched in terms of forward string coordination; the manner in which *to impress* is elided, however, is gapping. Similar comments are applicable to (43): topicalization there results in a situation where the topicalized expression is shared in terms of forward string coordination, but then gapping is responsible for eliding the verb from the second conjunct.

Certain coordinate structures allow competing analyses, i.e. forward string coordination alone or gapping alone, e.g.

- (44) a. Susan told [me to write] and [you to call].
- b. ??[Susan told me to write] and [you told me to call].

The a-analysis assumes the forward sharing of string coordination alone, whereas the b-analysis assumes just gapping alone. The a-analysis provides a reading that is more plausible than that of the b-analysis. Observe in this regard that pronoun parallelism (*me* and *you*) across the conjuncts also supports the a-analysis. However, while the reading associated with the b-analysis is unlikely, it is not impossible. In fact, the b-type analysis in terms of gapping alone becomes much more plausible in the following case:

- (45) a. Mom told [me to write], and [Dad to call].
- b. [Mom told me to write], and [Dad told me, to call].

The parallelism across *Mom* and *Dad* and the special intonation indicated by the commas now promote the gapping analysis in (45b). Sentence (45) is therefore

ambiguous, special intonation making the second reading indicated in (45b) available in addition to the reading indicated in (45a).

Based on the data examined in this section, one can reasonably conclude that backward sharing of string coordination and gapping can combine across matrix clauses. The forward sharing of string coordination can also combine directly with gapping. Difficulties arise, though, with cases that allow for competing analyses, whereby parallelism in expressions across the conjuncts and special intonation can tip the scale in favor of the one analysis/reading over the other.

## 10.8 Summary

The discussion above has provided a sense of the variability and flexibility of coordination. The first major point established the extent to which coordinate structures are organized in terms of dependency or phrase structure. The message delivered has been that dependency is the organizing principle underlying subordination, whereas phrase structure is the organizing principle underlying coordination. The current theory of sentence structure has therefore become a hybrid system, combining dependency and phrase structure in such a manner that allows for a principled analysis of the interaction between subordinate and coordinate structures.

The majority of actually occurring coordinate structures are straightforward insofar as the conjuncts are constituents that are parallel in semantic contribution and syntactic category. There are, however, many coordinate structures where the conjuncts fail to qualify as clear constituents. One acknowledges non-constituent conjuncts in such cases. A prominent means of addressing non-constituent conjuncts is to posit a deletion or ellipsis mechanism. The non-constituent conjuncts are actually full constituents (or clauses) at a deep level of representation and are reduced down to their surface appearance by a deletion mechanism. Or they are full clauses but have experienced ellipsis, meaning empty structure is in some sense present.

The discussion above has established just when deletion or ellipsis has or has not occurred. The large conjunct analysis, whereby all non-constituent conjuncts are complete constituents below the surface, has been rejected. An ellipsis mechanism is required to address gapping, however. One must distinguish between string and gapping coordination in this regard. String coordination occurs when the material that is common to the conjuncts appears outside of the coordinate structure, whereas gapping is present when this material appears inside the initial conjunct.

A further division concerning the shared material is required. Shared material that precedes the coordinate structure (forward string coordination) can behave differently from shared material that follows the coordinate structure (backward

string coordination). The overview of these distinctions must therefore acknowledge three parameters: (1) the forward sharing of string coordination, (2) the backward sharing of string coordination, and/or (3) gapping. The following table summarizes the various combinations:

Table 20.

| Coordinate structure                                                                 | With the forward sharing of string coordination | With the backward sharing of string coordination | With gapping |
|--------------------------------------------------------------------------------------|-------------------------------------------------|--------------------------------------------------|--------------|
| [He is for that proposal] but [she is against it].                                   | no                                              | no                                               | no           |
| He [is for that proposal] and [will vote for it].                                    | yes                                             | no                                               | no           |
| [He is for], but [she is against], that proposal.                                    | no                                              | yes                                              | no           |
| [He is for that proposal], but [she is against it].                                  | no                                              | no                                               | yes          |
| He [is for], and [will support], that proposal.                                      | yes                                             | yes                                              | no           |
| That proposal [he is for], but [she is against].                                     | yes                                             | no                                               | yes          |
| [He is for], but [she is against] that proposal.                                     | no                                              | yes                                              | yes          |
| That proposal [he is for], but [she is against] because it affects them differently. | yes                                             | yes                                              | yes          |

An important aspect of the examples sentences in this table must not be overlooked. This aspect is that each time, just a single coordinate structure is present. It is of course also possible to produce examples that combine the various parameters with two or more instances of coordination in a single sentence, e.g.

- (46) [Your [brother] and [sister] are for], but [your parents are against], the proposal.

Both forward and backward string coordination and gapping too are present in this example. Such a case is not so special, though, because two coordinate structures are present instead of just one, where by the one coordinated structure is nested inside the other.

Now that some of the central concepts have been established and an overview of the main sharing and ellipsis phenomena associated with coordination have been examined, the account can proceed to the structural analysis of coordinate structures.

## CHAPTER 11

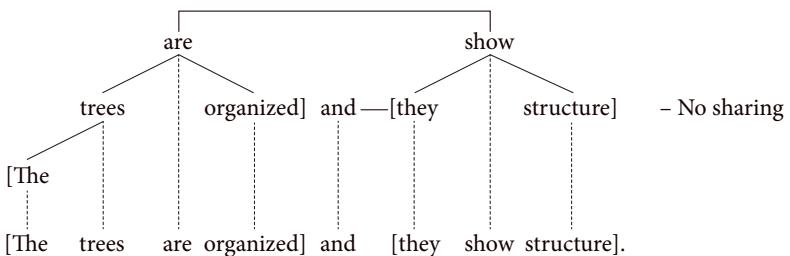
# The structure of coordination

### 11.1 Overview

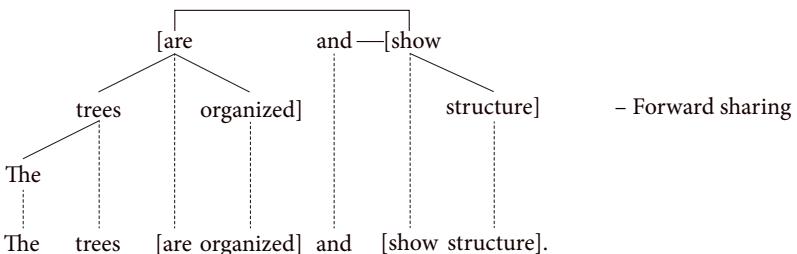
Section 10.3 established that phrase structure (not dependency) organizes the conjuncts of coordinate structures with respect to each other. This fact challenges the current dependency system to an extent, since among other things, it forces one to consider the tree conventions that can/should be used to represent coordinate structures. Conventions are needed that maintain the dependency backbone of the greater approach to syntax, but at the same time allow the approach to acknowledge and represent the organization of the conjuncts of coordinate structures in terms of phrase structure. This chapter demonstrates how this can be done; it presents tree conventions that integrate both principles of organization, dependency and phrase structure.

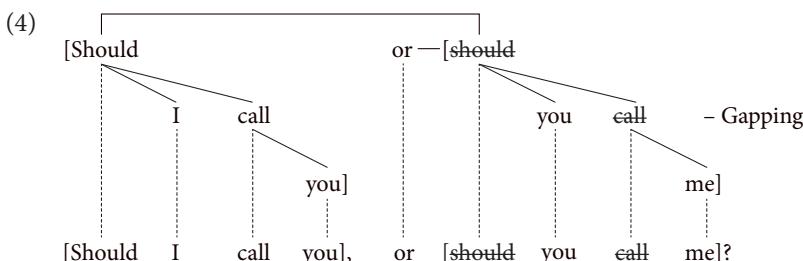
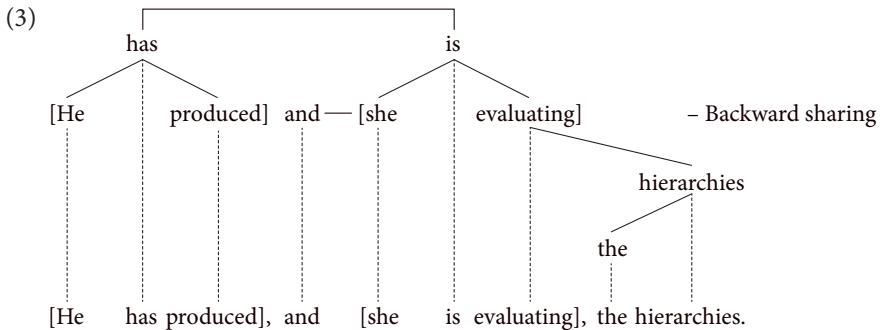
The following four trees illustrate the basic tree conventions for representing coordinate structures that are employed henceforth in this book:

(1)



(2)

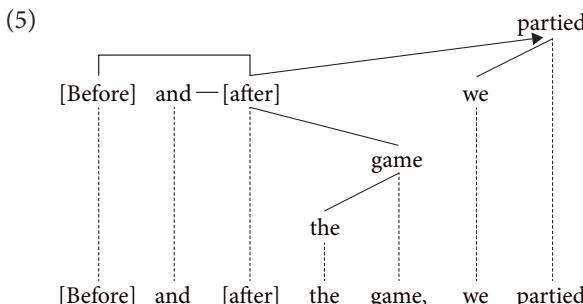




These four trees provide a preliminary illustration of the tree conventions employed to represent coordinate structures. The use of the tree conventions (square brackets, horizontal connectors, and horizontal edges) are explained in the next section.

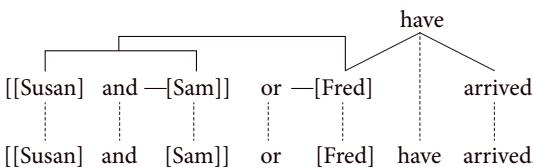
## 11.2 Tree conventions

The manner in which the conjuncts of coordinate structures are organized in terms of phrase structure is indicated using the square brackets and the horizontal connectors. The brackets mark the extent of the conjuncts and the horizontal connectors match the *roots* of the coordinated strings. A root of a coordinated string is a word that is not immediately dominated by any other word in that string, e.g.



The horizontal connector matches the words *before* and *after*, and these words are, trivially, the roots of their conjuncts. The particular advantage of using the horizontal connectors in this manner is that they can represent the nesting of coordinate structures. The next example appeared in part in Section 10.3:

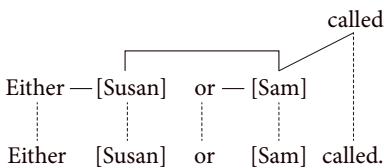
(6)



The square brackets and the manner in which the upper connector extends to the middle of the lower connector shows that *Susan* and *Sam* form a constituent first, and *Fred* is then added thereafter, creating the greater constituent *Susan and Sam or Fred*. In this way, the conjuncts are indeed organized in terms of phrase structure.

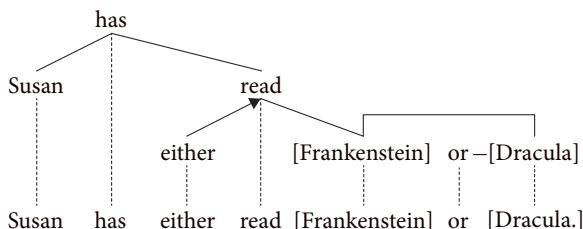
Examine how the coordinators *and* and *or* are integrated into the structure. They are attached to the word that immediately follows them using a simple horizontal edge.<sup>246</sup> This accommodates the fact that the coordinator serves as a marker, indicating the presence of coordination. These conventions can easily handle correlative coordinators, e.g.

(7)



Two further such correlative coordinators in English are *neither...nor* and *both...and*. At times, the first part of the two-part coordinator has the option to appear at a distance to the initial conjunct, in which case it has the status of an adverb in the structure, e.g.

(8)

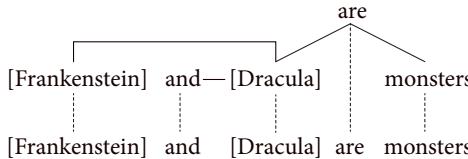


<sup>246</sup> Other DG accounts of coordination also grant the coordinator a unique status similar to the analysis here, (e.g. Hudson 1988; Lobin 1993: 118; Hudson 2010: 178).

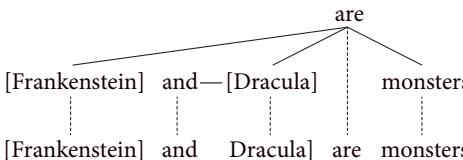
The first part of the correlative coordinator *either* appears as a dependent of the verb *read* in a manner similar to a degree adverb, e.g. *Susan has completely read Frankenstein*.

A crucial aspect of these tree conventions is that the dependency extending to a shared head or dependent reaches into the nearest conjunct only. Compare the following competing analyses in this regard:

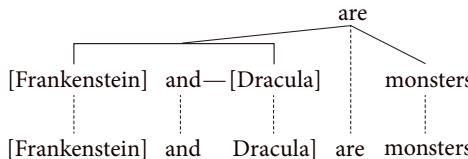
(9) a.



b.



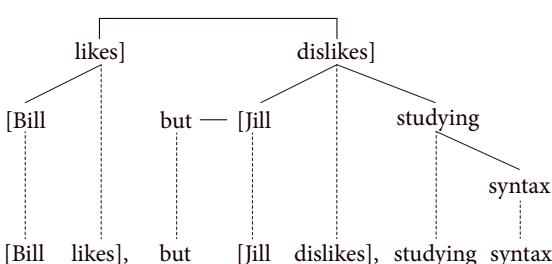
c.



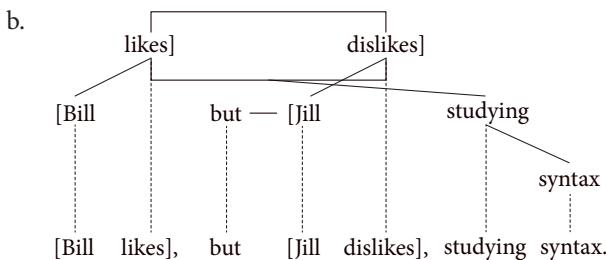
The analysis in (9a) is of the sort assumed throughout here. The analysis in (9b), which does without the horizontal connector matching the roots altogether, can be rejected because it misrepresents the combinatory potential, i.e. the valency, of the verb *are*: a finite verb takes a single subject argument rather than two.<sup>247</sup>

The analysis in (9c) is a distinct possibility, although it incurs a problem when a shared dependent is present, e.g.

(10) a.



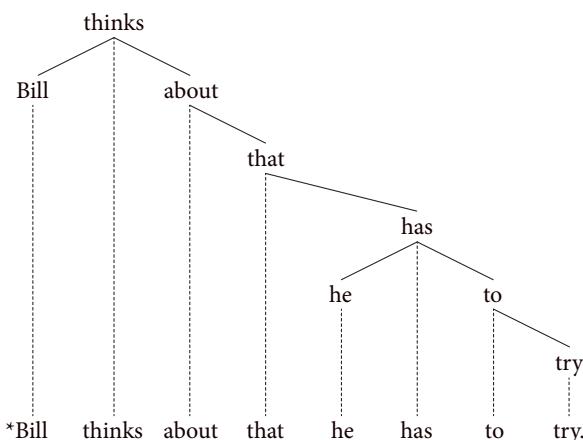
<sup>247</sup> A number of DG accounts reject an analysis of coordinate structures like (9b) for this reason, namely because it misrepresents the valency of the shared head (e.g. Schubert 1987: 115; Lobin 1993: 86, 98; Heringer 1996: 197).

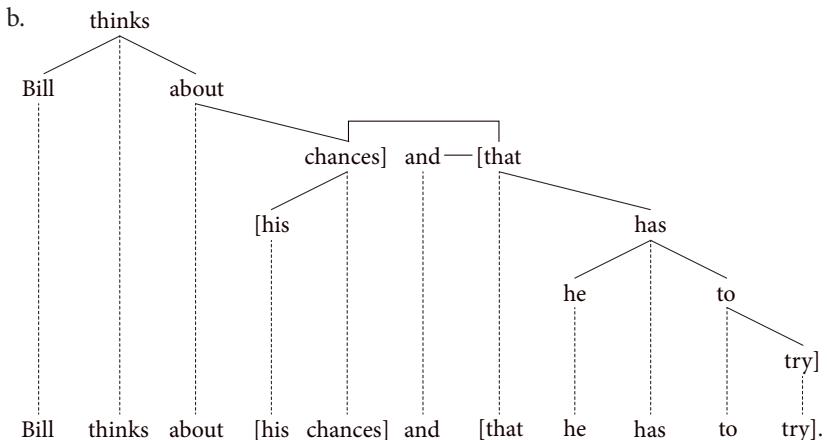


The analysis in (10a) is the one assumed here throughout for shared dependents. The one in (10b) is problematic because it proliferates the graphic elements, the representations becoming busy and thus opaque. Furthermore, the analysis would have difficulty accommodating certain coordinate structures in which the matched words would be distinct in syntactic category, e.g. *[Bill supports]*, and *[Susan has been speaking in favor of] the bill*. In such a case, an analysis along the lines shown in (10b) would somehow have to match the verb *supports* with the preposition *of*. The analysis in (10a) does not incur this difficulty, but rather it can accommodate the nature of shared dependents alone in terms of the square brackets in the tree, which mark the extent of the conjuncts and thus serve to identify the shared material.

There is another, more important reason why the analysis in (10a) can be preferred over the analysis in (10b). The analysis in (10a) accommodates the loosening of subcategorization restrictions that occur in cases of coordination, e.g.

(11) a.





Prepositions like *about* do not accept a *that*-clause as their complement, as demonstrated with the unacceptability of (11a). Interestingly, however, the *that*-clause can in fact appear if it is further removed from the head word as the second conjunct in a coordinate structure, as shown in (11b). Thus, there is a measure of flexibility of combinatory potential with the conjuncts that are further removed from the head word.<sup>248</sup> Extending the dependency to the root of initial conjunct only in (11b) accommodates this flexibility of combinatory potential.

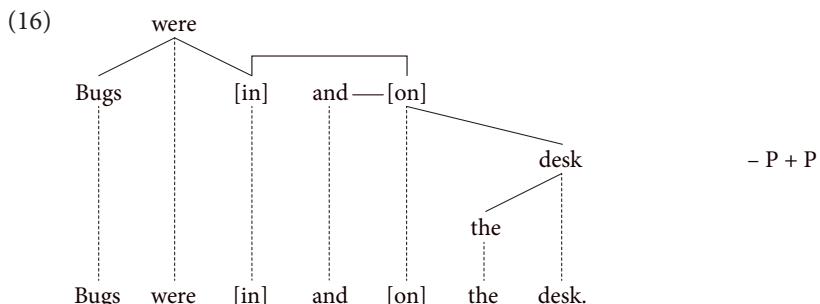
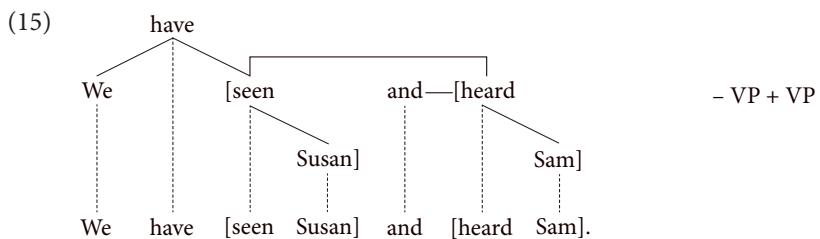
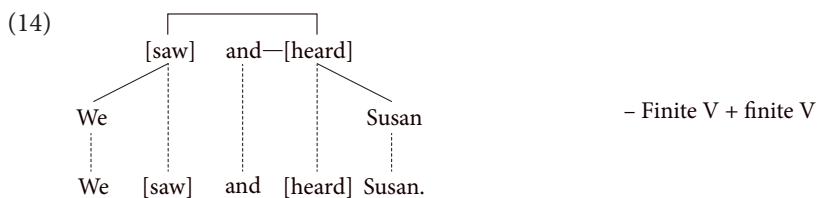
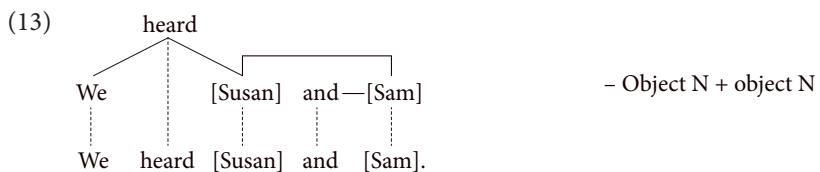
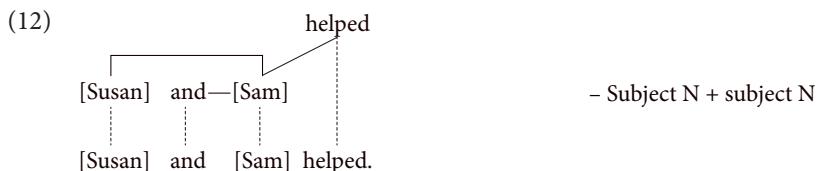
This section has introduced the basic conventions for the representation of coordinate structures employed throughout this chapter and in the following chapters. Familiarity with these conventions is further established below by way of the numerous trees produced for illustration.

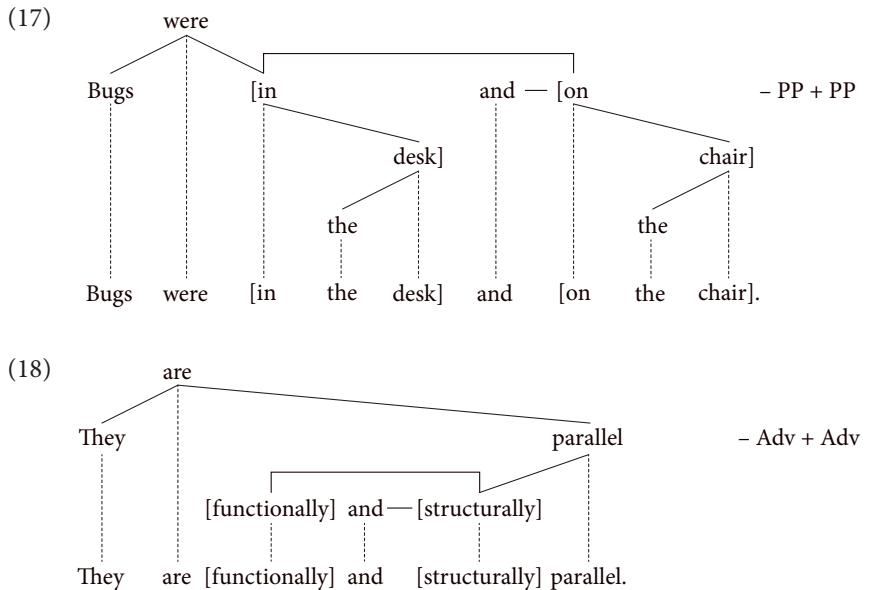
### 11.3 Parallelism

The conjuncts of most coordinate structures are both structurally and functionally parallel in a straightforward manner, e.g.

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<sup>248</sup>. This flexibility is also possible concerning agreement, e.g. *[one]* or *[two]* *people* vs. \**[one]* or *[two]* *person*. The rich case morphology of German provides further examples of this flexibility, as Heringer (1996: 212) illustrates, e.g. *[mit] oder [ohne] Betriebsräte* vs. \**[mit] oder [ohne] Betriebsräten*.





Examples of this sort could easily be expanded to include most syntactic functions and/or word or phrasal categories. Coordination is flexible and entirely productive in these areas, and this flexibility and productivity is present in many languages.

The observed structural and functional parallelism across the conjuncts of coordinate structures like the ones in (12–18) motivates the following hypothesis:

### Parallelism Hypothesis

Coordinated strings must be both functionally and structurally parallel.

This hypothesis receives immediate support from failed attempts to coordinate functionally and/or structurally non-parallel constituents, e.g.

- (19) \*[Bill] and [angry] were absent. – Subject noun + adjective
- (20) \*He knows [completely] or [the solution]. – Adverb + object NP
- (21) \*I [like] and [for] beans. – Finite verb + preposition
- (22) \*We [sometimes] and [perhaps] try. – Frequency adverb + modal adverb

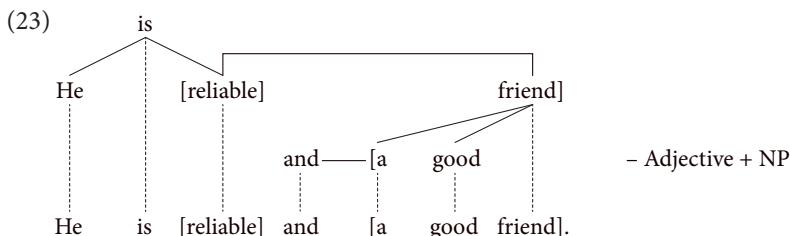
These coordinate structures fail because the coordinated units quite obviously lack the prerequisite functional and/or structural parallelism. Such data could easily be expanded ad nauseam.

The Parallelism Hypothesis serves as the orientation point for much of the discussion below. The stance taken here is that the hypothesis is in fact a law of grammar, there being no exceptions. There are, however, numerous phenomena of coordination that appear to contradict the hypothesis. These apparent exceptions

are worthy of exploration, since they reveal much about the nature of coordinate structures and syntactic structures in general. Some of these apparent exceptions are examined in the following sections.

#### 11.4 Functional parallelism

Perhaps the most obvious and frequently occurring challenge to the Parallelism Hypothesis occurs with coordinated constituents that lack parallelism in syntactic category. A mismatch in syntactic category often occurs with predicative expressions:



- (24) They are [under stress] and [experiencing difficulties]. – PP + participle phrase
- (25) She is [a hard worker] and [out of debt]. – NP + PP
- (26) That is [quite annoying] and [merely an excuse]. – Participle phrase + NP

The fact that the coordinated units in each case are distinct in syntactic category suggests that parallelism across conjuncts cannot be based on syntactic category. Indeed, the Parallelism Hypothesis does not require category parallelism. The key observation here is that as a complement of the copula *is/are*, each of the coordinated units is a predicative expression. As predicative expressions, the conjuncts are functionally parallel.<sup>249</sup> And given that each conjunct contains a single root word, structural parallelism is also present.

Another area where a mismatch in syntactic category appears is with coordinated adjuncts, e.g.

- (27) He did it [frequently] and [with pleasure]. – Adverb + PP
- (28) They cheated [for fun] and [to get a good grade]. – PP + *to*-phrase
- (29) He drinks coffee [all morning] and [in the afternoon]. – NP + PP

---

<sup>249</sup>. See Starosta (1988: 248) and Heringer (1996: 199–200) for a similar account of the flexibility of the predicate function following copular *be*.

The mismatch in syntactic category is not a problem because the coordinated adjuncts are functionally equivalent in the relevant sense. The coordinated adverb and PP in (27) bear the manner function, the coordinated PP and *to*-phrase in (28) are both purpose adjuncts, and the coordinated NP and PP in (29) are both temporal adjuncts.

Interestingly, adjuncts that are only marginally coordinatable become fully coordinatable as *wh*-expressions, e.g.

- (30) a. <sup>?</sup>Sam exercises [in the gymnasium] and [after school].
- b. [Where] and [when] does Sam exercise?
- (31) a. <sup>?</sup>Jill drinks [often] and [to relax].
- b. [How frequently] and [to what end] does Jill drink?

The a-sentences are marginal because the coordinated expressions are not sufficiently parallel in syntactic function. Curiously however, when these expressions bear an interrogative *wh*-feature, coordination is good, as illustrated with the b-sentences. Apparently, a *wh*-feature supercedes the “normal” functional contribution of an expression. Coordination is sensitive to these super-functions.

A related phenomenon was pointed out in Section 1.8 (see Examples (28)–(29) there). When they appear as *wh*-expressions, adjuncts can be coordinated with optional arguments, e.g.

- (32) a. \*Fred ordered [pizza] and [an hour ago].
- b. [What] and [when] did Fred order?
- (33) a. \*She bought [a scooter] and [yesterday].
- b. \*[What] and [when] did she buy?
- (34) a. \*Jerry has been waiting [two hours] and [for Lynn].
- b. [How long] and [for whom] has Jerry been waiting?

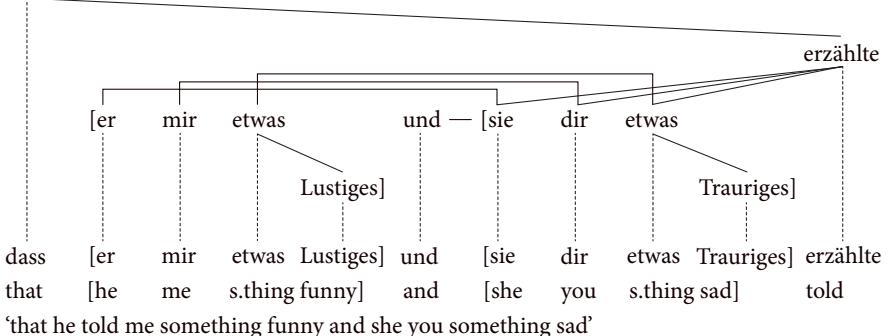
The a-sentences are again bad because the coordinated expressions lack the necessary functional equivalence. This shortcoming is overcome in (32b) and (34b), where a facultative argument and an adjunct are coordinated. In (33b) however, where an obligatory argument and an adjunct are coordinated, the shortcoming remains. These data therefore demonstrate that while a *wh*-feature is a super-function, this super-function is nevertheless split into two groups: obligatory arguments on the one hand and optional arguments and adjuncts on the other.

## 11.5 Structural parallelism

Coordinate structures like the following one from German challenge theories of coordination in significant ways:<sup>250</sup>

(35)

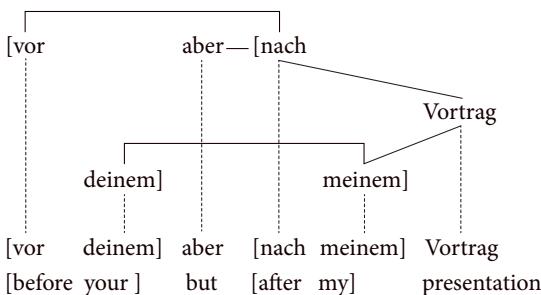
dass



One difficulty here lies with the flatness of the conjuncts. There is no way that the material contained in each conjunct can be analyzed as a single constituent – unless one posits a deletion mechanism. Section 10.4 established that coordinate structures like this one cannot be analyzed as gapping (although the English translation is an instance of gapping) and that a deletion mechanism is implausible. Given these limitations, one must inquire how the theory can accommodate such flat conjuncts.

The key insight in this area is that the conjuncts are parallel with respect to the number of expressions in each conjunct. There are three expressions in the initial conjunct of (35) (*er*, *mir*, and *etwas Lustiges*) and three expressions in the non-initial conjunct of (35) (*sie*, *dir*, and *etwas Trauriges*). Apparently, the conjuncts should be parallel with respect to the number of expressions they contain. While this insight is correct, the notion “expression” is vague. Examine the structure of the following conjuncts in this regard:

(36)



<sup>250</sup> Examples like (35) are discussed most extensively in Osborne (2006c).

These conjuncts are again parallel, two words in the first conjunct and two words in the second conjunct. Viewing these words as “expressions” seems wrong, however, since the two words in each conjunct appear rather to be parts of a single expression.

The relevant insight concerns the *conjunct roots*.

### Conjunct root

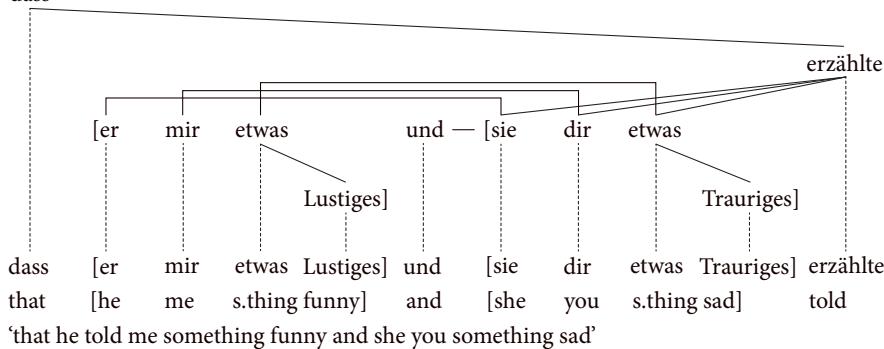
A word in a conjunct that is not immediately dominated by any other word in that conjunct<sup>251</sup>

The conjuncts are parallel with respect to the roots they contain. The initial conjunct in (36) contains a preposition and a determiner and the non-initial conjunct contains a preposition and a determiner. Both words in each case qualify as roots because the words that immediately dominate them appear external to the conjunct. The conjuncts are therefore structurally parallel with respect to their roots. Since the roots are on separate levels, the horizontal connectors appear on the level of each pair of roots.

With the root concept in mind, the conjuncts of Example (35) are also structurally parallel with respect to their roots. That example is repeated here as (37):

(37)

dass



'that he told me something funny and she you something sad'

The flatness of structure has each conjunct containing three roots. Since the roots match up perfectly, the coordinate structure is acceptable. This principle of structural parallelism is expressed more formally as follows:

<sup>251</sup>. The idea that conjuncts have roots stems from Hudson (1988: 323). See also Osborne (2006c: 75–7; 2008: 1134).

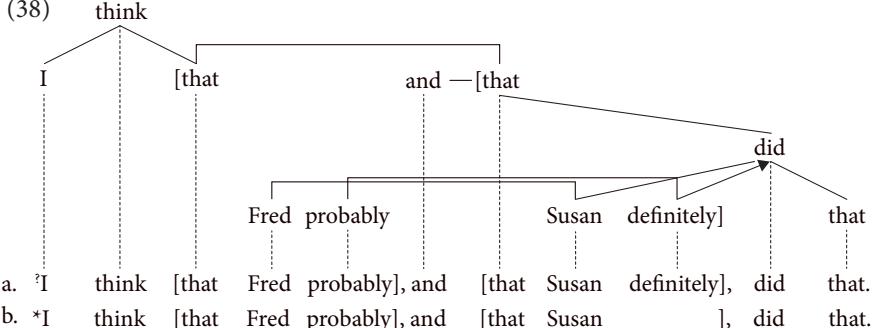
**Structural Parallelism Requirement (initial formulation)**

Coordinated strings must be parallel with respect to the roots they contain.

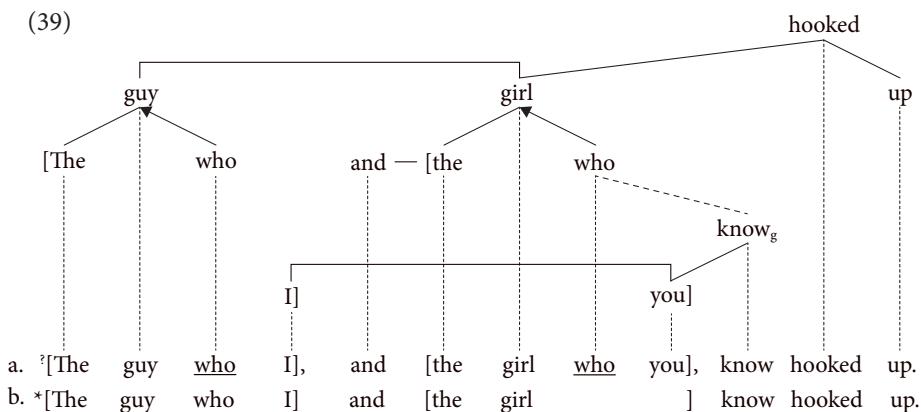
This principle correctly characterizes data like (35–37). We will see in Section 11.7, however, that the principle must be altered somewhat to account for certain additional cases.

The following examples illustrate this principle further:

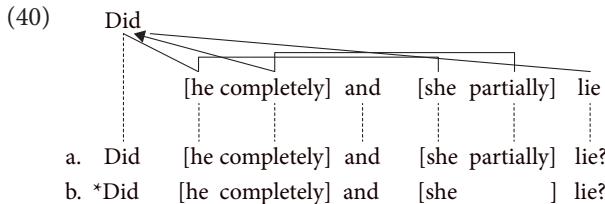
(38)



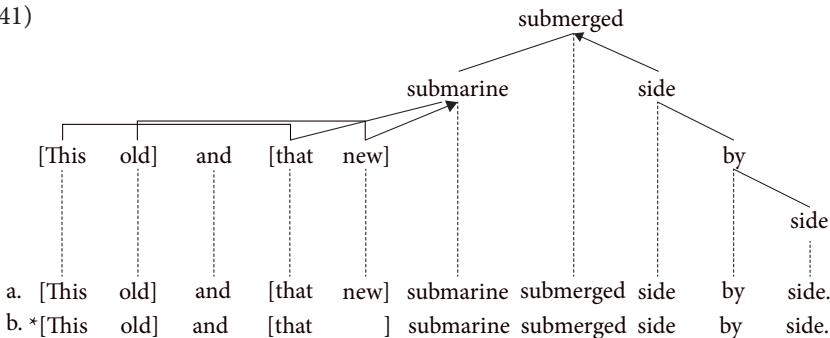
(39)



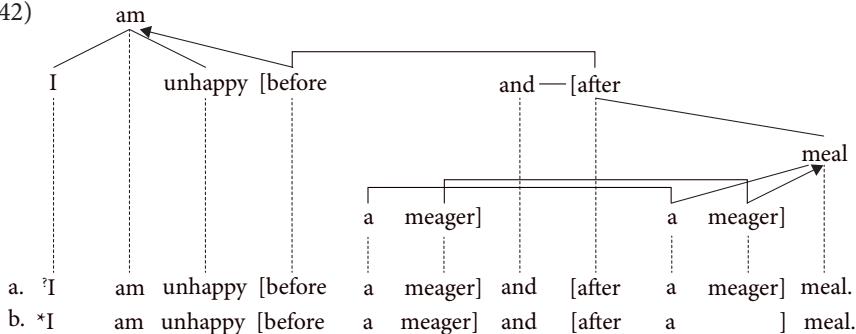
(40)



(41)



(42)

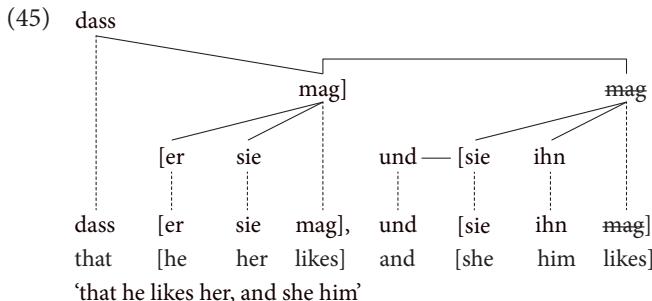
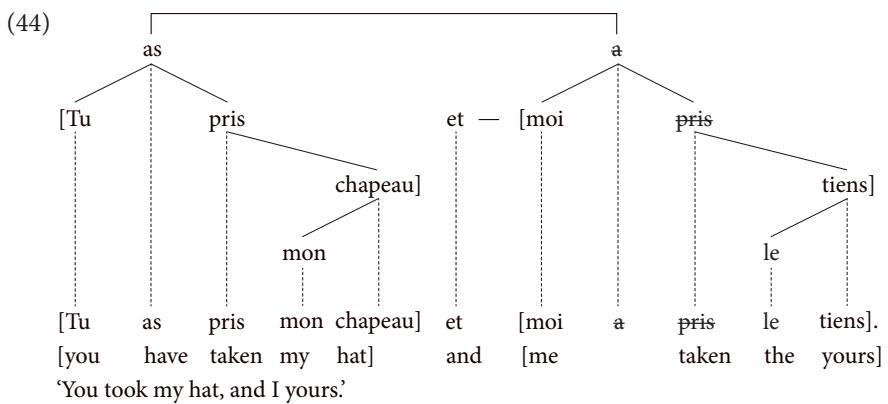
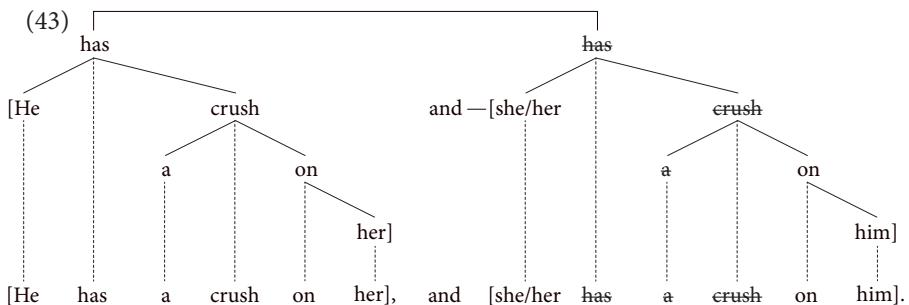


While the coordinate structures in the a-sentences are unusual, they can be acceptable given the correct intonation pattern (stress on contrasting nodes). The b-sentences, however, are simply bad. They are bad (in part) because the conjuncts are not structurally parallel. The initial conjunct contains a root that lacks a matching root in the non-initial conjunct.

## 11.6 A confounding factor: Gapping and stripping

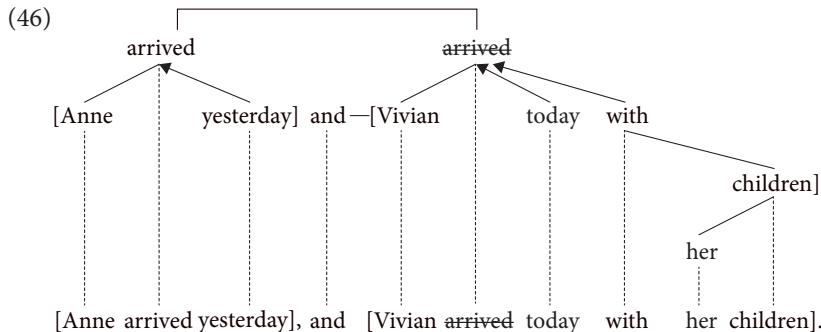
At times the possibility of a gapping analysis can obscure the presence of structural parallelism. Before illustrating how and when this occurs, one can first acknowledge that standard cases of gapping obey the Structural Parallelism Requirement. The difference to non-gapping coordinate structures is merely that the root of the non-initial conjunct is structurally but not phonologically present. An interesting aspect of gapping in this area is that a gapped conjunct only ever contains a single root (which is elided). The possibility of multiple roots does not arise because gapping occurs across clauses, whereby any given clause has a single root.

Standard instances of gapping are illustrated as follows with examples from English, French, and German:



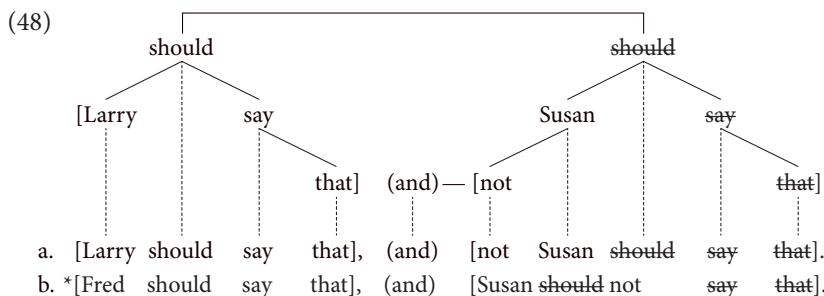
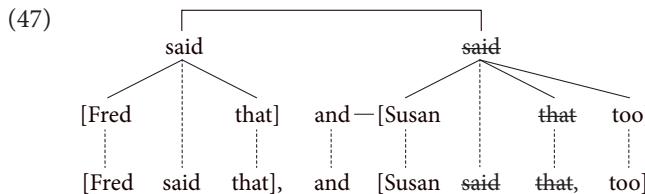
The conjuncts are parallel, since each of them contains a single root word. Of course this root word is phonologically empty in the non-initial conjunct.

The fact that gapped conjuncts contain a phonologically empty root allows the conjuncts to appear to lack structural parallelism since an additional, non-matched adjunct can appear in the gapped conjuncts, e.g.



The PP *with her children* lacks a parallel constituent in the initial conjunct. This fact might motivate one to incorrectly conclude that structural parallelism does not obtain in this case. This conclusion would be incorrect, however, since the conjuncts are in fact structurally parallel, each containing a single root (which is the finite verb).

The possibility of a stripping analysis is another source of confusion associated with structural parallelism. Stripping is a particular manifestation of gapping where only a single remnant appears in the gapped conjunct, everything else having been “stripped” away. Failing to recognize stripping, one might incorrectly conclude that the conjuncts in the following cases lack structural parallelism:



The verb and object have been gapped from the second conjunct in (47). The pause after the first conjunct (indicated by the comma), and the additive particle *too* help establish the stripping reading. Note in this regard that without the special

intonation and particle, the sentence is dubious: \**Fred said that and Susan*. The special intonation pattern is characteristic of gapping/stripping.

Sentence (48a) contains an instance of a particular type of stripping, which is called *not-stripping* here. That *not*-stripping is indeed a particular type of gapping can be seen when the negation appears with the two (or more) remnants associated with gapping, e.g. *You should call me, not me you*. The curious aspect of *not*-stripping is that the negation does not appear in its “normal” position, but rather it immediately precedes the (first) remnant, as illustrated across (48a–b). Further, *not*-stripping typically occurs without a coordinator, although the coordinator’s appearance is optional.

The special position of the negation immediately in front of the remnant can be addressed by acknowledging the special status of *not*. We have already seen that the negation cannot be gapped (see Examples (25)–(26) in Section 10.4), and now we have identified a second trait of the negation: it must attach to an overt word and therefore cannot attach to the empty structure of ellipsis. Further, the behavior of the negation in this area is not unique to gapping/stripping, but rather it can appear in this role in non-gapping environments, e.g. *[Fred], [not Susan], will do that*.

In addition to the confusion that stripping can generate, the possibility of competing analyses, i.e. string vs. gapping coordination, can also obscure the presence of structural parallelism across the conjuncts, e.g.

- (49) a. <sup>2</sup>*She sent [her boys to school at 8] and [her husband to the store]*.
- b. *[She sent her boys to school at 8], and [~~she sent~~ her husband to the store]*.

Given the single intonation curve associated with the sharing analysis shown in (49a), the sentence seems marginal. Given the two intonation curves associated with the gapping analysis in (49b), however, the sentence improves. This situation is consistent with the Structural Parallelism Requirement. The conjuncts in (49a) are not structurally parallel, because the initial conjunct contains the adjunct *at 8* which lacks a matching adjunct in the non-initial conjunct. This problem disappears given the gapping analysis, because on the gapping analysis, the conjuncts each contain a single root, which is the (elided) finite verb.

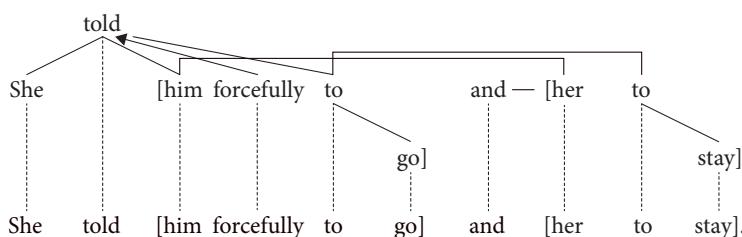
The discussion in this section has drawn attention to some data that appear to challenge the Structural Parallelism Requirement. Overlooking the possibility of a gapping/stripping analysis can incorrectly lead to the conclusion that structural parallelism does not obtain.

### 11.7 More on structural parallelism

So far structural parallelism has required that the conjuncts match each other in terms of their roots. If the initial conjunct contains three roots, the non-initial conjuncts must also contain three roots. While this parallelism is present in the vast majority of coordinate structures, there are certain cases that can flout the Structural Parallelism Requirement (as just formulated) in a limited way. These cases will motivate that the requirement be reformulated.

Examine the following coordinate structure:

(50) a.



- b. [She told him forcefully to go], and [she told her forcefully to stay].
- c. [She told him forcefully to go], and [she told her to stay].

Based on what has been established so far, the string analysis shown in (50a) should be impossible because the conjuncts are not structurally parallel, the initial conjunct containing the adverb *forcefully*, which lacks a matching adverb in the non-initial conjunct. This situation suggests that the gapping analysis in (50b) might be preferred, since its conjuncts are of course structurally parallel. The c-sentence, however, casts some doubt on the necessity of the gapping analysis because gapping definitely has not occurred there, yet the adverb *forcefully* can nevertheless scope over the non-initial conjunct.

The ability of adjuncts to appear in the initial conjunct and yet nevertheless scope over the non-initial conjunct(s) is illustrated further with the following examples:<sup>252</sup>

- (51) a. She [stayed today] and [relaxed].  
 b. She [stayed] and [relaxed] today.

- (52) a. He [sat in front of the TV] and [vegetated].  
 b. He [sat] and [vegetated] in front of the TV.

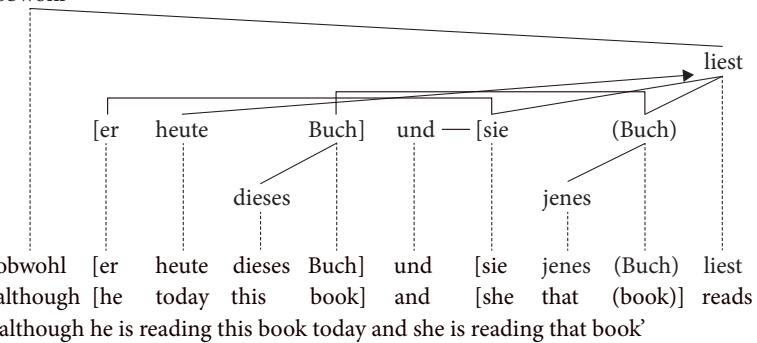
- (53) a. Did she [arrive last night] and [move in]?  
 b. Did she [arrive] and [move in] last night?

<sup>252</sup>. Examples (51)–(53) are from Osborne (2009: 445).

These data demonstrate that the position of the adjunct is somewhat flexible insofar as it can scope over the entire coordinate structure even when it appears inside the initial conjunct.<sup>253</sup> Given this observation, it indeed seems likely that the adverb *forcefully* has not been gapped from the second conjunct in (50). But if the adverb *forcefully* can be shared in the manner associated with the adjuncts in (51a), (52a), (53a), then perhaps it can be shared in (50a). This possibility suggests that the string analysis shown in (50a) might actually be plausible.

Further data from German confirm that gapping is not involved in cases like (50a). The following coordinate structures cannot be analyzed in terms of gapping due to the position of the verbs, which means that the string analysis is forced:

- (54) a. obwohl



- b. \*obwohl [er dieses Buch heute] und [sie jenes (Buch)] liest

The adjunct *heute* appears medially in the initial conjunct in (54a), whereas acceptability decreases markedly in (54b) where the adjunct appears on the right side of the initial conjunct.

Data like (50) and (54) suggest that structural parallelism in cases of pure sharing is less than completely strict, an adjunct being possible in the initial conjunct that has no matching adjunct in the non-initial conjunct. But if such an adjunct is present, then it must appear medially in the initial conjunct; it cannot appear as the right-most expression in that conjunct. This insight motivates the following reformulation of the Structural Parallelism Requirement.

## Structural Parallelism Requirement (final version)

Coordinated strings must be parallel with respect to their left- and right-most roots.

<sup>253</sup> See Heringer (1996: 169) concerning the ability of adjuncts to scope over large passages of text.

A large majority of coordinate structures have conjuncts that each contain just a single root. Such conjuncts trivially obey structural parallelism insofar as the one root is both the left- and right-most root. Furthermore, a large majority of multiple root conjuncts either contain just two roots or they contain more than two roots but match each other exactly in their number. It is only a small minority of multiple root conjuncts that have a medial adjunct in the initial conjunct that is not matched by a medial adjunct in the non-initial conjunct. When this occurs, the conjuncts are still parallel with respect to their left- and right-most roots.

### 11.8 A restriction on forward sharing (and gapping)

Section 10.6 established significant differences between forward and backward sharing. Backward sharing is more flexible than forward sharing in a couple of ways. The examples illustrating one of these differences, Examples (34)–(35) in Section 10.6, are reproduced here as (55)–(56):

- (55) a. ??His [brother left] and [sister stayed].
- b. \*The king [of England laughed] and [of Spain frowned].
- c. \*The attempt to solve [this problem succeeded] but [that problem failed].
- (56) a. [He sat on], and [she sat under, the table].
- b. [Fred always avoids], but [Susan really enjoys talking to, the new students].
- c. [The man with whom you], and [the woman with whom I, spoke know each other].

The attempts at forward sharing fail in (55a–c) fail, whereas similar instances of backward sharing are quite possible in (56a–c).<sup>254</sup> There is therefore a limitation on forward sharing that does not constrain backward sharing. This section identifies this limitation.<sup>255</sup> The underlines mark the key constituents for the analysis.

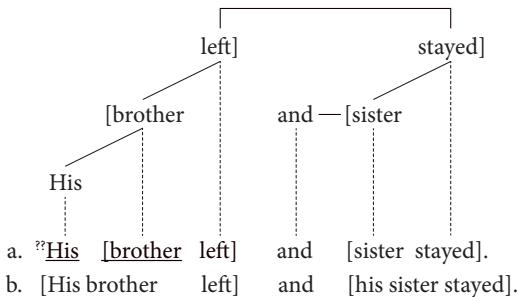
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<sup>254</sup>. The typical explanation for the badness of examples like (55a–c) is that the conjuncts are not constituents. In other words, attempts to coordinate nonconstituent strings like those in (55a–c) fail precisely because the conjuncts are not constituents – see for instance Baker (1978: 275), Neijt (1980: 52), Fromkin (2000: 161), Radford (2004: 71), Sportiche et al. (2014: 65). Such an explanation is not satisfactory, however, because similar examples that are acceptable in which the shared material follows the coordinate structure also seem to involve nonconstituent conjuncts, as (56a–c) and many of the examples produced further above demonstrate.

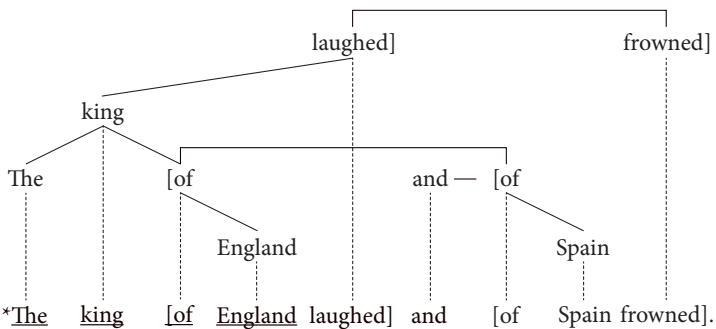
<sup>255</sup>. The limitation on sharing in coordination discussed in this section and the next is reproduced from Osborne (2006a; 2008) and from Osborne & Groß (2017). For an alternative account of the phenomenon, see Phillips (2003).

Examine the structures for (55a–c), which are given as the a-sentences in (57)–(59):

(57)

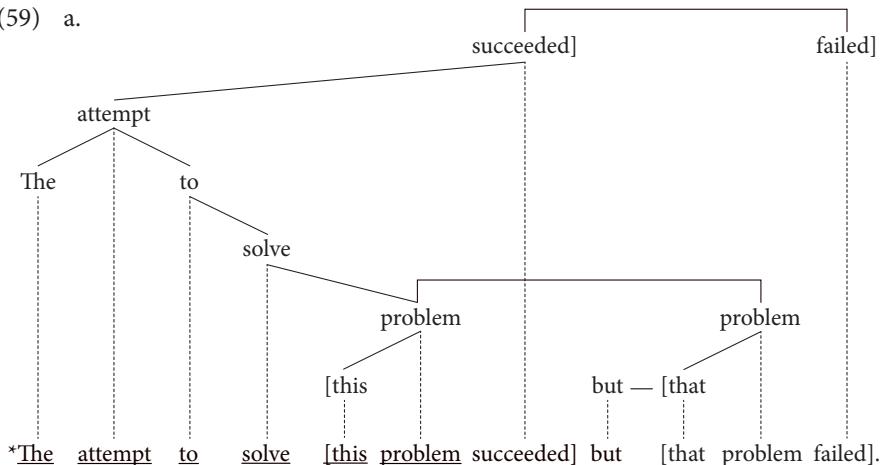


(58) a.



- b. [The king of England laughed] and [the king of Spain frowned].

(59) a.



- b. [The attempt to solve this problem succeeded], but [the attempt to solve that problem failed].

The source of the unacceptability of the a-sentences does not lie with a lack of structural parallelism, since the conjuncts each time are structurally parallel in terms of matching roots. One must therefore look elsewhere for the source of the unacceptability. The relevant observation concerns the status of the shared material. In each of (57a), (58a), (59a), there is a constituent (underlined) that precedes the left-most root of the initial conjunct, and this constituent is cut into by the coordinate structure. Therein lies the structural trait that can explain these data.

Sentence (57a) contains the constituent *his brother*, and this constituent precedes the root of the initial conjunct *left*. Part of this constituent is outside of the coordinate structure (*his*) and part of it is inside the coordinate structure (*brother*). Sentence (58a) is similar; it contains the constituent *The king of England*, and this constituent precedes the conjunct root *laughed*, whereby *The king* appears outside of the coordinate structure and *of England* appears inside the coordinate structure. The situation is also true of (59a); it contains the constituent *The attempt to solve this problem*, and this constituent precedes the conjunct root *succeeded*, whereby *The attempt to solve* is outside the coordinate structure and *this problem* is inside the coordinate structure.

Apparently, the relevant constraint prohibits a coordinate structure from cutting into a constituent that precedes a root of the coordinate structure. This constraint is formulated as follows:

#### **Principle of Full Clusivity (PFC)**

A constituent preceding a root of a coordinate structure must be included in, or excluded from, that coordinate structure entirely.<sup>256</sup>

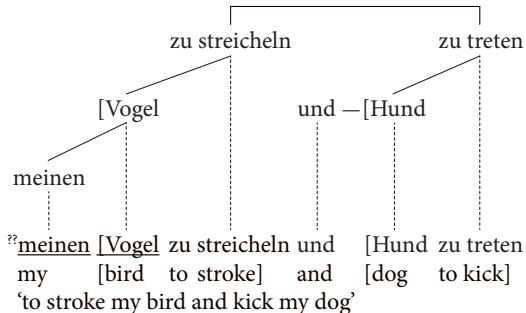
In other words, the initial conjunct of a coordinate structure may not cut into a preceding constituent. This constraint predicts the badness of the a-sentences in (57)–(59) because each time, there is a constituent that the initial conjunct cuts into. The important aspect of this constraint is that it limits constituents that precede the conjunct roots, but it says nothing about constituents that follow the conjunct roots. Hence, the similar instances of backward sharing in (56a–c) are possible. The PFC is a restriction on the production and processing of syntactic structures in time, earlier to later. As soon as constituents can be structurally acknowledged in the online production and processing of sentence structure, they are acknowledged and can be shared as a whole, but any subpart of a constituent that has been acknowledged can alone no longer be shared, that is, without the rest of that constituent being shared as well. The PFC is thus aiding sentence parsing by ensuring that constituents are perceived as soon as possible.

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<sup>256.</sup> The PFC accomplishes the same thing as Osborne's (2008: 1136) Restriction on External Sharing (RES). The only difference between the two formulations is the wording chosen.

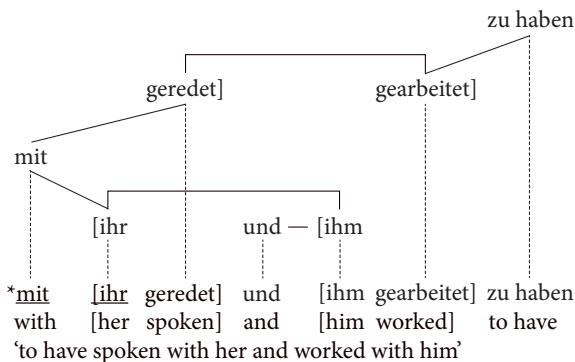
The PFC is valid for German as well:

(60) a.



b. [meinen Vogel zu streicheln] und [meinen Hund zu treten]

(61) a.



b. [mit ihr geredet] und [mit ihm gearbeitet] zu haben

Examining the a-examples, one sees again that each time there is a constituent that precedes the conjunct root (of the initial conjunct) and that this constituent is split, part of it being inside the coordinate structure and part of it being outside the coordinate structure. These data are therefore consistent with the PFC.

The following examples appear to contradict the PFC, however:

- (62) Sam edits articles [on ducks at home] and [on geese at work]. – Incorrect string analysis
- (63) John keeps pictures [of Paris in his desk] and [of Venice in his closet]. – Incorrect string analysis
- (64) I drink beer [from Ireland at parties] and [from Belgium at games]. – Incorrect string analysis

Given these analyses in terms of string coordination, where the underlined constituent is cut into by the coordinate structure, the PFC predicts these sentences to be bad. This prediction is obviously incorrect, though, since these sentences are all fine.

There is therefore some aspect of the PFC phenomenon that is not yet understood. A closer analysis of such cases reveals that they actually involve gapping, and that the structural analyses shown in (62)–(64) are therefore incorrect.

To begin to see why the analyses given in (62)–(64) are incorrect, consider the following a-sentences, which clearly involve gapping:

- (65) a. [Sam edits articles on ducks], and  
[Jo edits articles on geese]. – Gapping
- b. ??[Sam edited that article on ducks] and  
[Jo edited that article on geese]. – Failed gapping
- (66) a. [John keeps pictures of Paris], and  
[Larry keeps pictures of Venice]. – Gapping
- b. ??[John kept his picture of Paris], and  
[Larry kept his picture of Venice]. – Failed gapping
- (67) a. [I drink beer from Ireland], and  
[you drink that beer from Belgium]. – Gapping
- b. ??[I drank that beer from Ireland], and  
[you drank that beer from Belgium]. – Failed gapping

The gapping analyses shown in the a-sentences are necessary due to the appearance of the subject in the non-initial conjuncts – in other words, a string analysis is not possible. The acceptability contrast across the a- and b-sentences demonstrates that while the gaps can cut into the non-specific NPs in the a-sentences, they cannot cut into the specified NPs in the b-sentences.

Now when one extends this observation about specific and non-specific NPs to Examples (62)–(64), which are repeated here as the a-sentences in (68)–(70), one sees that the same acceptability contrast occurs:

- (68) a. [Sam edits articles on ducks at home], and  
[he edits articles on geese at work]. – Gapping analysis
- b. ??[Sam edited that article on ducks at home], and  
[he edited that article on geese at work]. – Failed gapping
- (69) a. [John keeps pictures of Paris in his desk] and  
[he keeps pictures of Venice in his closet]. – Gapping analysis
- b. ??[John kept his picture of Paris in his desk] and  
[he kept his picture of Venice in his closet]. – Failed gapping
- (70) a. [I drink beer from Ireland at parties] and  
[I drink beer from Belgium at games]. – Gapping analysis
- b. ??[I drank that good beer from Ireland at the party]  
and  
[I drank that good beer from Belgium at the game]. – Failed gapping

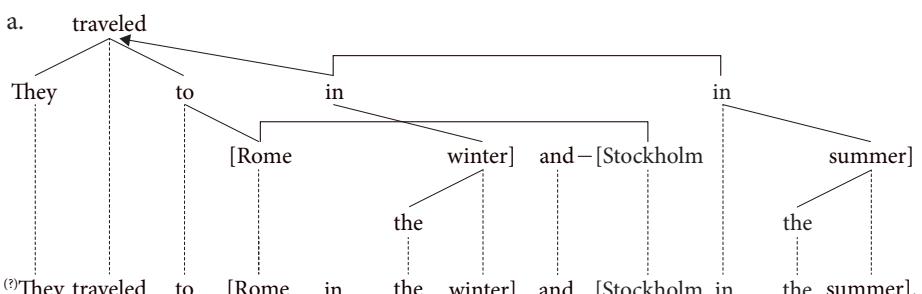
The gapping analyses shown in the a-sentences here are plausible insofar as the gap can cut into a non-specified NP. Given this observation, the analysis in terms of failed gapping in the b-sentences is also plausible insofar as the gap cannot cut into a specified NP. The greater point is therefore that the inability of the gapping mechanism to cut into specified NPs delivers the important clue about the nature of Examples (68)–(70).

To sum up the observations and reasoning, the incorrect analyses in terms of string coordination in (62)–(64) must be replaced with the corresponding gapping analyses in (68a), (69a), (70a). These gapping analyses are motivated by the fact that the NPs shown in (62)–(64) are non-specific and thus it is possible for the gapping mechanism to cut into them. Given the gapping analyses, then, Examples (62)–(64) do not contradict the PFC. Such examples do reveal, however, the difficulties that one experiences at times in distinguishing between string and gapping coordination.

## 11.9 Sharing and prepositions

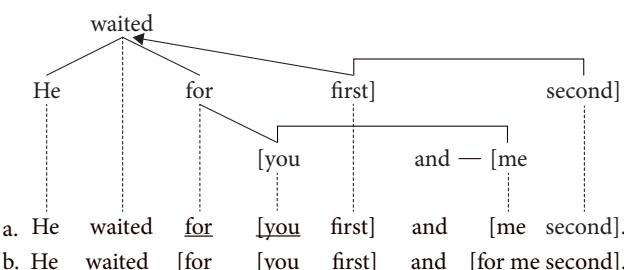
While sentences (62)–(64) do in fact not contradict the PFC, there are other cases that truly challenge the constraint. These cases involve a shared preposition in the post-verb domain, e.g.

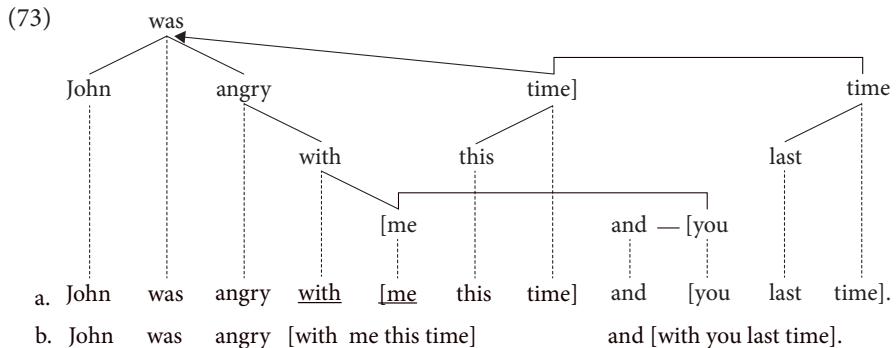
(71)



- b. They traveled [to Rome in the winter] and [to Stockholm in the summer].

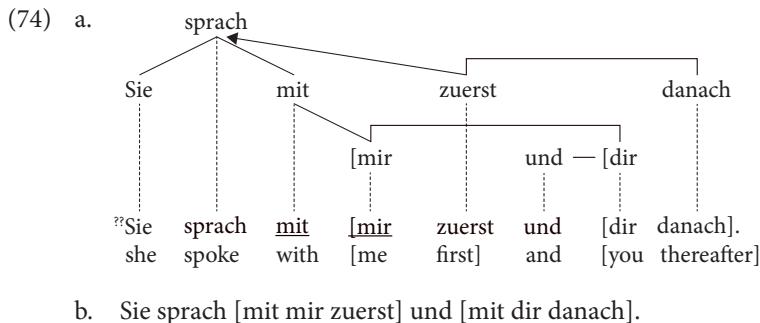
(72)



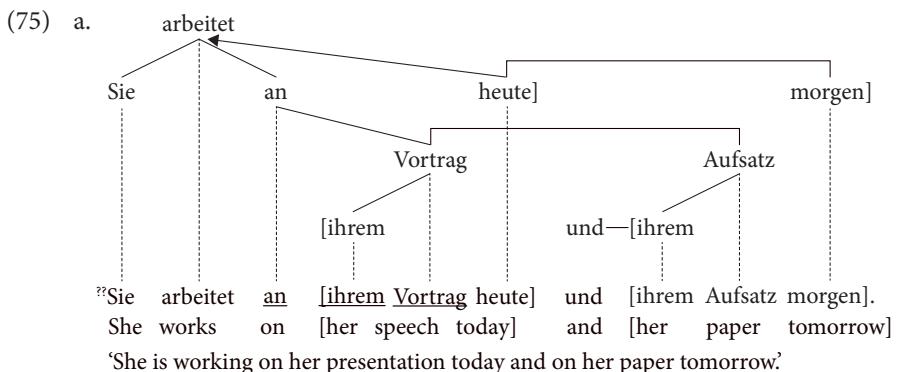


The a-sentences violate the PFC. The PP constituent *to Rome* in (71a) precedes the conjunct root *in*, the PP constituent *for you* in (72a) precedes the conjunct root *first*, and the PP constituent *with me* in (73a) precedes the conjunct root *time*. Since the initial conjunct cuts into these constituents, the expectation is that they should be bad. They are, however, acceptable for most speakers. The fact that informants slightly prefer to repeat the preposition as in the b-sentences does lend some support to the PFC. This support is weak, however, since the preference is mild. These data therefore challenge the PFC.<sup>257</sup>

Casting an eye on how analogous sentences in German behave, the PFC perhaps unexpectedly (given the English data) receives some support:



<sup>257</sup> Examples like (71a)–(73a), which challenge the PFC, are discussed in Osborne (2008: 1142–4).



- b. Sie arbeitet [an ihrem Vortrag heute] und [an ihrem Aufsatz morgen].

The preference for the b-sentences, where the preposition is repeated, is now stronger. Such data therefore support the PFC. Similar sentences from other languages support the PFC further, since the acceptability contrast increases in strength. The following examples illustrate that such cases in Danish, Dutch, French, Spanish, and Russian are also consistent with the PFC.<sup>258</sup>

#### Danish

- (76) a. \*Bill tager til [butikken forst] og [banken derefter].  
b. Bill tager [til butikken forst] og [til banken derefter].  
Bill goes to the.store first and to the.bank thereafter.

#### Dutch

- (77) a. \*Sam spreekt met [mej op het werk] en [jou thuis].  
b. Sam spreekt [met mej op het work] en [met jou thuis].  
Sam speaks with me at work and with you at.home.

#### French

- (78) a. \*Il va au [magasin avant le travail] et [stade après le travail].  
b. Il va [au magasin avant le travail] et [au stade après le travail].  
he goes to.the store before work and to.the stadium after work.

#### Spanish

- (79) a. ??Bill hablo' con [él hoy] y [ella ayer].  
b. Bill hablo' [con él hoy] y [con ella ayer].  
Bill spoke with him today and with her yesterday.

<sup>258</sup>. Examples (76)–(80) are taken from Osborne (2008: 1143–4).

## Russian

- (80) a. \*Bil pošel v [magazin pered rabotoj] i [bank posle raboty].  
b. Bil pošel [v magazin pered rabotoj] i [v bank posle raboty].  
Bill went to store before work and to bank after work.

Each of the a-sentences violates the PFC. When the preposition is repeated as in the b-sentences, however, the sentence becomes acceptable.

The conclusion to draw from these sentences is that the PFC is in fact valid. The reason it makes a somewhat inaccurate prediction for the English sentences (71a), (72a), (73a) is a mystery; English can flout the PFC in limited cases involving a shared preposition. The frequent occurrence of preposition stranding in English, and the absence of preposition stranding in related languages (see Section 9.3), is an avenue for addressing the exceptions to the PFC. In other words, the deviant cases involving prepositions in English have more to do with the theory of preposition stranding than with the theory of coordination.

## CHAPTER 12

# Ellipsis

### 12.1 Overview

Ellipsis occurs when an utterance, or part of an utterance, is perceived as abbreviated in some sense; something has been elided, i.e. omitted. Ellipsis is motivated by a number of subconscious desires on the part of the speaker, e.g. the desire to reduce redundancy, the desire to communicate with less effort, the desire to emphasize parts of an utterance, etc. The literature on ellipsis acknowledges numerous distinct ellipsis mechanisms, e.g. NP-ellipsis, gapping, stripping, VP-ellipsis, pseudogapping, answer fragments, sluicing, null complement anaphora (NCA), comparative deletion, left edge ellipsis, etc. Each of these mechanisms omits material from an utterance according to its own rules of application. The fact that these rules can vary in significant ways, motivates the various designations.<sup>259</sup>

This chapter explores ellipsis and presents a DG theory thereof, and the account of ellipsis then continues in Chapter 13. Some of the issues addressed in this chapter are given as questions here:

1. What is the nature of the elided material? Is it, for instance, present as null structure?
2. What is the nature of the material that survives ellipsis? The term *remnant* is used to denote this material.
3. What are the criteria that are used to explore and classify the various ellipsis mechanisms?

In addition to providing answers to these questions, the account of ellipsis in this chapter examines five mechanisms that have been analyzed as types of ellipsis: NP-ellipsis, gapping, stripping, VP-ellipsis, and pseudogapping. The next chapter, Chapter 13, then examines five further ellipsis mechanisms: answer fragments, sluicing, null complement anaphora (NCA), comparative deletion, and left edge ellipsis (LEE).

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<sup>259</sup>. Some of our understanding of ellipsis has remained mostly consistent since Ross' (1967) seminal dissertation and his subsequent papers. Ross coined some of the terms that are now widely employed to denote ellipsis mechanisms, most notably *gapping*, *stripping*, and *sluicing*.

An example of each of the ten types of ellipsis just mentioned is now given for orientation:

- |        |                                                                                             |                               |
|--------|---------------------------------------------------------------------------------------------|-------------------------------|
| (1) a. | You supported his first girlfriend, but<br>rejected his second <del>girlfriend</del> .      | - NP-ellipsis                 |
| b.     | I support you, and you <del>support</del> me.                                               | - Gapping                     |
| c.     | Jim will do it, and Sam <del>will do it</del> , too.                                        | - Stripping                   |
| d.     | He will leave before she will <del>leave</del> .                                            | - VP-ellipsis                 |
| e.     | He eats rice more than he does <del>eat</del> beans.                                        | - Pseudogapping               |
| f.     | A: What did you say? B: <del>I said</del> Nothing.                                          | - Answer fragment             |
| g.     | She is hiding something although not one of<br>us knows what <del>she is hiding</del> .     | - Sluicing                    |
| h.     | Billy always refuses to eat spinach after<br><del>Bonnie has refused to eat spinach</del> . | - Null complement<br>anaphora |
| i.     | She tells more stories about him than he tells<br>stories about her.                        | - Comparative deletion        |
| j.     | <del>Are you</del> Going to help us?                                                        | - Left edge ellipsis          |

Each of these types of ellipsis is examined in this chapter or the next.

## 12.2 Null material

The approach to ellipsis pursued here is one of null material. This null material is indicated in the examples using the strikethrough. A pertinent question in this area concerns the motivation for this material: Why should the existence of this null material be assumed? Certainly, an approach to ellipsis is possible that rejects the existence of this null material. Such an approach can claim that ellipsis does not actually omit anything at all; what is present is just what one hears, nothing more. The discussion in this section considers this issue. It motivates the null material of ellipsis in terms of *connectivity effects*.<sup>260</sup> The fragments of ellipsis behave as though they are connected into a greater structure. This greater structure is present in terms of the null material.<sup>261</sup> Four connectivity effects will now be enumerated: (1) morphological case, (2) reflexive pronouns, (3) polarity items, and (4) subcategorization.

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<sup>260</sup>. Merchant (2004: 676–85) discusses connectivity effects like the ones mentioned here below extensively in the context of sentence fragments.

<sup>261</sup>. Many DGs pursue an approach to ellipsis in terms of null material or empty nodes (e.g. Tesnière 1959/2015: Chapter 145; Stemmas 269 and 271; Mel'čuk & Pertsov 1987: 129, 142, 246–7; Weber 1992: 36, 62, 74–5; Starosta 1988: 253; Heringer 1996: 44, 102; Eroms 2001: 472; Schubert 2003: 649–50; Hudson 2007: 172–82).

## Morphological case

Morphological case in languages that have robust case systems motivate the null material of ellipsis, as the following instance of gapping from German illustrates:

- (2) [Dieser Text gefällt mir], und [jener Text gefällt dir].  
 [this text pleases me-DAT], and [that text pleases you-DAT].  
 'I like this text, and you that text.'

The psychological verb *gefällt* 'pleases' takes a dative object. Most transitive verbs in German, however, take an accusative object. By assuming the existence of the null verb *gefällt* 'pleases' in the gapped conjunct, the appearance of the dative *dir* is accommodated. Without the presence of the null verb, it would be more difficult to account for the appearance of the dative form *dir*. One would expect the nominative *du* or the accusative *dich* to appear instead, since those forms are more likely to be construed as the default case forms than the dative.

## Reflexive pronouns

A second connectivity effect occurs with reflexive pronouns (*herself*, *himself*, *themselves*). Such pronouns are reliant on an antecedent that appears close by, typically within the same clause. These pronouns can appear as answer fragments, though, e.g.

- (3) Who does Jim<sub>i</sub> praise? – He<sub>i</sub> praises Himself<sub>i</sub> / \*Him<sub>i</sub> / \*He<sub>i</sub>.

In order for the pronoun answer to refer to *Jim*, the reflexive pronoun *himself* is obligatory. The objective form *him* (or the subjective form *he*) is not possible, even though this form is more plausibly the default form that would appear in the absence of linguistic context. Hence by assuming the presence of the null subject *he* in the answer fragment, the obligatory occurrence of *himself* is accommodated.

## Polarity items

A similar connectivity effect occurs with polarity items such as *any*. These items can appear in certain affective environments. The typical licensor of such an environment is negation, e.g.

- (4) a. We did not try any of the oysters.  
 b. \*We tried any of the oysters.
- (5) What didn't you try? – We didn't try Any of the oysters.

The acceptability contrast across (4a) and (4b) is explained in terms of the presence/absence of the negation *not*; it licenses the environment in which *any* can appear. Applying this insight to (5), there is strong motivation to posit the presence of the null *didn't*, since without it, accounting for the appearance of the negative polarity item *any* would be more difficult.

### Subcategorization

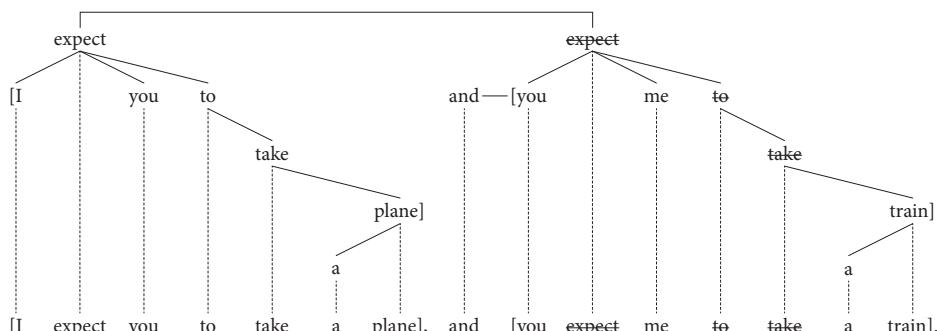
Subcategorization facts support the existence of null material in many instances of ellipsis. The subcategory of the fragment is determined by the combinatory potential of the elided material, as the following instance of sluicing demonstrates:

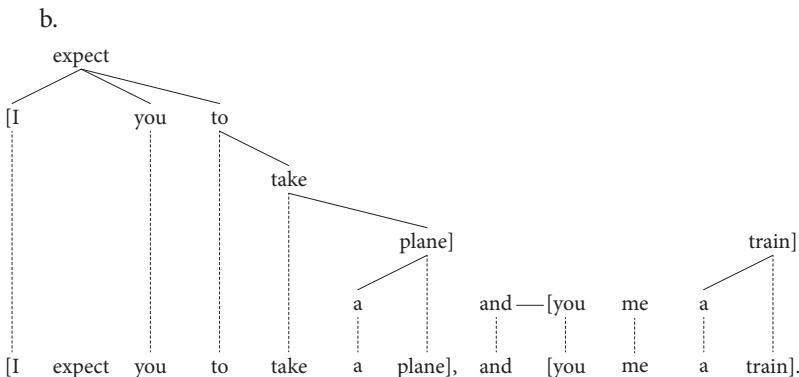
- (6) Somebody was laughing, but we don't know  
 a. at what they were laughing.  
 b. \*on what / \*for what / \*with what / \*to what.

The obligatory appearance of *at* in the continuation of the sentence – as opposed to *on*, *for*, *with*, or *to* – is accounted for by the presence of the null instance of *laughing*, since this verb subcategorizes for the specific preposition *at*. Without the null instance of *laughing*, it would be difficult to account for the acceptability of (6a) and unacceptability of (6b).

The preceding paragraphs have produced four observations that support the stance adopted here throughout, namely that ellipsis is a phenomenon involving null material. In addition to these four empirical observations, there is another matter that essentially forces the current DG to assume that null material is present in cases of ellipsis. This issue is one of simple practicality. Without the null material, the analysis of many instances of ellipsis would be difficult, since in some cases the remnants would be disconnected, e.g.

- (7) a.





By positing the existence of null material as in (7a), the structural analysis of this instance of gapping is straightforward; the three remnants in the gapped conjunct are connected into the structure by the null material. Without this null material, however, the analysis becomes arbitrary, as illustrated in (7b) where the three remnants in the gapped conjunct are disconnected.

In sum, there is ample empirical and practical motivation for the existence of the null material assumed for the account of ellipsis developed here. There are, though, also difficulties associated with the presence of null material, and these difficulties are mentioned below when they become relevant.

### 12.3 Targeted catenae and remnants

Examining the status of the elided words of ellipsis, a simple observation is that those null words form a catena. This observation is expressed as a general condition on ellipsis. The elided word combinations indicated in the examples form a catena, or in other words, the *target* of an instance of ellipsis is a catena. A related observation concerns the remnants of ellipsis. Given that the elided material of an instance of ellipsis is a catena, any remnant of ellipsis is necessarily a constituent. The following two statements therefore provide the conceptual basis going forward for the account of ellipsis:

#### Catena Condition

An instance of ellipsis targets a catena.

#### Remnant Condition

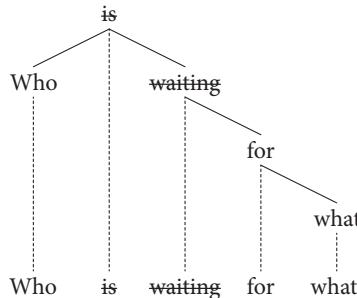
A remnant of ellipsis is a constituent.

Each of these statements entails the other. If an instance of ellipsis targets a catena, then any remnant that survives that instance of ellipsis is necessarily a constituent. Similarly, given a constituent remnant, the elided material is necessarily a catena.

Some clarification about the nature of remnants is required, though. A remnant of ellipsis is *any overt material that is dominated by elided material*. Examine the following instance of sluicing in this regard:

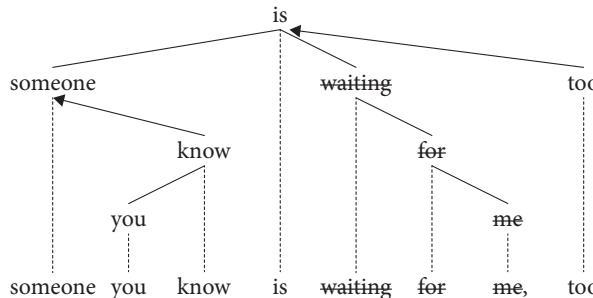
- (8) A: Someone is waiting for something.

B:



The elided material *is waiting* is a catena, and the remnants *who* and *for what* are constituents. These constituents qualify as remnants precisely because they are dominated by the elided material. Compare Example (8) involving sluicing with the following example involving VP-ellipsis:

- (9) Someone I know is waiting for me, and



The overt material *someone you know* is clearly not a constituent. This fact does not contradict the statements above, since to qualify as a remnant, the constituents must be dominated by elided material; neither *someone you know* nor *too* is dominated by the elided material *waiting for me*, thus neither qualifies as a remnant. Hence the fact that *someone you know* is not a constituent does not contradict the statement about remnants above, namely that they are constituents.

The two statements above serve as the conceptual basis for the theory of ellipsis currently being developed. There are, however, limited exceptions to these two statements. Certain answer fragments are such that the elided material cannot be construed as a catena and the remnants cannot be construed as constituents, e.g. *Will Tom buy or rent his skis? – He will Rent them*, and the same is true of certain instances of left edge ellipsis, e.g. *Has the Professor arrived yet?* These exceptions are acknowledged in Sections 13.2 and 13.6.

## 12.4 New information

The remnants of ellipsis are constituents, but certainly not all constituents can occur as remnants. There are, namely, further limitations on the constituents that can survive ellipsis. One major requirement on remnants is that they must present new information. Often this new information is understood in terms of contrast. A given remnant should stand in contrast to the parallel constituent in the antecedent clause. This condition is called the *New Information Condition*:

### New Information Condition

A remnant of ellipsis must present new/focused information.

This condition is illustrated with the following examples:

- (10) a. He likes her, and she/her likes him. – Gapping  
b. \*He likes her, and he likes himself, too. – Failed gapping
- (11) a. Sam will do it, and Fred will do it, too. – Stripping  
b. \*Sam<sub>i</sub> will do it, and he<sub>i</sub> will do it, too. – Failed stripping
- (12) a. He cheats more on Friday than he does cheat on Monday. – Pseudogapping  
b. ??He cheats more on Friday than she does cheat on Friday. – Marginal pseudogap.
- (13) Did he force JANE to drink the beer?  
a. – No, he forced SUSAN to drink it. – Answer fragment  
b. – \*No, he forced JANE to drink it. – Failed answer fragment

The b-sentences violate the New Information Condition. They are bad because (one of) the remnant(s) does not present new information and thus does not stand in contrast to the parallel constituent in the antecedent clause. For instance, *he* in the gapped clause in (11b) fails to stand in contrast to *Sam* in the antecedent clause.

## 12.5 Criteria of classification

The ten ellipsis mechanisms examined in this chapter and the next are a heterogeneous bunch. The one ellipsis mechanism can behave much differently than the next. In fact, efforts to distinguish the one ellipsis mechanism from the next can be difficult at times, and the large number of distinct traits associated with ellipsis in general complicates the analysis. Given the complexity, a template for examining the individual ellipsis mechanisms and comparing them to each other will be helpful. Each of the following questions represents a criterion for the classification of a given ellipsis mechanism:

1. Does the ellipsis mechanism occur optionally?
2. Does the ellipsis mechanism require the presence of a linguistic antecedent (or postcedent), or can the content of the ellipsis site be determined by non-linguistic cues in general?
3. Does the ellipsis mechanism operate both forwards and backwards? In other words, must the ellipsis site have an antecedent, or is it also possible for it to have a postcedent?
4. Must the remnant of the ellipsis mechanism present new information?
5. Is the ellipsis mechanism restricted to occurring in coordinate structures?
6. Can the ellipsis mechanism elide a negation?
7. Does the ellipsis mechanism preserve tense, mood, and aspect across antecedent clause and ellipsis clause?
8. Does the ellipsis mechanism allow sloppy identity of an elided pronoun?
9. Does the ellipsis mechanism allow the antecedent or postcedent to the ellipsis to dominate the ellipsis?

This list of criteria for the classification of ellipsis mechanisms could of course be expanded. The list does, however, provide a number of good orientation points for building an understanding of ellipsis mechanisms in general. A table is given at the beginning of each of the following sections that summarizes the behavior of the ellipsis mechanism at hand with respect to these criteria.

## 12.6 NP-ellipsis

Noun phrase ellipsis (NP-ellipsis, also abbreviated as NPE) is present in the following sentences – observe that null material is indicated in these examples using the strikethrough; the presence of this null material can be disputed, and indeed, further below its existence is rejected:

- (14) a. If you take your dog, we'll take ours ~~dog~~.
- b. The first song was good, although the second ~~song~~ wasn't.
- c. Jill's picture of you is better than Tina's ~~picture of you~~.
- d. Some people want to study syntax, but many ~~people~~ don't.
- e. If Jim brings three six-packs to the party, Jill will bring four ~~six-packs~~.
- f. Due to the difficulty of the first ~~problem~~, nobody tried the second problem.
- g. He caught many small spiders with long legs, and she caught many ~~small spiders~~ with short legs.
- h. Your story about me at the party was more accurate than mine ~~story~~ about you.

Examples (14b, d) also contain VP-ellipsis, and (14d) contains gapping, all of which are not indicated. While these examples are such that NP-ellipsis is assumed to involve null material (indicated with the strikethroughs), there are strong reasons to reject this assumption. These reasons are discussed below. First, though, NP-ellipsis has the following characteristics:

Table 21.

| Traits of ellipsis mechanism                   | NP-ellipsis             |
|------------------------------------------------|-------------------------|
| Occurs optionally                              | Sometimes               |
| Must have a linguistic antecedent              | No, but it usually does |
| Can operate backwards                          | Yes                     |
| Remnant must present new information           | No                      |
| Occurrence restricted to coordinate structures | No                      |
| Elided material can include a negation         | No                      |
| Flexibility in verb forms                      | Inapplicable            |
| Allows sloppy identity                         | Yes                     |
| Antecedent can dominate ellipsis               | Yes                     |

NP-ellipsis occurs in English with possessive determiners, cardinal and ordinal numbers, and some quantifiers (*some, many, none*), but it is impossible with most attributive adjectives, e.g. \*I have an old bike, and you have a new. In other languages, however, NP-ellipsis can occur with most adjectives.

But there are, as just stated, reasons to doubt that NP-ellipsis really involves the presence of null material. Indeed, the stance taken here is that NP-ellipsis is not true ellipsis, but rather the pre-modifier comes to serve as a pronoun. The key insight that supports this analysis occurs with the distinction between possessive determiners and possessive pronouns, e.g.

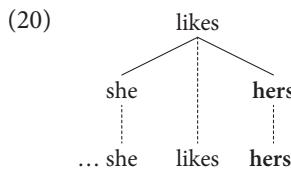
- (15) a. He likes his idea, and she likes **her**/**\*hers** idea.  
b. He likes his idea, and she likes **\*her/hers**.
- (16) a. You listened to my talk, and I listened to **your**/**\*yours** talk.  
b. You listened to my talk, and I listened to **\*your/yours**.

It appears as though the nouns *idea* and *talk* have been elided from the b-sentences. The behavior of the possessives provides the key insight concerning the status of the noun, however. The distinction between possessive determiners (*my, your, his, her, its, our, their*) and possessive pronouns (*mine, yours, his, hers, its, ours, theirs*) suggests that NP-ellipsis does not involve ellipsis at all.

When a possessive introduces (what looks like) ellipsis, the possessive pronoun must appear. Further such examples:

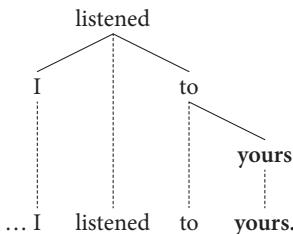
- (17) You have your idea, and I have **mine**/**\*my**.
- (18) If she brings **hers**/**\*her**, you should bring your dog.
- (19) They will support your proposal, because you supported **theirs**/**\*their**.

The fact that the possessive pronoun is obligatory suggests that ellipsis has not occurred, but rather the possessive is actually a proform that stands in for the noun.<sup>262</sup> Given this insight, the correct structural analysis of (15b) and (16b), given here as (20)–(21), is as follows:



<sup>262.</sup> Schubert (1987: 120–1) and Starosta (1988: 48–9) come to this same conclusion. The distinction between possessive determiners and possessive pronouns undermines an analysis of NP-ellipsis in terms of elided material. In other words, NP-ellipsis is not really a manifestation of ellipsis.

(21)



The possessives *hers* and *yours* appear in the position of the respective noun. In this manner, ellipsis has not occurred, but rather the possessive has come to function as a pronoun. This analysis is extended to the other pre-noun modifiers that license NP-ellipsis (ordinal and cardinal numbers, certain quantifiers).

While the distribution of NP-ellipsis is quite limited in English, its distribution is much freer in German. Most any determiner or attributive adjective can introduce NP-ellipsis in German, e.g.

- (22) Du hast ein teueres Fahrrad, und ich habe ein billiges.  
you have an expensive bicycle, and I have a cheap [one]
- (23) Dieser Computer ist schnell, aber jener ist langsam.  
this computer is fast but that [one] is slow.

These examples demonstrate the freedom of NP-ellipsis in German, and they also show that English can employ the pronominal count noun *one* to express the same meaning. The obligatory appearance of *one* (or the noun) in the translations supports further the assumption that the pre-noun words that introduce NP-ellipsis in German are indeed functioning as pronouns, which means ellipsis actually has not occurred.

That the element preceding an instance of NP-ellipsis is indeed functioning as a pronoun in German is supported by the contrast between strong and weak endings. A determiner or an adjective that introduces an NP-ellipsis often takes a strong ending, whereas the ending would be weak if the noun were present, e.g.

- (24) a. Sie hat zwei Bücher gelesen, aber ich habe nur ein  
she has two books read but I have only one-WEAK  
Buch gelesen.  
book read  
'She read two books, but I read only one book.'
- b. Sie hat zwei Bücher gelesen, aber ich habe nur ein-es gelesen.  
one-STRONG

The fact that the strong ending is obligatory in the cases of NP-ellipsis in the b-sentences indicates that the pre-noun determiner or adjective is functioning as a pronoun, which means, again, that ellipsis has not really occurred. The pre-noun modifier has taken on the additional function of a pronoun.

Yet another observation about NP-ellipsis that supports the analysis here concerns the nature of would-be remnants. If NP-ellipsis truly involved null material, then any remnant present would be expected to present new information. This is, however, not what one encounters, e.g.

- (26) He has two pictures of you, and  
a. she also has two pictures of you. – Incorrect analysis  
b. she also has two of you. – Correct analysis

The analysis shown in (26a) would have to acknowledge two remnants, *two* and *of you*. But neither of these remnants would present new information. Examples (10)–(13) above revealed that when null material is truly present, any remnant that survives ellipsis must present new information. The conclusion, then, is that there is no null material present in (26), which means the analysis in (26b) is correct. Since there is no null material, there are no remnants, which means there is no necessity for new information to appear.

A confounding factor for the current analysis of NP-ellipsis is that it allows sloppy identity, e.g.

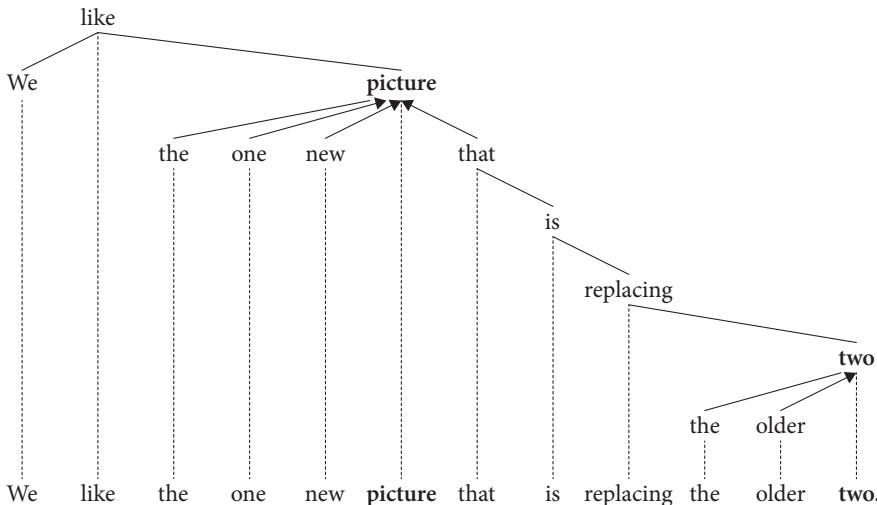
- (27) Susan has a picture of herself in her wallet, and

  - a. Fred has two in his wallet.  
‘two pictures of himself’ – Sloppy reading
  - b. Fred has two in his wallet.  
‘two pictures of Susan’ – Strict reading

The reading indicated in (27a) is known as the *sloppy reading*; the reading is “sloppy” because the pronoun *himself* does not match the pronoun in the antecedent (*himself* vs. *herself*). Ellipsis mechanisms in general allow sloppy identity, a fact that becomes clear in the analyses below in this chapter and the next. The presence of the sloppy reading indicated in (27a) is therefore a problem for the current analysis of NP-ellipsis. Despite this problem, the other considerations above outweigh this observation concerning sloppy identity.

Finally, note that NP-ellipsis is such that the antecedent to the pronominal modifier can dominate that modifier:

(28)



The antecedent *picture* dominates *two*. Such constellations are interesting and noteworthy insofar as they represent a basic problem for constituent-based theories of syntax. If the constituent is the only unit of syntax that the theory has to work with, then such a constellation should give rise to what is known as an *infinite regress*. The ellipsis, or in this case the pronoun, would have to be viewed as contained inside its antecedent, thus giving rise to the infinite regress associated with antecedent containment. The current catena-based theory, in contrast, has no problem with such cases, since the antecedent is a catena. The discussion returns to this notion of antecedent containment below in the discussion of VP-ellipsis (see Section 12.9).

In sum, NP-ellipsis is a mechanism that has the pre-noun determiner or adjective sliding into the position of the missing noun, taking on the additional function of a pronoun. Thus, despite the designation “NP-ellipsis”, the underlying mechanism does not actually involve ellipsis at all. The designation “NP-ellipsis” has been employed here because that is what the phenomenon is called more generally.

## 12.7 Gapping

Gapping is present in each of the following sentences:

- (29) a. John drinks coffee, and Tina ~~drinks~~ tea.  
 b. The girls want the boys to stay, and the boys ~~want~~ the girls ~~to stay~~.  
 c. Which women support Sanders, and which men ~~support~~ Clinton?  
 d. Is Bill going to visit Fred, or ~~is~~ Fred ~~going to visit~~ Bill?  
 e. She will speak with me today, and he ~~will speak~~ with you tomorrow.

- f. Today they gave to Sanders, but yesterday they gave to Clinton.
- g. Did the pundits attack Trump first, or did Trump attack the pundits?
- h. The hawks like Christie, but the doves like Paul.

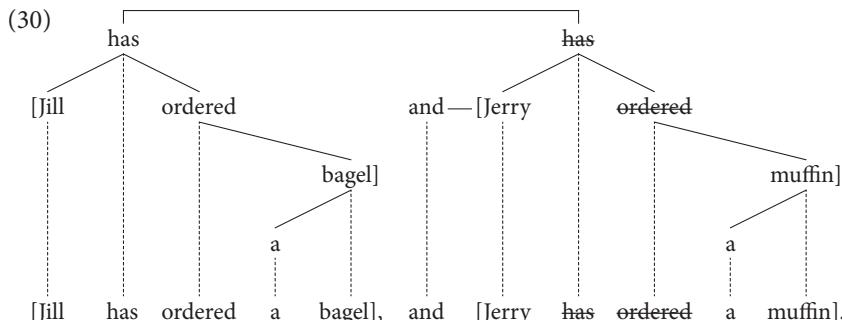
Numerous further examples of gapping have appeared above in this chapter and in Chapter 10 (see Sections 10.4 and 10.7). The gapping mechanism is characterized as follows:

Table 22.

| Traits of ellipsis mechanism                    | Gapping                                              |
|-------------------------------------------------|------------------------------------------------------|
| Occurs optionally                               | Yes, mostly                                          |
| Must have a linguistic antecedent or postcedent | Yes, an antecedent                                   |
| Can operate backwards                           | No                                                   |
| Remnants must present new information           | Yes                                                  |
| Occurrence restricted to coordinate structures  | Yes                                                  |
| Elided material can include a negation          | No                                                   |
| Flexibility in verb forms                       | Yes, but only regarding person and number morphology |
| Allows sloppy identity                          | Yes                                                  |
| Antecedent can dominate the ellipsis            | No                                                   |

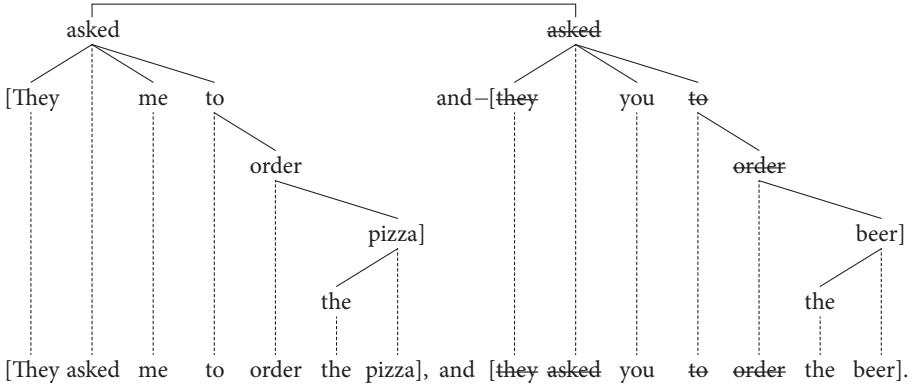
Gapping is restricted to coordinate structures only. This means that gapping operates forwards only and the elided material must have a linguistic antecedent. The remnants must present new information. Gapping is like stripping, VP-ellipsis, and pseudogapping insofar as it does not allow a negation to be interpreted as part of the elided material. There is flexibility in person morphology across the antecedent and elided finite verbs, but tense, aspect, and mood must be consistent. Like most types of ellipsis, gapping allows sloppy identity across the ellipsis and its antecedent.

The most characteristic trait of gapping is that in many cases there is indeed a gap present. This means there are two or more remnants, the gap splitting these remnants, e.g.



The elided material *has ordered* is the matrix predicate catena of the gapped conjunct. The two remnants *Jerry* and *a muffin* straddle the gap. While stereotypical instances of gapping like (30) involve a true gap, more than one gap is possible, or the gap can be discontinuous, e.g.

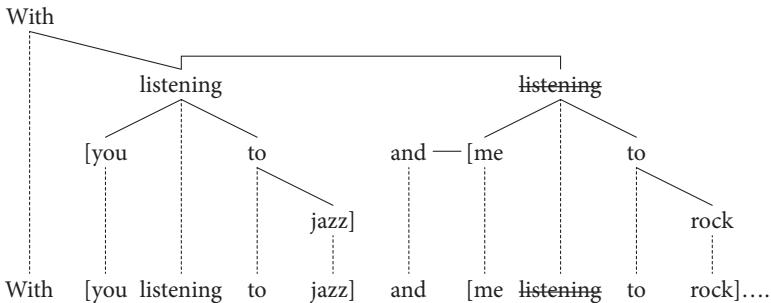
(31)



The gap in this case is discontinuous, straddling the first remnant *you*, whereas the two remnants straddle the second part of the gapped material.

While in most cases, the root word of the gap is a finite verb, this aspect of gapping is not a necessary condition. All that is required is for the gap to include the root word of the predicate at hand, e.g.

(32)



This example clearly involves gapping, yet no finite verb is present. As long as the gap includes the root verb of the predicate at hand, gapping is possible. Note that the subjects *you* and *me* are positioned as dependents of *listening*. This aspect of the analysis is controversial, since nonfinite verbs do not typically take subject dependents. The analysis shown is, though, supported by the very nature of this gapping

example. An alternative analysis that positions *listening* as a dependent of *you/me* would incorrectly predict gapping to be impossible in such cases.<sup>263</sup>

A negation cannot be interpreted as part of the gap, e.g.

- (33) [He does not want to support her],  
 a. \*and [she does not want to support him].  
 b. nor [does she want to support him].

The indicated reading in (33a) is not available because the negation cannot be interpreted as part of the gap.<sup>264</sup> If the negation is overt and expressed as *nor* as in (33b), though, the gapping reading is easily available. This aspect of gapping is shared by stripping, VP-ellipsis, and pseudogapping, as established in those sections below. See also Examples (25)–(26) in Section 10.4.

A superficial analysis of examples like (34a) might stipulate that the number of remnants in a gapped conjunct cannot exceed two. However, this stipulation is proved incorrect by examples such as (34b):

- (34) a. ??[Susan gave Bill a hug], and [Jill gave Fred a kiss].  
 b. [She gave him a hug], and [he gave her a kiss].

Example (34a) is certainly difficult to process. This difficulty has to do, though, with the number of distinct entities referred to in the example (*Susan, Bill, a hug, Jill, Fred, a kiss*) rather than to the presence of gapping. When the number of distinct entities is reduced as in (34b) (*she/her, he/him, a hug, and a kiss*), the example improves markedly. This observation is supported by the particularly felicitous instances of gapping that have a chiastic structure (AB and BA), e.g. [*Should I call you*] or [*should you call me*?]; the number of distinct entities in such cases is typically just two.

While the verbs of a gapped conjunct must match the antecedent verbs in tense, mood, and aspect, variation in number and person agreement is possible:

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<sup>263</sup> Mel'čuk and Pertsov (1987: 100–2) produce an analysis of what they call the “absolute surface syntactic relation”. On their analysis, *listening* in (32) would be dependent on *you/me*. Such an analysis is implausible precisely because it cannot accommodate the ability of gapping to occur, since the gap would not include the root of the non-initial conjunct.

<sup>264</sup> One might object here that if the disjunctive coordinator *or* is used, the negation can be interpreted as part of the gap, e.g. [*He does not want to support her*] or [*she does not want to support him*]. This objection is countered by the fact that part of De Morgan's law predicts this reading to be available:  $\neg(p \vee q) \equiv \neg p \wedge \neg q$ . The availability of this reading is thus due to the nature of De Morgan's Law rather than to the presence of the negation in the gapped material.

- (35) [Is he going to invite us], and [~~are we/us~~ ~~going to invite him~~]?

The gapped conjunct matches the antecedent conjunct in tense (present), aspect (progressive), and mood (indicative), but there is variation in person and number agreement. The antecedent subject is 3rd person singular, whereas the subject in the gapped conjunct is 1st person plural (*he* vs. *we*). Note as well that case forms need not match: *he* (subjective) vs. *us* (objective).

Another noteworthy trait of gapping concerns *sloppy identity*. The term *sloppy identity* denotes pronominal reference that is flexible, as established above (see Example 27), e.g.

- (36) [Fey gave her presentation first], and [Ben ~~gave his presentation~~ second].

The reading indicated in the gapped conjunct is the most natural one. The mismatch in determiner forms is the pertinent observation (*her* vs. *his*). When ellipsis allows this flexibility in pronominal reference, sloppy identity is acknowledged, as opposed to strict identity. In cases of strict identity, the elided pronominal form refers to the same entity as the overt pronominal form, e.g. [*Fey gave her presentation first*], and [*Ben gave her presentation second*]. Most, if not all, types of true ellipsis allow sloppy identity.

## 12.8 Stripping

Stripping is present in each of the following sentences:

- (37) a. I like RPG games, and you ~~like them~~, too.  
 b. They brew coffee at home, and ~~they brew~~ tea ~~at home~~, too.  
 c. Yesterday it rained, and today ~~it rained~~ also.  
 d. Chinese is really difficult, and Arabic ~~is really difficult~~ as well.  
 e. Larry made the mistake, not Phil ~~made the mistake~~.  
 f. Why would Tom support Trump, but ~~why would~~ not Phil support Trump?  
 g. Drinking beer is really enjoyable, and drinking wine ~~is really enjoyable~~, too.  
 h. Which oranges will they eat, and which bananas ~~will they eat~~?

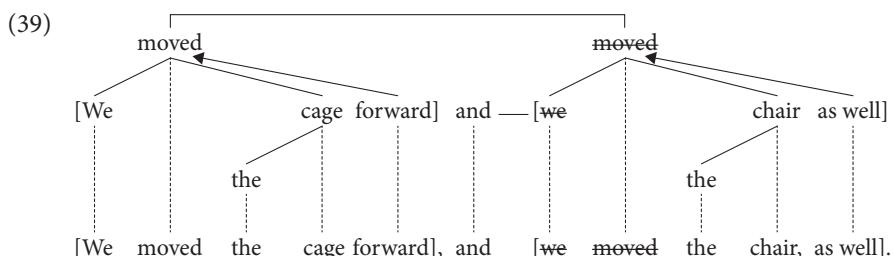
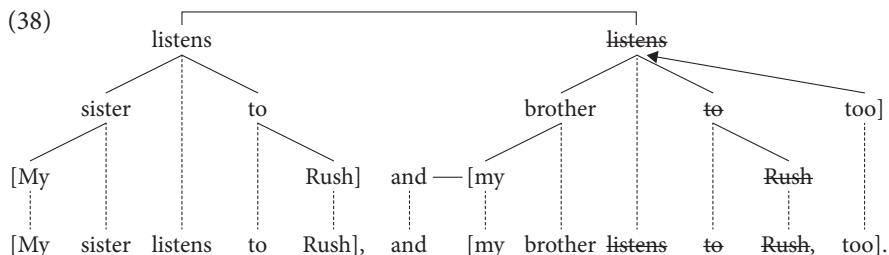
Stripping is a particular instantiation of the gapping mechanism whereby only a single remnant remains in the gapped clause (as opposed to the two or more remnants of gapping). Thus, the traits of stripping are almost identical to those of gapping:

Table 23.

| Traits of ellipsis mechanism                    | Stripping                                 |
|-------------------------------------------------|-------------------------------------------|
| Occurs optionally                               | Yes, sometimes                            |
| Must have a linguistic antecedent or postcedent | Yes, an antecedent                        |
| Can operate backwards                           | No                                        |
| Remnant must present new information            | Yes                                       |
| Occurrence restricted to coordinate structures  | Yes                                       |
| Elided material can include a negation          | No                                        |
| Flexibility in verb forms                       | Yes, but only regarding person and number |
| Allows sloppy identity                          | Yes                                       |
| Antecedent can dominate the ellipsis            | No                                        |

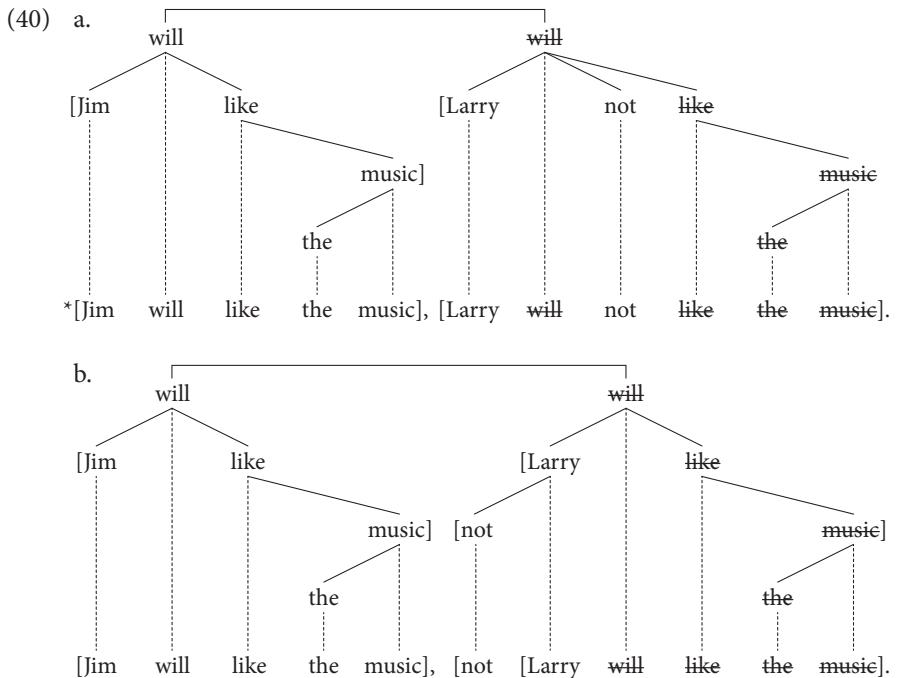
This table is the same as for gapping, with the one exception concerning the extent to which stripping occurs optionally (“yes, mostly” vs. “yes, sometimes”). Thus, almost all of the observations and comments produced for gapping in the previous section are also true of stripping. There are, though, two reasons why stripping is given as a separate ellipsis mechanism here. The first of these comes from the literature. Gapping and stripping are traditionally acknowledged as separate mechanisms, even though the basis for this separation is weak. The second is that one frequently occurring type of stripping, i.e. *not*-stripping, has a trait that obscures its status as a manifestation of the gapping mechanism.

Typical instances of stripping are illustrated as follows:



The stripped conjuncts can be construed as containing just a single remnant insofar as there is one remnant each time that stands in contrast to a constituent in the antecedent conjunct. The appearance of the additive adverbs *too* and *as well* obscure the analysis somewhat, since these adverbs qualify as remnants according to the definition given above (see Section 12.3).

*Not*-stripping is a frequently occurring type of stripping that involves the overt appearance of the negation *not*. This negation must precede the remnant in English; it cannot follow it, e.g.



The unacceptability of (40a) is perhaps unexpected, since there is no obvious reason why the negation *not* should be prohibited from appearing as a remnant in the gapped conjunct. The discussion has already demonstrated, though, that the negation *not* has special properties when interacting with ellipsis. The presence of the null material actually provides part of an explanation for such cases: one assumes that *not* is incapable of attaching to a null node. To overcome this inability, *not* attaches as a pre-dependent to the remnant as illustrated in (40b).

The tendency for negation to attach as a pre-dependent to content words is demonstrated in cases that cannot be analyzed as involving ellipsis, e.g. *Bill, not Fred, wanted to stay*. Observe as well that negation can marginally appear after the subject in cases of gapping, for it can attach to the second remnant:

- (41) a. [He should write to her], [not she ~~should write~~ to him].  
      b. <sup>?</sup>[He should write to her], [she ~~should write~~ not to him].

Example (41a) is most natural, but (41b) also seems not entirely bad. Consider that the negation must indeed attach to one of the remnants in such cases, since it can appear even in the event that there is no elided auxiliary verb to which it could attach, e.g.

- (42) a. \*[He wrote to her], but [not she wrote to him].  
      b. \*[He wrote to her], but [she wrote not to him].  
      c. [He wrote to her], but [not she ~~wrote~~ to him].  
      d. <sup>?</sup>[He wrote to her], but she ~~wrote~~ not to him.

Despite the absence of an auxiliary verb *did* to which one might expect the negation *not* to attach as a post-dependent, the negation *not* can appear in the gapped conjunct; it can do so because in cases of ellipsis, it can and must attach to one of the remnants, preferably to the first remnant, but the second remnant is also available.

An aspect of *not*-stripping (that is, *nicht*-stripping) in German supports this analysis. The negation *nicht* in German has the option to precede or follow the one remnant, e.g.

- (43) a. [Er schreibt an Hans], aber [nicht sie ~~schreibt an ihn~~].  
      b. [Er schreibt an Hans], aber [sie nicht ~~schreibt an ihn~~].

These examples can be accounted for by assuming that the negation *nicht* in German has the option to attach as a pre-dependent or as a post-dependent to the remnant. This assumption is supported by the fact that *nicht* often attaches as a post-dependent to a content verb, e.g. *Das geht nicht*, lit. ‘That goes not’, that is, ‘That doesn’t work’. In English, in contrast, the negation *not* can attach as a post-dependent only to an auxiliary verb; if it attaches to a content word, it must attach as a pre-dependent.

This section has noted that stripping is a particular manifestation of the gapping mechanism and thus that the observations about gapping from the previous section also apply to cases of stripping. Stripping differs from gapping mainly insofar as just one remnant is present in cases of stripping rather than two or more. The one aspect that challenges the account of stripping as a manifestation of the gapping mechanism is the frequent occurrence of what has been called *not*-stripping here. By drawing attention to the appearance of *not* in gapped conjuncts, however, it has been possible to support the analysis of *not*-stripping as involving the gapping mechanism.

## 12.9 VP-ellipsis

Verb phrase ellipsis (VP-ellipsis) is present in each of the following sentences:

- (44)
- a. Although you might cheat on an exam, I would never cheat on an exam.
  - b. Sue isn't going to try because Larry isn't going to try.
  - c. Sam is always helpful, although Susan rarely is helpful.
  - d. While only some people think Cruz is a narcissist, everyone agrees that Trump definitely is a narcissist.
  - e. If you don't do it, I will do it.
  - f. If you don't do it, I will do it.
  - g. He might be doing the work, and she might also be doing it.
  - h. He might be doing the work, and she might also be doing it.

VP-ellipsis is perhaps the most widely studied type of ellipsis in English. As far as the template is concerned, VP-ellipsis is characterized as follows:

Table 24.

| Traits of ellipsis mechanism                    | VP-ellipsis                |
|-------------------------------------------------|----------------------------|
| Occurs optionally                               | Yes, usually               |
| Must have a linguistic antecedent or postcedent | No, but it usually does    |
| Can operate backwards                           | Yes                        |
| Remnants must present new information           | Inapplicable               |
| Elided material can include a negation          | No                         |
| Occurrence restricted to coordinate structures  | No                         |
| Flexibility in verb forms                       | Yes, regarding subcategory |
| Allows sloppy identity                          | Yes                        |
| Antecedent can dominate the ellipsis            | Yes                        |

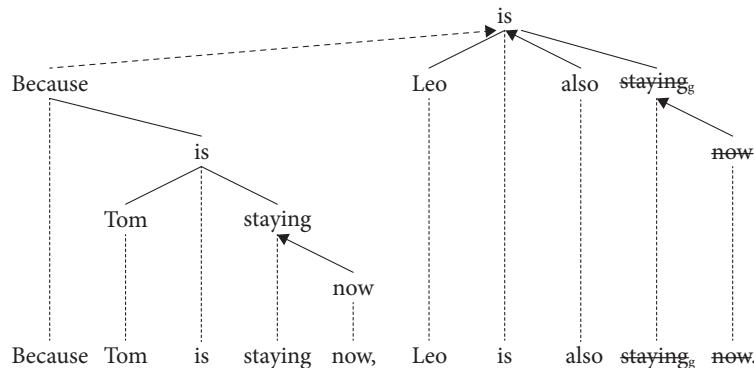
VP-ellipsis usually occurs optionally, although when it is licensed by the auxiliary *do*, it can be construed as occurring obligatorily. VP-ellipsis is unlike gapping and stripping in important ways. For instance, it need not occur in the non-initial conjunct(s) of a coordinate structure, but rather it can occur across separate sentences or in a clause that is subordinate or superordinate to the clause containing its antecedent or postcedent. Like gapping and stripping, it does not allow a negation to be construed as part of the elided material.

VP-ellipsis elides a constituent, which means there are never any remnants present. VP-ellipsis is much more flexible in the area of category identity than gapping and stripping; the ellipsis can differ significantly in subcategory from its antecedent or postcedent. Like gapping and stripping and other ellipsis mechanisms,

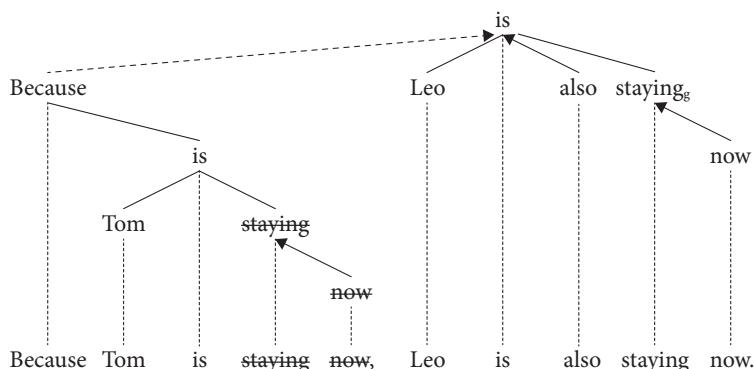
it allows sloppy identity of an elided pronoun. A particularly noteworthy trait of VP-ellipsis is the ability of the antecedent to the elided material to dominate the elided material. This trait of VP-ellipsis is known as *antecedent containment*, and it has inspired much theorizing about the nature of VP-ellipsis. Perhaps most interestingly, VP-ellipsis occurs very frequently in English, but it is entirely or mostly absent from most related languages (like German, French, etc.).

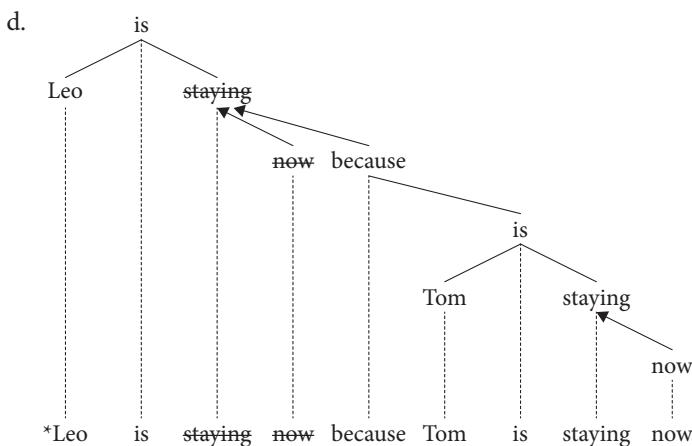
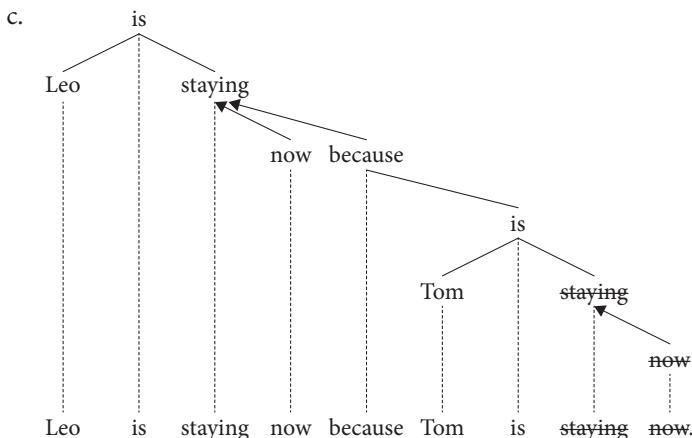
VP-ellipsis is licensed by auxiliary verbs and by the particle *to*. The following examples illustrate many of the key traits:

(45) a.



b.





Each of the acceptable Examples (45a–c) allows the elided material to be overt, e.g. *Larry is staying now because Tom is staying now*, and in each of these cases, the elided material is a constituent, which means that there are no remnants present. Example (45b) demonstrates that elided material can take a postcedent, as opposed to an antecedent. Examples (45b–c) also demonstrate that ellipsis can appear in a subordinate clause at the same time that the antecedent or postcedent appears in the matrix clause, and vice versa. Example (45d) illustrates an important trait of VP-ellipsis: the elided material cannot both precede and dominate its postcedent.

Most instances of VP-ellipsis are such that the elided material has an antecedent or postcedent nearby in the linguistic context. This is not a necessity, however. VP-ellipsis can occur with an implied antecedent, e.g.

## (46) Situation

A child is climbing on a chair to reach into a cookie jar on the counter.  
 Her mother calls out: *Don't climb on the chair!*

The situational context easily allows the inference of the elided material *climb on the chair*. A linguistic antecedent or postcedent is therefore not necessary. A similar illustration of the flexibility of VP-ellipsis concerns mismatches in subcategory. The elided material need not match its antecedent or postcedent in subcategory, e.g.

- (47) a. She **tried**, but he did not **try**.
- b. You have **understood**, but we do not **understand**.
- c. When Jim wants to **work**, Tom already is **working**.

The acceptability of (47b) and (47c) is slightly degraded due to the lack of parallelism across antecedent and ellipsis. Nevertheless, such examples illustrate the flexibility of VP-ellipsis in form across elided VP and antecedent or postcedent. The flexibility in form can go so far as to even allow a mismatch in voice:

- (48) ?The dishes should have been **washed**, but nobody did **wash them**.

In this case the antecedent *washed* is a passive participle whereas the elided material *washed them* is an active infinitive. While such examples are usually marginal to varying degrees for many speakers, many speakers accept them quite readily, and such examples can be found in corpora.

Like with gapping and stripping, a negation cannot be interpreted as part of the elided material of VP-ellipsis, e.g.

- (49) He does **not want to support us**,
- a. \*and she does **not want to support us**, too.
- b. nor does she **want to support us**.

These examples are closely similar to Examples (33a–b) above involving gapping. The negation *not* cannot be construed as part of the elided material. This aspect of the distribution of negation is mysterious, particularly because there are other ellipsis mechanisms for which the situation is reversed: answer fragments, sluicing, and null complement anaphora easily allow a negation to be elided, as established in Sections 13.2–13.4 below.

VP-ellipsis occurs optionally most of the time. There are, however, certain limited cases where VP-ellipsis must occur, in particular, when the auxiliary verb *do* is involved, e.g.

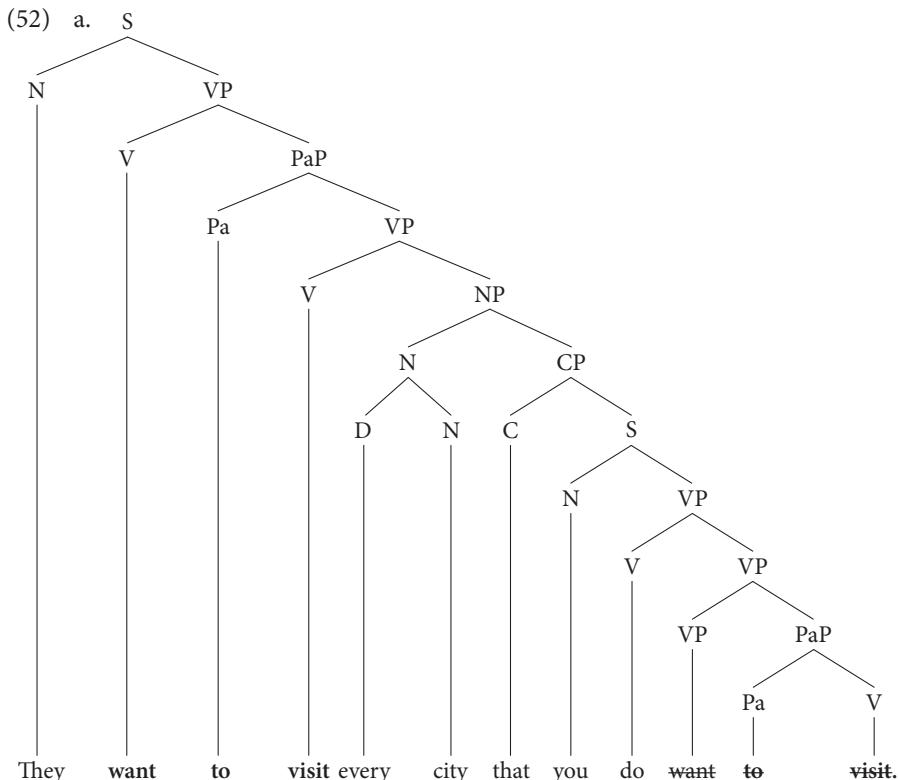
- (50) Tom solved the problem, and
- a. Bill did **solve it**, too.
- b. ??Bill did solve it, too.

Example (50b), from which VP-ellipsis is absent, is strongly marginal, whereas (50a), which is the same except that VP-ellipsis is present, is perfect. One might take this state of affairs as evidence that VP-ellipsis is actually not present in (50a) and conclude instead that *did* is functioning as a pro-verb. This conclusion would, though, fail to account for related cases, e.g.

- (51) Tom did not solve the problem, but  
 a. Bill did solve it.  
 b. Bill did solve it.

The acceptability of both (51a) and (51b) as opposed to the acceptability contrast across (50a) and (50b) can be addressed in terms of emphasis. When the auxiliary verb *do* appears in the absence of ellipsis, contrastive emphasis should be present as it is in (51b). If there is no reason for the emphasis as in (50b), though, then VP-ellipsis becomes obligatory in order to avoid a formulation that expresses this emphasis.

Certain instances of VP-ellipsis challenge the very nature of phrase structure syntax, since they appear to give rise to an infinite regress. Examine the following phrase structure analyses of the next example in this regard:



This phrase structure analysis is challenged by the fact that the smallest constituent containing the antecedent material *want to visit* also contains the elided material. The smallest constituent containing *want to visit* is *want to visit every city that you do want to visit*.

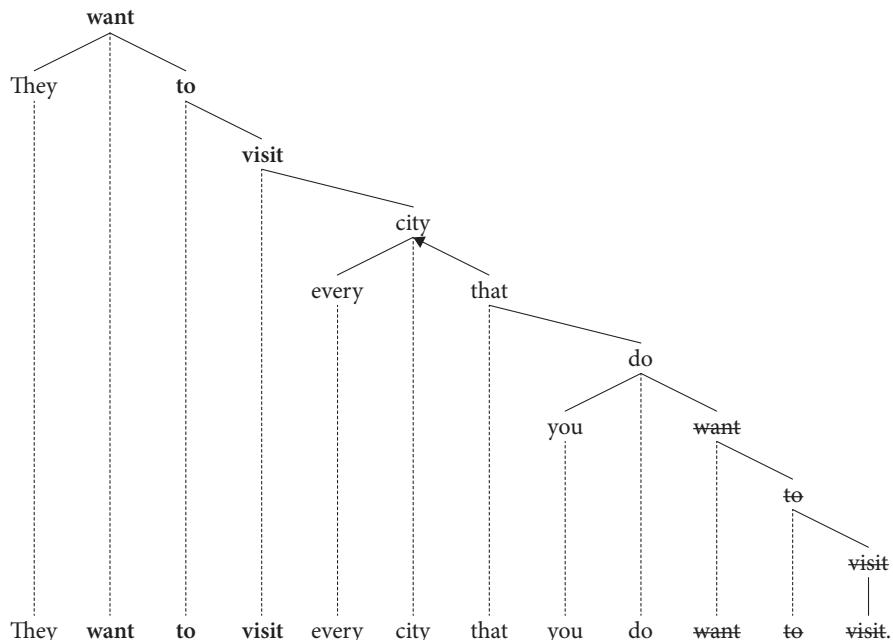
What this means is that a constituent-based account is faced with an *infinite regress*. If one substitutes in the smallest constituent containing the antecedent for the elided material, the substitution process continues ad infinitum:

- (52') *They want to visit every city that you do ...ad infinitum.*

This is known as an infinite regress, and an infinite regress is indisputably an impossibility. Hence the constituent-based account of such cases is strongly challenged, and certainly numerous solutions to the problem have been proposed over the years.

The current catena-based DG is not faced with this difficulty. There is no infinite regress because the DG approach does not have to assume that the antecedent to the elided material is a constituent; it can be a non-constituent catena instead:

- (52) b.



The antecedent to the ellipsis is *want to visit*, and this antecedent is a catena. There is therefore no infinite regress on this catena-based analysis. Antecedent containment is in no way present. The noteworthy aspect of such constellations is that the antecedent to the ellipsis dominates the ellipsis. VP-ellipsis is like pseudogapping, sluicing, and comparative deletion in this regard, and unlike gapping, stripping, answer fragments, and null complement anaphora.

## 12.10 Pseudogapping

Pseudogapping is present in the following sentences:

- (53) a. Jill gets more done at night than she does ~~get done~~ during the day.
- b. Larry sleeps in French class more than he does ~~sleep~~ in math class.
- c. He won't read Stoker, but he will ~~read~~ Kafka.
- d. While he might support Sanders, he definitely wouldn't ~~support~~ Clinton.
- e. More men have ordered the fish than women have ~~ordered~~ the chicken.
- f. He drinks coffee in the morning more than he does ~~drink~~ tea at night.
- g. Sue can write French better than she can ~~write~~ English.
- h. Although Jerry isn't lazy at school, he is ~~lazy~~ at home.

Pseudogapping is an ellipsis mechanism that has some traits of gapping and some traits of VP-ellipsis. The template for pseudogapping is as follows:

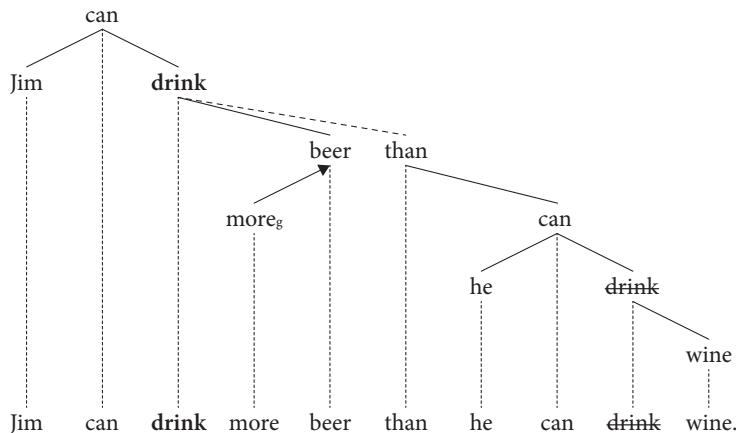
Table 25.

| Traits of ellipsis mechanism                   | Pseudogapping |
|------------------------------------------------|---------------|
| Occurs optionally                              | Yes           |
| Must have a linguistic antecedent              | Yes           |
| Can operate backwards                          | No            |
| Remnants must present new information          | Yes           |
| Occurrence restricted to coordinate structures | No            |
| Elided material can include a negation         | No            |
| Flexibility in verb forms                      | No            |
| Allows sloppy identity                         | Yes           |
| Antecedent can dominate the ellipsis           | Yes           |

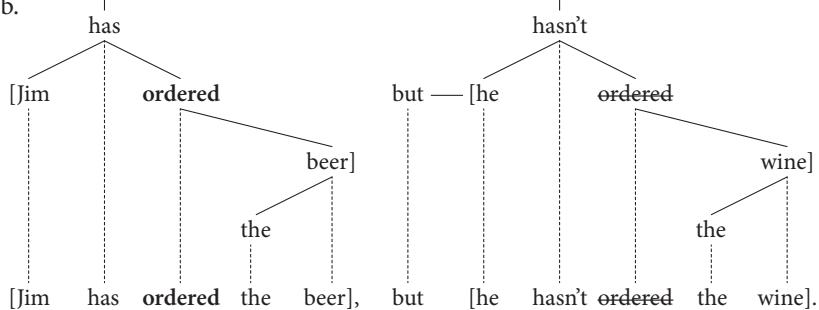
Pseudogapping is like VP-ellipsis in that the elided material is necessarily introduced by an auxiliary verb, and the elided material can appear in a subordinate clause at the same time that the antecedent appears in the matrix clause. Pseudogapping is like gapping insofar as there is a gap present and at least one remnant, and these remnants must present new information.

Pseudogapping occurs most easily when it helps establish contrast; it therefore occurs frequently in environments associated with contrast, such as in comparative clauses introduced by *than* and after the coordinator *but* and the subordinator *although*, e.g.

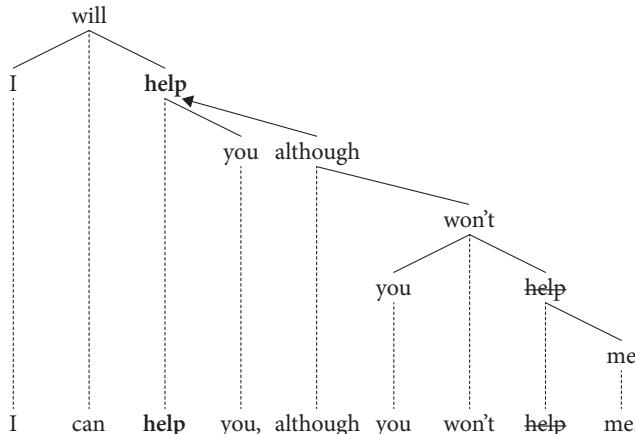
(54) a.



b.



c.



These examples illustrate the main traits of pseudogapping. In each case, the elided verb could appear, which means ellipsis is optional. There is a gap present each time, and one remnant, and this remnant presents new information that stands in contrast to the parallel constituent in the antecedent clause. The antecedent to the elided verb in (54a) and (54c) dominates the elided verb: *drink* dominates *drink* in (54a) and *help* dominates *help* in (54c).

Pseudogapping is like gapping, stripping, and VP-ellipsis insofar as it does not allow a negation to be construed as part of the gap, e.g.

- (55) a. \*He has not tried the oysters more frequently than he has **not** tried the clams.
- b. \*I may not read Kafka, and I definitely will **not** read Stoker.

These attempts at pseudogapping fail because the negation *not* cannot be construed as part of the elided material. Pseudogapping is less flexible than VP-ellipsis, though, in a couple of ways. Pseudogapping cannot occur backwards, that is, the elided material may not have a postcedent. Pseudogapping is also less flexible than VP-ellipsis regarding syntactic identity. Examples (46)–(48) above demonstrated that VP-ellipsis is relatively flexible in the form mismatches that it allows across the elided material and its antecedent or postcedent. Pseudogapping, in contrast, prefers strict form identity across elided material and antecedent:

- (56) a. ??He has already **drunk** the eggnog, but he won't **drink** the punch.
- b. ??You are expected to **take** trigonometry, although you haven't **taken** geometry.

These attempts at pseudogapping are quite marginal because there is a mismatch in verb forms across the elided verb and its antecedent (*drunk* vs. *drink* and *take* vs. *taken*).

And yet further, pseudogapping is less flexible than VP-ellipsis insofar as the gap must have a linguistic antecedent, and this antecedent should appear in the immediately preceding clause. It is hence impossible to construct an instance of pseudogapping where the elided material lacks a linguistic antecedent, or to produce an instance of pseudogapping that has an intervening clause separating the antecedent clause and the ellipsis clause, e.g.

- (57) ??The students are studying syntax now, and we are pleased about that, but they aren't **studying** phonology.

Pseudogapping is like gapping in these ways. Gapping occurs forwards only; the elided material must match the antecedent closely; and gapped clause must immediately precede the antecedent clause.

To summarize, pseudogapping demonstrates traits of both gapping and VP-ellipsis. The term *pseudogapping* is therefore a good choice of terminology, since pseudogapping is indeed like gapping in certain ways, but more like VP-ellipsis in other ways. Finally, pseudogapping appears to be rather rare cross-linguistically.

## CHAPTER 13

# More ellipsis

### 13.1 Overview

This chapter explores five further ellipsis mechanisms. The four types of ellipsis explored in the previous chapter were gapping, stripping, VP-ellipsis, and pseudo-gapping. This chapter examines answer fragments, sluicing, null complement anaphora, comparative deletion, and left edge ellipsis. It also briefly considers the potential for acknowledging additional types of ellipsis, types that are not yet generally acknowledged in the literature on ellipsis. The account of ellipsis in this chapter and the previous one is then summarized; a table is given that lists the main traits of all ten ellipsis mechanisms. This table provides an easy way to compare the various types of ellipsis.

The five types of ellipsis examined in this chapter are illustrated with the following sentences:

- |                                                                       |                               |
|-----------------------------------------------------------------------|-------------------------------|
| (1) a. Q: What does Cliven Bundy not<br>acknowledge?                  |                               |
| A: He does not acknowledge The federal<br>government.                 | - Answer fragment             |
| b. It may have happened, but nobody knows<br>when it happened.        | - Sluicing                    |
| c. Larry told the kids what to do before Tom<br>told them what to do. | - Null complement<br>anaphora |
| d. More men ordered beer than men ordered<br>wine.                    | - Comparative deletion        |
| e. It is Time for some traffic problems in Fort<br>Lee.               | - Left edge ellipsis          |

The first two (answer fragments and sluicing) form a coherent group, since they typically occur in interrogative environments, i.e. in environments in which a direct or indirect question is expressed. While a couple of papers have explored left edge ellipsis to an extent, it is generally a little-acknowledged ellipsis mechanism. Null complement anaphora (NCA) and comparative deletion are, in contrast, well-established types of ellipsis.

The examination of these five further ellipsis mechanisms also employs the nine criteria introduced in Section 12.5. These criteria continue to serve as the template for the further analysis and comparison of the various ellipsis mechanisms.

### 13.2 Answer fragments

Answer fragments are illustrated with the following examples:

- (2) a. Who is getting their insurance through a state exchange? – Many people ~~are getting their insurance through a state exchange~~.
- b. Who is relying on whom? – You ~~are relying~~ on me.
- c. Did they visit Istanbul last year? – No, ~~they visited~~ Budapest ~~last year~~.
- d. Which science are the Republicans denying the validity of? – ~~The republicans are denying the validity of~~ Climate change and evolution.
- e. The story about whom is unbelievable? (echo question) – ~~The story about Jill is unbelievable~~.
- f. Did he leave? – Yes, ~~he left~~.
- g. Are you satisfied with the news? – No, ~~I am not satisfied with the news~~.
- h. What and when did they eat? – ~~They ate~~ Tacos at 2pm.

The ellipsis of answer fragments has the following traits:

Table 26.

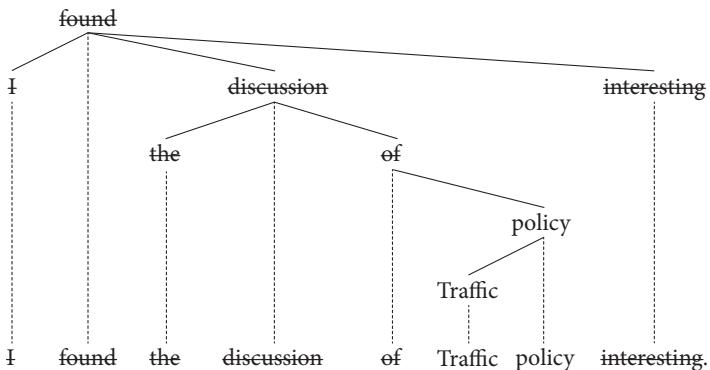
| Traits of ellipsis mechanism                   | Answer fragments                                     |
|------------------------------------------------|------------------------------------------------------|
| Occurs optionally                              | Yes, mostly                                          |
| Must have a linguistic antecedent              | No, but it usually does                              |
| Can operate backwards                          | No                                                   |
| Remnant must present new information           | Yes                                                  |
| Occurrence restricted to coordinate structures | Inapplicable                                         |
| Can include a negation                         | Yes                                                  |
| Flexibility in verb forms                      | Yes, but regarding number and person morphology only |
| Allows sloppy identity                         | Yes                                                  |
| Antecedent can dominate ellipsis               | No                                                   |

The antecedent and elided material of answer fragments usually occur across speakers. The ellipsis is usually optional insofar as the answer has the option to be a complete sentence. Exceptions occur with objective pronouns functioning as subjects, e.g. *Who did it?* – *Me did it*. If the objective pronoun functions as the subject, ellipsis must occur.

Since a question can be understood from situational context, answer fragments do not always have a linguistic antecedent, and since a question always precedes an answer, answer fragments operate forwards only, never backwards. The remnants of answer fragments, like almost all remnants of ellipsis, must present new information, that is, they must answer the question. There is flexibility in verb forms across the antecedent and the ellipsis only with respect to person and number morphology; the morphology of tense, mood, and aspect must be maintained. Sloppy identity is possible.

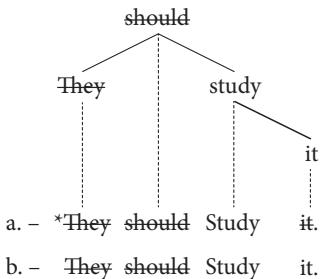
Answer fragments illustrate the catena condition on ellipsis particularly well. A remnant of an answer fragment is (almost always) a constituent. The elided material consists of everything else in the sentence, and this “everything else” is a catena, e.g.

- (3) The discussion of which issue did you find interesting?



The elided material *I found the discussion of...interesting* is a catena, and the answer fragment *traffic policy* is a constituent. Attempts at answer fragments where the/a remnant does not qualify as a constituent usually fail, e.g.

- (4) What should they do with the text?

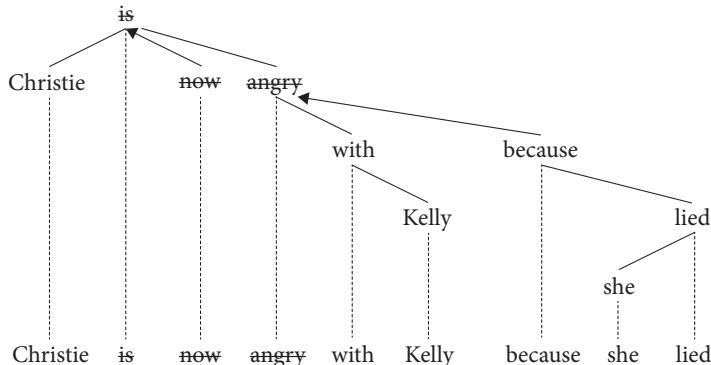


The answer fragment *study* in (4a) is unacceptable on two counts: the elided material *they should...it* is not a catena nor is the remnant *study* a constituent. The

elided material *They should* in (4b), in contrast, is a catena, and the remnant *study it* is a constituent.

Even when the question asks for two or more pieces of information, the elided material still qualifies as a catena and each of the remnants is a constituent, e.g.

- (5) Who is now angry with whom, and why?



This answer fragment consists of three remnants: *Christie*, *with Kelly*, and *because she lied*. Each of these remnants is a constituent that presents new information, which means that the elided material *is now angry* is necessarily a catena.

A curious trait of many answer fragments concerns the fact that the fragment answer cannot be intermediate in size when fronting of the interrogative expression has occurred in the question. The answer can consist of just the constituent focused by the interrogative expression or of an entire sentence. Intermediate fragments are, however, usually not possible, e.g.

- (6) What have you been telling John to try to get?

- I have been telling him to try to get A new bicycle.
- \*I have been telling him to try to Get a new bicycle.
- \*I have been telling him to try To get a new bicycle.
- \*I have been telling him to Try to get a new bicycle.
- \*I have been telling him To try to get a new bicycle.
- \*I have been Telling him to try to get a new bicycle.
- \*I have Been telling him to try to get a new bicycle.
- I have been telling him to try to get a new bicycle.

The answer fragment in (6a) is acceptable, and the answer sentence in (6h) as well, but the answer fragments (6b–g) of intermediate size are unacceptable. Interestingly, however, some of the fragment answers to the corresponding echo question are acceptable:

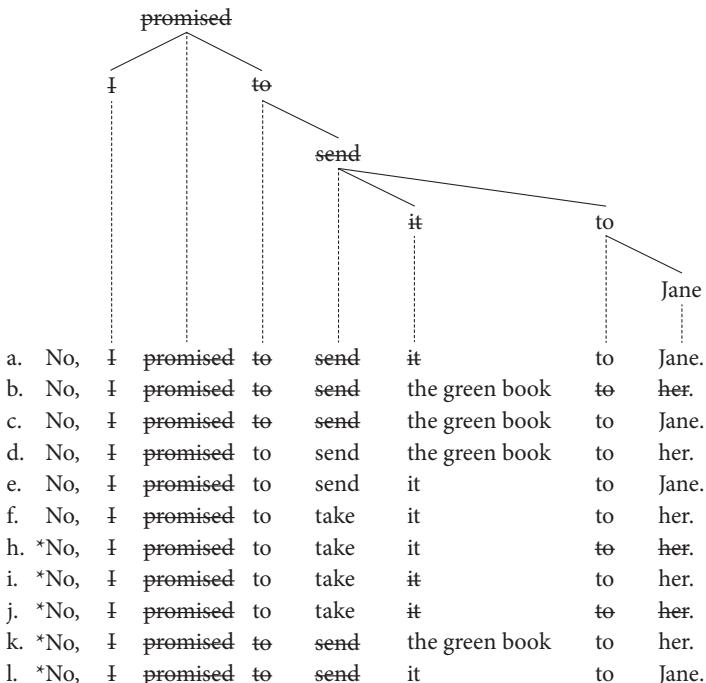
(7) You have been telling John to try to get a new WHAT?

- a. – ~~I have been telling him to try to get~~ A new bicycle.
- b. – ~~?I have been telling him to try to~~ Get a new bicycle.
- c. – ~~I have been telling him to try To~~ get a new bicycle.
- d. – \*~~I have been telling him to Try to~~ get a new bicycle.
- e. – ~~I have been telling him To try to~~ get a new bicycle.
- f. – \*~~I have been Telling him to try to~~ get a new bicycle.
- g. – ~~?I have Been telling him to try to~~ get a new bicycle.
- h. – I have been telling him to try to get a new bicycle.

The acceptability contrast across (6a–h) and (7a–h) reveals something important about the remnants that constitute answer fragments. The remnants must of course present new information, and they must structurally match a constituent in the question. If they do not structurally match a constituent in the question, the fragment answer is disallowed. For instance, the fragment answer *To get a new bicycle* in (6c) does not match a constituent in the question, so (6c) is bad.

Answer fragments also provide a good environment for testing the requirement on remnants that they present new information, e.g.

(8) You promised to send the red book to Susan, right?



The elided material in the acceptable sentences (8a–f) is a catena each time, and each of the remnants presents new information. Examples (8h–j) are bad because the elided material there is not a catena, and Examples (8k) and (8l) are bad because a remnant is present each time that does not present new information.

The following sentences demonstrate that answer fragments can easily elide a negation:

- (9) a. Who did you not visit? – I did not visit Harry.
- b. What is not worth reading? – Aspects is not worth reading.

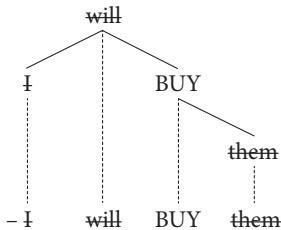
Answer fragments are like sluicing and null complement anaphora in this regard, since these two mechanisms can also easily elide a negation, but it is unlike gapping, stripping, VP-ellipsis, pseudogapping, and left edge ellipsis, which cannot elide a negation. The next example illustrates sloppy identity:

- (10) Has Susan<sub>i</sub> given her<sub>i</sub> talk? – No, Bill<sub>j</sub> has given his<sub>j</sub> talk.

Finally, it is impossible to construct an answer fragment that has the antecedent dominating the elided material because answer fragments occur across sentence boundaries that are usually associated with distinct speakers, a first and a second person.

There is an aspect of answer fragments that challenges the current catena-based account of ellipsis mechanisms. This challenge occurs when a disjunctive coordinator is used to help focus single words as opposed to DG constituents, e.g.

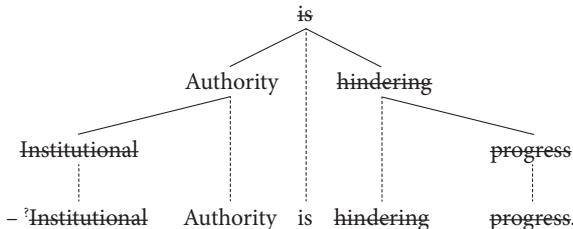
- (11) Will you BUY OR RENT your skis?



Intonation and the presence of the disjunctive coordinator *or* establish a choice between two actions, buying or renting. This then means that the fragment answer *BUY* fails to qualify as a DG constituent and accordingly that the elided material *I will...them* fails to qualify as a catena.

A similar type of answer fragment that challenges the current catena-based account of ellipsis mechanisms occurs can occur when *what* or *who* appears in an echo question, e.g.

- (12) *?Institutional* what is hindering progress?



The echo question in this case focuses just the one word corresponding to *what*. This then means, in turn, that the fragment answer *Authority* is not a DG constituent and the elided material *Institutional...is hindering* progress is not a catena.

While the current catena-based approach must concede that certain answer fragments such as those in (11)–(12) contradict the catena condition on ellipsis (see Section 12.3), this ability to flout the catena condition can be accommodated in terms of the ability to focus individual words. Intonation, the disjunctive coordinator *or*, and the ability of the *wh*-word *what* (and *who/whom*) to take a dependent are all special means that allow one to focus individual words. When an individual word is focused in the question, the answer then is most naturally just a single word, regardless of whether this individual word is a DG constituent or not.

### 13.3 Sluicing

Sluicing is illustrated with the following sentences:

- (13)
- Dyson is angry, although we don't know why he is angry.
  - Who is lying is unclear, but someone is lying.
  - Susan says someone has a crush on someone. Unfortunately, she won't tell us who has a crush on whom.
  - Will Hillary announce she is going to run, and if so, when will she announce that she is going to run?
  - Jill is hiding the facts, but nobody understands what she is hiding the facts for.
  - A: Tom is not revealing something. B: What is he not revealing?
  - Why exactly his position on climate change has flip-flopped is not known, but Rubio's position on climate change has clearly flip-flopped.
  - A: Some politicians do not want to take a position on climate change. B: Which ones do not want to take position on climate change?

Sluicing has the following traits:

Table 27.

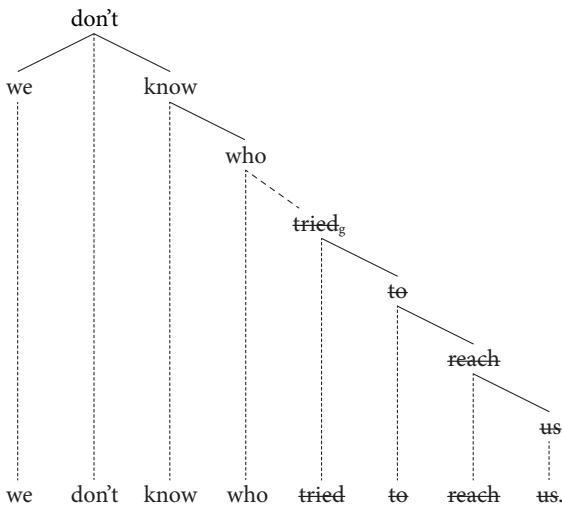
| Traits of ellipsis mechanism                   | Sluicing                |
|------------------------------------------------|-------------------------|
| Occurs optionally                              | Yes                     |
| Must have a linguistic antecedent              | No, but it usually does |
| Can operate backwards                          | Yes                     |
| A remnant must present new information         | Yes                     |
| Occurrence restricted to coordinate structures | No                      |
| Can elide a negation                           | Yes                     |
| There is flexibility in verb forms             | No                      |
| Allows sloppy identity                         | Yes                     |
| Antecedent can dominate the ellipsis           | Yes                     |

The ellipsis of sluicing occurs in interrogative clauses, i.e. in questions, both direct and indirect ones. The ellipsis is introduced by just an interrogative word (*what*, *when*, *where*, *which*, *who*, etc.), unless pied-piping is involved, in which case the entire pied-piped expression introduces the ellipsis (see Section 9.5). In most cases, everything is elided in the immediate clause containing the interrogative word except the interrogative word itself. Sluicing is a frequently occurring type of ellipsis, and it exists in many languages, including those related to English.

Sluicing occurs optionally, and in a large majority of cases, the sluiced material has a linguistic antecedent. It operates both forwards and backwards, and the elided material can include a negation. Sluicing occurs in the presence and absence of coordination. One or more remnants can be present. While a remnant of sluicing presents new information, this new information does not stand in contrast to a parallel constituent in the antecedent clause. Verb morphology remains consistent across ellipsis and antecedent/postcedent – or if mismatches can occur in this area, they are very rare. The antecedent can dominate the ellipsis.

The following tree illustrates the structural analysis of a typical instance of sluicing:

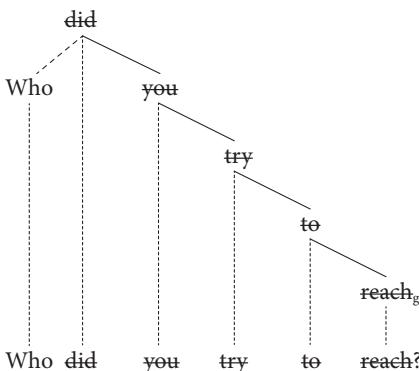
- (14) Someone tried to reach us, but



The analysis of the *wh*-word that licenses sluicing is consistent; it rises in accordance with the theory of discontinuities laid out in Chapters 7, 8, and 9. In this case, non-constituent rising is present. In direct questions, in contrast, constituent rising is often present, e.g.

- (15) A: I tried to reach someone.

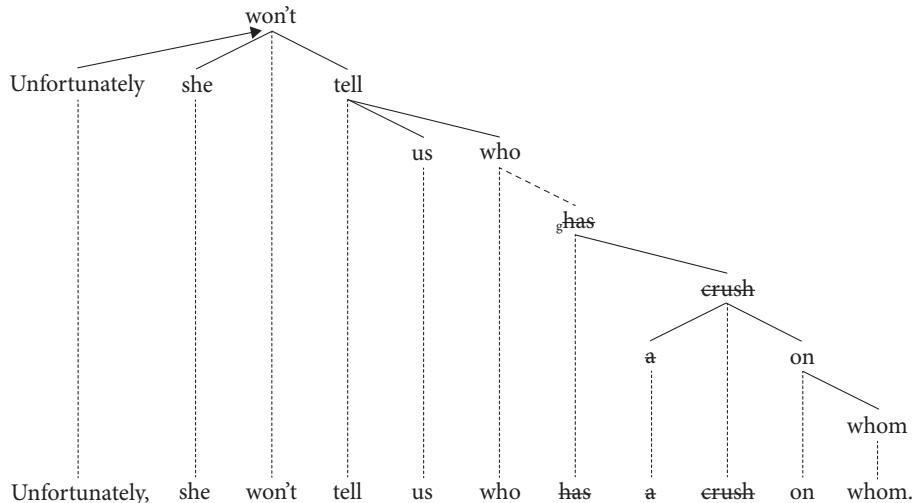
B.



The presence of sluicing thus has no effect on the actual structural analysis of the sluiced clause. The interrogative clause has the same structure regardless of whether sluicing does or does not occur. Note that this point is controversial, since many previous explorations of sluicing claim that sluicing is capable of effecting so-called *island repair*. The stance adopted here, however, is that the instances of sluicing that appear to require a notion of island repair actually involve a separate ellipsis mechanism, which is called slicing in Section 13.7 (see Examples (53)–(54) below).

The catena-based analysis of sluicing is particularly strong with instances of so-called *multiple sluicing*. Multiple sluicing occurs when the question asks for two or more pieces of information, which means that there is necessarily one or more remnants present in the sluiced clause, e.g.

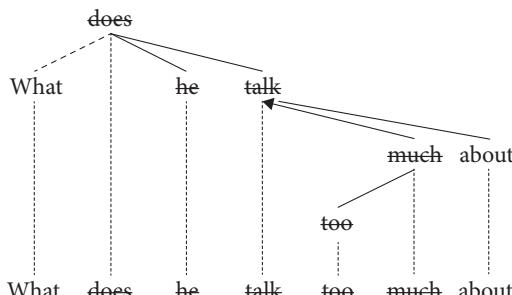
- (16) Susan says someone has a crush on someone.



The sluiced material here is clearly not a constituent, but it is a catena (and in this case, a component as well). Since the ellipsis dominates the overt material *on whom*, *on whom* satisfies the criterion that make it a remnant. The same sort of analysis is necessary when preposition stranding occurs in the sluiced clause, e.g.

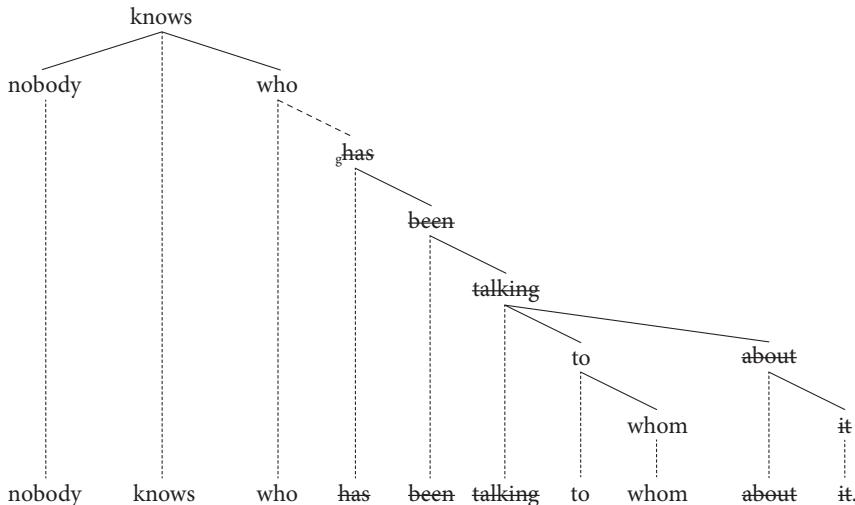
- (17) A: Fred always talks too much.

B:



No theory of syntax sees the elided material *does he talk too much* to the exclusion of *about* as a constituent in surface syntax, yet it is catena (and again, a component as well). The elided material in the following instance of sluicing is a non-component catena:

- (18) Someone has been talking to someone about the scandal, but



The elided material *has been talking...about it* is not a constituent and it is not a component, but it is a catena.

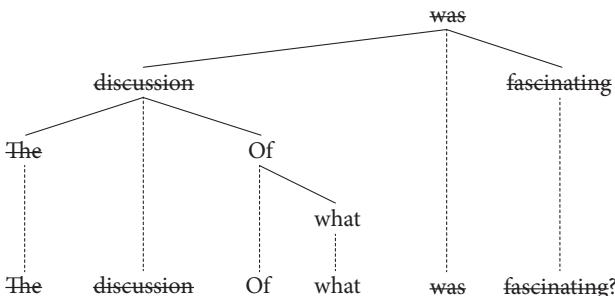
Sluicing can easily elide a negation, e.g.

- (19) a. John does not understand. – Why **does he not understand?**  
 b. Larry is not telling us something. – What is **he not telling us?**

And the following example illustrates that the elided catena of sluicing can cut into a subject NP:

- (20) A: The discussion of something was really fascinating.

B:



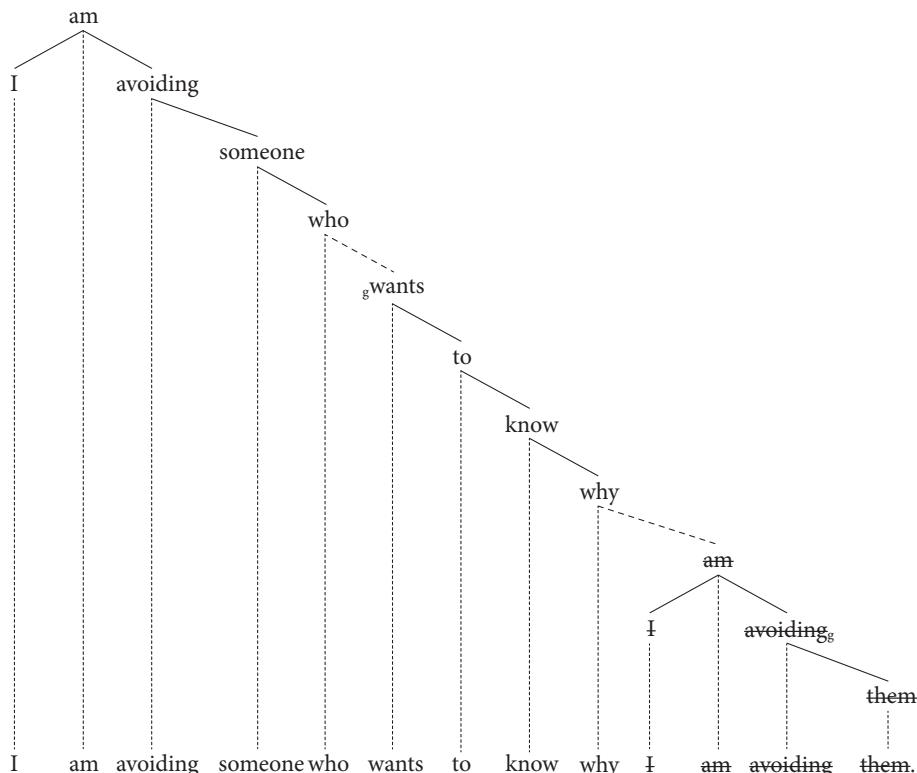
The subject NP in this case is *The discussion of what*. Despite the fact that the ellipsis cuts into this constituent, the elided material is still a catena. The following example illustrates the potential for sloppy identity:

- (21) I know when I have to visit my relatives, and you also know
- when I have to visit my relatives.
  - when you have to visit your relatives.

Informants generally dislike such examples. The judgment is one of hesitation, the comment being that it is not clear what is meant. This reaction bears witness to the ambiguity; it is not clear which meaning is intended, and informants therefore state that such formulations are avoided in practice; the non-ellipsis variant is preferred in such cases in order to avoid the ambiguity. Nevertheless, the presence of the ambiguity signals that the sloppy identity indicated in (21b) is available.

The following example has the antecedent to the ellipsis dominating the ellipsis:

- (22)



The antecedent to the ellipsis, i.e. *I am avoiding someone*, dominates the ellipsis itself. Thus, the same problem that is associated with the antecedent-contained deletion configurations of VP-ellipsis (see Examples 52a–b in Section 12.9) occurs with sluicing as well. As stated in Sections 12.6 and 12.9, the problem for constituent-based theories of syntax is that if all one has to work with is the

constituent unit, such constellations should give rise to an infinite regress. There is, however, clearly no infinite regress. The antecedent can be a catena, whereby this catena may or may not be a constituent. In other words, the catena-based approach to ellipsis is not challenged in any way by instances of apparent *antecedent contained ellipsis*, for given the catena unit, antecedent containment quite plausibly never occurs.

### 13.4 Null complement anaphora

Null complement anaphora (NCA) is illustrated with the following sentences:

- (23) a. Fred asked to have ice cream before Larry asked ~~to have ice cream~~.
- b. Susan doesn't know what happened, but we do know ~~what happened~~.
- c. He stopped smoking before she stopped ~~smoking~~.
- d. Nobody wants to go, and it's too bad ~~that nobody wants to go~~.
- e. Did you do your homework? – No, I forgot ~~to do it~~.
- f. Tom is actually reading *Aspects*, but Fred refuses ~~to read it~~.
- g. Before he noticed ~~it had rained a lot~~, I noticed it had rained a lot.
- h. A: John actually passed the test. B: Yes, it's true that ~~he passed the test~~.

NCA has the following traits:

Table 28.

| Traits of ellipsis mechanism                   | NCA                   |
|------------------------------------------------|-----------------------|
| Occurs optionally                              | Yes                   |
| Must have a linguistic antecedent              | No, but it often does |
| Can operate backwards                          | Yes                   |
| Remnant must present new information           | Inapplicable          |
| Occurrence restricted to coordinate structures | No                    |
| Elided material can include a negation         | Yes                   |
| Flexibility in verb forms                      | Yes                   |
| Allows sloppy identity                         | Yes                   |
| Antecedent can dominate ellipsis               | No                    |

Typical cases of NCA have an elided propositional complement of a predicate; the elided material has the status of a full clause, *to*-infinitive phrase, or gerund phrase, the latter two being at least clause-like. NCA exists in English and related languages, and it occurs frequently. Its appearance is optional like almost all other ellipsis mechanisms. The ellipsis usually has a linguistic antecedent, although it can occur without one in limited cases. A negation can easily be construed as part of

the ellipsis. NCA is not reliant on coordination to occur, and since it always elides an entire constituent, there is never a remnant present. Some variation is possible in the morphological forms of verbs across the elided material and its antecedent, and it allows sloppy identity.

Interestingly, only some predicates that take propositional complements can license NCA, whereas many others fail to do so. For instance, frequently occurring predicates such as *say*, *believe*, and *think* do not license NCA:

- (24) a. \*He said there was a problem, and she also said *there was a problem*. – NCA not possible
- b. \*You believe it is going to rain, and I also believe *it is going to rain*. – NCA not possible
- c. \*Because he thinks we have to stay, she also thinks *we have to stay*. – NCA not possible

These attempts at NCA fail because the predicates *say*, *believe*, and *think* are incapable of licensing NCA. This fact raises a fundamental question about NCA: What is the relevant aspect of predicates that determines whether they are capable or incapable of licensing NCA? The answer to this question is elusive. At present, all that can be accomplished is to list some of the predicates that can license NCA in English:

#### Predicates licensing NCA

agree, approve, ask, attempt, too bad, decline, disapprove, eager, find out, forget, good, hear, inquire, know, let, listen, notice, probe, promise, ready, refuse, reluctant, request, see, succeed, surprised, tell, try, true, volunteer

This list is by no means exhaustive; it merely provides some of the predicates that have been employed to illustrate NCA in the literature.

The examples of NCA in (23a–h) see entire clauses or *to*-phrases being elided. A difficult question in this area concerns the possibility that NCA can elide an NP or a PP as well. For instance, an analysis in terms of NCA might seem possible in the following cases:

- (25) a. Jack won his match, and Jerry also won *his match*.
- b. If he helps them, we will also help *them*.
- (26) a. We laughed at you, and they also laughed *at you*.
- b. She objected to the proposal, before we objected *to it*.

The elided material shown in these four sentences assumes that the NCA can also elide a nominal, as in (25a–b), or a PP, as in (26a–b). While typical cases of NCA involve propositional complements, it is not immediately evident whether examples like (25)–(26) should be analyzed in terms of NCA.

The stance adopted here is that examples like (25)–(26) do not involve NCA, but rather ellipsis is not present in such cases. There are a couple of reasons why examples like (25)–(26) should not be analyzed in terms of NCA. The first of these is that the interpretation of the object can be open. Compare the following a- and b-examples in this regard:

- |                                                                                                                                                |                               |
|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| (27) a. Tom won a running match, and Bill also won.<br>b. Tom knows what has to occur, and Bill also knows<br><i>what has to occur.</i>        | – NCA absent<br>– NCA present |
| (28) a. When Tom laughs at the news, Susan also laughs.<br>b. As soon as she tells us what happened, we will tell<br><i>you what happened.</i> | – NCA absent<br>– NCA present |

We can know that NCA is absent in the a-sentences because the interpretation of the second clause is open: what exactly Bill won in (27a) is not clear, but rather it is only important that he won, and what or who Susan laughs at is not stated in (28a), but rather what is pertinent is merely that she laughs when Tom laughs. The b-sentences, in contrast, do not allow this flexibility of interpretation. It is necessarily the case in (27b) that Bill knows *what has to occur*, and it is necessarily the case in (28b) that we will tell you *what happened*.

Another observation in this area concerns the inability to elide an NP. Certain predicates that clearly license the ellipsis of a propositional complement cannot license the ellipsis of a simple NP, e.g.

- |                                                                                                                                                               |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| (29) a. ??I forgot my keys, and you also forgot <i>your keys.</i><br>b. I forgot to bring my keys, and you also forgot to bring <i>your keys.</i>             |  |
| (30) a. ??Susan asked a question, and I also asked <i>a question.</i><br>b. Susan asked to receive guidance, and I also asked to receive <i>guidance.</i>     |  |
| (31) a. ??Tom refused a raise, and Tina also refused <i>a raise.</i><br>b. Tom refused to accept a raise, and Tina also refused to accept <i>a raise.</i>     |  |
| (32) a. ??Sam noticed a problem, and we also noticed <i>a problem.</i><br>b. Sam noticed there was a problem, and we also noticed <i>there was a problem.</i> |  |

The attempts at NCA in the a-sentences are awkward, whereas the similar attempts at NCA in the b-sentences are fine. This acceptability contrast is probably due to the presence of the propositional complement in the first part of each b-sentence. The presence of this complement promotes the reading in terms of NCA. In other words, the acceptability contrast is predictable based on the assumption that NCA necessarily elides a propositional complement as opposed to a simple NP. Note that Example (29b) illustrates the possibility of sloppy identity across antecedent and ellipsis (*my* vs. *your*).

The NCA mechanism often elides extraposed clauses, as illustrated in the following b-sentences:

- (33) The gun lobby is powerful, and
  - a. it's bad that it is powerful.
  - b. it's bad that it is powerful.
  - c. \*that's bad that it is powerful.
  - d. that's bad.
  
- (34) We have to save money, and
  - a. it's a shame that we have to save money.
  - b. it's a shame that we have to save money.
  - c. \*that's a shame that we have to save money.
  - d. that's a shame.

Comparing the a- and b-sentences with the c- and d-sentences reveals that the b-sentences involve NCA as indicated. The expletive *it* appears in cases of *it*-extraposition, whereas the demonstrative pronoun *that* does not license extraposition, as demonstrated with the c-sentences. Given the unacceptable c-sentences, the d-sentences cannot be analyzed in terms of an extraposed clause that has been elided. The greater acceptability pattern is accounted for in part by assuming the presence of an elided clause in the b-sentences and the absence of this clause in the d-sentences.

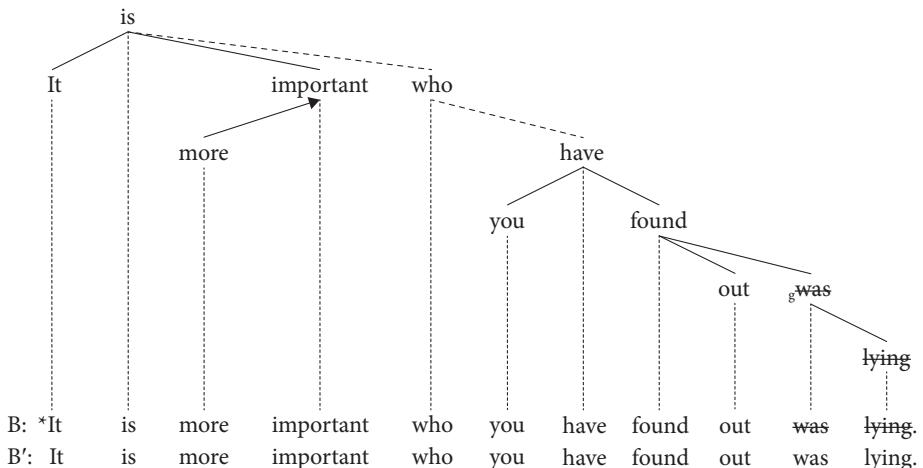
The analysis of the b-sentences in (33)–(34) can be extended to truncated clefts, e.g.

- (35) a. It was Tom who corrected them;  
it was not Ben who corrected them.  
b. It's not the music that should be changed;  
it's the food that should be changed.  
c. It was Larry who cheated;  
it was not Bill who cheated.

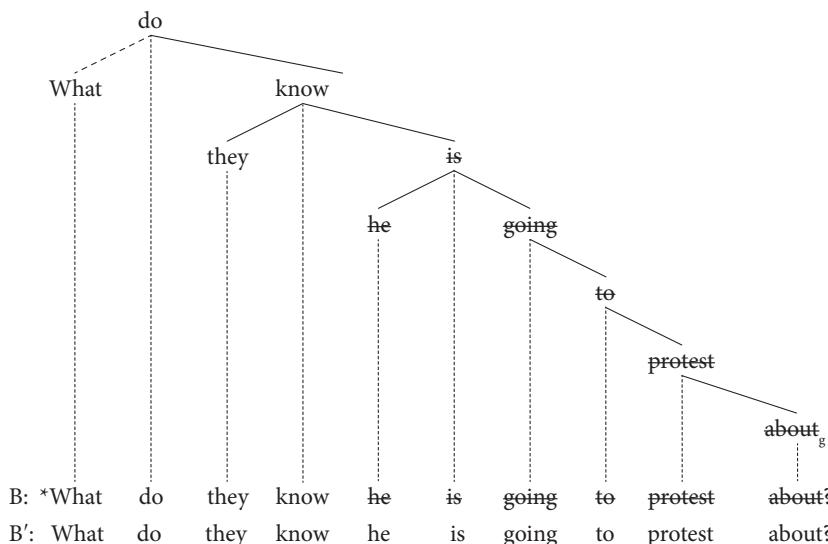
Examples (35a–c) are instances of NCA in the same manner that the extraposed clauses in (33b) and (34b) are instances of NCA. NCA is thus an ellipsis mechanism that is associated with *it*-extraposition and *it*-clefts.

A central trait of NCA is the rigid nature of the elided material. This rigidity prevents a rising catena from reaching into the null material, e.g.

- (36) A: Who have the investigators found out was lying?



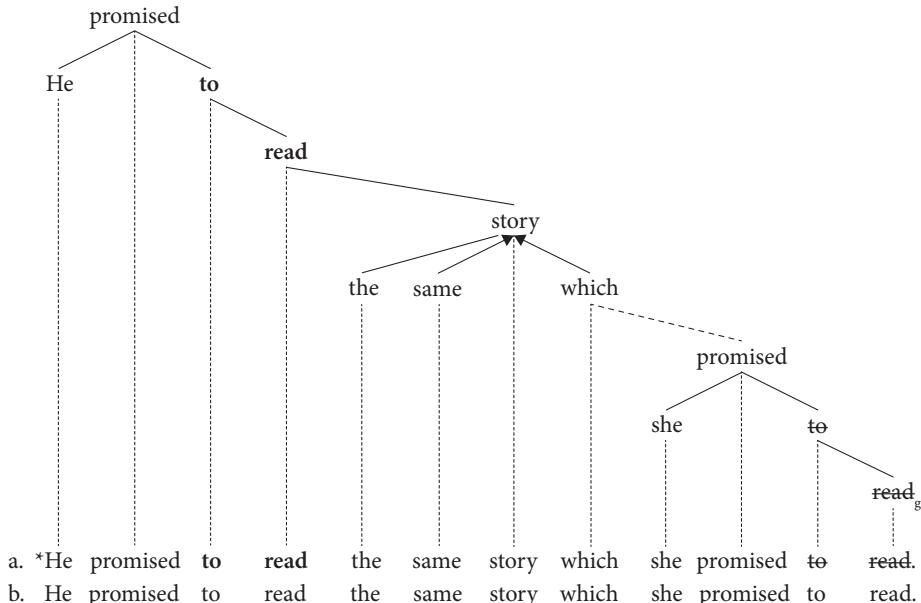
- (37) A: They know that Bill is going to protest and about what he is going to protest.



The B-responses to the A-statements fail because a rising catena cannot reach into the elided material of NCA. The B'-responses are, in contrast, fine because NCA is not present there.

This aspect of NCA predicts that the antecedent or postcedent in cases of NCA should not be able to dominate the ellipsis site. This is indeed the case, e.g.

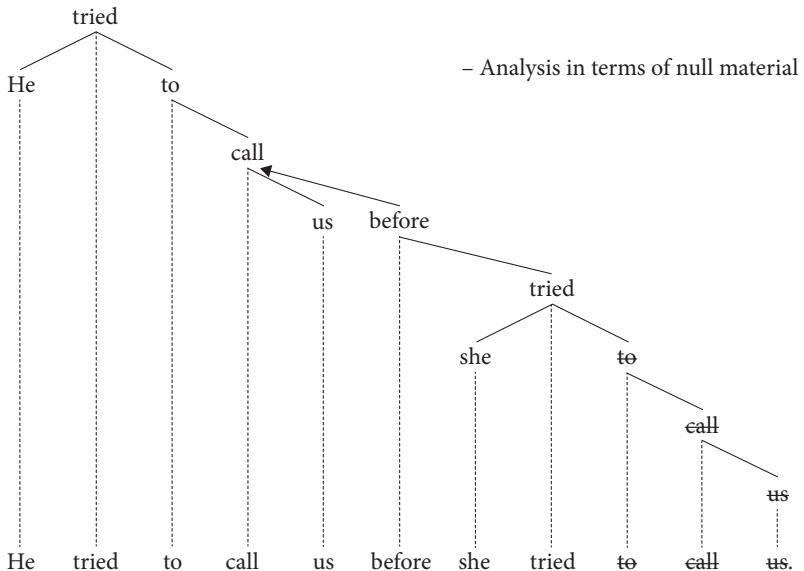
(38)



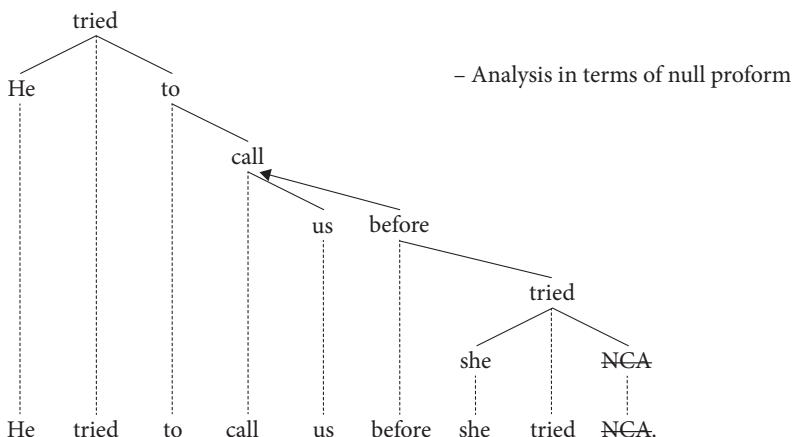
The antecedent (*to read*) to the elided material *to read* in (38a) dominates the elided material in this sentence. The sentence is bad because *which* has non-constituent risen in such a manner that the rising catena would have to extend into the elided material. Again, NCA does not allow this. Many other ellipsis mechanisms (gapping, stripping, VP-ellipsis, pseudogapping, answer fragments, sluicing) allow a rising catena to reach into the null material, e.g. *Which flowers did he bring yesterday, and which chocolates did he bring today?*

This inability of a rising catena to reach into the ellipsis of NCA might motivate one to pursue an analysis of NCA in terms of a null proform. Observe the following competing analyses of the same one sentence:

(39) a.



b.



The analysis in (39a) assumes null material; it is supported by the general approach to ellipsis pursued here in this book throughout: NCA is deemed to be another type of ellipsis in which the elision of material is optional. The analysis in (39b), in contrast, is supported by the inability of a rising catena to reach into the NCA site. If null material were really present, then examples like (36B), (37B), (38a) would be acceptable.

By assuming that NCA actually involves a null proform as indicated in (39b), one correctly predicts Examples (36B), (37B), (38a) to be bad, since the risen catena

lacks a governor in those cases. At present no clear decision about the best analysis of NCA is given here, although there is a preference for the analysis in terms of a null proform as illustrated with (39b).

### 13.5 Comparative deletion

Comparative deletion is illustrated with the following sentences:

- (40) a. More cats stand their ground against Spot than he gets eats to run from him.  
 b. Tom works harder than Bill works hard.  
 c. He took more good pictures of you than she took good pictures of me.  
 d. You drink less beer than I drink beer.  
 e. Tom has as many cats as Bill has eats.  
 f. You know funnier jokes about me than I know funny jokes about you.  
 g. Sarah will wear a racier red dress to the party than Jill will wear a racy red dress.  
 h. More rumors about Jill are circulating than rumors about Fred are circulating.

Comparative deletion has the following traits:

Table 29.

| Traits of ellipsis mechanism                   | Comparative deletion        |
|------------------------------------------------|-----------------------------|
| Occurs optionally                              | No, it occurs obligatorily! |
| Must have a linguistic antecedent              | Yes                         |
| Can operate backwards                          | No                          |
| Remnant must present new information           | No!                         |
| Occurrence restricted to coordinate structures | No                          |
| Elided material can include a negation         | No                          |
| Flexibility in verb forms                      | No                          |
| Allows sloppy identity                         | Yes                         |
| Antecedent can dominate the ellipsis           | No                          |

Comparative deletion is unique to the syntax of comparatives. It appears exclusively in the clause introduced by *than* or *as*. Unlike all other ellipsis mechanisms, comparative deletion is obligatory when it is licensed – sentences (40a–h) are all unacceptable if the indicated ellipsis does not occur, e.g. \*Tom works harder than Bill works hard.

Comparative deletion is impossible in the absence of a linguistic antecedent, and it operates forwards only, never backwards. Since a negation cannot be focused by the element of comparison (*more*, *less*, *-er*), the ellipsis cannot include a negation. Comparative deletion does not occur in coordinate structures, a fact that is established in Chapter 14 (see Section 14.7), where the syntax of comparatives is explored. The elided material and its antecedent always match exactly, so there is no flexibility in morphology across the ellipsis and its antecedent, but sloppy identity is possible. Finally, the ellipsis of comparative deletion is never dominated by its antecedent.

The elided material of comparative deletion is usually a constituent, but at times it can be a non-constituent component. The following trees position the clause following *than* directly underneath the antecedent clause for ease of comparison across the clauses:



- (42)

```

graph TD
 occur[occur] -- solid --> discussions[discussions]
 occur -- dashed --> at[at]
 discussions -- solid --> More[More]
 discussions -- dashed --> of[of]
 of -- solid --> politics[politics]
 of -- dashed --> than[than]
 politics -- solid --> ideas[ideas]

```

a. discussions of ideas occur.  
b. discussions of politics occur at your dinner table.  
c. discussions of politics occur at your dinner table.

The elided material in the a- and c-examples cannot be viewed as a constituent (as defined in Section 4.2). While the c-examples seem a bit degraded due to the unnecessary repetition of *of landscapes* and *of politics*, they are good enough to allow the conclusion that a remnant of comparative deletion need not present new information. Example (41d) is particularly noteworthy, since it suggests that the elided material must include any pre-dependent of the noun (here *interesting*).

While the remnants of comparative deletion need not present new information, a contrast of some sort must obtain across the antecedent clause and the comparative. In the event that the constituents being compared are entirely distinct, comparative deletion does not occur at all, e.g.

- (43) a. More **men** wanted to dance than **women** were present.
- b. More **passengers** tried to board the plane than **tickets** were issued.
- c. There were fewer **drivers** available than **cars** were present that had to be driven.

The bold script marks the expressions that are being compared directly. Since these expressions are entirely distinct, the necessary contrast is present without the occurrence of comparative deletion.

The examples of comparative deletion above have the elided material and its antecedent matching in syntactic function. The following examples, in contrast, involve a mismatch in this area:

- (44) a. More **people** came than we could accommodate **people**.
- b. We invited many more **people** than **people** showed up.

In (44a) the elided *people* functions as object and its antecedent *people* is the subject. Similarly, in (44b) the elided *people* is a subject whereas its antecedent *people* is an object. Such examples are rare, since the context needs to be quite particular to make it work. In any case, they demonstrate that functional parallelism across the *than*-clause and the antecedent clause is not necessary in order for comparative deletion to occur.

The most noteworthy aspect of comparative deletion is, again, that when it occurs, it occurs obligatorily. In fact, this aspect of comparative deletion raises a basic question about the nature of ellipsis. A defining characteristic of most types of ellipsis is that ellipsis occurs optionally; both the elliptical and non-elliptical variant of the sentence are possible; style and register influence which variant is chosen in a given context. Comparative deletion, in contrast, does not allow this flexibility. This situation raises a basic concern about comparative deletion: perhaps it should be not analyzed as a type of ellipsis at all. The stance adopted here concerning this issue is agnostic. A better understanding of comparative deletion is needed before a concrete decision can be reached about whether or not it is actually a type of ellipsis.

### 13.6 Left edge ellipsis

Left edge ellipsis is illustrated with the following utterances:<sup>265</sup>

- (45) a. ~~Do you want~~ Coffee or tea?  
 b. ~~I Went~~ to bed early last night.  
 c. ~~That is~~ Ridiculous!  
 d. ~~Are you~~ Upset about something?  
 e. ~~There are~~ Big advantages to that.  
 f. ~~Do you~~ Want some?  
 g. ~~I am~~ Totally confused. ~~I~~ Don't know what to do.  
 h. ~~Have you~~ Been eating your vegetables lately?

Left edge ellipsis has the following traits:

Table 30.

| Traits of ellipsis mechanism                    | Left edge ellipsis                            |
|-------------------------------------------------|-----------------------------------------------|
| Occurs optionally                               | Yes                                           |
| Must have a linguistic antecedent or postcedent | No, it does not have a linguistic antecedent. |
| Can operate backwards                           | Inapplicable                                  |
| Remnant must present new information            | Yes                                           |
| Occurrence restricted to coordinate structures  | Inapplicable                                  |
| Elided material can include a negation          | No                                            |
| Flexibility in verb forms                       | Inapplicable                                  |
| Allows sloppy identity                          | Inapplicable                                  |
| Antecedent can dominate the ellipsis            | Inapplicable                                  |

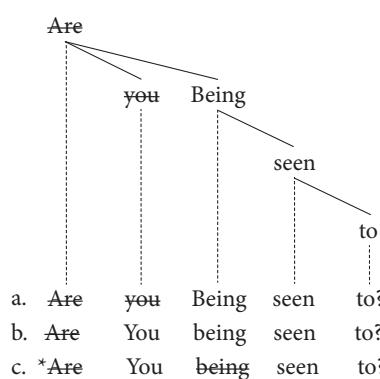
Ellipsis reaches in from the left edge of an utterance. It occurs optionally, and is frequent in informal registers, such as in informal conversation, text messaging, chats, and emails. The ellipsis lacks a linguistic antecedent, and it therefore cannot be interpreted as operating forwards or backwards. The ellipsis cannot include a negation. Left edge ellipsis is not reliant on coordinate structures in any way. Since there is generally no antecedent to the ellipsis, the aspects of ellipsis that are reliant on the presence of an antecedent/postcedent are not applicable: flexibility in forms, sloppy identity, and the ability of the antecedent to dominate the ellipsis are hence all criteria that are inapplicable to left edge ellipsis.

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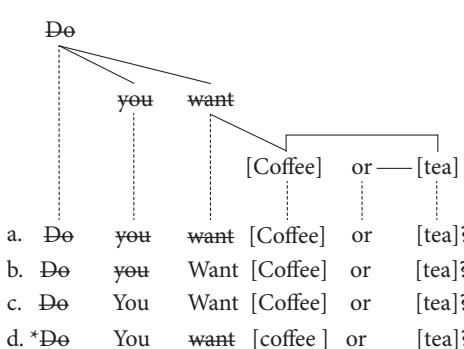
<sup>265</sup>. Aspects of left edge ellipsis are explored in at least three places (Napoli 1982; Wilder 1997; Fitzpatrick 2006). The term *left edge ellipsis* itself is taken from Wilder (1997: 77). Fitzpatrick is concerned only with the ellipsis of an auxiliary verb (e.g. *Is Anyone interested in dessert?*).

The following trees illustrate the structural analysis of typical cases of left edge ellipsis:

(46)



(47)



The elided material is certainly not a constituent in these cases. The grammatically unacceptable Example (46c) and (47d) demonstrate that the elided material must be continuous in the horizontal dimension, that is, it must be a string.

Left edge ellipsis necessarily reaches in from the left edge of an utterance. Attempts at left edge ellipsis fail or are degraded if the ellipsis appears medially, e.g.

- (48) a. Do you want Coffee or tea this time?  
 b. \*This time, do you want coffee or tea?

- (49) a. I Slept in class today.  
 b. ??Today I slept in class.

This acceptability contrast is due to the fact that the ellipsis cannot be construed as left-peripheral in the b-sentences, but it can in the a-sentences. In this regard, the term *left edge ellipsis* is appropriate.

Demonstrative pronouns and deictic *there* are particularly frequent candidates for ellipsis by this mechanism, e.g.

- (50) a. That is A problem.  
 b. That is Worth repeating.  
 c. There are Two things to remember.  
 d. There is Not much interest in syntax courses these days.

Such examples are instructive about the nature of the combination of a subject pronoun and copular *be*. These two words seem to be frequent candidates for ellipsis in general.

Left edge ellipsis often elides first and second person pronouns, and in fact attempts at left edge ellipsis that involve third person pronouns seem degraded, e.g.

- (51) a. I've known Larry for ages. ?He is A good friend.  
 b. Susan is always willing to support us. ?She is A big help.

Comparing these two examples with Example (45g) above, the contrast in acceptability must have to do with the subject pronoun, first vs. third person. Left edge ellipsis occurs more freely with the conventionalized discourse exchanges between a first person (*I/we*) and a second person (*you*). Concerning first person pronouns, left edge ellipsis is a particularly frequent in diary-type writing, where first person pronouns are often omitted in the interest of brevity and less egocentrism.

Certain instances of left edge ellipsis suggest that the elided material must be a string, but it perhaps need not be a catena, e.g.

- (52) a. ?Has the Professor arrived yet?  
 b. ?Is the Music starting finally?  
 c. ?Are the Women interested in going?

These examples, which seem less than good, show the elision of the definite article *the* each time. If these analyses are correct and such cases are at least marginally acceptable, then the account of left edge ellipsis must back away from the claim that the elided material must be a catena, but rather the most that can be determined is that the elided material must be a string. However, an alternative analysis of these examples might rectify the catena-based analysis of left edge ellipsis: one might posit *article* or *determiner drop* in such cases, as one frequently encounters in, for instance, headlines, e.g. *A Dog saves a man in icy lake*. One might then argue that Examples (52a–c) involve both left edge ellipsis and article drop, in which case, the claim that left edge ellipsis necessarily elides a catena could be maintained.

Left edge ellipsis has not yet been studied intensely, so many aspects of this mechanism remain murky. The most noteworthy aspect of this mechanism is that the elided material usually lacks a linguistic antecedent, a fact that makes left edge ellipsis unlike the other ellipsis mechanisms examined above.

### 13.7 Further types of ellipsis

Before concluding this chapter, attention is drawn to further phenomena that suggest an analysis in terms of ellipsis, but that have not generally yet been fully identified and examined as types of ellipsis in the literature on ellipsis. These phenomena are denoted here as *slicing*, *parasitism*, *trimming*, and *bridge ellipsis*.

Slicing is the term employed here to denote instances of ellipsis that occur in environments where one might otherwise expect sluicing to occur, e.g.

- (53) a. A: They drafted a really tall player?  
B: How tall ~~is he?~~ – Slicing
- b. A: He has married a really rich woman.  
B: How rich ~~is she?~~ – Slicing
  
- (54) a. A: They are going to pass everyone except for two boys.  
B: Which boys ~~are they?~~ – Slicing
- b. A: We will stay because of a certain possibility.  
B: Which possibility ~~is it?~~ – Slicing

The ellipsis in these examples is similar to the ellipsis of sluicing insofar as the elided material appears in an interrogative clause. Slicing is unlike sluicing, however, regarding the material that is elided. Slicing elides just a subject pronoun and a form of the auxiliary *be* (and potentially one or more additional auxiliaries), whereas sluicing elides more material and this material matches the material in the antecedent or postcedent clause. Thus, the elided material of slicing lacks a linguistic antecedent in part, whereas the elided material of sluicing usually has a matching full linguistic antecedent (or postcedent). Note that the analyses of these examples in terms of sluicing are implausible because so-called *island repair* would be necessary, for the non-elliptical variants of the sentences would be bad: \**How tall did they draft a player?*, \**How rich did she marry a woman?*, \**Which boys are they going to pass everyone except for?*, \**Which possibility will we stay because of?*.

A second phenomenon that suggests an analysis in terms of ellipsis occurs with so-called *parasitic gaps*, e.g.

- (55) a. Which cake did you bake \_\_ without even tasting it? – Parasitism
- b. That explanation they rejected \_\_ before even hearing it. – Parasitism
- c. She is difficult to dislike \_\_ after you've gotten to know her. – Parasitism
- d. The essay is easy to appreciate \_\_ without having read it entirely. – Parasitism

The ellipses indicated in these examples are reliant on *wh*-fronting in (55a), on topicalization in (55b), and on the missing objects in (55c) and (55d) (see Section 6.10). This reliance is described in terms of a parasitic relationship. For instance, the normal “gap” that arises in (55a) due to *wh*-fronting licenses the second gap indicated

as the elision of *it* here. The aspect of such cases that suggests that ellipsis is involved is the optional appearance of the pronoun. The variants of (55a–d) in which the pronoun is overt are perfectly acceptable, e.g. *What is he going to drink without even tasting it?*

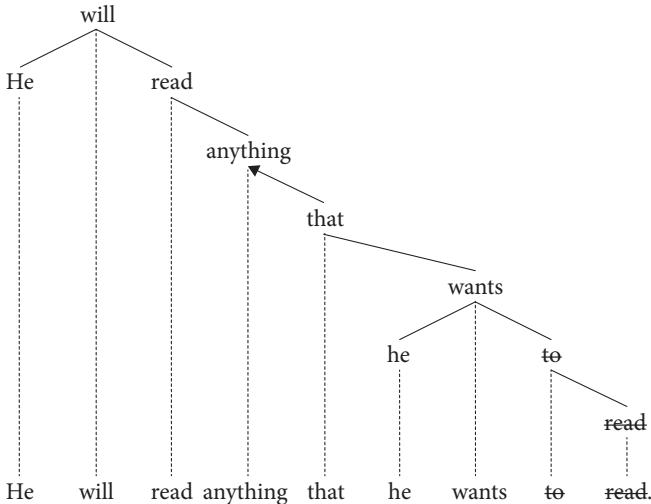
Another phenomenon that strongly suggests an analysis in terms of ellipsis is called *trimming* here – for lack of a better designation. Certain predicates that express a wish or desire can introduce ellipsis in a relative or comparative clause (*ask, desire, expect, feel like, hope, please, want, wish*), e.g.

- (56) a. He will read anything that he wants to read. – Trimming  
 b. He said everything you expected for him to say. – Trimming  
 c. He is allowed to eat as much as he wishes to eat. – Trimming  
 d. She can do whatever she feels like doing. – Trimming

The elided material is a *to*-phrase, *for-to-clause*, or gerund phrase. The governor of the relative clause must be indefinite and indicative of free choice (*any-, -ever, every-*).

A noteworthy aspect of trimming is that the elided material contains the governor of an object that is not included in the elided material. The tree structure of Example (56a) illustrates this situation:

- (56) a'.



Trimming is impossible if the object must be interpreted as part of the ellipsis, e.g. \**He should read any book, and he wants to read any book*. Trimming is thus a type of ellipsis that is quite restricted in its distribution; it elides combinations that consist of *for-to-VERB*, *to-VERB*, or a present participle only; it cannot elide the object of the verb.

A fourth further type of ellipsis mentioned here is *bridge ellipsis*. Bridge ellipsis occurs in an embedded clause introduced by a *bridge verb*, e.g.

- (57) a. Susan is seeing someone;  
     they say ~~she is seeing~~ Bill. – Bridge ellipsis  
     b. A: Someone is going to call you.  
         B: Yeh, we hope Susan ~~is going to call us~~. – Bridge ellipsis  
     c. A: I wonder what he said.  
         B: I bet ~~he said~~ nothing. – Bridge ellipsis  
     d. A: What did they bring?  
         B: Fred claims ~~they brought~~ wine. – Bridge ellipsis

Bridge verbs are predicates of speaking and thinking that typically take an object clause; they have special properties that motivate their classification; among these is the ability to serve as a “bridge”, allowing the rising catenae of *wh*-fronting and topicalization to reach into their object clauses.

Bridge ellipsis typically occurs in an embedded object clause; the object clause is the argument of the bridge verb. Bridge ellipsis shares a number of traits with sluicing and answer fragments: it requires any remnant to present new information; it necessarily elides the main predicate of the clause; it allows a negation to be included in the elided material; flexibility in verb forms in person and number morphology is possible across the antecedent and ellipsis, and most importantly, bridge ellipsis often occurs in the exact same environments in which sluicing and answer fragments occur, as illustrated with Example (57a), which could also easily license sluicing (*Susan is seeing someone. Everyone is wondering who she is seeing*), and with Example (57d), which could also license straightforward answer ellipsis (*What did they bring? – They brought Wine.*). The fact that bridge ellipsis has these traits in common with sluicing and answer fragments suggests that these three mechanisms are in fact particular manifestations of a single greater ellipsis mechanism, which one might call *clausal ellipsis*.

Slicing, parasitism, trimming, and bridge ellipsis have not been widely acknowledged and investigated as types of ellipsis in the literature on ellipsis. They have been mentioned here to increase awareness and thus promote future efforts to explore their potential for being included in the canon of widely acknowledged ellipsis mechanisms.

### 13.8 Summary of ellipsis

In summary, the main traits of the ten main ellipsis mechanisms examined are summarized with the table on the next page. The main generalization about the account of ellipsis above can be emphasized here as a final note. This generalization is that most instances of ellipsis demonstrably elide a catena. The only exceptions to this insight occur with certain answer fragments (see Examples 11–12, in this chapter) and perhaps with certain limited cases of left edge ellipsis as well (see Examples 51a–c, just above). Hence the catena is indeed the key unit of syntax for the analysis of ellipsis in general.

Table 31.

|                                       | Occurs<br>optionally           | Must have<br>a linguistic<br>antecedent | Can operate<br>backwards | Remnant<br>must<br>present new<br>information | Occurrence<br>restricted to<br>new coordinate<br>structures | Elted<br>material<br>can include<br>a negation | Flexibility<br>in verb forms                    | Allows<br>sloppy<br>identity | Antecedent<br>can dominate<br>ellipsis |
|---------------------------------------|--------------------------------|-----------------------------------------|--------------------------|-----------------------------------------------|-------------------------------------------------------------|------------------------------------------------|-------------------------------------------------|------------------------------|----------------------------------------|
| NP-ellipsis                           | Yes,<br>sometimes              | No, but it<br>usually does              | Yes                      | No                                            | No                                                          | No                                             | Inapplicable                                    | Yes                          | Yes                                    |
| Gapping                               | Yes, usually                   | Yes                                     | No                       | Yes                                           | Yes                                                         | No                                             | Yes, but only<br>regarding number               | Yes                          | No                                     |
| Stripping                             | Yes, usually                   | Yes                                     | No                       | Yes                                           | Yes                                                         | No                                             | Yes, but only<br>and person                     | Yes                          | No                                     |
| VP-ellipsis                           | Yes, usually                   | No, but it<br>usually does              | Yes                      | Inapplicable                                  | No                                                          | No                                             | Yes, but only<br>regarding number<br>and person | Yes!                         | Yes                                    |
| Pseudo-gapping<br>Answer<br>fragments | Yes                            | Yes                                     | No                       | Yes                                           | No                                                          | No                                             | No                                              | Yes                          | Yes                                    |
|                                       | Yes, usually                   | No, but it<br>usually does              | No                       | Yes                                           | Inapplicable                                                | Yes                                            | Yes, but only<br>regarding number               | Yes                          | No                                     |
| Slicing                               | Yes                            | No, but it<br>usually does              | Yes                      | Yes                                           | No                                                          | Yes                                            | No                                              | Yes                          | Yes                                    |
| Null complement<br>anaphora           | Yes                            | No, but it<br>often does                | Yes                      | Inapplicable                                  | No                                                          | Yes                                            | Yes                                             | Yes                          | No                                     |
| Comparative<br>deletion               | No, it occurs<br>obligatorily! | Yes                                     | No                       | No                                            | No                                                          | No                                             | Inapplicable                                    | Yes                          | No                                     |
| Left edge ellipsis                    | Yes                            | No! it usually<br>has none              | Inapplicable             | Yes                                           | Inapplicable                                                | No                                             | Inapplicable                                    | Inapplicable                 | Inapplicable                           |



## CHAPTER 14

# The syntax of comparatives

### 14.1 Overview

The syntax of comparatives has been postponed until this final chapter for a reason. This reason is that the syntax of comparatives is very complex. One needs an understanding of coordination and ellipsis in order to begin to address comparatives. Comparative phrases (and strings) and clauses (introduced by *than* in English) must at times be analyzed in terms of coordination and at other times in terms of subordination. When coordination obtains, one can expect the occurrence of the ellipsis mechanisms associated with coordination (gapping, stripping), and when subordination obtains, one has to expect the occurrence of ellipsis mechanisms that occur in subordinate clauses (VP-ellipsis, pseudogapping). The interaction of these various components of syntax renders the syntax of comparatives very challenging.

To provide a preliminary sense of the challenge that the syntax of comparatives present, consider the following acceptability contrast:

- (1) a. Fred is bigger than **Larry**.  
b. **Who** is Fred bigger than?
- (2) a. Fred eats more hamburgers than **salads**.  
b. \***What** does Fred eat more hamburgers than?

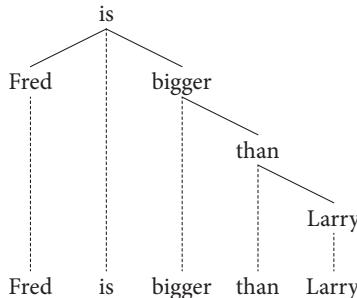
*Larry*, the complement of *than* in (1a), can be questioned in (1b). In contrast, *salads*, which appears to be the complement of *than* in (2a), cannot be questioned in (2b). What is responsible for this contrast? Part of the answer to this question developed below is that the *than-string* in (1a) is subordinate to the word that immediately precedes it, whereas the *than-string* in (2a) is coordinate to the word that immediately precedes it. Thus, in (1a) comparative subordination obtains, whereas in (2a) comparative coordination obtains.

This chapter establishes the distinction between comparatives that must be analyzed in terms of subordination and those that must be analyzed in terms of coordination.<sup>266</sup> The following structural analyses of (1a) and (2a) provide orientation:

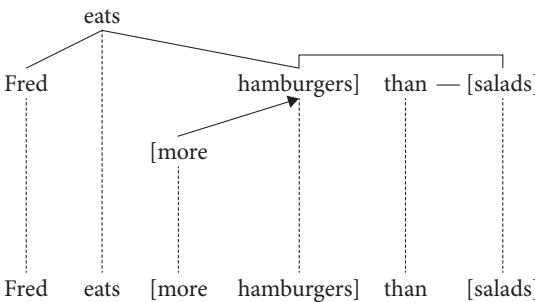
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<sup>266</sup>. The account of the syntax of comparatives presented in this chapter follows Osborne (2009) closely.

(1) a'.



(2) a'.



The standard conventions for showing subordination are present in (1a'); the *than*-string *than Larry* is a dependent of its governor *bigger*, and the standard conventions for showing coordination are present in (2a'), where *than salads* is coordinate to *hamburgers*.

The challenge of determining when the analysis of a comparative expression involves coordination and when it involves subordination will be accomplished in terms of *functional equivalence*. When the *than*-string immediately follows its functional equivalent, comparative coordination obtains; otherwise, comparative subordination is present.

## 14.2 Preliminaries

The comparative is the intermediate stage of comparison that occurs between the positive and the superlative:

- (3) a. Spot is **big**. – Positive
- b. Spot is **bigger** than Fido. – Comparative
- c. Spot is the **biggest**. – Superlative

The form *big* is the positive form of that adjective; the form *bigger* is its comparative form; and the form *biggest* is its superlative form. The comparative of most single syllable adjectives and adverbs in English is formed with the *-er* suffix, and the superlative is formed with the *-est* suffix. Many adjectives and adverbs that contain two or more syllables form the comparative with *more* and the superlative with (*the*) *most*, e.g. *Spot is more intelligent than Fido, Spot is the most intelligent*. Since the syntax associated with positive and superlative forms of adjectives and adverbs is relatively straightforward, this chapter will not explore them. The focus here is on the syntax of comparatives.

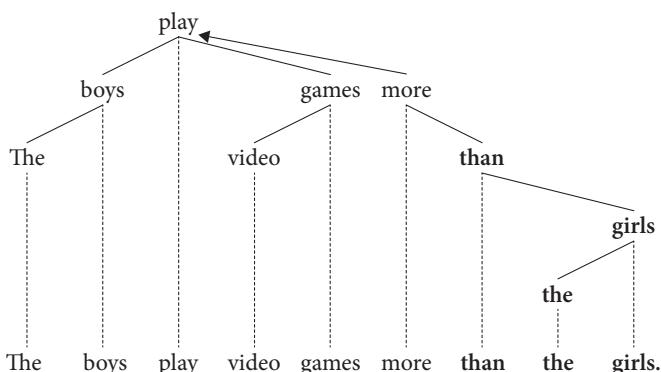
The most challenging and thus interesting aspect of the syntax of comparatives concerns the distribution of the comparative expressions. In English *than* is most often the word that introduces a comparative expression. In cases of similarity, the word *as* serves this purpose, e.g. *Spot is as friendly as Fido*. There is a limited set of words that license these comparative expressions. The following table gives an overview of the relevant words:

| Elements that can govern a comparative expression | Words that introduce a comparative expression |
|---------------------------------------------------|-----------------------------------------------|
| <i>-er, more, less, as, same, different</i>       | <i>than, as, from</i>                         |

A basic question concerns the syntactic category of these elements. The status of *-er* as a suffix is not disputed, and the words *more*, *less*, *as*, *same*, and *different*, which license the appearance of a comparative expression, seem to distribute like determiners, nouns, adjectives, or adverbs. The words *than* and *as* can behave as coordinators, prepositions, or subordinators depending on the syntactic environment in which they appear, and when *from* introduces a comparative expression, it maintains its status as a preposition.

Another instance of comparative subordination serves to illustrate the terminology:

(4)



The word *more* is the *comparative governor*; it licenses the appearance of the comparative expression *than the girls*. The term *comparative expression* denotes the expression introduced by *than*, *as*, or *from*. Actually, though, the term *than-string* is used henceforth to denote this expression because most of the examples produced in this chapter involve *than*. The ability to front the *than-string* with its governor supports the analysis shown, which takes *more than the girls* to be a constituent: ... *but more than the girls, the boys play video games*.

An obvious observation about the distribution of the comparative governor and the *than-string* is that that the former usually precedes the latter, and that the opposite order can result in a bad sentence, e.g.

- (5) a. I **more** often eat cookies **than** fruit.
- b. \*I eat cookies **than** fruit **more** often.

Exceptions to this principle are rare. The only cases that challenge the principle involve fronting, e.g.

- (6) a. <sup>?</sup>**Than** whom are you **more** patient?
- b. <sup>?</sup>**Than** such a slogan nothing could be **more** negative.

Based on such examples, it is reasonable to assume that the comparative governor must precede the *than-string* unless the latter has been fronted.

Another noteworthy aspect about the syntactic relationship between the comparative governor and the *than-string* is that the two must be sufficiently local to each other, e.g.

- (7) a. \***More** people said women **than** men were at the party.
- b. The people said **more** women **than** men were at the party.
- (8) a. \***Fewer** girls expect that soccer players will ask them out **than** rugby players.
- b. The girls expect that **fewer** soccer players will ask them out **than** rugby players.

Apparently, the comparative governor and the *than-string* must appear within the same clause. If the one appears in a clause that is superordinate to the clause containing the other, the *than-string* is not licensed. Why this locality constraint exists is a mystery that is not addressed here.

With the basic terminology used to explore the syntax of comparatives now established, the account can proceed to the central question explored in this chapter. This question addresses the extent to which comparatives adhere to the syntax of coordination or to the syntax of subordination.

### 14.3 Comparative coordination

A basic observation concerning the syntax of comparatives is that comparative expressions can at times mirror the syntax of coordination.<sup>267</sup> The following two data sets illustrate this fact:

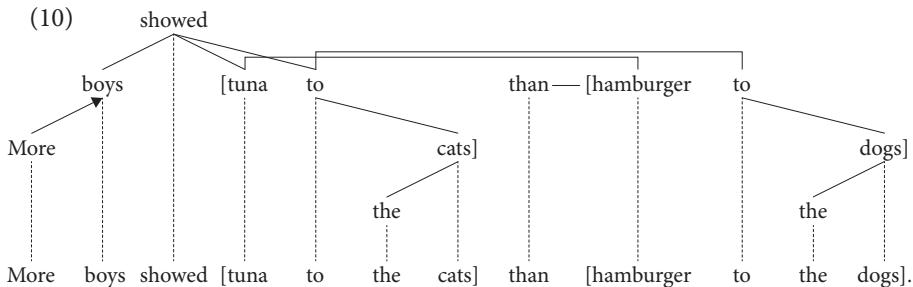
- (9) The boys showed tuna to the cats.
- a. More [boys] than [girls] showed tuna to the cats.
  - b. More boys [showed] than [gave] tuna to the cats.
  - c. More boys showed [tuna] than [hamburger] to the cats.
  - d. More boys showed tuna [to the cats] than [to the dogs].
  - e. <sup>?</sup>More boys [showed tuna], than [gave hamburger], to the cats.
  - f. <sup>?</sup>More boys [showed tuna to], than [withheld hamburger from], the cats.
  - g. More boys showed [tuna to the cats] than [hamburger to the dogs].
  - h. More boys [showed tuna to the cats] than [gave hamburger to the dogs].
  - a'. The [boys] and [girls] showed tuna to the cats.
  - b'. The boys [showed] and [gave] tuna to the cats.
  - c'. The boys showed [tuna] and [hamburger] to the cats.
  - d'. The boys showed tuna [to the cats] and [to the dogs].
  - e'. <sup>?</sup>The boys [showed tuna], but [gave hamburger], to the cats.
  - f'. <sup>?</sup>The boys [showed tuna to], and [withheld hamburger from], the cats.
  - g'. The boys showed [tuna to the cats] and [hamburger to the dogs].
  - h'. The boys [showed tuna to the cats] and [gave hamburger to the dogs].

The parallelism across these two sets of sentences reveals that the syntax of comparatives and the syntax of coordination can be the same. The same strings that coordination can coordinate can also be compared. The syntax of comparatives should at least at times match the syntax of coordination.

The theoretical apparatus developed for coordination in Chapters 10 and 11 is therefore extended here to the analysis of comparatives, e.g.

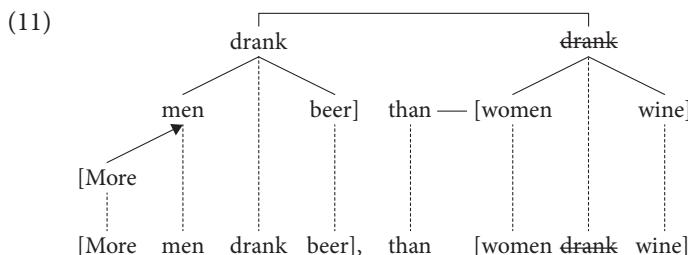
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<sup>267</sup> The observation that the syntax of comparatives overlaps to a greater or lesser extent with the syntax of coordination has been present in the literature on comparatives for a long time (e.g. Pinkham 1982a; 1982b; Napoli 1983; Ryan 1983; McCawley 1988; Eroms 2000: 475–8; Lechner 2001; 2004).



This analysis, just as for the analysis of coordinate structures, matches the roots of the compared strings. The *than* introducing the comparative expression is seen as a coordinator, and is hence attached directly to the word that immediately follows it. The square brackets mark the extent of the coordinated strings.

Support for the analysis in terms of coordination is delivered by ellipsis. The gapping mechanism can elide material in comparative clauses, e.g.



This sentence is clearly a gapping structure, the non-initial conjunct containing two remnants that straddle the elided verb. Ellipsis of this sort does not occur across matrix and subordinate clause, so the analysis shown here in terms of comparative coordination is warranted.

The examples just produced deliver strong evidence in favor of the stance adopted and developed here, namely that the syntax of comparatives often overlaps with the syntax of coordination. The goal now is to determine when comparative coordination occurs, and when it does not, in which case comparative subordination is present instead. Examining Examples (9a–h), it should be apparent that the *than*-string is parallel to the string of words marked as the initial conjunct. This observation is the most reliable indicator as to when an analysis in terms of comparative coordination is appropriate. If the *than*-string immediately follows a functionally equivalent string, then comparative coordination obtains.

#### 14.4 Ellipsis or not?

A basic question arises at this stage about the status of *than*-phrases, many of which appear clause-finally. Should these phrases be analyzed in terms of coordination or subordination. If they are analyzed in terms of coordination, then the ellipsis of stripping might be involved, reducing what are essentially complete clauses down to their phrasal appearance. Examine the following similarities and competing analyses in this regard:

- (12) a. [Dogs] and [cats] live in the area.
- b. [Dogs live in the area], and [cats ~~live in the~~  
         area, too]. – Stripping
- c. [More dogs] than [cats] live in the area.
- d. [More dogs live in the area] than [cats ~~live in~~  
         the area]. – Possible analysis
- d'. More dogs live in the area than cats. – Competing analysis
  
- (13) a. We took [the boys] and [the girls] there.
- b. [We took the boys there], and [we ~~took~~ the  
         girls ~~there~~, too]. – Stripping
- c. We took [more boys] than [girls] there.
- d. [We took more boys there] than [we ~~took~~ girls  
         ~~there~~]. – Possible analysis
- d'. We took more boys there than girls. – Competing analysis

The main issue addressed in this section concerns the competing analyses shown in the d- and d'-sentences. Should *than*-phrases be analyzed as clauses that are reduced down to their phrasal appearance by an ellipsis mechanism? A careful analysis of such cases reveals that the non-ellipsis analysis shown in the d'-sentences should be preferred over the ellipsis analysis shown in the d-sentences.

The a- and b-sentences involve standard coordination, whereby the ellipsis of stripping is present in the b-sentences. Given the obvious similarity of the a- and b-sentences to the c- and d-sentences, one could assume that the ellipsis of stripping is also occurring in the d-sentences as shown, just like it occurs in the b-sentences. Support for the stripping analysis shown in the d-sentences comes in the form of comparative expressions that involve the subjective form of pronouns, e.g. *You took more boys to the show than I took to the show*. The appearance of the subjective *I*, as opposed to the objective *me*, in this case is consistent with the ellipsis analysis, since the subjective *I* is reliant on the presence of a finite verb. This argument in favor of the ellipsis analysis is not strong, though, for the objective *me* is of course also possible: *You took more boys to the show than me*. Furthermore, the appearance of *I*

in such cases is likely due to the influence of prescriptive grammar and is therefore not indicative of the underlying linguistic system.

An obvious consideration that speaks against the ellipsis analysis shown in the d-sentences and in favor of the non-ellipsis analysis shown in the d'-sentences is the intonation contour. Standard instances of stripping involve a pause before the remnant as marked by a comma in the b-sentences and the appearance of the additive particle *too*, *also*, or *as well*. Neither of these markers appears in the d- (and d')-sentences. Clause-final *than*-strings typically receive no special intonation contour. Furthermore, in cases when the ellipsis of gapping/stripping is indisputably present, a pause seems appropriate, e.g.

- (14) [More men drank beer], than [women ~~drank~~ wine].

Example (14) appears above as (11). A phrasal analysis of this *than*-string is quite obviously not possible here, but rather the ellipsis of gapping is necessarily present. The presence of ellipsis is marked in the intonation contour, whereby the pause indicated by the comma seems appropriate.

Another consideration that supports the non-ellipsis analysis of most phrasal *than*-strings is evident with cases where an analysis in terms of coordination is not possible for the variant that has the *than*-string in a clause-internal position, e.g.

- (15) a. We sent a better player **than Peter** to the match.  
 b. \*We sent [a better player] and [Peter] to the match.  
 c. We sent a better player to the match **than Peter**.  
 d. ?[We sent a good player to the match] and [Peter is good].

The inability in (15b) to coordinate *Peter*, which has subject status, with *a better player*, which has object status, demonstrates that *than Peter* in (15a) is not coordinate to *a better player*. Furthermore, the oddness of (15d) and the meaning mismatch across (15c) and (15d) undermines a coordination analysis entirely. Comparative coordination is in no way present in (15a) and (15c). This situation forces one to concede that the ellipsis of stripping has not occurred in (15c) and therefore at least some clause-final phrasal *than*-phrases do not involve the ellipsis of stripping.

And yet another observation that supports the non-ellipsis analysis of at least some *than*-phrases occurs with *wh*-fronting. Certain limited cases allow the complement of *than* to be questioned, e.g.

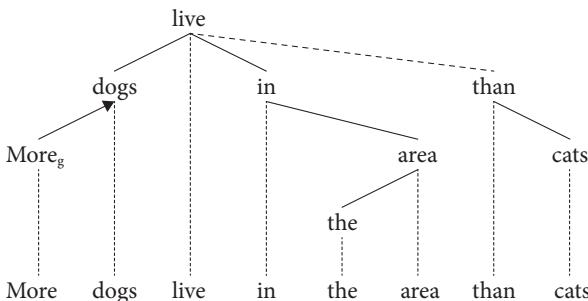
- (16) a. You ate more beans than **Bill**.  
 b. Who did you eat more beans than?  
 (17) a. You ate more beans than **Bill ate**.  
 b. \*Who did you eat more beans than \_\_ ate?

The ability to question the complement of *than* in (16b) supports the non-ellipsis analysis shown with (16a). The competing analysis in (17a) is based on the quite acceptable sentence *You ate more beans than Bill ate*. That analysis is, however, contradicted by the badness of (17b), where an unsuccessful attempt has been made to front a subject out of the *than*-clause.

A gapping/stripping analysis of certain clause-final *than*-strings is, however, at times necessary, as for instance with Example (14). The overall impression can be that a black-and-white decision about the nature of clause-final phrasal *than*-strings (ellipsis or not) is difficult. It may in fact be that a black-and-white decision in this area would force an untenable approach to the syntax of comparatives. Flexibility is needed. The stance adopted here is therefore that phrasal *than*-strings do not generally involve ellipsis, but that an ellipsis account is available in case it is needed.

The dependency structure of (12d'), which is given here as (18), summarizes the approach to *than*-phrases assumed here throughout:

(18)



The *than*-string *than cats* does not contain ellipsis. The noun *cat* is viewed as a direct dependent of *than*. The *than*-string *than cats* has undergone extraposition from its governor *more*. The role of extraposition in comparatives is examined below in Section 14.7.

## 14.5 Functional equivalence

*Than*-clauses can appear sentence medially, e.g.

- (19) a. More people than we had invited people showed up.  
b. More people showed up than we had invited people.
- (20) a. Less money than they had spent money was being collected.  
b. Less money was being collected than they had spent money.

The ellipsis shown in these examples is comparative deletion (see Section 13.5). The b-sentences, in which the *than*-clauses appear clause-finally, are perhaps more natural than the a-sentences. The a-sentences, however, in which the *than*-clauses appear clause-medially, are also acceptable.

Examples like (19)–(20) suggest that the distribution of *than*-clauses is flexible. Interestingly, however, this flexibility does not show up in other cases, e.g.

- (21) a. \*More men than women tried to board the plane tried to board the plane.  
b. More men tried to board the plane than women tried to board the plane.
- (22) a. \*More cars than bicycles were parked behind the building were parked in front of it.  
b. More cars were parked in front of the building than bicycles were parked behind it.

The b-sentences, in which the *than*-clauses again appear clause-finally, are again fine. The a-sentences, though, in which the *than*-clauses appear clause-medially, are now bad. The flexibility of position seen in (19)–(20) is no longer present. The distribution of the *than*-clauses is restricted to the clause-final position. Apparently, some aspect of comparatives does at times put restrictions on where *than*-strings can appear in sentences.

The inability of *than*-expressions to appear clause-medially also occurs with non-clausal *than*-strings. At times, these strings cannot appear clause medially, e.g.

- (23) a. \*We sent more boys than girls to the market to the school  
b. We sent more boys to the school than girls to the market.
- (24) a. \*What did more girls than boys order order?  
b. What did more girls order than boys order?

The *than*-strings in these examples are not complete clauses. Like the *than*-clauses in (21)–(22), these *than*-strings cannot appear clause-medially, as the a-examples demonstrate.

Examples (21)–(24) raise a basic question about the distribution of *than*-strings in general: What is determining where they can appear? Why is it that some *than*-strings can appear clause-medially, whereas others cannot? The answers to these questions have been suggested in part in Section 14.3 above, where it was demonstrated that many *than*-strings can be analyzed in terms of coordination, that is, the given *than*-string is coordinate to the material that immediately precedes it. As of yet, however, no clear means of determining when comparative coordination obtains has been established, although it was noted that in cases of comparative coordination, the *than*-string immediately follows functionally equivalent material.

The concept of functional equivalence is the basis for making sense of the distribution of *than*-strings. A given *than*-string has a functional equivalent in the main clause if the two strings could be coordinated using a standard coordinator (*and*, *or*, *but*).

### Functional equivalent of a *than*-string

A *than*-string has a functionally equivalent string in the matrix clause if the two could be coordinated (with *and*, *or*, *but*) without altering the word order of the matrix clause.

Functional equivalents are identified via the coordination test, as illustrated with Examples (21)–(24), repeated here as (25)–(28) with the c-sentences added:

- (25) a. \*We sent more boys than girls to the market to the school.  
 b. We sent [more boys to the school] than [girls to the market].  
 c. We sent [boys to the school] and [girls to the market].
- (26) a. \*What did more girls than boys order order?  
 b. What did [more girls order] than [boys order]?  
 c. What did [girls order] and [boys order]?
- (27) a. \*More men than women tried to board the plane tried to board the plane.  
 b. [More men tried to board the plane] than [women tried to board the plane].  
 c. [Men tried to board the plane] and [women tried to board the plane].
- (28) a. \*More cars than bicycles were parked behind the building were parked in front of it.  
 b. [More cars were parked in front of the building] than [bicycles were parked behind it].  
 c. [Cars were parked in front of the building] and [bicycles were parked behind it].

The c-sentences illustrate how functional equivalents are identified. The ability to coordinate, for instance, *girls to the market* with *boys to the school* in (25c) demonstrates the presence of functional equivalents to the *than*-strings. These functional equivalents are underlined in the a- and b-sentences.

With the functional equivalents to the *than*-strings identified, it should be apparent why the *than*-strings cannot appear clause-medially in the a-sentences: they split their functional equivalents there. Thus sentence (25a) is bad because the *than*-string *than girls to the market* splits its functional equivalent *boys to the school*, and sentence (26a) is bad because the *than*-string *than boys order* splits its functional equivalent *girls order*. *Than*-strings cannot split their functional equivalents. This is the first generalization about the distribution of *than*-strings.

Now examine sentences (19)–(20) again, repeated here as (29)–(30) but with the c-sentences added:

- (29) a. More people **than we had invited** people showed up.
  - b. More people showed up **than we had invited** people.
  - c. \*[People showed up] and [we had invited people].
- (30) a. Less money **than they had spent** money was being collected.
  - b. Less money was being collected **than they had spent** money.
  - c. \*[Money was being collected] and [they had spent money].

The badness of the c-sentences demonstrates that a functional equivalent to the *than*-strings is not present in the a- and b-sentences. Given that there is no functional equivalent present, there is no functional equivalent that the clause-medial *than*-strings could split. The a-sentences are therefore predictably acceptable in the relevant sense.

Another observation about the distribution of *than*-strings in relation to their functional equivalents concerns cases in which the *than*-string entirely precedes its functional equivalent. Given unmarked word order, the result is strongly marginal, e.g.

- (31) a. ??More men **than wine** drank beer.
  - b. More men drank [beer] than [wine].
- (32) a. ??Fewer men **than drank wine** drank beer.
  - b. Fewer men [drank beer] than [drank wine].
- (33) a. ??There were fewer dogs **than barking in the yard** barking in the street.
  - b. There were fewer dogs [barking in the street] than [barking in the yard].

In each of these a-sentences, the *than*-string in bold completely precedes its functional equivalent (underlined). While such examples are not entirely bad, they are strongly marginal. The marginality disappears if the *than*-string follows its functional equivalents as shown in the b-sentences, where standard comparative coordination obtains.

Examples that have the *than*-string preceding its functional equivalent can actually be somewhat acceptable if the *than*-string precedes its functional equivalent due to fronting, e.g.

- (34) a. ...but more beer **than you**, nobody can drink.
- b. How much more often **than Bill** do you drink beer?
- c. ??Than such a slogan, nothing could be more negative. (=6b)

In each of these sentences, the *than*-string precedes its functional equivalent, yet acceptability is reduced only somewhat. The relative acceptability of such cases is due to the presence of fronting. The *than*-string, or a string containing the *than*-string, has been fronted in each case. The presence of fronting sets up the expectation that the *than*-string will precede its functional equivalent. This expectation promotes processing and thus increases acceptability.

Three descriptive generalizations have been identified; they are stated here in summary:

**Generalization 1**

When a *than*-string immediately follows its functional equivalent, comparative coordination obtains.

**Generalization 2**

A *than*-string may not split its functional equivalent.

**Generalization 3**

A *than*-string that entirely precedes its functional equivalent is at best marginal unless that *than*-string, or a string containing it, has been fronted.

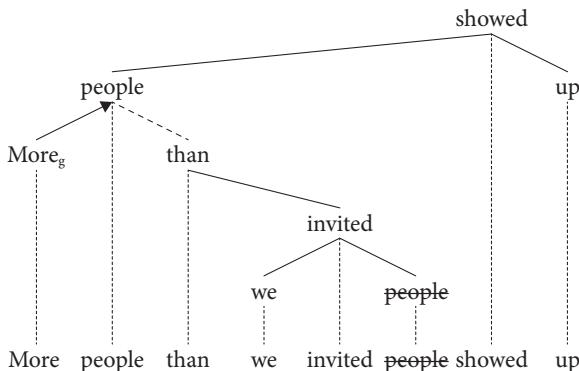
Two more descriptive generalizations about the distribution of *than*-strings appear below.

## 14.6 The role of extraposition

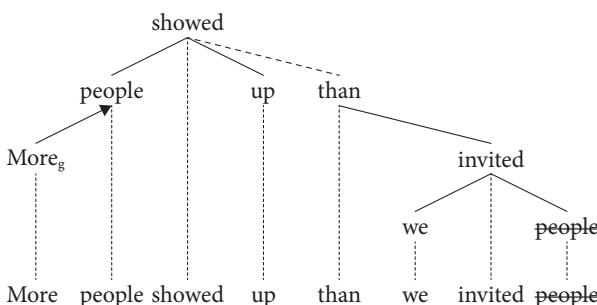
The first of the three generalizations just produced, about the presence of comparative coordination, implies a related generalization. This related generalization is that if comparative coordination does not obtain, because the *than*-string does not immediately follow its functional equivalent, then comparative subordination is present. Given this guideline, an examination of the *than*-strings that must be analyzed in terms of comparative subordination quickly reveals that these strings can be clausal or phrasal, and that there are even cases that require one to acknowledge *than*-strings that consist of two or more constituents.

The structural analysis of comparative subordination views *than* as a preposition- or subordinator-like element, and the comparative governors *more* and *less* are often assumed to be a pre-dependent of the word that immediately follows, as illustrated in many of the examples above. This situation necessitates an analysis of comparative subordination that sees extraposition occurring frequently, e.g.

(35) a.



b.



The ellipsis indicated is comparative deletion (see Section 13.5). Extraposition is present in both of these examples. In (35a) extraposition has occurred within the subject NP *more people than we invited people*, and in (35b) extraposition occurs within the entirety, that is, at the clause level. In both cases, the *than*-string has been extraposed away from its governor *more*.

The fact that *than*-strings often undergo extraposition should not be surprising. As a mechanism of syntax, extraposition often serves to move heavier, informationally central constituents to the right periphery of the clause. *Than*-strings are such informationally heavy constituents, since they serve to express a contrast. The importance of extraposition is further illustrated now using an example from German. The relatively flat structure of verb-final subordinate clauses in German provides a good environment for probing the distribution of *than*-strings (i.e. of *als*-strings):

- (36) a. dass er öfter als sie die Zeitung in der Freizeit schnell liest  
           that he more.often than she the newspaper in the free.time quickly read

'that he more often than she reads the newspaper quickly in his free time'  
 b. \*dass er öfter die Zeitung als sie in der Freizeit schnell liest

- c. \*dass er öfter die Zeitung in der Freizeit als sie schnell liest
- d. \*dass er öfter die Zeitung in der Freizeit schnell als sie liest
- e. dass er öfter die Zeitung in der Freizeit schnell liest als sie

The distribution of the *als*-string *als sie* is just as expected according to the analysis in terms of extraposition. It can appear next to its governor *öfter* as in (36a), or in extraposed position clause-finally as in (36e). It cannot appear in the clause-medial positions shown in (36b–d), where an analysis in terms of extraposition is not possible.

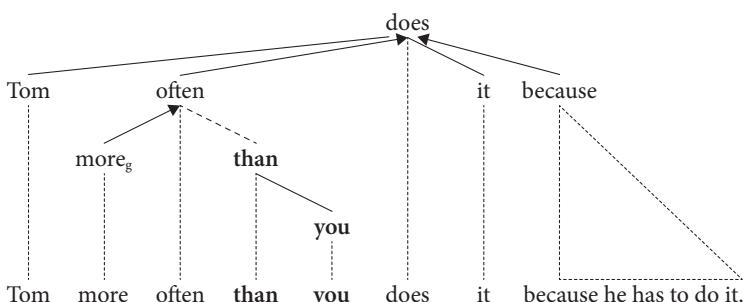
The examples just examined can be compared with the following set of examples involving the free relative clause *was er sagte* ‘what he said’:

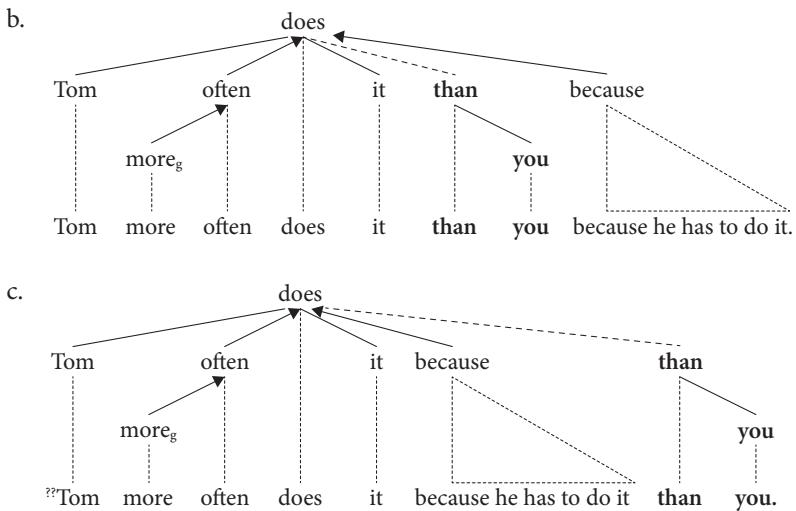
- (37) a. weil das, was er sagte, mich gestern sehr überraschte  
     because that what he said me yesterday very surprised  
     ‘because what he said surprised me strongly yesterday’
- b. \*weil das mich, was er sagte, gestern sehr überraschte
- c. \*weil das mich gestern, was er sagte, sehr überraschte
- d. \*weil das mich gestern sehr, was er sagte, überraschte
- e. weil das mich gestern sehr überraschte, was er sagte

The same distributional pattern seen in (36a–e) is present here in (37a–e). The free relative clause *was er sagte* – relative clauses often undergo extraposition in German (and English) – can appear next to its governor *das* or in extraposed position clause-finally. The observation, then, is that the *als*-string *als sie* in (36a–e) of the comparative is distributing just like a constituent that typically undergoes extraposition, the free relative clause *was er sagte*.

Another aspect of extraposition is important for the analysis of comparatives. Section 14.4 presented a number of observations demonstrating that phrasal *than*-strings are indeed phrasal, that is, they are not reduced down to their phrasal appearance via ellipsis. Extraposition delivers further support for this conclusion. Phrasal *than*-strings precede their clausal co-sibling constituents:

- (37) a.





The distribution of *than you* in these three sentences demonstrates that it should NOT be viewed as a clause that has been reduced down to its phrasal appearance by an ellipsis mechanism. If it had, we would expect it to distribute like a clause, but as the strong marginality of (37c) demonstrates, *than you* does not distribute like a clause.

The *than*-string *than you* distributes like a phrase that is lighter than the clause *because he has to do it*. The acceptability contrast across (37b) and (37c) is consistent with an analysis in terms of shifting (see Section 7.6). Since *than you* and *because he has to do it* are co-sisters, the lighter phrase *than you* must be precede the heavier clause *because he has to do it*. If *than you* were really a clause in phrasal clothing, we would expect both (37b) and (37c) to be acceptable word orders, since neither clause would be significantly heavier than the other.

## 14.7 The distribution of comparative deletion

One final aspect of the syntax of comparatives is addressed in this final chapter. This aspect concerns the distribution of comparative deletion. Comparative deletion cannot co-occur with comparative coordination, whereas it can co-occur with comparative subordination. This insight helps explain some rather opaque examples and a mysterious acceptability contrast.

The following example sets, in which the comparative governor appears in an argument, provide some initial clues about the distribution of comparative deletion:

- (38) a. The kids want more ice cream than they can have ~~ice cream~~.  
     b. \*The kids want more ice cream than they can have ice cream.  
     c. \*The kids [want more ice cream] than [can have ~~ice cream~~].
- (39) a. Our dog has chased many more squirrels than he has caught ~~squirrels~~.  
     b. \*Our dog has chased many more squirrels than he has caught squirrels.  
     c. \*Our dog [has chased many more squirrels] than [has caught ~~squirrels~~].

The ellipses in the a-sentences are straightforward instances of comparative deletion. The comparative governor appears in the object NPs, which means these nominals are then elided from the *than*-clauses. The b-sentences are bad because comparative deletion has failed to occur – recall that comparative deletion occurs obligatorily when it is licensed (see Section 13.5). The reason the c-sentences are bad is not immediately clear; on the comparative coordination analysis shown, one might expect them to be acceptable, since the subject should be sharable via string coordination (as indicated) and comparative deletion should be able to elide the object nominals.

Examples (38)–(39) are now compared with the following examples in which the comparative governor appears in an adjunct:

- (40) a. \*Jim buys the food more often than he eats *it*.  
     b. Jim buys the food more often than he eats *it*.  
     c. \*Jim [buys the food more often] than [eats *it*].
- (41) a. \*Sam spreads rumors more frequently than he kills *them*.  
     b. Sam spreads rumors more frequently than he kills *them*.  
     c. \*Sam [spreads rumors more frequently] than [kills *them*].

The a-sentences are now bad, and for an obvious reason: comparative deletion cannot elide the objects *it* and *them*, for the object NPs are not focused by the comparative governor in the antecedent clauses. Further, the fact that the objects are not focused predicts that the b-sentences, in which the object is overt, should be fine, and they are. The c-sentences are again bad, but this time an explanation for their badness is evident: comparative deletion cannot elide the object pronouns for the same reason that it cannot elide the pronouns in the a-sentences: the parallel nominals in the antecedent clauses are not focused by the comparative governor.

To summarize so far, the fact that comparative deletion must occur if it is licensed helps predict the badness of (38b, 39b). The badness of Examples (38c) and (39c) remains a mystery, however. In order to better understand what is going on with those examples, examine the following acceptability contrast:

- (42) a. \*Bill [bought a car] and [fixed].  
     b. Bill [bought] and [fixed] a car.

- (43) a. \*It [looks like a meal] and [eats].  
       b. It [looks] and [eats] like a meal.
- (44) a. She [stayed today] and [relaxed].  
       b. She [stayed] and [relaxed] today.
- (45) a. Did they [arrive last night] and [move in]?  
       b. Did they [arrive] and [move in] last night?

Examples (42)–(43) demonstrate that an object NP cannot be shared across the conjuncts if it appears inside the initial conjunct, but it can be shared if it appears outside of the coordinate structure to the right. In contrast, Examples (44)–(45) demonstrate that an adjunct can be shared by the conjuncts regardless of whether it appears inside or outside of the coordinate structure.

Returning to Examples (38c) and (39c), consider the following competing analyses of those sentences:

- (46) a. \*The kids [want more ice cream] than [can have ice cream].  
       b. \*The kids [want more ice cream] than [can have].
- (47) a. \*Our dog [has chased many more squirrels] than [has caught squirrels].  
       b. \*Our dog [has chased many more squirrels] than [has caught].

The analyses shown in these sentences are all in terms of comparative coordination. The a-sentences show both comparative coordination and comparative deletion, whereas the b-sentences show just comparative coordination. On the b-analyses, the sentences are bad because conjunct-internal object nominals cannot be shared in terms of string coordination, as just demonstrated with Examples (42)–(43). But then why are the a-analyses in terms of comparative deletion also impossible? The answer to this question must be that comparative deletion cannot occur in a coordinate *than*-clause. Indeed, there is no evidence that comparative deletion ever occurs in coordinated *than*-strings. When comparative deletion is undoubtedly present, as with all the examples in Section 13.5, an analysis in terms of comparative coordination is not possible, but rather comparative subordination obtains.

To summarize the observations and conclusion, the examples examined in this section are on the whole quite opaque. But they are in part explainable if one assumes that comparative deletion can occur only in subordinate *than*-clauses; it cannot occur in coordinate *than*-clauses. The badness of the key examples above, Examples (38c) and (39c), is predictable precisely because comparative deletion cannot occur in the coordinate *than*-clauses that appear there.

## Concluding statements

The research agenda inspiring the content of this book reaches back more than 15 years. Close collaboration has occurred with Professor Thomas Groß over most of these years, and many of the insights gained are due to this fruitful collaboration. The theoretical apparatus presented and employed above for representing dependencies is a product of the cooperation. Many thanks go out to Thomas in this regard. I am, however, solely responsible for producing the content above and any errors in the presentation are entirely mine.

There has been cross-linguistic testing of the theoretical apparatus, mainly with an eye for its utility in representing the syntactic structures of Japanese (because one of Thomas Groß' specialties is Japanese syntax). The cross-linguistic applicability of the apparatus is certainly one of the promising traits of dependency syntax in general. The relatively flat structures of dependency syntax seem appropriate for the analysis of other languages, especially those with freer word order than English.

The research agenda just mentioned is ongoing. In this regard, more recent developments in the agenda have not been included in this book. In particular, a chapter on negative polarity was foreseen based on Osborne and Reeve (2018), but due to length concerns and the desire to “get it done”, that chapter has not been included above. Current efforts in the research agenda are focusing on predicate-argument structures in English and across languages. This focus will lead to detailed accounts of it-clefts, pseudoclefts, and specification copular sentences in general. My desire is certainly to expand the coverage above of the syntactic phenomena of English to these areas and many others.

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(April 2019)



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Dependency grammar (DG) is an approach to the syntax of natural languages with a long and venerable tradition, yet awareness of its potential to serve as a basis for principled analyses of natural language syntax is minimal due to the predominance of phrase structure grammar (PSG). This book presents a DG of English with two main goals in mind. The first is to make the principles of dependency syntax accessible to a general audience so that the novice linguist as well as the seasoned syntactician becomes fully aware of what makes DG unique as an approach to the study of natural language syntax. The second is to present and develop a version of DG that then serves as a principled basis for the investigation of central areas of the syntax of English, such as long-distance dependencies, coordination, ellipsis, valency, etc. An overarching theme in all this is that DG is simple compared to PSG, yet despite this simplicity, it is quite effective at shedding light on the nature of syntactic phenomena.

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